

# ICML 2018

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*Stockholm, Sweden*

*July 10th - 15th*

*[icml.cc](http://icml.cc)*



# WELCOME TO ICML 2018 IN STOCKHOLM

## Dear ICML attendees,

Welcome to Stockholm and the 35th International Conference on Machine Learning (ICML 2018)! It is a true pleasure to bring the premiere machine learning conference to Sweden and to reunite with you to share the latest breakthroughs in the field. This year is special as we are co-locating our meetings with the International Conference on Autonomous Agents and Multiagent Systems (AAMAS) and the International Joint Conference on Artificial Intelligence (IJCAI), with in particular a joint plenary session, and joint workshops. This is a great opportunity for further exchanges.

## Technical Program

The core of the ICML 2018 conference is the main technical program of contributed papers, talks and posters. This year, ICML continues its rigorous and selective process for identifying impactful and technically sound papers to publish. All in all, ICML 2018 evaluated a recordbreaking total of 2473 submissions. Of these, 621 excellent articles (another record!) were accepted for publication and for presentation at the conference. Each accepted contribution is granted both an oral presentation (in one of 10 parallel tracks over three days of meetings) as well as a poster presentation (across 3 poster sessions during the evenings). Furthermore, all accepted articles will be published in the Journal of Machine Learning Research (JMLR) under its Workshop and Conference Proceedings series (PMLR).

The main ICML technical program also features four world-class keynote talks by invited speakers at the forefront of the field. We are thrilled to host presentations from the following distinguished luminaries: Dawn Song from the University of California, Berkeley, Max Welling from the University of Amsterdam, Josh Tenenbaum from the Massachusetts Institute of Technology and Joyce Chai from Michigan State University. The latter two speakers are presenting in a joint session shared with IJCAI and AAMAS.

## Tutorials

The main technical program is preceded by a tutorials day featuring 9 tutorial sessions that cover core topics in machine learning today. Attendees will be brought up to speed on the latest advances in subjects including the theory of deep learning, imitation learning, variational Bayes, temporal point processes, algorithmic fairness, personalized health, automated pricing and auctions, nearest neighbor methods, and learning to control.

## Workshops

The main technical program is followed by 67 workshops spread over three days of meetings. This year, these workshops are jointly organized by members of the ICML, IJCAI, ECAI, and AAMAS communities, and thus are ideal settings for attendees to gain perspectives and identify synergies across these different communities within artificial intelligence and machine learning. They are also ideal settings for attendees to see late-breaking work, hear about exploratory topics, and pursue collaboration opportunities.

## Awards

We will present two best paper awards to honor some of the most promising research from the technical program. The best papers will be invited to a fast track for award winning papers in the Journal of Machine Learning Research. We will also present the ICML-2018 test of time award. This award is for the paper from the 2008 ICML conference (held at the University of Helsinki, Finland) that has retrospectively had a significant impact on our field. It goes to the paper "A Unified Architecture for Natural Language Processing: Deep Neural Networks with Multitask Learning" by Ronan Collobert and Jason Weston.

## Acknowledgements

So many people contributed tremendously to make ICML 2018 a success, we are humbled and deeply thankful for their dedication and their hard work.

First of all, we would like to thank the crucially important service of the 160 distinguished members of the Senior Program Committee and the amazing Program Committee reviewers they collaborated with. All of them worked hard to give each paper at least three high-quality reviews as well as an extensive deliberation process that culminated in what was sometimes a very difficult decision. The complete list of all these members of the program committee is available on the ICML website. Through their efforts and worldclass expertise, program committee members help ensure ICML's technical quality and intellectual leadership in the field of machine learning.

Next, we would like to recognize and thank the entire Organizing Committee who put the conference together this year. The Local Chairs, Mary Ellen Perry and Fredrik Heintz were pivotal in securing the location in Stockholm and for much of the on-the-ground local work in Sweden. The Tutorial Chairs, Arthur Gretton and Ruslan Salakhutdinov coordinated with many distinguished speakers to put together a fantastic tutorials program for the first conference day. The Workshop Chairs, Finale Doshi-Velez and Kristian Kersting curated a wonderful list of 67 workshops, held together with IJCAI and AAMAS. Our Funding Chairs, Ryan Adams and Erik Sudderth, enlisted an amazing collection of sponsors and saved the day with the amount of financial support they secured. Many thanks to Shakir Mohamed and Iain Murray for their work as Publications Chairs and for putting together the proceedings volume at PMLR. Thanks also to Katherine Gorman and Neil Lawrence, who tremendously helped us cope with the significant media interest. Finally, we are indebted to our Workflow Chairs, Felix Berkenkamp and Yale Chang, who provided crucially helpful behind-the-scenes work for ICML.

We owe a special thank you to Mary Ellen Perry, the ICML Executive Director and Lee Campbell, the ICML IT Director. They are truly the backbone of this year's conference along with their team that work the meeting. Mary Ellen organized logistics, contracts, finances, negotiations, hotel arrangements, travel arrangements, video recording, and much more. Lee Campbell maintains ICML's servers, web-pages, registration systems, payment systems, and other workflows. Without them, ICML 2018 would not have been possible.

We are extremely grateful for the sponsors who helped make ICML a success this year. In particular, their contributions were instrumental in securing registration discounts and travel funds for students who would have otherwise been unable to afford the journey to Sweden.

Finally, we want to send a warm thank you to our esteemed IMLS board members and IMLS President Joelle Pineau. Their continued guidance has been crucial this year. On behalf of all of us at ICML 2018, enjoy the conference and see you in Stockholm!

Jennifer Dy (Program Co-Chair, ICML 2018)  
Andreas Krause (Program Co-Chair, ICML 2018)  
Francis Bach (General Chair, ICML 2018)

# CONFERENCE AT A GLANCE

## TUESDAY JULY 10TH

Coffee Break (Hall B)	8:15 - 9:15 am
Tutorials Session One	9:15 - 11:30 am
Lunch on your own	11:30 am - 1:00 pm
Tutorials Session Two	1:00 - 3:15 pm
Coffee Break (Hall B)	3:15 - 3:45 pm
Tutorials Session Three	3:45 - 6:00 pm
Opening Reception (Hall B)	6:00 - 7:30 pm

## WEDNESDAY JULY 11TH

Opening Remarks	8:45 - 9:00 am
Invited Talk: Dawn Song (A1)	9:00 - 10:00 am
Best Paper (A1)	10:00-10:30 am
Coffee Break (Hall B)	10:30 - 11:00 am
Session 1	11:00 am - 12:00 pm
Lunch on your own	12:00 - 1:30 pm
Session 2A & 2B	1:30 - 3:30 pm
Coffee Break (Hall B)	3:30 - 4:00 pm
Session 3	4:00 - 6:00 pm
Poster Session/Snack (Hall B)	6:15 - 9:00 pm

## THURSDAY JULY 12TH

Invited Talk: Max Welling (A1)	9:00 - 10:00 am
Best Paper (A1)	10:00-10:30 am
Coffee Break (Hall B)	10:30 - 11:00 am
Session 1	11:00 am - 12:00 pm
Lunch on your own	12:00 - 1:30 pm
European Research Council Funding Information (K1)	12:30 - 1:30 pm
Session 2A & 2B	1:30 - 3:30 pm
Coffee Break (Hall B)	3:30 - 4:00 pm
Session 3	4:00 - 6:00 pm
Poster Session/Snack (Hall B)	6:15 - 9:00 pm

## FRIDAY JULY 13TH

Test Of Time Award (A1)	9:00 - 9:20 am
Session 1	9:30 - 10:30 am
Coffee Break (Hall B)	10:30 - 11:00 am
Session 2	11:00 am - 12:00 pm
Lunch on your own	12:00 - 1:30 pm
FAIM Invited Talk: Joyce Chai (A1)	1:30 - 2:30 pm
FAIM Invited Talk: Josh Tenenbaum (A1)	2:30 - 3:30 pm
Coffee Break (Hall B)	3:30 - 4:00 pm
Session 3	4:00 - 6:00 pm
Poster Session/Snack (Hall B)	6:15 - 9:00 pm
FAIM Workshops (page 57)	8:30 am - 6:00 pm

## SATURDAY JULY 14TH

FAIM Workshop Sessions	8:30 am - 5:30 pm
See page 58 for locations	

## SUNDAY JULY 15TH

FAIM Workshop Sessions	8:30 am - 5:30 pm
See page 59 for locations	

FAIM Joint Reception	6:00 - 10:00pm
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## Book Contents

Event Sponsors	2
Sponsor Map & General Information	6
Conference Map	7
Poster Map & Best Paper Awards	7
Organizing committee	9
Tuesday Tutorial Sessions	10
Invited Speakers	13
Wednesday Sessions	15
Wednesday Posters	24
Thursday Sessions	30
Thursday Posters	39
Friday Sessions	45
Friday Posters	52
Workshop Schedules	57
Scholar Awards	60
Reviewers	61
Author Index	65



# A Special Thank You To Our Sponsors!

Funding for student travel awards was generously provided by our sponsors. We particularly thank our diamond sponsors, Facebook, Intel, Intuit, and NVIDIA. Their exemplary support helped provide travel scholarships so that more than 300 student researchers could attend ICML to present their research. We are grateful for the support and generosity of our sponsors for helping make ICML a more dynamic and inclusive scientific community.

## DIAMOND SPONSOR



Giving people the power to build community and bring the world closer together requires constant innovation. At Facebook, research permeates everything we do. We work on cutting edge research with a practical focus, pushing product boundaries every day, as we seek to create new technologies to give people better ways to communicate.



Intuit's mission is to power prosperity around the world. Its global products and platforms, including TurboTax, QuickBooks, Mint and Turbo, are designed to empower consumers, self-employed, and small businesses to improve their financial lives, finding them more money with the least amount of work, while giving them complete confidence in their actions and decisions. Intuit's data scientists are critical to delivering on that mission. They are tasked with solving complex economic problems for over 46 million customers by unlocking an unrivaled set of our customers' financial data to invent and build algorithms that provide valuable connections and advanced insights for our customers and partners. Intuit has been harnessing the power of artificial intelligence (AI) and machine learning (ML) to revolutionize customers' experiences for more than a decade. The company has over 170 AI and ML patent applications, and 40+ products/features currently in our products. But they are just getting started. With a massive market opportunity - and 35 years of continuous reinvention - Intuit is well-positioned for continued growth that changes the lives of customers around the world.



Early detection of tumors. Predicting equipment failures before they happen. Having a natural conversation with your home or car. Making retail more personal than ever. This is Artificial Intelligence powered by Intel, and companies around the globe are using it to make money, save money, and advance the future of their industry. At Intel, we're using decades of expertise in silicon, software, communications, memory and storage to create the new technologies that AI demands. Technologies that break barriers between data center and edge, server and network, training and inference, model and reality – maximizing the economics of AI to take data from theory to real-world success.



NVIDIA's invention of the GPU in 1999 sparked the growth of the PC gaming market, redefined modern computer graphics, and revolutionized parallel computing. More recently, GPU deep learning ignited modern AI — the next era of computing — with the GPU acting as the brain of computers, robots, and self-driving cars that can perceive and understand the world.

## PLATINUM SPONSORS



Graphcore has created a completely new processor, the Intelligence Processing Unit (IPU), specifically designed for machine intelligence. The IPU's unique architecture means developers can run current machine learning models orders of magnitude faster. More importantly, it lets AI researchers undertake entirely new types of work, not possible using current technologies, to drive the next great breakthroughs in general machine intelligence.



Baidu is the biggest Chinese search engine and Chinese website worldwide. With the development of 17 years, Baidu has thousands of R&D engineers, who constitute the best technical team around China and even the world.



Tencent AI Lab is a leading AI research and application lab of Tencent, China's largest internet company. AI Lab was founded in 2016 and backed by 50 world-class research scientists and 200 experienced engineers in China and US. With a vision of "Make AI Everywhere", the Lab aims at continuous improvement of AI's capabilities in understanding, decision-making and creativity. Its research focuses on four areas: machine learning, computer vision, speech recognition and natural language processing. To serve the needs of Tencent's core business, it's looking at four areas of AI application: content, game, social and platform AI.

## PLATINUM SPONSORS



Voleon is a technology company that applies state-of-the-art machine learning techniques to real-world problems in finance. For more than a decade, we have led our industry and worked at the frontier of applying machine learning to investment management. We have become a multibillion dollar asset manager, and we have ambitious goals for the future.



Our mission is to organize the world's information and make it universally accessible and useful, and AI is enabling us to do that in incredible new ways - solving problems for our users, our customers, and the world. AI makes it easier for you to do things every day, whether it's searching for photos of people you love, breaking down language barriers, or helping you get things done with your own personal digital assistant. But it's also providing us with new ways of looking at old problems and helping transform how we work and live, and we think the biggest impact will come when everyone can access it.



Come to the Montréal booth and discover AI's best kept secret. Montréal houses the largest academic concentration of AI professionals in the world with over 250 researchers and doctoral students in AI related fields. If that wasn't enough, Montréal offers an affordable cost of living, a vibrant cultural scene, incomparable dining experiences and safe, welcoming neighbourhoods... Montréal is THE place to be.



DeepMind is a neuroscience-inspired AI company which develops general-purpose learning algorithms and uses them to help tackle some of the world's most pressing challenges. Since its founding in London in 2010, DeepMind has published over 170 peer-reviewed papers, five of them in the scientific journal Nature, which is an unprecedented track record for a computer science lab. It was acquired by Google in their largest ever European acquisition in 2014. DeepMind's groundbreaking work includes the development of deep reinforcement learning, combining the domains of deep learning and reinforcement learning. This technique underpinned AlphaGo, a computer program that defeated Go world champion Lee Sedol in 2016—a breakthrough experts proclaimed to have arrived a decade ahead of its time.



At Microsoft, we aim to empower every person and every organization on the planet to achieve more. We care deeply about having a global perspective and making a difference in lives and organizations in all corners of the planet. This involves playing a small part in the most fundamental of human activities: Creating tools that enable each of us along our journey to become something more. Our mission is grounded in both the world in which we live and the future we strive to create. Today, we live in a mobile-first, cloud-first world, and we aim to enable our customers to thrive in this world.



Amazon is guided by four principles: customer obsession rather than competitor focus, passion for invention, commitment to operational excellence, and long-term thinking. Customer reviews, personalized recommendations, Prime, AWS, Kindle, Amazon Echo, and Alexa are some of the products and services pioneered by Amazon. For more information about machine learning at Amazon, visit [amazon.jobs/ICML](http://amazon.jobs/ICML).



Ant Financial is a technology company that brings inclusive financial services to the world. Ant Financial, officially founded in October 2014, originated from Alipay founded in 2004. Ant Financial Services Group is dedicated to using technology to provide inclusive financial services to individuals as well as small and micro enterprises. We believe financial services should be simple, low-cost and accessible to the many, not the few. Ant Financial is building an open ecosystem, enabling traditional financial institutions to provide services in a more efficient way.

## GOLD SPONSORS



Criteo Research is pioneering innovations in computational advertising. As the center of scientific excellence in the company, Criteo Research delivers both fundamental and applied scientific leadership through published research, product innovations and new technologies powering the company's products. We are looking for outstanding machine learning research scientists whose skills span the entire spectrum of scientific research and are interested in revolutionizing the world of online and computational advertising.



At Two Sigma, we imagine breakthroughs in investment management, insurance and related fields by pushing the boundaries of what open source and proprietary technology can do. In the process, we work to help real people. Our engineers, data scientists and modelers harness data at tremendous scale, using machine learning, distributed computing and other technologies to build powerful predictive models. Come build with us!



At Element AI, we advance cutting-edge AI research and turn it into scalable solutions that make businesses safer, stronger, and more agile.



Insilico Medicine is committed to extending human performance and longevity using the latest advances in AI. It employs over 40 deep learning scientists and bioinformatics experts in 6 countries and is responsible for the many "firsts" in drug discovery, biomarker development, and aging research. CB Insights's global top 100 AI companies 2018 and Nvidia top 5 AI companies for social impact 2017.



Yandex is one of the largest internet companies in Europe, operating Russia's most popular search engine. We provide user-centric products and services based on the latest innovations in information retrieval, machine learning and machine intelligence to a worldwide customer audience on all digital platforms and devices.



Disney Research's objective is to drive value across The Walt Disney Company by injecting scientific & technological innovation. Our world-class research seeks to invent and transfer the most compelling technologies enabling the company to differentiate its content, services, and products.

## GOLD SPONSORS



The Bosch Center for Artificial Intelligence, founded in early 2017, deploys cutting-edge AI technologies to generate real-world impact across Bosch products and services. The center's goal is to achieve a leading position for Bosch in AI by attracting top talent, conducting differentiating research, and applying AI for the transformation of Bosch towards an AI-driven IoT company.



At JPMorgan, technology innovation is driven by a shared commitment to stay ahead of our customers' needs globally. In our worldwide tech centers, our team of 40,000 technology professionals collaborate to design, build, & deploy solutions that include strategic technology initiatives, big data, mobile solutions, electronic payments, machine learning, cyber security & cloud development.



QuantumBlack is an advanced analytics firm, acquired by McKinsey & Company in 2015. Teams work in multi-disciplinary environments harnessing data to provide real-world impact bringing together the brightest data scientists, engineers and designers to take on the biggest problems. Our projects range from helping pharmaceutical companies bring lifesaving drugs to market quicker to optimising a Formula 1 car's performance. At QuantumBlack you'll enjoy the benefits of being part of one of the leading management consultancies globally and the autonomy to thrive in a fast growth tech culture.



American International Group, Inc. is a leading international insurance organization with the vision to become its clients' most valued insurer. AIG believes in harnessing the power of machine learning and deep learning techniques to generate new insights from data and to enhance human judgment in real business contexts. If you have a passion for evidence-based decision making, connect with AIG!



Netflix is the world's leading internet entertainment service with 125 million memberships in over 190 countries enjoying TV series, documentaries and feature films across a wide variety of genres and languages. Members can watch as much as they want, anytime, anywhere, on any internet-connected screen. Members can play, pause and resume watching, all without commercials or commitments.



Expedia is one of the world's leading full-service online travel brands helping travelers easily plan and book travel from the widest selection of vacation packages, flights, hotels, rental cars, rail, cruises, activities, attractions, and services. Our scientists combine their passion for travel and expertise in ML and AI to solve some of the most complex computational problems in the travel domain.



Uber's mission is to bring reliable transportation to everywhere, for everyone. We started in 2010 to solve a simple problem: how do you get a ride at the touch of a button? More than eight years and five billion trips later, we've started tackling an even greater challenge: reducing congestion and pollution in our cities by getting more people into fewer cars.



NAVER LABS is an ambient intelligence technology company of NAVER Corporation, Korea's leading internet company. Researchers, engineers & designers work on autonomous vehicles, 3D mapping & localization, mobility assistance, context-aware search, AR, dialog and robotics. Areas of expertise are AI, machine learning, optimization, computer vision and natural language processing. Innovation products include the AI-based translation app 'Papago', virtual AI assistant 'CLOVA', biologically-inspired robotic arm AMBIDEX & 3D indoor mapping robot 'AROUND'. LABS is located in Seoul & Grenoble..



Hudson River Trading brings a scientific approach to trading financial products. We have built one of the world's most sophisticated computing environments for research and development. Our researchers are at the forefront of innovation in the world of algorithmic trading.



Spotify is the world's leading music streaming service with over 170M users across 65 countries streaming over 1B songs per day. Machine learning touches every aspect of the business, from helping users discover great music via recommendations, generating playlists, understanding voice commands, serving ads, through to searching and understanding content. Our team of research scientists in London, Boston, New York, and Stockholm publish their research on these topics and more at top tier conferences worldwide.



At IBM Research, we invent things that matter to the world. Today, we are pioneering promising and disruptive technologies that will transform industries and society, including the future of AI, blockchain and quantum computing. We are driven to discover. We are home to 3,000+ researchers including 5 Nobel Laureates, 9 US National Medals of Technology, 5 US National Medals of Science, 6 Turing Awards and 13 Inductees in the National Inventors Hall of Fame.



Wecash is a tech-driven company aiming to empower and transform traditional industries by big data, AI and machine learning technology. By providing credit solution to financial industry, smart solution to living space and working space environment, and exploring other new industries tech solutions, Wecash works to make our world become much more efficient and people to enjoy a better life.



Peltarion makes AI technology usable and affordable for all companies and organizations. Led by top engineers from Spotify, Skype, King, TrueCaller and Google, Peltarion provides a collaborative, graphical cloud platform for developing, managing and deploying deep learning systems at scale. Founded in 2004, over 300 companies and organizations have used Peltarion's AI technology.



SK Telecom is Korea's largest telecom company serving more than 29 million mobile subscribers. SK Telecom has actively developed platforms in various areas such as lifestyle enhancement, media and IoT as part of its effort to create and deliver the optimal value to the customers in diverse business environments. Especially, SK Telecom's AI Research Center and it's research group, T-Brain (of DiscoGAN, ICML 2017) are focused on advancing fundamental AI research while also producing practical applications on SK Telecom's own data and service platforms.



Inspire and empower the world to realize their creative vision at Adobe Research. We create innovative technologies that are the foundation of our next generation solutions for consumers, creative professionals, enterprises, and marketers.

SigOpt is an optimization platform that seamlessly tunes AI and ML model parameters through a state-of-the-art ensemble of Bayesian and global optimization algorithms behind a simple API. SigOpt can tune any predictive or machine learning model right in place, and the federated API design ensures no proprietary data leaves your premises.



SEED is a pioneering group within Electronic Arts, combining creativity with applied research. Our mission is to explore, build and help define the future of interactive entertainment; to enable anyone to create their own games and interactive experiences. We work within areas such as game AI, virtual characters, procedural content generation, NLP, animation, rendering, and simulated worlds.



Wayfair is one of the largest tech companies in Boston and is rapidly expanding. Wayfair is the online destination for all things home and is powered by custom software created by our team of over 1300 engineers and data scientists. We are expanding rapidly and are accepting applications for engineering and data science positions at our global headquarters in Boston.



As Korea's No. 1 internet company, NAVER Corporation accounts for over 76 percent of the country's search market, and operates a diverse range of services and products related to news, blogging, music, translations, webtoons, video and more. Based in Japan, LINE Corporation launched the LINE messaging app in June 2011 and since then has grown into a diversified platform, offering a variety of services and contents for more than 200 million users around the globe.



Qualcomm invents breakthrough technology that transforms the way the world connects and communicates. Going beyond mobile chipsets, we're inventing AI technology that can be used across a range of products and industries - from Mobile and Automotive, to smart homes and cities - ultimately changing the way people live for the better.



Sberbank is a powerful innovative bank which is rapidly becoming one of the major digital financial institutions. Sberbank is an international bank in the top 20 in terms of capitalization with offices in Switzerland, Austria, England, Turkey and a number of European countries. We are actively using artificial intelligence and machine learning technologies to empower our products and services.



Wadhvani AI is an independent nonprofit research institute with the mission of AI for social good.

## SILVER SPONSORS



The D. E. Shaw group is a global investment and technology development firm with more than \$46 billion in investment capital as of October 1, 2017, and offices in North America, Europe, and Asia. Since our founding in 1988, our firm has earned an international reputation for successful investing based on innovation, careful risk management, and the quality and depth of our staff.



Man AHL is a quantitative investment manager. A pioneer of systematic trading since 1987, we mix machine learning, computer science and engineering with terabytes of data to invest billions of dollars every day. Our collaboration with academia – the Oxford-Man Institute of Quantitative Finance – celebrated its 10th anniversary in 2017. We are a flat-structured company that seeks the best.



We create environments for your data to thrive. Everywhere data lives, we're there to drive the innovation necessary for results today and the future you'll create tomorrow. New devices, new systems, new solutions, all optimized and tuned to create the right conditions for your data to realize its full potential.



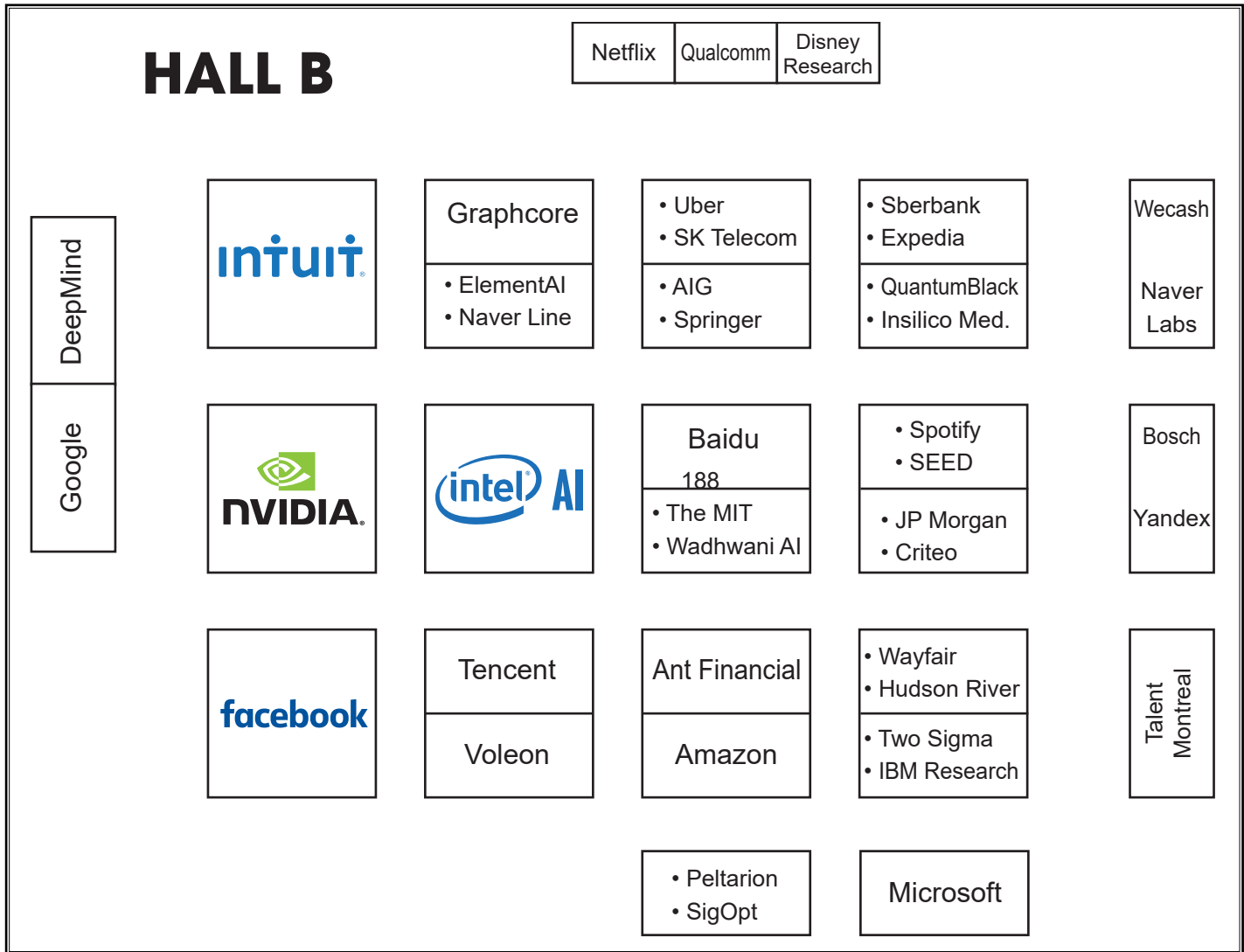
The Inception Institute of Artificial Intelligence is a national-scale organization of the UAE aiming for breakthroughs in fundamental and applied AI research. The institute is led by Ling Shao, who was previously Chair Professor of Computer Vision and Machine Learning with the University of East Anglia, UK, and Chief Scientist of AI with a Fortune Global 500 company.

## EXHIBITORS



**ICML 2019:**  
 Long Beach, California - June 10 - 15th





## GENERAL INFORMATION

### Event Location

ICML will be held at the Stockholm mässan Convention Centre, Stockholm Sweden  
Mässvägen 1, 125 80  
Älvsjö, Sweden

### Registration

Registration starts at 7 am every day. Registration desk is on the ground floor outside Hall B

### Information Desk

Information desk near the Main Entrance of the Convention Centre is open and available to cloak any coats/luggage. Your attendees are more than welcome to cloak their items there until they need to depart for the airport.

### Opening Reception

Tuesday, July 10th @ 6 PM  
Hall B

### Joint FAIM Reception

Sunday, July 15th @ 6:30 PM

### FAIM Workshops

All FAIM workshops will be held on Saturday & Sunday

### Poster Sessions

Hall B  
Wednesday 6:15 - 9:00 PM  
Thursday 6:15 - 9:00 PM  
Friday 6:15 - 9:00 PM

### Mobile App

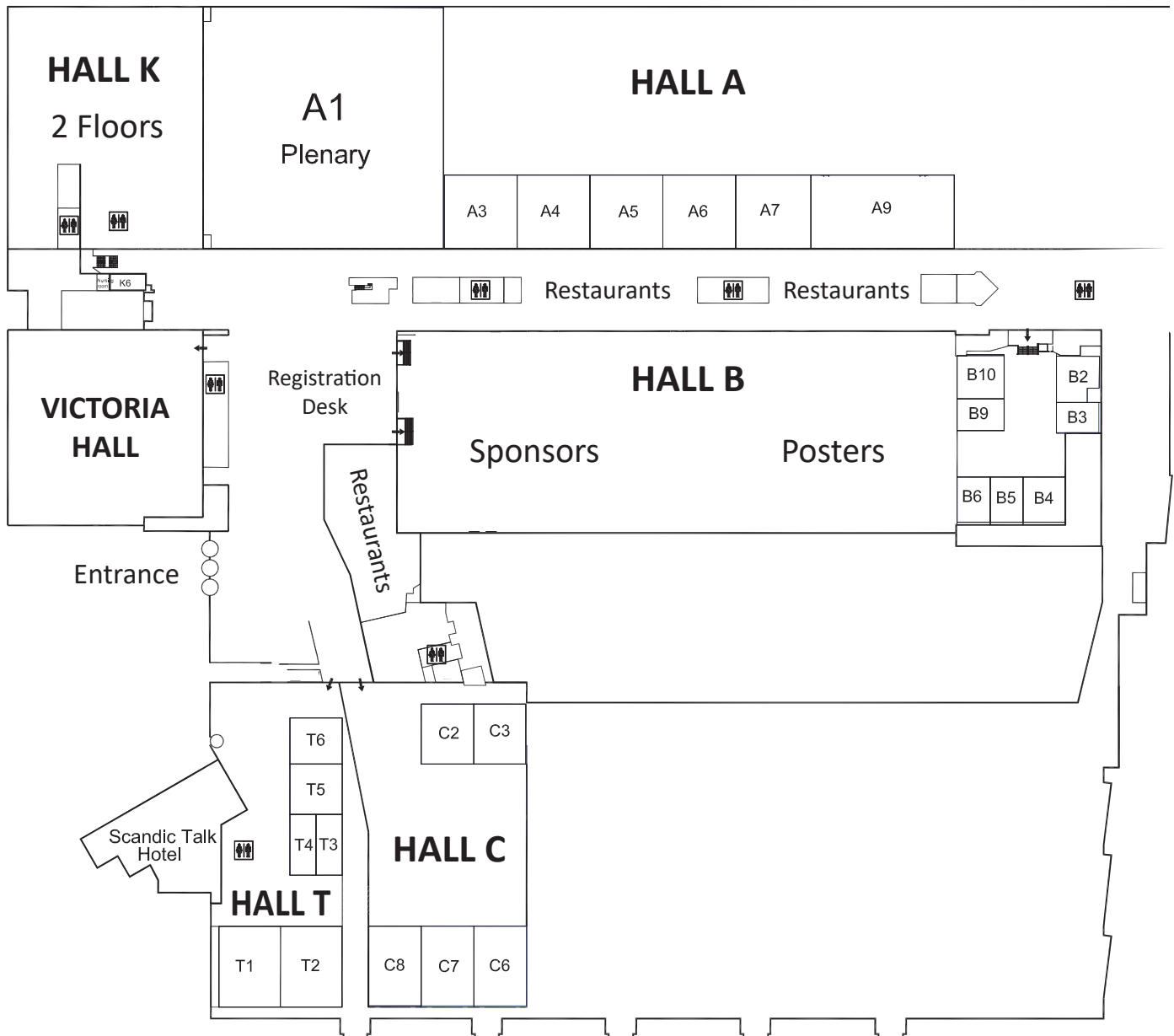
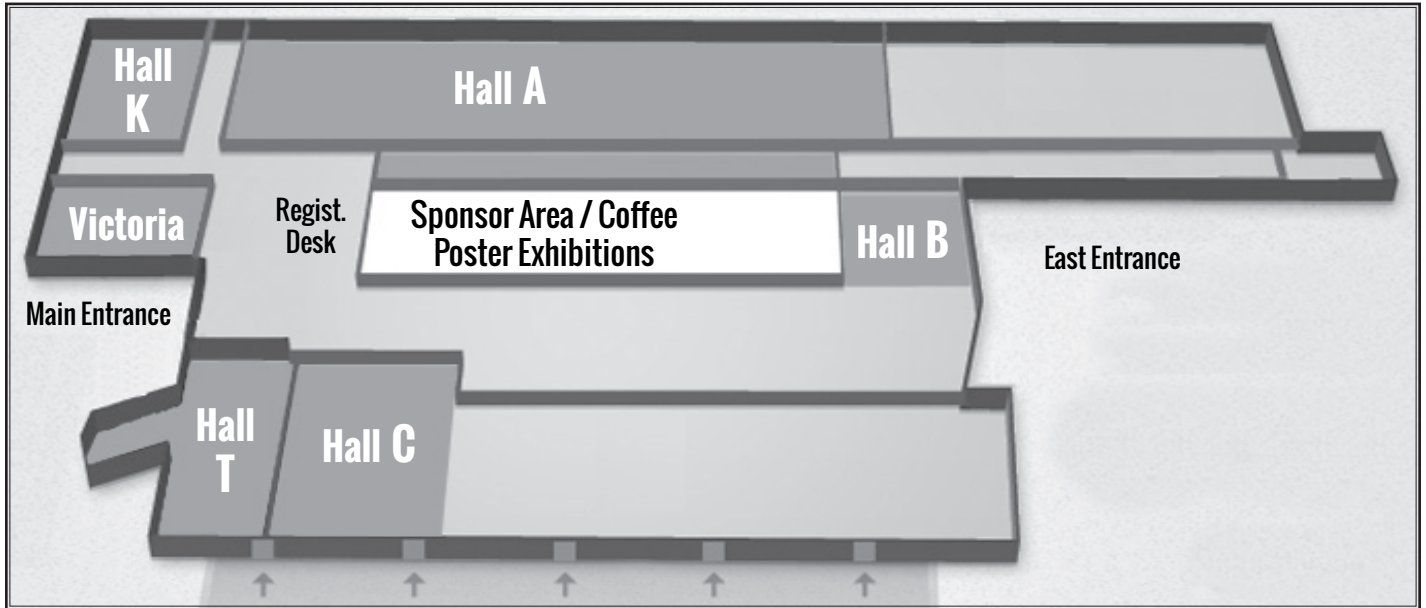
Step 1: Download and install the Whova app from App Store (for iPhones) or Google Play (for Android phones).  
Step 2: Sign up in the app using the email address you registered with.

Now you will be able to:

- View event agenda/plan your schedule.
- Send in-app messages & exchange contact information (w/profile)
- Receive update notifications
- Access agenda, maps, & directions.

After downloading, sign up on Whova with the email address that you used to RSVP for our event, or sign up using your social media accounts. If you are asked to enter an invitation code to join the event, please use the following invitation code: "icml"







## HALL B

Coffee Stations

Coffee Stations

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>				
<u>34</u>	<u>33</u>	<u>32</u>	<u>31</u>	<u>30</u>	<u>29</u>	<u>28</u>	<u>27</u>	<u>26</u>	<u>25</u>	<u>24</u>	<u>23</u>	<u>22</u>	<u>21</u>	<u>20</u>	<u>19</u>	<u>18</u>				
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<u>114</u>	<u>113</u>	<u>112</u>	<u>111</u>	<u>110</u>	<u>109</u>	<u>108</u>	<u>107</u>	<u>106</u>	<u>105</u>	<u>104</u>	<u>103</u>	<u>102</u>	<u>101</u>	<u>100</u>	<u>99</u>	<u>98</u>	<u>97</u>	<u>96</u>	<u>95</u>	<u>94</u>
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<u>152</u>	<u>151</u>	<u>150</u>	<u>149</u>	<u>148</u>	<u>147</u>	<u>146</u>	<u>145</u>	<u>144</u>	<u>143</u>	<u>142</u>	<u>141</u>	<u>140</u>	<u>139</u>	<u>138</u>	<u>137</u>	<u>136</u>	<u>135</u>	<u>134</u>	<u>133</u>	<u>132</u>
<u>153</u>	<u>154</u>	<u>155</u>	<u>156</u>	<u>157</u>	<u>158</u>	<u>159</u>	<u>160</u>	<u>161</u>	<u>162</u>	<u>163</u>	<u>164</u>	<u>165</u>	<u>166</u>	<u>167</u>	<u>168</u>	<u>169</u>	<u>170</u>	<u>171</u>	<u>172</u>	
<u>190</u>	<u>189</u>	<u>188</u>	<u>187</u>	<u>186</u>	<u>185</u>	<u>184</u>	<u>183</u>	<u>182</u>	<u>181</u>	<u>180</u>	<u>179</u>	<u>178</u>	<u>177</u>	<u>176</u>	<u>175</u>	<u>174</u>	<u>173</u>	<u>172</u>	<u>171</u>	<u>170</u>
<u>191</u>	<u>192</u>	<u>193</u>	<u>194</u>	<u>195</u>	<u>196</u>	<u>197</u>	<u>198</u>	<u>199</u>	<u>200</u>	<u>201</u>	<u>202</u>	<u>203</u>	<u>204</u>	<u>205</u>	<u>206</u>	<u>207</u>	<u>208</u>	<u>209</u>	<u>210</u>	<u>211</u>
<u>232</u>	<u>231</u>	<u>230</u>	<u>229</u>	<u>228</u>	<u>227</u>	<u>226</u>	<u>225</u>	<u>224</u>	<u>223</u>	<u>222</u>	<u>221</u>	<u>220</u>	<u>219</u>	<u>218</u>	<u>217</u>	<u>216</u>	<u>215</u>	<u>214</u>	<u>213</u>	<u>212</u>

## AWARDS

### Best Papers

- **1559 - Obfuscated Gradients Give a False Sense of Security: Circumventing Defenses to Adversarial Examples**  
*Anish Athalye, Nicholas Carlini, David Wagner*
- **2244 - Delayed Impact of Fair Machine Learning**  
*Lydia Liu, Sarah Dean, Esther Rolf, Max Simchowitz, Moritz Hardt*

### Test OfTime Award

- **A Unified Architecture for Natural Language Processing: Deep Neural Networks with Multitask Learning (from 2008)**  
*Ronan Collobert and Jason Weston*

### Best Paper Runner Ups

- **810 - The Mechanics of n-Player Differentiable Games**  
*David Balduzzi, Sebastien Racaniere, James Martens, Jakob Foerster, Karl Tuyls, Thore Graepel*
- **1176 - Near Optimal Frequent Directions for Sketching Dense and Sparse Matrices**  
*Zengfeng Huang*
- **2379 - Fairness Without Demographics in Repeated Loss Minimization**  
*Tatsunori Hashimoto, Megha Srivastava, Hongseok Namkoong, Percy Liang*

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Zoltan Szabo



# Tuesday

JULY 10TH  
TUTORIALS

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## TUTORIAL SESSION 1 - 9:15 - 11:30 AM

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### Imitation Learning

Yisong Yue (Caltech)  
Hoang M Le (Caltech)

**Location:** Victoria



We aim to present to researchers and industry practitioners a broad overview of imitation learning techniques and recent applications. Imitation learning is a powerful and practical alternative to reinforcement learning for learning sequential decision-making policies. Also known as learning from demonstrations or apprenticeship learning, imitation learning has benefited from recent progress in core learning techniques, increased availability and fidelity of demonstration data, as well as the computational advancements brought on by deep learning. We expect the tutorial to be highly relevant for researchers & practitioners who have interests in reinforcement learning, structured prediction, planning and control. The ideal audience member should have familiarity with basic supervised learning concepts. No knowledge of reinforcement learning techniques will be assumed.

<https://sites.google.com/view/icml2018-imitation-learning>

and finally introduce advanced concepts such as marks and dynamical systems with jumps. In the second and third parts of the tutorial, we will explain how temporal point processes have been used in developing a variety of recent machine learning models and control algorithms, respectively. Therein, we will revisit recent advances related to, e.g., deep learning, Bayesian nonparametrics, causality, stochastic optimal control and reinforcement learning. In each of the above parts, we will highlight open problems and future research to facilitate further research in temporal point processes within the machine learning community.

### Machine Learning in Automated Mechanism Design for Pricing and Auctions



Nina Balcan (CMU)  
Tuomas Sandholm (CMU)  
Ellen Vitercik (CMU)

**Location:** A9

Mechanism design is a field of game theory with tremendous real-world impact, encompassing areas such as pricing and auction design. A powerful approach in this field is automated mechanism design, which uses machine learning and optimization to design mechanisms based on data. This automated approach helps overcome challenges faced by traditional, manual approaches to mechanism design, which have been stuck for decades due to inherent computational complexity challenges: the revenue-maximizing mechanism is not known even for just two items for sale! In this tutorial, we cover the rapidly growing area of automated mechanism design for revenue maximization. This encompasses both the foundations of batch and online learning (including statistical guarantees and optimization procedures), as well as real-world success stories.

<https://sites.google.com/view/amdtutorial>

### Learning with Temporal Point Processes

Manuel Gomez Rodriguez (MPI)  
Isabel Valera (MPI)

**Location:** K1 + K2



In recent years, there has been an increasing number of machine learning models, inference methods and control algorithms using temporal point processes. They have been particularly popular for understanding, predicting, and enhancing the functioning of social and information systems, where they have achieved unprecedented performance. This tutorial aims to introduce temporal point processes to the machine learning community at large. In the first part of the tutorial, we will first provide an introduction to the basic theory of temporal point processes, then revisit several types of points processes,




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**TUTORIAL SESSION 2 - 1:00 - 3:15 PM**


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**Toward Theoretical  
Understanding of Deep Learning**

Sanjeev Arora (Princeton U., Inst. For  
Advanced Study)

**Location:** Victoria



We survey progress in recent years toward developing a theory of deep learning. Works have started addressing issues such as: (a) the effect of architecture choices on the optimization landscape, training speed, and expressiveness (b) quantifying the true “capacity” of the net, as a step towards understanding why nets with hugely more parameters than training examples nevertheless do not overfit (c) understanding inherent power and limitations of deep generative models, especially (various flavors of) generative adversarial nets (GANs) (d) understanding properties of simple RNN-style language models and some of their solutions (word embeddings and sentence embeddings). While these are early results, they help illustrate what kind of theory may ultimately arise for deep learning.

<http://unsupervised.cs.princeton.edu/deeplearningtutorial.html>

**Defining and Designing  
Fair Algorithms**

Sam Corbett-Davies (Stanford)  
Sharad Goel (Stanford)

**Location:** K1 + K2



Machine learning algorithms are increasingly used to guide decisions by human experts, including judges, doctors, and managers. Researchers and policymakers, however, have raised concerns that these systems might inadvertently exacerbate societal biases. To measure and mitigate such potential bias, there has recently been an explosion of competing mathematical definitions of what it means for an algorithm to be fair. But there’s a problem: nearly all of the prominent definitions of fairness suffer from subtle shortcomings that can lead to serious adverse consequences when used as an objective. In this tutorial, we illustrate these problems that lie at the foundation of this nascent field of algorithmic fairness, drawing on ideas from machine learning, economics, and legal theory. In doing so we hope to offer researchers and practitioners a way to advance the area.

<https://policylab.stanford.edu/projects/defining-and-designing-fair-algorithms.html>

**Understanding your  
Neighbors: Practical  
Perspectives From  
Modern Analysis**

Sanjoy Dasgupta (UCSD)  
Samory Kpotufe (Princeton)

**Location:** A9



Nearest-neighbor methods are among the most ubiquitous and oldest approaches in Machine Learning and other areas of data analysis. They are often used directly as predictive tools, or indirectly as integral parts of more sophisticated modern approaches (e.g. recent uses that exploit deep representations, uses in geometric graphs for clustering, integrations into time-series classification, or uses in ensemble methods for matrix completion). Furthermore, they have strong connections to other tools such as classification and regression trees, or even kernel machines, which are all (more sophisticated) forms of local prediction. Interestingly, our understanding of these methods is still evolving, with many recent results shedding new insights on performance under various settings describing a range of modern uses and application domains. Our aim is to cover such new perspectives on k-NN, and in particular, translate new theoretical insights (with practical implications) to a broader audience.

<http://www.princeton.edu/~samory/Documents/ICML-kNN-Tutorial.pdf>




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**TUTORIAL SESSION 3 - 3:45 - 6:00 PM**


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**Variational Bayes and Beyond:  
Bayesian Inference for Big Data**

Tamara Broderick (MIT)

**Location:** Victoria


Bayesian methods exhibit a number of desirable properties for modern data analysis—including (1) coherent quantification of uncertainty, (2) a modular modeling framework able to capture complex phenomena, (3) the ability to incorporate prior information from an expert source, and (4) interpretability. In practice, though, Bayesian inference necessitates approximation of a high-dimensional integral, and some traditional algorithms for this purpose can be slow—notably at data scales of current interest. The tutorial will cover modern tools for fast, approximate Bayesian inference at scale. One increasingly popular framework is provided by “variational Bayes” (VB), which formulates Bayesian inference as an optimization problem. We will examine key benefits and pitfalls of using VB in practice, with a focus on the widespread “mean-field variational Bayes” (MFVB) subtype. We will highlight properties that anyone working with VB, from the data analyst to the theoretician, should be aware of. In addition to VB, we will cover recent data summarization techniques for scalable Bayesian inference that come equipped with finite-data theoretical guarantees on quality. We will motivate our exploration throughout with practical data analysis examples and point to a number of open problems in the field.

<http://www.tamarabroderick.com/tutorial2018icml.html>
**Machine Learning  
for Personalised  
Health**

Danielle Belgrave

(Microsoft Research)

Konstantina Palla (Microsoft Research)

Lamiae Azizi (U of Sydney)

**Location:** K1 + K2


Machine learning advances are opening new routes to more precise healthcare, from the discovery of disease subtypes for patient stratification to the development of personalised interactions and interventions. As medicine pivots from treating diagnoses to treating mechanisms, there is an increasing need for personalised health through more intelligent feature extraction and phenotyping. This offers an exciting opportunity for machine learning techniques to impact healthcare in a meaningful way, by putting patients at the centre of research. Health presents some of the most challenging and under-investigated domains of machine learning research. This tutorial presents a timely opportunity to engage the machine learning community with

the unique challenges presented within the healthcare domain as well as to provide motivation for meaningful collaborations within this domain. We will evaluate the current drivers of machine learning in healthcare and present machine learning strategies for personalised health. Some of the challenges we will address include, but are not limited to, integrating heterogeneous types of data to understand disease subtypes, causal inference to understand underlying disease mechanisms, learning from “small” labelled data, striking a balance between privacy, transparency, interpretability and model performance. This tutorial will be targeted towards a broad machine learning audience with various skill sets, some of whom may not have encountered practical applications. The main goal is to transmit inter- as well as intra- disciplinary thinking, to evaluate problems across disciplines as well as to raise awareness of context-driven solutions which can draw strength from using multiple areas of critique within the machine learning discipline. No background in healthcare or medicine is needed.

<https://mlhealthtutorial.com/>
**Optimization Perspectives on  
Learning to Control**

Benjamin Recht (UC Berkeley)

**Location:** A9


Given the dramatic successes in machine learning over the past half decade, there has been a resurgence of interest in applying learning techniques to continuous control problems in robotics, self-driving cars, and unmanned aerial vehicles. Though such applications appear to be straightforward generalizations of reinforcement learning, it remains unclear which machine learning tools are best equipped to handle decision making, planning, and actuation in highly uncertain dynamic environments.

This tutorial will survey the foundations required to build machine learning systems that reliably act upon the physical world. The primary technical focus will be on numerical optimization tools at the interface of statistical learning and dynamical systems. We will investigate how to learn models of dynamical systems, how to use data to achieve objectives in a timely fashion, how to balance model specification and system controllability, and how to safely acquire new information to improve performance. We will close by listing several exciting open problems that must be solved before we can build robust, reliable learning systems that interact with an uncertain environment.



# INVITED SPEAKERS



**Dawn Song**  
UC Berkeley



**Wednesday July 11th**  
**9 AM**  
Location: A1

## ***AI and Security: Lessons, Challenges and Future Directions***

In this talk, I will talk about challenges and exciting new opportunities at the intersection of AI and Security, how AI and deep learning can enable better security, and how Security can enable better AI. In particular, I will talk about secure deep learning and challenges and approaches to ensure the integrity of decisions made by deep learning. I will also give an overview on challenges and new techniques to enable privacy-preserving machine learning. I will also talk about our recent project on confidentiality-preserving smart contracts and towards democratization of AI. Finally, I will conclude with future directions at the intersection of AI and Security.

### **Biography:**

*Dawn Song is a Professor in the Department of Electrical Engineering and Computer Science at UC Berkeley. Her research interest lies in deep learning, security, and blockchain. She has studied diverse security and privacy issues in computer systems and networks, including areas ranging from software security, networking security, distributed systems security, applied cryptography, blockchain and smart contracts, to the intersection of machine learning and security. She is the recipient of various awards including the MacArthur Fellowship, the Guggenheim Fellowship, the NSF CAREER Award, the Alfred P. Sloan Research Fellowship, the MIT Technology Review TR-35 Award, the George Tallman Ladd Research Award, the Okawa Foundation Research Award, the Li Ka Shing Foundation Women in Science Distinguished Lecture Series Award, the Faculty Research Award from IBM, Google and other major tech companies, and Best Paper Awards from top conferences in Computer Security and Deep Learning. She obtained her Ph.D. degree from UC Berkeley. Prior to joining UC Berkeley as a faculty, she was a faculty at Carnegie Mellon University from 2002 to 2007.*

**Max Welling**  
University Of Amsterdam



**Thursday July 12th**  
**9 AM**  
Location: A1

## ***Intelligence per Kilowatt-hour***

In the 19th century the world was revolutionized because we could transform energy into useful work. The 21st century is revolutionized due to our ability to transform information (or data) into useful tools. Driven by Moore's law and the exponential growth of data, artificial intelligence is permeating every aspect of our lives. But intelligence is not for free, it costs energy, and therefore money. Evolution has faced this problem for millions of years and made brains about a 100x more energy efficient than modern hardware (or, as in the case of the sea-squirt, decided that it should eat its brain once it was no longer necessary). I will argue that energy will soon be one of the determining factors in AI. Either companies will find it too expensive to run energy hungry ML tools (such as deep learning) to power their AI engines, or the heat dissipation in edge devices will be too high to be safe. The next battleground in AI might well be a race for the most energy efficient combination of hardware and algorithms.

In this talk I will discuss some ideas that could address this problem. The technical hammer that I will exploit is the perfect reflection of the energy versus information balancing act we must address: the free energy, which is the expected energy minus the entropy of a system. Using the free energy we develop a Bayesian interpretation of deep learning which, with the appropriate sparsity inducing priors, can be used to prune both neurons and quantize parameters to low precision. The second hammer I will exploit is sigma-delta modulation (also known as herding) to introduce spiking into deep learning in an attempt to avoid computation in the absence of changes.

### **Biography:**

*Prof. Dr. Max Welling is a research chair in Machine Learning at the University of Amsterdam and a VP Technologies at Qualcomm. He has a secondary appointment as a senior fellow at the Canadian Institute for Advanced Research (CIFAR). He is co-founder of "Scyfer BV" a university spin-off in deep learning which got acquired by Qualcomm in summer 2017. In the past he held postdoctoral positions at Caltech ('98-'00), UCL ('00-'01) and the U. Toronto ('01-'03). He received his PhD in '98 under supervision of Nobel laureate Prof. G. 't Hooft. Max Welling has served as associate editor in chief of IEEE TPAMI from 2011-2015 (impact factor 4.8). He serves on the board of the NIPS foundation since 2015 (the largest conference in machine learning) and has been program chair and general chair of NIPS in 2013 and 2014 respectively. He was also program chair of AISTATS in 2009 and ECCV in 2016 and general chair of MIDL 2018. He has served on the editorial boards of JMLR and JML and was an associate editor for Neurocomputing, JCGS and TPAMI. He received multiple grants from Google, Facebook, Yahoo, NSF, NIH, NWO and ONR-MURI among which an NSF career grant in 2005. He is recipient of the ECCV Koenderink Prize in 2010. Welling is in the board of the Data Science Research Center in Amsterdam, he directs the Amsterdam Machine Learning Lab (AMLAB), and co-directs the Qualcomm-UvA deep learning lab (QUVA) and the Bosch-UvA Deep Learning lab (DELTA). Max Welling has over 200 scientific publications in machine learning, computer vision, statistics and physics.*



## Joyce Chai

Michigan State University

**Friday July 13th**

**1:30 PM**

Location: A1



### ***Language to Action: towards Interactive Task Learning with Physical Agents***

Language communication plays an important role in human learning and skill acquisition. With the emergence of a new generation of cognitive robots, empowering these physical agents to learn directly from human partners about the world and joint tasks becomes increasingly important. In this talk, I will share some recent work on interactive task learning where humans can teach physical agents new tasks through natural language communication and demonstration. I will give examples of language use in interactive task learning and discuss multiple levels of grounding that are critical in this process. I will demonstrate the importance of common-sense knowledge, particularly the acquisition of very basic physical causality knowledge, in grounding human language to actions not only perceived but also performed by the agent. As humans and agents often have mismatched capabilities and knowledge, I will highlight the role of collaboration in communicative grounding to mediate differences and strive for a common ground of joint representations.

#### **Biography:**

*Joyce Chai is a Professor in the Department of Computer Science and Engineering at Michigan State University, where she was awarded the William Beal Outstanding Faculty Award in 2018. She holds a Ph.D. in Computer Science from Duke University. Prior to joining MSU in 2003, she was a Research Staff Member at IBM T. J. Watson Research Center. Her research interests include natural language processing, situated dialogue agents, human-robot communication, artificial intelligence, and intelligent user interfaces. Her recent work is focused on situated language processing to facilitate natural communication with robots and other artificial agents. She served as Program Co-chair for the Annual Meeting of the Special Interest Group in Dialogue and Discourse (SIGDIAL) in 2011, the ACM International Conference on Intelligent User Interfaces (IUI) in 2014, and the Annual Meeting of the North America Chapter of Association of Computational Linguistics (NAACL) in 2015. She received a National Science Foundation CAREER Award in 2004 and the Best Long Paper Award from the Annual Meeting of Association of Computational Linguistics (ACL) in 2010.*

## Josh Tenenbaum

MIT

**Friday July 13th**

**2:30 PM**

Location: A1



### ***Building Machines that Learn and Think Like People***

Recent successes in artificial intelligence and machine learning have been largely driven by methods for sophisticated pattern recognition, including deep neural networks and other data-intensive methods. But human intelligence is more than just pattern recognition. And no machine system yet built has anything like the flexible, general-purpose commonsense grasp of the world that we can see in even a one-year-old human infant. I will consider how we might capture the basic learning and thinking abilities humans possess from early childhood, as one route to building more human-like forms of machine learning and thinking.

At the heart of human common sense is our ability to model the physical and social environment around us: to explain and understand what we see, to imagine things we could see but haven't yet, to solve problems and plan actions to make these things real, and to build new models as we learn more about the world. I will focus on our recent work reverse-engineering these capacities using methods from probabilistic programming, program induction and program synthesis, which together with deep learning methods and video game simulation engines, provide a toolkit for the joint enterprise of modeling human intelligence and making AI systems smarter in more human-like ways.

#### **Biography:**

*Joshua Brett Tenenbaum is Professor of Cognitive Science and Computation at the Massachusetts Institute of Technology. He is known for contributions to mathematical psychology and Bayesian cognitive science. He previously taught at Stanford University, where he was the Wasow Visiting Fellow from October 2010 to January 2011. Tenenbaum received his undergraduate degree in physics from Yale University in 1993, and his Ph.D. from MIT in 1999. His work primarily focuses on analyzing probabilistic inference as the engine of human cognition and as a means to develop machine learning.*

# Wednesday

JULY 11TH | SESSIONS



TIME	DESCRIPTION	LOCATION	TIME	DESCRIPTION	LOCATION
8:45 am	Opening remarks	A1	2:30 pm	<b>SESSION 2B</b>	
9:00 am	<b>Invited Talk: Dawn Song</b> AI and Security: Lessons, Challenges and Future Directions	A1		Reinforcement Learning	A1
10:00 am	Best Paper Award	A1		Active Learning	A3
10:30 am	Coffee Break	Hall B		Deep Learning (Bayesian)	A4
11:00 am	<b>SESSION 1</b>			Ranking and Preference Learning	A5
	Reinforcement Learning	A1		Statistical Learning Theory	A6
	Transfer and Multi-Task Learning	A3		Representation Learning	A7
	Unsupervised Learning	A4		Optimization (Non-convex)	A9
	Structured Prediction	A5		Computer Vision	K1 + K2
	Statistical Learning Theory	A6		Sparsity and Compressed Sensing	K11
	Representation Learning	A7		Deep Learning (Neural Network Arch.)	Victoria
	Parallel and Distributed Learning	A9	3:30 pm	Coffee Break	Hall B
	Feature Selection	K1 + K2	4:00 pm	<b>SESSION 3</b>	
	Clustering	K11		Reinforcement Learning	A1
	Deep Learning (Neural Network Arch.)	Victoria		Approximate Inference	A4
12 pm	<b>LUNCH (On Your Own)</b>			Networks and Relational Learning	A5
1:30 pm	<b>SESSION 2A</b>			Privacy, Anonymity, and Security	A6
	Reinforcement Learning	A1		Generative Models	A7
	Optimization (Bayesian)	A3		Optimization (Convex)	A9
	Gaussian Processes	A4		Optimization (Combinatorial)	K1 + K2
	Sparsity and Compressed Sensing	A5		Deep Learning (Theory)	K11
	Statistical Learning Theory	A6		Deep Learning (Neural Network Arch.)	Victoria
	Representation Learning	A7	6:15 pm	Poster Session	Hall B
	Optimization (Non-convex)	A9			
	Other Applications	K1 + K2			
	Dimensionality Reduction	K11			
	Deep Learning (Neural Network Arch.)	Victoria			





## SESSION 1 - 11:00 AM - 12:00 PM

### Reinforcement Learning

Location: A1

- **Problem Dependent Reinforcement Learning Bounds Which Can Identify Bandit Structure in MDPs**  
Andrea Zanette, Emma Brunskill
- **Learning with Abandonment**  
Sven Schmit, Ramesh Johari
- **Lipschitz Continuity in Model-based Reinforcement Learning**  
Kavosh Asadi, Dipendra Misra, Michael L. Littman
- **Implicit Quantile Networks for Distributional Reinforcement Learning**  
Will Dabney, Georg Ostrovski, David Silver, Remi Munos
- **More Robust Doubly Robust Off-policy Evaluation**  
Mehrdad Farajtabar, Yinlam Chow, Mohammad Ghavamzadeh

### Transfer and Multi-Task Learning

Location: A3

- **Pseudo-task Augmentation: From Deep Multitask Learning to Intratask Sharing—and Back**  
Elliot Meyerson, Risto Miikkulainen
- **Transfer Learning via Learning to Transfer**  
Ying WEI, Yu Zhang, Junzhou Huang, Qiang Yang
- **Meta-Learning by Adjusting Priors Based on Extended PAC-Bayes Theory**  
Ron Amit, Ron Meir
- **Bilevel Programming for Hyperparameter Optimization and Meta-Learning**  
Luca Franceschi, Paolo Frasconi, Saverio Salzo, Riccardo Grazi, Massimiliano Pontil

### Unsupervised Learning

Location: A4

- **Crowdsourcing with Arbitrary Adversaries**  
Matthäus Kleindessner, Pranjal Awasthi
- **Analysis of Minimax Error Rate for Crowdsourcing and Its Application to Worker Clustering Model**  
Hideaki Imamura, Issei Sato, Masashi Sugiyama
- **Conditional Noise-Contrastive Estimation of Unnormalised Models**  
Ciwan Ceylan, Michael Gutmann
- **Deep One-Class Classification**  
Lukas Ruff, Nico Görnitz, Lucas Deecke, Shoaib Ahmed Siddiqui, Rob Vandermeulen, Alexander Binder, Emmanuel Müller, Marius Kloft

- **Deep Density Destructors**

David Inouye, Pradeep Ravikumar

### Structured Prediction

Location: A5

- **Predict and Constrain: Modeling Cardinality in Deep Structured Prediction**  
Nataly Brukhim, Amir Globerson
- **SparseMAP: Differentiable Sparse Structured Inference**  
Vlad Niculae, Andre Filipe Torres Martins, Mathieu Blondel, Claire Cardie
- **Efficient and Consistent Adversarial Bipartite Matching**  
Rizal Fathony, Sima Behpour, Xinhua Zhang, Brian Ziebart
- **Learning to Speed Up Structured Output Prediction**  
Xingyuan Pan, Vivek Srikumar

### Statistical Learning Theory

Location: A6

- **Nonparametric Regression with Comparisons: Escaping the Curse of Dimensionality with Ordinal Information**  
Yichong Xu, Hariank Muthakana, Sivaraman Balakrishnan, Aarti Singh, Artur Dubrawski
- **Do Outliers Ruin Collaboration?**  
Mingda Qiao
- **LeapsAndBounds: A Method for Approximately Optimal Algorithm Configuration**  
Gellért Weisz, Andras Gyorgy, Csaba Szepesvari
- **Variational Network Inference: Strong and Stable with Concrete Support**  
Amir Dezfouli, Edwin Bonilla, Richard Nock
- **Network Global Testing by Counting Graphlets**  
Jiashun Jin, Zheng Ke, Shengming Luo



**SESSION 1 - 11:00 AM - 12:00 PM**

**Representation Learning**

Location: A7

- **Learning Continuous Hierarchies in the Lorentz Model of Hyperbolic Geometry**  
Maximillian Nickel, Douwe Kiela
- **Hyperbolic Entailment Cones for Learning Hierarchical Embeddings**  
Octavian-Eugen Ganea, Gary Becigneul, Thomas Hofmann
- **Tree Edit Distance Learning via Adaptive Symbol Embeddings**  
Benjamin Paaßen, Claudio Gallicchio, Alessio Micheli, CITEC Barbara Hammer
- **Learning K-way D-dimensional Discrete Codes for Compact Embedding Representations**  
Ting Chen, Martin Reqiang Min, Yizhou Sun
- **CoVeR: Learning Covariate-Specific Vector Representations with Tensor Decompositions**  
Kevin Tian, Teng Zhang, James Zou

**Parallel and Distributed Learning**

Location: A9

- **Optimal Tuning for Divide-and-conquer Kernel Ridge Regression with Massive Data**  
Ganggang Xu, Zuofeng Shang, Guang Cheng
- **Distributed Nonparametric Regression under Communication Constraints**  
Yuan Cheng Zhu, John Lafferty
- **Coded Sparse Matrix Multiplication**  
Sinong Wang, Jiashang Liu, Ness Shroff
- **Towards More Efficient Stochastic Decentralized Learning: Faster Convergence and Sparse Communication**  
Zebang Shen, Aryan Mokhtari, Tengfei Zhou, Peilin Zhao, Hui Qian
- **Faster Derivative-Free Stochastic Algorithm for Shared Memory Machines**  
Bin Gu, Zhouyuan Huo, Cheng Deng, Heng Huang

**Feature Selection**

Location: K1 + K2

- **Nonoverlap-Promoting Variable Selection**  
Pengtao Xie, Hongbao Zhang, Yichen Zhu, Eric Xing
- **MSplit LBI: Realizing Feature Selection and Dense Estimation Simultaneously in Few-shot and Zero-shot Learning**  
Bo Zhao, Xinwei Sun, Yanwei Fu, Yuan Yao, Yizhou Wang

- **Black Box FDR**  
Wesley Tansey, Yixin Wang, David Blei, Raul Rabadan
- **Learning to Explain: An Information-Theoretic Perspective on Model Interpretation**  
Jianbo Chen, Le Song, Martin Wainwright, Michael Jordan
- **Variable Selection via Penalized Neural Network: a Drop-Out-One Loss Approach**  
Mao Ye, Yan Sun

**Clustering**

Location: K11

- **Quickshift++: Provably Good Initializations for Sample-Based Mean Shift**  
Heinrich Jiang, Jennifer Jang, Samory Kpotufe
- **Hierarchical Clustering with Structural Constraints**  
Vaggos Chatziafratis, Niazadeh Niazadeh, Moses Charikar
- **K-means clustering using random matrix sparsification**  
Kaushik Sinha
- **Clustering Semi-Random Mixtures of Gaussians**  
Aravindan Vijayaraghavan, Pranjal Awasthi
- **Equivalence of Multicategory SVM and Simplex Cone SVM: Fast Computations and Statistical Theory**  
Guillaume Pouliot

**Deep Learning (Neural Network Architectures)**

Location: Victoria

- **DiCE: The Infinitely Differentiable Monte Carlo Estimator**  
Jakob Foerster, Gregory Farquhar, Maruan Al-Shedivat, Tim Rocktäschel, Eric Xing, Shimon Whiteson
- **Learning to search with MCTSnets**  
Arthur Guez, Theo Weber, Ioannis Antonoglou, Karen Simonyan, Oriol Vinyals, Daan Wierstra, Remi Munos, David Silver
- **Differentiable plasticity: training plastic neural networks with backpropagation**  
Thomas Miconi, Ken Stanley, Jeff Clune
- **TACO: Learning Task Decomposition via Temporal Alignment for Control**  
Kyriacos Siarlis, Markus Wulfmeier, Sasha Salter, Shimon Whiteson, Ingmar Posner
- **Graph Networks as Learnable Physics Engines for Inference and Control**  
Alvaro Sanchez, Nicolas Heess, Jost Springenberg, Josh Merel, Martin Riedmiller, Raia Hadsell, Peter Battaglia



## SESSION 2A - 1:30 PM - 2:30 PM

### Reinforcement Learning

Location: A1

- **Coordinated Exploration in Concurrent Reinforcement Learning**  
Maria Dimakopoulou, Benjamin Van Roy
- **Structured Evolution with Compact Architectures for Scalable Policy Optimization**  
Krzysztof Choromanski, Mark Rowland, Vikas Sindhwani, Richard E Turner, Adrian Weller
- **Spotlight: Optimizing Device Placement for Training Deep Neural Networks**  
Yuanxiang Gao, Department of Electrical and Computer Li Chen, Baochun Li
- **Gated Path Planning Networks**  
Lisa Lee, Emilio Parisotto, Devendra Singh Chaplot, Eric Xing, Russ Salakhutdinov
- **Best Arm Identification in Linear Bandits with Linear Dimension Dependency**  
Chao Tao, Saúl A. Blanco, Yuan Zhou

### Optimization (Bayesian)

Location: A3

- **BOCK : Bayesian Optimization with Cylindrical Kernels**  
ChangYong Oh, Stratis Gavves, Max Welling
- **Stagewise Safe Bayesian Optimization with Gaussian Processes**  
Yanan Sui, Vincent Zhuang, Joel Burdick, Yisong Yue
- **BOHB: Robust and Efficient Hyperparameter Optimization at Scale**  
Stefan Falkner, Aaron Klein, Frank Hutter
- **Bayesian Optimization of Combinatorial Structures**  
Ricardo Baptista, Matthias Poloczek

### Gaussian Processes

Location: A4

- **Markov Modulated Gaussian Cox Processes for Semi-Stationary Intensity Modeling of Events Data**  
Minyoung Kim
- **Bayesian Quadrature for Multiple Related Integrals**  
Xiaoyue Xi, Francois-Xavier Briol, Mark Girolami
- **Differentiable Compositional Kernel Learning for Gaussian Processes**  
Shengyang Sun, Guodong Zhang, Chaoqi Wang, Wenyan Zeng, Jiaman Li, Roger Grosse
- **Generalized Robust Bayesian Committee Machine for Large-scale Gaussian Process Regression**  
Haitao Liu, Jianfei Cai, Yi Wang, Yew Soon ONG

### Sparsity and Compressed Sensing

Location: A5

- **WHInter: A Working set algorithm for High-dimensional sparse second order Interaction models**  
Marine LE MORVAN, JP Vert
- **Nearly Optimal Robust Subspace Tracking**  
Praneeth Narayanamurthy, Iowa Namrata Vaswani
- **Safe Element Screening for Submodular Function Minimization**  
Weizhong Zhang, Bin Hong, Lin Ma, Wei Liu, Tong Zhang
- **Online Convolutional Sparse Coding with Sample-Dependent Dictionary**  
Yaqing WANG, Quanming Yao, James Kwok, Lionel NI

### Statistical Learning Theory

Location: A6

- **Data-Dependent Stability of Stochastic Gradient Descent**  
Ilja Kuzborskij, Christoph Lampert
- **Stability and Generalization of Learning Algorithms that Converge to Global Optima**  
Zachary Charles, Dimitris Papailiopoulos
- **Optimal Rates of Sketched-regularized Algorithms for Least-Squares Regression over Hilbert Spaces**  
Junhong Lin, Volkan Cevher
- **Dropout Training, Data-dependent Regularization, and Generalization Bounds**  
Wenlong Mou, Yuchen Zhou, Jun Gao, Liwei Wang





## SESSION 2A - 1:30 PM - 2:30 PM

### Representation Learning

Location: A7

- **A probabilistic framework for multi-view feature learning with many-to-many associations via neural networks**  
oknaki Okuno, Tetsuya Hada, Hidetoshi Shimodaira
- **Improving Optimization in Models With Continuous Symmetry Breaking**  
Robert Bamler, Stephan Mandt
- **Learning Steady-States of Iterative Algorithms over Graphs**  
Hanjun Dai, Zornitsa Kozareva, Bo Dai, Alex Smola, Le Song
- **Anonymous Walk Embeddings**  
Sergey Ivanov, Evgeny Burnaev

### Optimization (Non-convex)

Location: A9

- **signSGD: Compressed Optimisation for Non-Convex Problems**  
Jeremy Bernstein, Yu-Xiang Wang, Kamyar Azizzadenesheli, Anima Anandkumar
- **Asynchronous Decentralized Parallel Stochastic Gradient Descent**  
Xiangru Lian, Wei Zhang, Ce Zhang, Ji Liu
- **Katyusha X: Simple Momentum Method for Stochastic Sum-of-Nonconvex Optimization**  
Zeyuan Allen-Zhu
- **D<sup>2</sup>: Decentralized Training over Decentralized Data**  
Hanlin Tang, Xiangru Lian, Ming Yan, Ce Zhang, Ji Liu

### Other Applications

Location: K1 + k2

- **Limits of Estimating Heterogeneous Treatment Effects: Guidelines for Practical Algorithm Design**  
Ahmed M. Alaa Ibrahim, M van der Schaar
- **Variance Regularized Counterfactual Risk Minimization via Variational Divergence Minimization**  
Hang Wu, May Wang
- **An Estimation and Analysis Framework for the Rasch Model**  
Andrew Lan, Mung Chiang, Christoph Studer
- **End-to-end Active Object Tracking via Reinforcement Learning**  
Wenhan Luo, Peng Sun, Fangwei Zhong, Wei Liu, Tong Zhang, Yizhou Wang

### Dimensionality Reduction

Location: K11

- **Leveraging Well-Conditioned Bases: Streaming and Distributed Summaries in Minkowski  $\ell_p$ -Norms**  
Charlie Dickens, Graham Cormode, David Woodruff
- **Subspace Embedding and Linear Regression with Orlicz Norm**  
Alexandr Andoni, Chengyu Lin, Ying Sheng, Peilin Zhong, Ruiqi Zhong
- **Stochastic PCA with  $\ell_2$  and  $\ell_1$  Regularization**  
Poorya Mianjy, Raman Arora
- **Streaming Principal Component Analysis in Noisy Setting**  
Teodor Vanislavov Marinov, Poorya Mianjy, Raman Arora

### Deep Learning (Neural Network Architectures)

Location: Victoria

- **RadialGAN: Leveraging multiple datasets to improve target-specific predictive models using Generative Adversarial Networks**  
Jinsung Yoon, James Jordon, Mihaela van der Schaar
- **Semi-Supervised Learning via Compact Latent Space Clustering**  
Konstantinos Kamnitsas, Daniel C. Castro, Loic Le Folgoc, Ian Walker, Ryutaro Tanno, Daniel Rueckert, Ben Glocker, Antonio Criminisi, Aditya Nori
- **Conditional Neural Processes**  
Marta Garnelo, Dan Rosenbaum, Chris Maddison, Tiago Ramalho, David Saxton, Murray Shanahan, Yee Teh, Danilo J. Rezende, S. M. Ali Eslami
- **A Semantic Loss Function for Deep Learning with Symbolic Knowledge**  
Jingyi Xu, Zilu Zhang, Tal Friedman, Yitao Liang, Guy Van den Broeck



## SESSION 2B - 2:30 PM - 3:30 PM

### Reinforcement Learning

Location: A1

- **Structured Control Nets for Deep Reinforcement Learning**  
Mario Srouji, Jian Zhang, Russ Salakhutdinov
- **Latent Space Policies for Hierarchical Reinforcement Learning**  
Tuomas Haarnoja, Kristian Hartikainen, Pieter Abbeel, Sergey Levine
- **Self-Consistent Trajectory Autoencoder: Hierarchical Reinforcement Learning with Trajectory Embeddings**  
JD Co-Reyes, Yu Xuan Liu, Abhishek Gupta, Benjamin Eysenbach, Pieter Abbeel, Sergey Levine
- **An Inference-Based Policy Gradient Method for Learning Options**  
Matthew Smith, Herke van Hoof, Joelle Pineau

### Active Learning

Location: A3

- **Design of Experiments for Model Discrimination Hybridising Analytical and Data-Driven Approaches**  
Simon Olofsson, Marc P Deisenroth, Ruth Misener
- **Selecting Representative Examples for Program Synthesis**  
Yewen Pu, Zachery Miranda, Armando Solar-Lezama, Leslie Kaelbling
- **On the Relationship between Data Efficiency and Error for Uncertainty Sampling**  
Steve Mussmann, Percy Liang

### Deep Learning (Bayesian)

Location: A4

- **Variational Inference and Model Selection with Generalized Evidence Bounds**  
Liquan Chen, Chenyang Tao, RUIYI ZHANG, Ricardo Henao, Lawrence Carin
- **Fixing a Broken ELBO**  
Alex Alemi, Ben Poole, iansf Fischer, Josh V Dillon, Rif Saurous, Kevin Murphy
- **Tighter Variational Bounds are Not Necessarily Better**  
Tom Rainforth, Adam Kosiorek, Tuan Anh Le, Chris Maddison, Max Igl, Frank Wood, Yee Whye Teh
- **Continuous-Time Flows for Efficient Inference and Density Estimation**  
Changyou Chen, Chunyuan Li, Liquan Chen, Wenlin Wang, Yunchen Pu, Lawrence Carin

### Ranking and Preference Learning

Location: A5

- **The Limits of Maxing, Ranking, and Preference Learning**  
Moein Falahatgar, Ayush Jain, Alon Orlitsky, Venkatadheeraj Pichapati, Vaishakh Ravindrakumar
- **Learning a Mixture of Two Multinomial Logits**  
Flavio Chierichetti, Ravi Kumar, Andrew Tomkins
- **The Weighted Kendall and High-order Kernels for Permutations**  
Yunlong Jiao, JP Vert
- **Parameterized Algorithms for the Matrix Completion Problem**  
Robert Ganian, DePaul Iyad Kanj, Sebastian Ordyniak, Stefan Szeider

### Statistical Learning Theory

Location: A6

- **The Well-Tempered Lasso**  
Yuanzhi Li, Yoram Singer
- **Information Theoretic Guarantees for Empirical Risk Minimization with Applications to Model Selection and Large-Scale Optimization**  
Ibrahim Alabdulmohsin
- **The Generalization Error of Dictionary Learning with Moreau Envelopes**  
ALEXANDROS GEORGOGIANNIS
- **On Learning Sparsely Used Dictionaries from Incomplete Samples**  
Thanh Nguyen, Akshay Soni, Chinmay Hegde
- **Differentially Private Identity and Equivalence Testing of Discrete Distributions**  
Maryam Aliakbarpour, Ilias Diakonikolas, MIT Ronitt Rubinfeld

### Representation Learning

Location: A7

- **Generative Temporal Models with Spatial Memory for Partially Observed Environments**  
Marco Fraccaro, Danilo J. Rezende, Yori Zwols, Alexander Pritzel, S. M. Ali Eslami, Fabio Viola
- **Disentangling by Factorising**  
DeepMind Hyunjik Kim, Andriy Mnih



## SESSION 2B - 2:30 PM - 3:30 PM

- **Discovering Interpretable Representations for Both Deep Generative and Discriminative Models**  
Tameem Adel, Zoubin Ghahramani, Adrian Weller
- **Learning Independent Causal Mechanisms**  
Giambattista Parascandolo, Niki Kilbertus, Mateo Rojas-Carulla, Bernhard Schölkopf
- **Contextual Graph Markov Model: A Deep and Generative Approach to Graph Processing**  
Davide Bacciu, Federico Errica, Alessio Micheli

### Optimization (Non-convex)

Location: A9

- **Non-convex Conditional Gradient Sliding**  
chao qu, Yan Li, Huan Xu
- **Stochastic Variance-Reduced Cubic Regularized Newton Method**  
Dongruo Zhou, Pan Xu, Quanquan Gu
- **An Alternative View: When Does SGD Escape Local Minima?**  
Bobby Kleinberg, Yuanzhi Li, Yang Yuan
- **Escaping Saddles with Stochastic Gradients**  
Hadi Daneshmand, Jonas Kohler, Aurelien Lucchi, Thomas Hofmann

### Computer Vision

Location: K1 + K2

- **Deep Predictive Coding Network for Object Recognition**  
Haiguang Wen, Kuan Han, Junxing Shi, Yizhen Zhang, Eugenio Culurciello, Zhongming Liu
- **Gradually Updated Neural Networks for Large-Scale Image Recognition**  
Siyuan Qiao, Zhishuai Zhang, Wei Shen, Bo Wang, Alan Yuille
- **Neural Inverse Rendering for General Reflectance Photometric Stereo**  
Tatsunori Tanai, Takanori Maehara
- **One-Shot Segmentation in Clutter**  
Claudio Michaelis, Matthias Bethge, Alexander Ecker
- **Active Testing: An Efficient and Robust Framework for Estimating Accuracy**  
Phuc Nguyen, Deva Ramanan, Charless Fowlkes

### Sparsity and Compressed Sensing

Location: K11

- **Linear Spectral Estimators and an Application to Phase Retrieval**  
Ramina Ghods, Andrew Lan, Tom Goldstein, Christoph Studer
- **Covariate Adjusted Precision Matrix Estimation via Nonconvex Optimization**  
Jinghui Chen, Pan Xu, Lingxiao Wang, Jian Ma, Quanquan Gu
- **Signal and Noise Statistics Oblivious Orthogonal Matching Pursuit**  
Sreejith Kallummil, Sheetal Kalyani
- **Testing Sparsity over Known and Unknown Bases**  
Siddharth Barman, Arnab Bhattacharyya, Suprovat Ghoshal

### Deep Learning (Neural Network Architectures)

Location: Victoria

- **Non-linear motor control by local learning in spiking neural networks**  
Aditya Gilra, Wulfram Gerstner
- **PredRNN++: Towards A Resolution of the Deep-in-Time Dilemma in Spatiotemporal Predictive Learning**  
Yunbo Wang, Zhifeng Gao, Mingsheng Long, Jianmin Wang, Philip Yu
- **Hierarchical Long-term Video Prediction without Supervision**  
Nevan Wichers, Ruben Villegas, Dumitru Erhan, Honglak Lee
- **Exploiting the Potential of Standard Convolutional Autoencoders for Image Restoration by Evolutionary Search**  
Masanori SUGANUMA, Mete Ozay, Takayuki Okatani
- **Model-Level Dual Learning**  
Yingce Xia, Xu Tan, Fei Tian, Tao Qin, Nenghai Yu, Tie-Yan Liu



## SESSION 3 - 4:00 PM - 6:00 PM

### Reinforcement Learning

Location: A1

- **Programmatically Interpretable Reinforcement Learning**  
Abhinav Verma, Vijayaraghavan Murali, Rishabh Singh, Pushmeet Kohli, Swarat Chaudhuri
- **Learning by Playing - Solving Sparse Reward Tasks from Scratch**  
Martin Riedmiller, Roland Hafner, Thomas Lampe, Michael Neunert, Jonas Degraeve, Tom Van de Wiele, Vlad Mnih, Nicolas Heess, Jost Springenberg
- **Automatic Goal Generation for Reinforcement Learning Agents**  
Carlos Florensa, David Held, Xinyang Geng, Pieter Abbeel
- **Universal Planning Networks: Learning Generalizable Representations for Visuomotor Control**  
Aravind Srinivas, Allan Jabri, Pieter Abbeel, Sergey Levine, Chelsea Finn
- **Competitive Multi-agent Inverse Reinforcement Learning with Sub-optimal Demonstrations**  
IEMS Xingyu Wang, Diego Klabjan
- **Feedback-Based Tree Search for Reinforcement Learning**  
Daniel Jiang, Emmanuel Ekwedike, Han Liu
- **Deep Reinforcement Learning in Continuous Action Spaces: a Case Study in the Game of Simulated Curling**  
kywoon Lee, Sol-A Kim, Jaesik Choi, Seong-Whan Lee
- **Learning the Reward Function for a Misspecified Model**  
Erik Talvitie

### Approximate Inference

Location: A4

- **Semi-Implicit Variational Inference**  
Mingzhang Yin, Mingyuan Zhou
- **Efficient Gradient-Free Variational Inference using Policy Search**  
Oleg Arenz, Gerhard Neumann, Mingjun Zhong
- **A Spectral Approach to Gradient Estimation for Implicit Distributions**  
Jiaxin Shi, Shengyang Sun, Jun Zhu
- **Quasi-Monte Carlo Variational Inference**  
Alexander Buchholz, Florian Wenzel, Stephan Mandt

### Networks and Relational Learning

Location: A5

- **Stochastic Training of Graph Convolutional Networks with Variance Reduction**  
Jianfei Chen, Jun Zhu, Le Song
- **Representation Learning on Graphs with Jumping Knowledge Networks**  
Keyulu Xu, Chengtao Li, Yonglong Tian, Tomohiro Sonobe, Ken-ichi Kawarabayashi, Stefanie Jegelka
- **Learning Diffusion using Hyperparameters**  
Dimitris Kalimeris, Yaron Singer, Karthik Subbian, Udi Weinsberg
- **Canonical Tensor Decomposition for Knowledge Base Completion**  
Timothee Lacroix, Nicolas Usunier, Guillaume R Obozinski

### Privacy, Anonymity, and Security

Location: A6

- **Local Private Hypothesis Testing: Chi-Square Tests**  
Marco Gaboardi, Ryan Rogers
- **Differentially Private Matrix Completion Revisited**  
Prateek Jain, Om Thakkar, Abhradeep Thakurta
- **Mitigating Bias in Adaptive Data Gathering via Differential Privacy**  
Seth V Neel, Aaron Roth
- **Locally Private Hypothesis Testing**  
Or Sheffet
- **INSPECTRE: Privately Estimating the Unseen**  
Jayadev Acharya, Gautam Kamath, Ziteng Sun, Huanyu Zhang

### Generative Models

Location: A7

- **Which Training Methods for GANs do actually Converge?**  
Lars Mescheder, Andreas Geiger, Sebastian Nowozin
- **Chi-square Generative Adversarial Network**  
Chenyang Tao, Liqun Chen, Ricardo Henao, Jianfeng Feng, Lawrence Carin
- **Learning Implicit Generative Models with the Method of Learned Moments**  
Suman Ravuri, Shakir Mohamed, Mihaela Rosca, Oriol Vinyals
- **A Classification-Based Study of Covariate Shift in GAN Distributions**  
Shibani Santurkar, Ludwig Schmidt, Aleksander Madry





## SESSION 3 - 4:00 PM - 6:00 PM

### Optimization (Convex)

Location: A9

- **ADMM and Accelerated ADMM as Continuous Dynamical Systems**  
Guilherme Franca, Daniel Robinson, Rene Vidal
- **Dissipativity Theory for Accelerating Stochastic Variance Reduction: A Unified Analysis of SVRG and Katyusha Using Semidefinite Programs**  
Bin Hu, Stephen Wright, Laurent Lessard
- **Lyapunov Functions for First-Order Methods: Tight Automated Convergence Guarantees**  
Adrien Taylor, Bryan Van Scoy, Laurent Lessard
- **Computational Optimal Transport: Complexity by Accelerated Gradient Descent Is Better Than by Sinkhorn's Algorithm**  
Pavel Dvurechenskii, Alexander Gasnikov, Alexey Kroshnin
- **An Efficient Semismooth Newton based Algorithm for Convex Clustering**  
Yancheng Yuan, Defeng Sun, Kim-Chuan Toh

### Deep Learning (Theory)

Location: K1 + K2

- **Dynamical Isometry and a Mean Field Theory of CNNs: How to Train 10,000-Layer Vanilla Convolutional Neural Networks**  
Lechao Xiao, Yasaman Bahri, Jascha Sohl-Dickstein, Samuel Schoenholz, Jeffrey Pennington
- **The Dynamics of Learning: A Random Matrix Approach**  
Zhenyu Liao, Romain Couillet
- **On the Optimization of Deep Networks: Implicit Acceleration by Overparameterization**  
Sanjeev Arora, Nadav Cohen, Elad Hazan
- **Deep Linear Networks with Arbitrary Loss: All Local Minima Are Global**  
Thomas Laurent, James von Brecht

### Optimization (Combinatorial)

Location: K11

- **Weakly Submodular Maximization Beyond Cardinality Constraints: Does Randomization Help Greedy?**  
Lin Chen, Moran Feldman, Amin Karbasi
- **Beyond 1/2-Approximation for Submodular Maximization on Massive Data Streams**  
Ashkan Norouzi-Fard, Jakub Tarnawski, Boba Mitrovic, Amir Zandieh, Aida Mousavifar Mousavifar, Ola Svensson
- **Scalable Deletion-Robust Submodular Maximization: Data Summarization with Privacy and Fairness Constraints**  
Ehsan Kazemi, Morteza Zadimoghaddam, Amin Karbasi
- **Data Summarization at Scale: A Two-Stage Submodular Approach**  
Marko Mitrovic, Ehsan Kazemi, Morteza Zadimoghaddam, Amin Karbasi

### Deep Learning (Neural Network Architectures)

Location: Victoria

- **Adafactor: Adaptive Learning Rates with Sublinear Memory Cost**  
Noam Shazeer, Mitchell Stern
- **Orthogonal Recurrent Neural Networks with Scaled Cayley Transform**  
Kyle Helfrich, Devin Willmott, Qiang Ye
- **Kronecker Recurrent Units**  
Cijo Jose, Moustapha Cisse, Francois Fleuret
- **Fast Parametric Learning with Activation Memorization**  
Jack Rae, Chris Dyer, Peter Dayan, Tim Lillicrap
- **Dynamic Evaluation of Neural Sequence Models**  
Ben Krause, Emmanuel Kahembwe, Iain Murray, Steve Renals



- #1 **Spline Filters For End-to-End Deep Learning**  
*Randall Balestriero, Romain Cosentino, Herve Glotin, Richard Baraniuk*
- #2 **Non-linear motor control by local learning in spiking neural networks**  
*Aditya Gilra, Wulfram Gerstner*
- #3 **Implicit Quantile Networks for Distributional Reinforcement Learning**  
*Will Dabney, Georg Ostrovski, David Silver, Remi Munos*
- #4 **An Inference-Based Policy Gradient Method for Learning Options**  
*Matthew Smith, Herke van Hoof, Joelle Pineau*
- #5 **Predict and Constrain: Modeling Cardinality in Deep Structured Prediction**  
*Nataly Brukhim, Amir Globerson*
- #6 **Differentially Private Matrix Completion Revisited**  
*Prateek Jain, Om Thakkar, Abhradeep Thakurta*
- #7 **Differentiable plasticity: training plastic neural networks with backpropagation**  
*Thomas Miconi, Ken Stanley, Jeff Clune*
- #8 **Model-Level Dual Learning**  
*Yingce Xia, Xu Tan, Fei Tian, Tao Qin, Nenghai Yu, Tie-Yan Liu*
- #9 **CoVeR: Learning Covariate-Specific Vector Representations with Tensor Decompositions**  
*Kevin Tian, Teng Zhang, James Zou*
- #10 **Tree Edit Distance Learning via Adaptive Symbol Embeddings**  
*Benjamin Paaßen, Claudio Gallicchio, Alessio Micheli, CITEC Barbara Hammer*
- #11 **Gradually Updated Neural Networks for Large-Scale Image Recognition**  
*Siyuan Qiao, Zhishuai Zhang, Wei Shen, Bo Wang, Alan Yuille*
- #12 **One-Shot Segmentation in Clutter**  
*Claudio Michaelis, Matthias Bethge, Alexander Ecker*
- #13 **Active Testing: An Efficient and Robust Framework for Estimating Accuracy**  
*Phuc Nguyen, Deva Ramanan, Charless Fowlkes*
- #14 **Learning Deep ResNet Blocks Sequentially using Boosting Theory**  
*Furong Huang, Jordan Ash, John Langford, Robert Schapire*
- #15 **Self-Consistent Trajectory Autoencoder: Hierarchical Reinforcement Learning with Trajectory Embeddings**  
*JD Co-Reyes, Yu Xuan Liu, Abhishek Gupta, Benjamin Eysenbach, Pieter Abbeel, Sergey Levine*
- #16 **Problem Dependent Reinforcement Learning Bounds Which Can Identify Bandit Structure in MDPs**  
*Andrea Zanette, Emma Brunskill*
- #17 **Stochastic PCA with  $\ell_2$  and  $\ell_1$  Regularization**  
*Poorya Mianjy, Raman Arora*
- #18 **Subspace Embedding and Linear Regression with Orlicz Norm**  
*Alexandr Andoni, Chengyu Lin, Ying Sheng, Peilin Zhong, Ruiqi Zhong*
- #19 **Signal and Noise Statistics Oblivious Orthogonal Matching Pursuit**  
*Sreejith Kallummil, Sheetal Kalyani*
- #20 **Provable Defenses against Adversarial Examples via the Convex Outer Adversarial Polytope**  
*Eric Wong, Zico Kolter*
- #21 **Learning the Reward Function for a Misspecified Model**  
*Erik Talvitie*
- #22 **Deep Reinforcement Learning in Continuous Action Spaces: a Case Study in the Game of Simulated Curling**  
*kyowoon Lee, Sol-A Kim, Jaesik Choi, Seong-Whan Lee*
- #23 **Do Outliers Ruin Collaboration?**  
*Mingda Qiao*
- #24 **Dropout Training, Data-dependent Regularization, and Generalization Bounds**  
*Wenlong Mou, Yuchen Zhou, Jun Gao, Liwei Wang*
- #25 **Competitive Multi-agent Inverse Reinforcement Learning with Sub-optimal Demonstrations**  
*IEMS Xingyu Wang, Diego Klabjan*
- #26 **Continual Reinforcement Learning with Complex Synapses**  
*Christos Kaplanis, Murray Shanahan, Claudia Clopath*
- #27 **Equivalence of Multicategory SVM and Simplex Cone SVM: Fast Computations and Statistical Theory**  
*Guillaume Pouliot*
- #28 **Quickshift++: Provably Good Initializations for Sample-Based Mean Shift**  
*Heinrich Jiang, Jennifer Jang, Samory Kpotufe*
- #29 **Learning Diffusion using Hyperparameters**  
*Dimitris Kalimeris, Yaron Singer, Karthik Subbian, Udi Weinsberg*
- #30 **Learning a Mixture of Two Multinomial Logits**  
*Flavio Chierichetti, Ravi Kumar, Andrew Tomkins*
- #31 **Crowdsourcing with Arbitrary Adversaries**  
*Matthäus Kleindessner, Pranjal Awasthi*
- #32 **Deep Density Destructors**  
*David Inouye, Pradeep Ravikumar*
- #33 **Programmatically Interpretable Reinforcement Learning**  
*Abhinav Verma, Vijayaraghavan Murali, Rishabh Singh, Pushmeet Kohli, Swarat Chaudhuri*
- #34 **Structured Evolution with Compact Architectures for Scalable Policy Optimization**  
*Krzysztof Choromanski, Mark Rowland, Vikas Sindhwani, Richard E Turner, Adrian Weller*
- #35 **The Weighted Kendall and High-order Kernels for Permutations**  
*Yunlong Jiao, JP Vert*
- #36 **The Limits of Maxing, Ranking, and Preference Learning**  
*Moein Falahatgar, Ayush Jain, Alon Orlitsky, Venkatadheeraj Pichapati, Vaishakh Ravindrakumar*
- #37 **Black Box FDR**  
*Wesley Tansey, Yixin Wang, David Blei, Raul Rabadan*
- #38 **Variable Selection via Penalized Neural Network: a Drop-Out-One Loss Approach**  
*Mao Ye, Yan Sun*
- #39 **Clustering Semi-Random Mixtures of Gaussians**  
*Aravindan Vijayaraghavan, Pranjal Awasthi*
- #40 **Leveraging Well-Conditioned Bases: Streaming and Distributed Summaries in Minkowski  $p$ -Norms**  
*Charlie Dickens, Graham Cormode, David Woodruff*



- #41 **Learning by Playing - Solving Sparse Reward Tasks from Scratch**  
*Martin Riedmiller, Roland Hafner, Thomas Lampe, Michael Neunert, Jonas Degraeve, Tom Van de Wiele, Vlad Mnih, Nicolas Heess, Jost Springenberg*
- #42 **Structured Control Nets for Deep Reinforcement Learning**  
*Mario Srouji, Jian Zhang, Russ Salakhutdinov*
- #43 **Stagewise Safe Bayesian Optimization with Gaussian Processes**  
*Yanan Sui, Vincent Zhuang, Joel Burdick, Yisong Yue*
- #44 **Bayesian Optimization of Combinatorial Structures**  
*Ricardo Baptista, Matthias Poloczek*
- #45 **GraphRNN: Generating Realistic Graphs with Deep Auto-regressive Models**  
*Jiaxuan You, Zhitao Ying, Xiang Ren, Will Hamilton, Jure Leskovec*
- #46 **Dependent Relational Gamma Process Models for Longitudinal Networks**  
*Sikun Yang, Heinz Koepfl*
- #47 **K-means clustering using random matrix sparsification**  
*Kaushik Sinha*
- #48 **Hierarchical Clustering with Structural Constraints**  
*Vaggos Chatziafratis, Niazadeh Niazadeh, Moses Charikar*
- #49 **Kronecker Recurrent Units**  
*Cijo Jose, Moustapha Cisse, Francois Fleuret*
- #50 **Semi-Supervised Learning via Compact Latent Space Clustering**  
*Konstantinos Kamnitsas, Daniel C. Castro, Loic Le Folgoc, Ian Walker, Ryutaro Tanno, Daniel Rueckert, Ben Glocker, Antonio Criminisi, Aditya Nori*
- #51 **Dynamic Evaluation of Neural Sequence Models**  
*Ben Krause, Emmanuel Kahembwe, Iain Murray, Steve Renals*
- #52 **TACO: Learning Task Decomposition via Temporal Alignment for Control**  
*Kyriacos Shiarlis, Markus Wulfmeier, Sasha Salter, Shimon Whiteson, Ingmar Posner*
- #53 **A Spectral Approach to Gradient Estimation for Implicit Distributions**  
*Jiaxin Shi, Shengyang Sun, Jun Zhu*
- #54 **Quasi-Monte Carlo Variational Inference**  
*Alexander Buchholz, Florian Wenzel, Stephan Mandt*
- #55 **Learning to Optimize Combinatorial Functions**  
*Nir Rosenfeld, Eric Balkanski, Amir Globerson, Yaron Singer*
- #56 **Proportional Allocation: Simple, Distributed, and Diverse Matching with High Entropy**  
*Shipra Agarwal, Morteza Zadimoghaddam, Vahab Mirrokni*
- #57 **Representation Learning on Graphs with Jumping Knowledge Networks**  
*Keyulu Xu, Chengtao Li, Yonglong Tian, Tomohiro Sonobe, Ken-ichi Kawarabayashi, Stefanie Jegelka*
- #58 **NetGAN: Generating Graphs via Random Walks**  
*Aleksandar Bojchevski, Alex Shchur, Daniel Zügner, Stephan Günnemann*
- #59 **INSPECTRE: Privately Estimating the Unseen**  
*Jayadev Acharya, Gautam Kamath, Ziteng Sun, Huanyu Zhang*
- #60 **Locally Private Hypothesis Testing**  
*Or Sheffet*
- #61 **Latent Space Policies for Hierarchical Reinforcement Learning**  
*Tuomas Haarnoja, Kristian Hartikainen, Pieter Abbeel, Sergey Levine*
- #62 **More Robust Doubly Robust Off-policy Evaluation**  
*Mehrdad Farajtabar, Yinlam Chow, Mohammad Ghavamzadeh*
- #63 **Learning to Explain: An Information-Theoretic Perspective on Model Interpretation**  
*Jianbo Chen, Le Song, Martin Wainwright, Michael Jordan*
- #64 **End-to-end Active Object Tracking via Reinforcement Learning**  
*Wenhan Luo, Peng Sun, Fangwei Zhong, Wei Liu, Tong Zhang, Yizhou Wang*
- #65 **Efficient and Consistent Adversarial Bipartite Matching**  
*Rizal Fathony, Sima Behpour, Xinhua Zhang, Brian Ziebart*
- #66 **SparseMAP: Differentiable Sparse Structured Inference**  
*Vlad Niculae, Andre Filipe Torres Martins, Mathieu Blondel, Claire Cardie*
- #67 **Bilevel Programming for Hyperparameter Optimization and Meta-Learning**  
*Luca Franceschi, Paolo Frasconi, Saverio Salzo, Riccardo Grazi, Massimiliano Pontil*
- #68 **Meta-Learning by Adjusting Priors Based on Extended PAC-Bayes Theory**  
*Ron Amit, Ron Meir*
- #69 **Parameterized Algorithms for the Matrix Completion Problem**  
*Robert Galian, DePaul Iyad Kanj, Sebastian Ordyniak, Stefan Szeider*
- #70 **Nearly Optimal Robust Subspace Tracking**  
*Praneeth Narayanamurthy, Iowa Namrata Vaswani*
- #71 **Katyusha X: Simple Momentum Method for Stochastic Sum-of-Nonconvex Optimization**  
*Zeyuan Allen-Zhu*
- #72 **signSGD: Compressed Optimisation for Non-Convex Problems**  
*Jeremy Bernstein, Yu-Xiang Wang, Kamyar Aizzadenesheli, Anima Anandkumar*
- #73 **Synthesizing Robust Adversarial Examples**  
*Anish Athalye, Logan Engstrom, Andrew Ilyas, Kevin Kwok*
- #74 **Differentiable Abstract Interpretation for Provably Robust Neural Networks**  
*Matthew Mirman, Timon Gehr, Martin Vechev*
- #75 **Stochastic Training of Graph Convolutional Networks with Variance Reduction**  
*Jianfei Chen, Jun Zhu, Le Song*
- #76 **Neural Relational Inference for Interacting Systems**  
*Thomas Kipf, Ethan Fetaya, Jackson Wang, Max Welling, Richard Zemel*
- #77 **Which Training Methods for GANs do actually Converge?**  
*Lars Mescheder, Andreas Geiger, Sebastian Nowozin*
- #78 **Learning Independent Causal Mechanisms**  
*Giambattista Parascandolo, Niki Kilbertus, Mateo Rojas-Carulla, Bernhard Schölkopf*
- #79 **Nonconvex Optimization for Regression with Fairness Constraints**  
*Junpei Komiyama, Akiko Takeda, Junya Honda, Hajime Shimao*



- #80 **Fairness Without Demographics in Repeated Loss Minimization**  
*Tatsunori Hashimoto, Megha Srivastava, Hongseok Namkoong, Percy Liang*
- #81 **MSplit LBI: Realizing Feature Selection and Dense Estimation Simultaneously in Few-shot and Zero-shot Learning**  
*Bo Zhao, Xinwei Sun, Yanwei Fu, Yuan Yao, Yizhou Wang*
- #82 **Nonoverlap-Promoting Variable Selection**  
*Pengtao Xie, Hongbao Zhang, Yichen Zhu, Eric Xing*
- #83 **Towards More Efficient Stochastic Decentralized Learning: Faster Convergence and Sparse Communication**  
*Zebang Shen, Aryan Mokhtari, Tengfei Zhou, Peilin Zhao, Hui Qian*
- #84 **Graph Networks as Learnable Physics Engines for Inference and Control**  
*Alvaro Sanchez, Nicolas Heess, Jost Springenberg, Josh Merel, Martin Riedmiller, Raia Hadsell, Peter Battaglia*
- #85 **An Alternative View: When Does SGD Escape Local Minima?**  
*Bobby Kleinberg, Yuanzhi Li, Yang Yuan*
- #86 **Asynchronous Decentralized Parallel Stochastic Gradient Descent**  
*Xiangru Lian, Wei Zhang, Ce Zhang, Ji Liu*
- #87 **An Estimation and Analysis Framework for the Rasch Model**  
*Andrew Lan, Mung Chiang, Christoph Studer*
- #88 **Mitigating Bias in Adaptive Data Gathering via Differential Privacy**  
*Seth V Neel, Aaron Roth*
- #89 **Local Private Hypothesis Testing: Chi-Square Tests**  
*Marco Gaboardi, Ryan Rogers*
- #90 **Disentangling by Factorising**  
*DeepMind Hyunjik Kim, Andriy Mnih*
- #91 **Efficient Bias-Span-Constrained Exploration-Exploitation in Reinforcement Learning**  
*Ronan Fruit, Matteo Pirota, Alessandro Lazaric, Ronald Ortner*
- #92 **Learning to search with MCTSnets**  
*Arthur Guez, Theo Weber, Ioannis Antonoglou, Karen Simonyan, Oriol Vinyals, Daan Wierstra, Remi Munos, David Silver*
- #93 **Decoupled Parallel Backpropagation with Convergence Guarantee**  
*Zhouyuan Huo, Bin Gu, Qian Yang, Heng Huang*
- #94 **On Learning Sparsely Used Dictionaries from Incomplete Samples**  
*Thanh Nguyen, Akshay Soni, Chinmay Hegde*
- #95 **Variational Network Inference: Strong and Stable with Concrete Support**  
*Amir Dezfouli, Edwin Bonilla, Richard Nock*
- #96 **Weakly Submodular Maximization Beyond Cardinality Constraints: Does Randomization Help Greedy?**  
*Lin Chen, Moran Feldman, Amin Karbasi*
- #97 **Data Summarization at Scale: A Two-Stage Submodular Approach**  
*Marko Mitrovic, Ehsan Kazemi, Morteza Zadimoghaddam, Amin Karbasi*
- #98 **Best Arm Identification in Linear Bandits with Linear Dimension Dependency**  
*Chao Tao, Saúl A. Blanco, Yuan Zhou*
- #99 **Learning with Abandonment**  
*Sven Schmit, Ramesh Johari*
- #100 **Hyperbolic Entailment Cones for Learning Hierarchical Embeddings**  
*Octavian-Eugen Ganea, Gary Becigneul, Thomas Hofmann*
- #101 **Generative Temporal Models with Spatial Memory for Partially Observed Environments**  
*Marco Fraccaro, Danilo J. Rezende, Yori Zwols, Alexander Pritzel, S. M. Ali Eslami, Fabio Viola*
- #102 **DiCE: The Infinitely Differentiable Monte Carlo Estimator**  
*Jakob Foerster, Gregory Farquhar, Maruan Al-Shedivat, Tim Rocktäschel, Eric Xing, Shimon Whiteson*
- #103 **Orthogonal Recurrent Neural Networks with Scaled Cayley Transform**  
*Kyle Helfrich, Devin Willmott, Qiang Ye*
- #104 **Least-Squares Temporal Difference Learning for the Linear Quadratic Regulator**  
*Stephen Tu, Benjamin Recht*
- #105 **Spotlight: Optimizing Device Placement for Training Deep Neural Networks**  
*Yuanxiang Gao, Department of Electrical and Computer Li Chen, Baochun Li*
- #106 **Universal Planning Networks: Learning Generalizable Representations for Visuomotor Control**  
*Aravind Srinivas, Allan Jabri, Pieter Abbeel, Sergey Levine, Chelsea Finn*
- #107 **Coordinated Exploration in Concurrent Reinforcement Learning**  
*Maria Dimakopoulou, Benjamin Van Roy*
- #108 **A probabilistic framework for multi-view feature learning with many-to-many associations via neural networks**  
*oknaki Okuno, Tetsuya Hada, Hidetoshi Shimodaira*
- #109 **Learning Steady-States of Iterative Algorithms over Graphs**  
*Hanjun Dai, Zornitsa Kozareva, Bo Dai, Alex Smola, Le Song*
- #110 **Delayed Impact of Fair Machine Learning**  
*Lydia T. Liu, Sarah Dean, Esther Rolf, Max Simchowitz, University of California Moritz Hardt*
- #111 **Fair and Diverse DPP-Based Data Summarization**  
*Elisa Celis, Vijay Keswani, Damian Straszak, Amit Jayant Deshpande, Tarun Kathuria, Nisheeth Vishnoi*
- #112 **Learning Implicit Generative Models with the Method of Learned Moments**  
*Suman Ravuri, Shakir Mohamed, Mihaela Rosca, Oriol Vinyals*
- #113 **Chi-square Generative Adversarial Network**  
*Chenyang Tao, Liqun Chen, Ricardo Henao, Jianfeng Feng, Lawrence Carin*
- #114 **Streaming Principal Component Analysis in Noisy Setting**  
*Teodor Vanislavov Marinov, Poorya Mianjy, Raman Arora*
- #115 **Partial Optimality and Fast Lower Bounds for Weighted Correlation Clustering**  
*Jan-Hendrik Lange, Andreas Karrenbauer, Bjoern Andres*
- #116 **SGD and Hogwild! Convergence Without the Bounded Gradients Assumption**  
*Lam Nguyen, PHUONG HA NGUYEN, Marten van Dijk, Peter Richtarik, Katya Scheinberg, Martin Takac*





- #117 Computational Optimal Transport: Complexity by Accelerated Gradient Descent Is Better Than by Sinkhorn's Algorithm**  
*Pavel Dvurechenskii, Alexander Gasnikov, Alexey Kroshnin*
- #118 Stability and Generalization of Learning Algorithms that Converge to Global Optima**  
*Zachary Charles, Dimitris Papailiopoulos*
- #119 Optimal Rates of Sketched-regularized Algorithms for Least-Squares Regression over Hilbert Spaces**  
*Junhong Lin, Volkan Cevher*
- #120 Adafactor: Adaptive Learning Rates with Sublinear Memory Cost**  
*Noam Shazeer, Mitchell Stern*
- #121 Fast Parametric Learning with Activation Memorization**  
*Jack Rae, Chris Dyer, Peter Dayan, Tim Lillicrap*
- #122 Essentially No Barriers in Neural Network Energy Landscape**  
*Felix Draxler, Kambis Veschgini, Manfred Salmhofer, Fred Hamprecht*
- #123 Deep Linear Networks with Arbitrary Loss: All Local Minima Are Global**  
*Thomas Laurent, James von Brecht*
- #124 Generalized Robust Bayesian Committee Machine for Large-scale Gaussian Process Regression**  
*Haitao Liu, Jianfei Cai, Yi Wang, Yew Soon Ong*
- #125 Bayesian Quadrature for Multiple Related Integrals**  
*Xiaoyue Xi, Francois-Xavier Briol, Mark Girolami*
- #126 Deep Predictive Coding Network for Object Recognition**  
*Haiguang Wen, Kuan Han, Junxing Shi, Yizhen Zhang, Eugenio Culurciello, Zhongming Liu*
- #127 Neural Inverse Rendering for General Reflectance Photometric Stereo**  
*Tatsunori Tani, Takanori Maehara*
- #128 On the Relationship between Data Efficiency and Error for Uncertainty Sampling**  
*Steve Mussmann, Percy Liang*
- #129 Selecting Representative Examples for Program Synthesis**  
*Yewen Pu, Zachery Miranda, Armando Solar-Lezama, Leslie Kaelbling*
- #130 Conditional Neural Processes**  
*Marta Garnelo, Dan Rosenbaum, Chris Maddison, Tiago Ramalho, David Saxton, Murray Shanahan, Yee Teh, Danilo J. Rezende, S. M. Ali Eslami*
- #131 Hierarchical Long-term Video Prediction without Supervision**  
*Nevan Wichers, Ruben Villegas, Dumitru Erhan, Honglak Lee*
- #132 Adversarial Risk and the Dangers of Evaluating Against Weak Attacks**  
*Jonathan Uesato, Brendan O'Donoghue, Pushmeet Kohli, Aäron van den Oord*
- #133 A Classification-Based Study of Covariate Shift in GAN Distributions**  
*Shibani Santurkar, Ludwig Schmidt, Aleksander Madry*
- #134 Gated Path Planning Networks**  
*Lisa Lee, Emilio Parisotto, Devendra Singh Chaplot, Eric Xing, Russ Salakhutdinov*
- #135 Automatic Goal Generation for Reinforcement Learning Agents**  
*Carlos Florensa, David Held, Xinyang Geng, Pieter Abbeel*
- #136 ADMM and Accelerated ADMM as Continuous Dynamical Systems**  
*Guilherme Franca, Daniel Robinson, Rene Vidal*
- #137 Dissipativity Theory for Accelerating Stochastic Variance Reduction: A Unified Analysis of SVRG and Katyusha Using Semidefinite Programs**  
*Bin Hu, Stephen Wright, Laurent Lessard*
- #138 Contextual Graph Markov Model: A Deep and Generative Approach to Graph Processing**  
*Davide Bacciu, Federico Errica, Alessio Micheli*
- #139 Learning Continuous Hierarchies in the Lorentz Model of Hyperbolic Geometry**  
*Maximillian Nickel, Douwe Kiela*
- #140 Fast Variance Reduction Method with Stochastic Batch Size**  
*University of California Xuanqing Liu, Cho-Jui Hsieh*
- #141 Lyapunov Functions for First-Order Methods: Tight Automated Convergence Guarantees**  
*Adrien Taylor, Bryan Van Scoy, Laurent Lessard*
- #142 Nonparametric Regression with Comparisons: Escaping the Curse of Dimensionality with Ordinal Information**  
*Yichong Xu, Hariank Muthakana, Sivaraman Balakrishnan, Aarti Singh, Artur Dubrawski*
- #143 The Well-Tempered Lasso**  
*Yuanzhi Li, Yoram Singer*
- #144 Transfer Learning via Learning to Transfer**  
*Ying WEI, Yu Zhang, Junzhou Huang, Qiang Yang*
- #145 Pseudo-task Augmentation: From Deep Multitask Learning to Intratask Sharing—and Back**  
*Elliot Meyerson, Risto Miikkulainen*
- #146 Analysis of Minimax Error Rate for Crowdsourcing and Its Application to Worker Clustering Model**  
*Hideaki Imamura, Issei Sato, Masashi Sugiyama*
- #147 Deep One-Class Classification**  
*Lukas Ruff, Nico Görnitz, Lucas Deecke, Shoaib Ahmed Siddiqui, Rob Vandermeulen, Alexander Binder, Emmanuel Müller, Marius Kloft*
- #148 Binary Partitions with Approximate Minimum Impurity**  
*Eduardo Lober, Marco Molinaro, Felipe de A. Mello Pereira*
- #149 Beyond 1/2-Approximation for Submodular Maximization on Massive Data Streams**  
*Ashkan Norouzi-Fard, Jakub Tarnawski, Boba Mitrovic, Amir Zandieh, Aida Mousavifar Mousavifar, Ola Svensson*
- #150 Yes, but Did It Work?: Evaluating Variational Inference**  
*Yuling Yao, Aki Vehtari, Daniel Simpson, Andrew Gelman*
- #151 Black-Box Variational Inference for Stochastic Differential Equations**  
*Tom Ryder, Andrew Golightly, Stephen McGough, Dennis Prangle*
- #152 Online Convolutional Sparse Coding with Sample-Dependent Dictionary**  
*Yaqing WANG, Quanming Yao, James Kwok, Lionel NI*
- #153 Learning to Speed Up Structured Output Prediction**  
*Xingyuan Pan, Vivek Srikumar*



- #154 Differentially Private Identity and Equivalence Testing of Discrete Distributions**  
*Maryam Aliakbarpour, Ilias Diakonikolas, MIT Ronitt Rubinfeld*
- #155 Information Theoretic Guarantees for Empirical Risk Minimization with Applications to Model Selection and Large-Scale Optimization**  
*Ibrahim Alabdulmohsin*
- #156 BOCK : Bayesian Optimization with Cylindrical Kernels**  
*ChangYong Oh, Stratis Gavves, Max Welling*
- #157 BOHB: Robust and Efficient Hyperparameter Optimization at Scale**  
*Stefan Falkner, Aaron Klein, Frank Hutter*
- #158 Distributed Nonparametric Regression under Communication Constraints**  
*Yuancheng Zhu, John Lafferty*
- #159 Optimal Tuning for Divide-and-conquer Kernel Ridge Regression with Massive Data**  
*Ganggang Xu, Zuofeng Shang, Guang Cheng*
- #160 WHInter: A Working set algorithm for High-dimensional sparse second order Interaction models**  
*Marine LE MORVAN, JP Vert*
- #161 Safe Element Screening for Submodular Function Minimization**  
*Weizhong Zhang, Bin Hong, Lin Ma, Wei Liu, Tong Zhang*
- #162 Feedback-Based Tree Search for Reinforcement Learning**  
*Daniel Jiang, Emmanuel Ekwedike, Han Liu*
- #163 Transfer in Deep Reinforcement Learning Using Successor Features and Generalised Policy Improvement**  
*Andre Barreto, Diana Borsa, John Quan, Tom Schaul, David Silver, Matteo Hessel, Daniel J. Mankowitz, Augustin Zidek, Remi Munos*
- #164 Data-Dependent Stability of Stochastic Gradient Descent**  
*Ilya Kuzborskij, Christoph Lampert*
- #165 LeapsAndBounds: A Method for Approximately Optimal Algorithm Configuration**  
*Gellért Weisz, Andras Gyorgy, Csaba Szepesvari*
- #166 Scalable Deletion-Robust Submodular Maximization: Data Summarization with Privacy and Fairness Constraints**  
*Ehsan Kazemi, Morteza Zadimoghaddam, Amin Karbasi*
- #167 Covariate Adjusted Precision Matrix Estimation via Nonconvex Optimization**  
*Jinghui Chen, Pan Xu, Lingxiao Wang, Jian Ma, Quanquan Gu*
- #168 Comparing Dynamics: Deep Neural Networks versus Glassy Systems**  
*Marco Baity-Jesi, Levent Sagun, Mario Geiger, Stefano Spigler, Gerard Arous, Chiara Cammarota, Yann LeCun, Matthieu Wyart, Giulio Biroli*
- #169 An Optimal Control Approach to Deep Learning and Applications to Discrete-Weight Neural Networks**  
*Qianxiao Li, IHPC Shuji Hao*
- #170 Not All Samples Are Created Equal: Deep Learning with Importance Sampling**  
*Angelos Katharopoulos, Francois Fleuret*
- #171 Dynamical Isometry and a Mean Field Theory of CNNs: How to Train 10,000-Layer Vanilla Convolutional Neural Networks**  
*Lechao Xiao, Yasaman Bahri, Jascha Sohl-Dickstein, Samuel Schoenholz, Jeffrey Pennington*
- #172 Path Consistency Learning in Tsallis Entropy Regularized MDPs**  
*Yinlam Chow, Ofir Nachum, Mohammad Ghavamzadeh*
- #173 Lipschitz Continuity in Model-based Reinforcement Learning**  
*Kavosh Asadi, Dipendra Misra, Michael L. Littman*
- #174 Linear Spectral Estimators and an Application to Phase Retrieval**  
*Ramina Ghods, Andrew Lan, Tom Goldstein, Christoph Studer*
- #175 Testing Sparsity over Known and Unknown Bases**  
*Siddharth Barman, Arnab Bhattacharyya, Suprovat Ghoshal*
- #176 Inference Suboptimality in Variational Autoencoders**  
*Chris Cremer, Xuechen Li, David Duvenaud*
- #177 Semi-Implicit Variational Inference**  
*Mingzhang Yin, Mingyuan Zhou*
- #178 Variance Regularized Counterfactual Risk Minimization via Variational Divergence Minimization**  
*Hang Wu, May Wang*
- #179 Limits of Estimating Heterogeneous Treatment Effects: Guidelines for Practical Algorithm Design**  
*Ahmed M. Alaa Ibrahim, M van der Schaar*
- #180 A Semantic Loss Function for Deep Learning with Symbolic Knowledge**  
*Jingyi Xu, Zilu Zhang, Tal Friedman, Yitao Liang, Guy Van den Broeck*
- #181 Stabilizing Gradients for Deep Neural Networks via Efficient SVD Parameterization**  
*Jiong Zhang, Qi Lei, Inderjit Dhillon*
- #182 An Efficient Semismooth Newton based Algorithm for Convex Clustering**  
*Yancheng Yuan, Defeng Sun, Kim-Chuan Toh*
- #183 Lightweight Stochastic Optimization for Minimizing Finite Sums with Infinite Data**  
*Shuai Zheng, James Kwok*
- #184 Exploiting the Potential of Standard Convolutional Autoencoders for Image Restoration by Evolutionary Search**  
*Masanori SUGANUMA, Mete Ozay, Takayuki Okatani*
- #185 Efficient Neural Architecture Search via Parameters Sharing**  
*Hieu Pham, Melody Guan, Barret Zoph, Quoc Le, Jeff Dean*
- #186 Non-convex Conditional Gradient Sliding**  
*chao qu, Yan Li, Huan Xu*
- #187 Stochastic Variance-Reduced Cubic Regularized Newton Method**  
*Dongruo Zhou, Pan Xu, Quanquan Gu*
- #188 On the Optimization of Deep Networks: Implicit Acceleration by Overparameterization**  
*Sanjeev Arora, Nadav Cohen, Elad Hazan*
- #189 The Dynamics of Learning: A Random Matrix Approach**  
*Zhenyu Liao, Romain Couillet*
- #190 Learning K-way D-dimensional Discrete Codes for Compact Embedding Representations**  
*Ting Chen, Martin Rezag Min, Yizhou Sun*
- #191 Discovering Interpretable Representations for Both Deep Generative and Discriminative Models**  
*Tameem Adel, Zoubin Ghahramani, Adrian Weller*



- #192 Continuous-Time Flows for Efficient Inference and Density Estimation**  
*Changyou Chen, Chunyuan Li, Liqun Chen, Wenlin Wang, Yunchen Pu, Lawrence Carin*
- #193 Tighter Variational Bounds are Not Necessarily Better**  
*Tom Rainforth, Adam Kosiorek, Tuan Anh Le, Chris Maddison, Max Igl, Frank Wood, Yee Whye Teh*
- #194 PredRNN++: Towards A Resolution of the Deep-in-Time Dilemma in Spatiotemporal Predictive Learning**  
*Yunbo Wang, Zhifeng Gao, Mingsheng Long, Jianmin Wang, Philip Yu*
- #195 RadialGAN: Leveraging multiple datasets to improve target-specific predictive models using Generative Adversarial Networks**  
*Jinsung Yoon, James Jordon, Mihaela van der Schaar*
- #196 Differentiable Compositional Kernel Learning for Gaussian Processes**  
*Shengyang Sun, Guodong Zhang, Chaoqi Wang, Wenyuan Zeng, Jiaman Li, Roger Grosse*
- #197 Markov Modulated Gaussian Cox Processes for Semi-Stationary Intensity Modeling of Events Data**  
*Minyoung Kim*
- #198 Improved Regret Bounds for Thompson Sampling in Linear Quadratic Control Problems**  
*Marc Abeille, Alessandro Lazaric*
- #199 Design of Experiments for Model Discrimination Hybridising Analytical and Data-Driven Approaches**  
*Simon Olofsson, Marc P Deisenroth, Ruth Misener*
- #200 Anonymous Walk Embeddings**  
*Sergey Ivanov, Evgeny Burnaev*
- #201 Improving Optimization in Models With Continuous Symmetry Breaking**  
*Robert Bamler, Stephan Mandt*
- #202 Conditional Noise-Contrastive Estimation of Unnormalised Models**  
*Ciwan Ceylan, Michael Gutmann*
- #203 Canonical Tensor Decomposition for Knowledge Base Completion**  
*Timothee Lacroix, Nicolas Usunier, Guillaume R Obozinski*
- #204 The Power of Interpolation: Understanding the Effectiveness of SGD in Modern Over-parametrized Learning**  
*Siyuan Ma, Raef Bassily, Mikhail Belkin*
- #205 A Simple Stochastic Variance Reduced Algorithm with Fast Convergence Rates**  
*Kaiwen Zhou, Fanhua Shang, James Cheng*
- #206 Escaping Saddles with Stochastic Gradients**  
*Hadi Daneshmand, Jonas Kohler, Aurelien Lucchi, Thomas Hofmann*
- #207  $\$D^2\$$ : Decentralized Training over Decentralized Data**  
*Hanlin Tang, Xiangru Lian, Ming Yan, Ce Zhang, Ji Liu*
- #208 Machine Theory of Mind**  
*Neil Rabinowitz, Frank Perbet, Francis Song, Chiyuan Zhang, S. M. Ali Eslami, Matthew Botvinick*
- #209 Been There, Done That: Meta-Learning with Episodic Recall**  
*Sam Ritter, Jane Wang, Zeb Kurth-Nelson, Siddhant Jayakumar, Charles Blundell, Razvan Pascanu, Matthew Botvinick*
- #210 Faster Derivative-Free Stochastic Algorithm for Shared Memory Machines**  
*Bin Gu, Zhouyuan Huo, Cheng Deng, Heng Huang*
- #211 Coded Sparse Matrix Multiplication**  
*Sinong Wang, Jiashang Liu, Ness Shroff*
- #212 Augment and Reduce: Stochastic Inference for Large Categorical Distributions**  
*Francisco Ruiz, Michalis Titsias, Adji Bousso Dieng, David Blei*
- #213 Efficient Gradient-Free Variational Inference using Policy Search**  
*Oleg Arenz, Gerhard Neumann, Mingjun Zhong*
- #214 Fixing a Broken ELBO**  
*Alex Alemi, Ben Poole, Iansf Fischer, Josh V Dillon, Rif Saurous, Kevin Murphy*
- #215 Variational Inference and Model Selection with Generalized Evidence Bounds**  
*Liqun Chen, Chenyang Tao, RUIYI ZHANG, Ricardo Henao, Lawrence Carin*
- #216 The Generalization Error of Dictionary Learning with Moreau Envelopes**  
*ALEXANDROS GEORGOGIANNIS*
- #217 Network Global Testing by Counting Graphlets**  
*Jiashun Jin, Zheng Ke, Shengming Luo*

# Thursday

JULY 12TH | SESSIONS



TIME	DESCRIPTION	LOCATION	TIME	DESCRIPTION	LOCATION
9:00 am	<b>Invited Talk: Max Welling</b> Intelligence per Kilowatthour	A1	2:30 pm	<b>SESSION 2B</b> Reinforcement Learning	A1
10:00 am	Best Paper	A1		Kernel Methods	A3
10:30 am	Coffee Break	Hall B		Graphical Models	A4
11:00 am	<b>SESSION 1</b> Reinforcement Learning	A1		Online Learning	A5
	Multi-Agent Learning	A3		Supervised Learning	A6
	Gaussian Processes	A4		Deep Learning (Adversarial)	A7
	Structured Prediction	A5		Optimization (Convex)	A9
	Privacy, Anonymity, and Security	A6		Deep Learning (Theory)	K1
	Generative Models	A7		Large Scale Learning and Big Data	K11
	Parallel and Distributed Learning	A9		Deep Learning (Neural Network Architectures)	Victoria
	Other Applications	K1	3:30 pm	Coffee Break	Hall B
	Matrix Factorization	K11	4:00 pm	<b>SESSION 3</b> Reinforcement Learning	A1
	Deep Learning (Neural Network Architectures)	Victoria		Natural Language and Speech Processing	A3
12 pm	<b>LUNCH (On Your Own)</b>			Deep Learning (Bayesian)	A4
12:30	<b>European Research Council Funding Information</b>	K1		Online Learning	A5
1:30 pm	<b>SESSION 2A</b> Reinforcement Learning	A1		Supervised Learning	A6
	Optimization (Bayesian)	A3		Deep Learning (Adversarial)	A7
	Monte Carlo Methods	A4		Optimization (Non-Convex)	A9
	Ranking and Preference Learning	A5		Deep Learning (Theory)	K1
	Supervised Learning	A6		Optimization (Combinatorial)	K11
	Deep Learning (Adversarial)	A7		Deep Learning (Neural Network Architectures)	Victoria
	Optimization (Convex)	A9	6:15 pm	Poster Session	Hall B
	Deep Learning (Theory)	K1			
	Large Scale Learning and Big Data	K11			
	Deep Learning (Neural Network Architectures)	Victoria			





**SESSION 1 - 11:00 AM - 12:00 PM**

**Reinforcement Learning**

Location: A1

- **Convergent Tree Backup and Retrace with Function Approximation**  
Ahmed Touati, Pierre-Luc Bacon, Doina Precup, Pascal Vincent
- **SBEED: Convergent Reinforcement Learning with Nonlinear Function Approximation**  
Bo Dai, Albert Shaw, Lihong Li, Lin Xiao, Niao He, Zhen Liu, Jianshu Chen, Le Song
- **Scalable Bilinear Pi Learning Using State and Action Features**  
Yichen Chen, Lihong Li, Mengdi Wang
- **Stochastic Variance-Reduced Policy Gradient**  
Matteo Papini, Damiano Binaghi, Giuseppe Canonaco, Matteo Pirota, Marcello Restelli

**Multi-Agent Learning**

Location: A3

- **Learning to Coordinate with Coordination Graphs in Repeated Single-Stage Multi-Agent Decision Problems**  
Eugenio Bargiacchi, Timothy Verstraeten, Diederik Roijers, Ann Nowé, Hado van Hasselt
- **Learning to Act in Decentralized Partially Observable MDPs**  
Jilles Dibangoye, Olivier Buffet
- **Modeling Others using Oneself in Multi-Agent Reinforcement Learning**  
Roberta Raileanu, Emily Denton, Arthur Szlam, Facebook Rob Fergus
- **QMIX: Monotonic Value Function Factorisation for Deep Multi-Agent Reinforcement Learning**  
Tabish Rashid, Mikayel Samvelyan, Christian Schroeder, Gregory Farquhar, Jakob Foerster, Shimon Whiteson
- **Learning Policy Representations in Multiagent Systems**  
Aditya Grover, Maruan Al-Shedivat, Jayesh Gupta, Yura Burda, Harrison Edwards

**Gaussian Processes**

Location: A4

- **Learning unknown ODE models with Gaussian processes**  
Markus Heinonen, Cagatay Yildiz, Henrik Mannerström, Jukka Intosalmi, Harri Lähdesmäki
- **Constraining the Dynamics of Deep Probabilistic Models**  
Marco Lorenzi, Maurizio Filippone
- **Probabilistic Recurrent State-Space Models**  
Andreas Doerr, Christian Daniel, Martin Schiegg, Duy Nguyen-Tuong, Stefan Schaal, Marc Toussaint, Sebastian Trimpe
- **Structured Variationally Auto-encoded Optimization**  
Xiaoyu Lu, Javier González, Zhenwen Dai, Neil Lawrence

**Structured Prediction**

Location: A5

- **Learning Maximum-A-Posteriori Perturbation Models for Structured Prediction in Polynomial Time**  
Asish Ghoshal, Jean Honorio
- **Differentiable Dynamic Programming for Structured Prediction and Attention**  
Arthur Mensch, Mathieu Blondel
- **Structured Output Learning with Abstention: Application to Accurate Opinion Prediction**  
Alexandre Garcia, Telecom-ParisTech Chloé Clavel, Slim ESSID, Florence d’Alche-Buc
- **End-to-End Learning for the Deep Multivariate Probit Model**  
Di Chen, Yexiang Xue, Carla Gomes

**Privacy, Anonymity, and Security**

Location: A6

- **Multicalibration: Calibration for the (Computationally-Identifiable) Masses**  
Ursula Hebert-Johnson, Michael Kim, Omer Reingold, Guy Rothblum
- **Residual Unfairness in Fair Machine Learning from Prejudiced Data**  
Nathan Kallus, Angela Zhou
- **Improving the Gaussian Mechanism for Differential Privacy: Analytical Calibration and Optimal Denoising**  
Borja de Balle Pigem, Yu-Xiang Wang
- **Improving the Privacy and Accuracy of ADMM-Based Distributed Algorithms**  
Xueru Zhang, Mohammad Khalili, Mingyan Liu
- **Adversarial Regression with Multiple Learners**  
Liang Tong, Sixie Yu, Scott Alfeld, Yevgeniy Vorobeychik



## SESSION 1 - 11:00 AM - 12:00 PM

### Generative Models

Location: A7

- **Adversarial Learning with Local Coordinate Coding**  
Jiezhong Cao, Yong Guo, Qingyao Wu, Chunhua Shen, Junzhou Huang, Mingkui Tan
- **Geometry Score: A Method For Comparing Generative Adversarial Networks**  
Valentin Khruikov, Ivan Oseledets
- **Optimizing the Latent Space of Generative Networks**  
Piotr Bojanowski, Armand Joulin, David Lopez-Paz, Arthur Szlam
- **Learning Representations and Generative Models for 3D Point Clouds**  
Panos Achlioptas, Olga Diamanti, Ioannis Mitliagkas, Leonidas Guibas
- **Theoretical Analysis of Image-to-Image Translation with Adversarial Learning**  
Morino Pan, Mi Zhang, Daizong Ding

### Parallel and Distributed Learning

Location: A9

- **Exploring Hidden Dimensions in Accelerating Convolutional Neural Networks**  
Zhihao Jia, Sina Lin, Charles Qi, Alex Aiken
- **Error Compensated Quantized SGD and its Applications to Large-scale Distributed Optimization**  
Jiaxiang Wu, Weidong Huang, Junzhou Huang, Tong Zhang
- **DICOD: Distributed Convolutional Coordinate Descent for Convolutional Sparse Coding**  
CMLA Thomas Moreau, Laurent Oudre, CMLA Nicolas Vayatis
- **Distributed Asynchronous Optimization with Unbounded Delays: How Slow Can You Go?**  
Zhengyuan Zhou, Panayotis Mertikopoulos, Nicholas Bambos, Peter Glynn, Yinyu Ye, Li-Jia Li, Li Fei-Fei

### Other Applications

Location: K1

- **Learning Memory Access Patterns**  
Milad Hashemi, Kevin Swersky, Jamie Smith, Grant Ayers, Heiner Litz, Jichuan Chang, Christos Kozyrakis, Partha Ranganathan
- **Geodesic Convolutional Shape Optimization**  
Pierre Baque, Edoardo Remelli, Francois Fleuret, EPFL Pascal Fua

- **AutoPrognosis: Automated Clinical Prognostic Modeling via Bayesian Optimization with Structured Kernel Learning**  
Ahmed M. Alaa Ibrahim, M van der Schaar
- **TAPAS: Tricks to Accelerate (encrypted) Prediction As a Service**  
Amartya Sanyal, Matt Kusner, Adria Gascon, Varun Kanade

### Matrix Factorization

Location: K11

- **Probabilistic Boolean Tensor Decomposition**  
Tammo Rukat, Christopher Holmes, Christopher Yau
- **A Primal-Dual Analysis of Global Optimality in Nonconvex Low-Rank Matrix Recovery**  
Xiao Zhang, Lingxiao Wang, Yaodong Yu, Quanquan Gu
- **Implicit Regularization in Nonconvex Statistical Estimation: Gradient Descent Converges Linearly for Phase Retrieval and Matrix Completion**  
Cong Ma, Kaizheng Wang, Yuejie Chi, Yuxin Chen
- **Learning Binary Latent Variable Models: A Tensor Eigenpair Approach**  
Ariel Jaffe, Roi Weiss, Boaz Nadler, Shai Carmi, Yuval Kluger
- **Closed-form Marginal Likelihood in Gamma-Poisson Matrix Factorization**  
Louis Filstroff, Alberto Lumbreras, Cedric Fevotte

### Deep Learning (Neural Network Architectures)

Location: Victoria

- **Not to Cry Wolf: Distantly Supervised Multitask Learning in Critical Care**  
Patrick Schwab, Emanuela Keller, Carl Muroi, David J. Mack, Christian Strässle, Walter Karlen
- **Compressing Neural Networks using the Variational Information Bottleneck**  
Bin Dai, Chen Zhu, Baining Guo, David Wipf
- **Kernelized Synaptic Weight Matrices**  
Lorenz Müller, Julien Martel, Giacomo Indiveri
- **Deep Models of Interactions Across Sets**  
Jason Hartford, Devon Graham, Kevin Leyton-Brown, Siamak Ravanbakhsh



## SESSION 2A - 1:30 PM - 2:30 PM

### Reinforcement Learning

Location: A1

- **Investigating Human Priors for Playing Video Games**  
Rachit Dubey, Pulkit Agrawal, Deepak Pathak, Tom Griffiths, Alexei Efros
- **Can Deep Reinforcement Learning Solve Erdos-Selfridge-Spencer Games?**  
Maithra Raghu, Alex Irpan, Jacob Andreas, Bobby Kleinberg, Quoc Le, Jon Kleinberg
- **GEP-PG: Decoupling Exploration and Exploitation in Deep Reinforcement Learning Algorithms**  
Cédric Colas, Olivier Sigaud, Pierre-Yves Oudeyer
- **Time Limits in Reinforcement Learning**  
Fabio Pardo, Arash Tavakoli, Vitaly Levnik, Petar Kormushev
- **Visualizing and Understanding Atari Agents**  
Samuel Greydanus, Anurag Koul, Jonathan Dodge, Alan Fern

### Optimization (Bayesian)

Location: A3

- **Fast Information-theoretic Bayesian Optimisation**  
Robin Ru, Michael A Osborne, Mark Mcleod, Diego Granzio
- **Optimization, fast and slow: optimally switching between local and Bayesian optimization**  
Mark McLeod, Stephen Roberts, Michael A Osborne
- **Batch Bayesian Optimization via Multi-objective Acquisition Ensemble for Automated Analog Circuit Design**  
Wenlong Lyu, Fan Yang, Changhao Yan, Dian Zhou, Xuan Zeng
- **Tight Regret Bounds for Bayesian Optimization in One Dimension**  
Jonathan Scarlett

### Monte Carlo Methods

Location: A4

- **Error Estimation for Randomized Least-Squares Algorithms via the Bootstrap**  
Miles Lopes, Shusen Wang, Michael Mahoney
- **Asynchronous Stochastic Quasi-Newton MCMC for Non-Convex Optimization**  
Umut Simsekli, Cagatay Yildiz, Thanh Huy Nguyen, Ali Cemgil, Gaël RICHARD
- **Stochastic Variance-Reduced Hamilton Monte Carlo Methods**  
Difan Zou, Pan Xu, Quanquan Gu

- **A Robust Approach to Sequential Information Theoretic Planning**  
Sue Zheng, Jason Pacheco, John Fisher
- **Discrete-Continuous Mixtures in Probabilistic Programming: Generalized Semantics and Inference Algorithms**  
Yi Wu, Siddharth Srivastava, Nicholas Hay, Simon Du, Stuart Russell

### Ranking and Preference Learning

Location: A5

- **Accelerated Spectral Ranking**  
Arpit Agarwal, Prathamesh Patil, Shivani Agarwal
- **Composite Marginal Likelihood Methods for Random Utility Models**  
Zhibing Zhao, Lirong Xia
- **Ranking Distributions based on Noisy Sorting**  
Adil El Mesaoudi-Paul, Eyke Hüllermeier, Robert Busa-Fekete
- **SQL-Rank: A Listwise Approach to Collaborative Ranking**  
LIWEI WU, Cho-Jui Hsieh, University of California James Sharpnack
- **Extreme Learning to Rank via Low Rank Assumption**  
Minhao Cheng, Ian Davidson, Cho-Jui Hsieh

### Supervised Learning

Location: A6

- **Prediction Rule Reshaping**  
Matt Bonakdarpour, Sabyasachi Chatterjee, Rina Barber, John Lafferty
- **Noise2Noise: Learning Image Restoration without Clean Data**  
Jaakko Lehtinen, Jacob Munkberg, Jon Hasselgren, Samuli Laine, Tero Karras, Miika Aittala, Timo Aila
- **Inductive Two-Layer Modeling with Parametric Bregman Transfer**  
Vignesh Ganapathiraman, Zhan Shi, Xinhua Zhang, Yaoliang Yu
- **Does Distributionally Robust Supervised Learning Give Robust Classifiers?**  
Weihua Hu, Gang Niu, Issei Sato, Masashi Sugiyama
- **Finding Influential Training Samples for Gradient Boosted Decision Trees**  
Boris Sharchilev, Yury Ustinovskiy, Pavel Serdyukov, Maarten de Rijke



## SESSION 2A - 1:30 PM - 2:30 PM

### Deep Learning (Adversarial)

Location: A7

- **Composite Functional Gradient Learning of Generative Adversarial Models**  
Rie Johnson, Tong Zhang
- **Tempered Adversarial Networks**  
Mehdi S. M. Sajjadi, Giambattista Parascandolo, Arash Mehrjou, Bernhard Schölkopf
- **Improved Training of Generative Adversarial Networks Using Representative Features**  
Duhyeon Bang, Hyunjung Shim
- **A Two-Step Computation of the Exact GAN Wasserstein Distance**  
Huidong Liu, Xianfeng GU, Samaras Dimitris
- **Is Generator Conditioning Causally Related to GAN Performance?**  
Augustus Odena, Jacob Buckman, Catherine Olsson, Tom B Brown, Christopher Olah, Colin Raffel, Ian Goodfellow

### Optimization (Convex)

Location: A9

- **Shampoo: Preconditioned Stochastic Tensor Optimization**  
Vineet Gupta, Tomer Koren, Yoram Singer
- **Characterizing Implicit Bias in Terms of Optimization Geometry**  
Suriya Gunasekar, Jason Lee, Daniel Soudry, Nati Srebro
- **A Distributed Second-Order Algorithm You Can Trust**  
Celestine Dünnner, Aurelien Lucchi, Matilde Gargiani, An Bian, Thomas Hofmann, Martin Jaggi
- **A Delay-tolerant Proximal-Gradient Algorithm for Distributed Learning**  
Konstantin Mishchenko, Franck Iutzeler, Jérôme Malick, Massih-Reza Amini
- **Gradient Coding from Cyclic MDS Codes and Expander Graphs**  
Netanel Raviv, Rashish Tandon, Alex Dimakis, Itzhak Tamo

### Deep Learning (Theory)

Location: K1

- **Learning One Convolutional Layer with Overlapping Patches**  
Surbhi Goel, Adam Klivans, Raghu Meka

- **Gradient Descent Learns One-hidden-layer CNN: Don't be Afraid of Spurious Local Minima**  
Simon Du, Jason Lee, Yuandong Tian, Aarti Singh, Barnabás Póczos
- **The Multilinear Structure of ReLU Networks**  
Thomas Laurent, James von Brecht
- **Understanding the Loss Surface of Neural Networks for Binary Classification**  
SHIYU LIANG, Ruoyu Sun, Yixuan Li, R Srikant

### Large Scale Learning and Big Data

Location: K11

- **Improved large-scale graph learning through ridge spectral sparsification**  
Daniele Calandriello, Alessandro Lazaric, Ioannis Koutis, Michal Valko
- **Parallel and Streaming Algorithms for K-Core Decomposition**  
Hossein Esfandiari, Silvio Lattanzi, Vahab Mirrokni
- **Fast Approximate Spectral Clustering for Dynamic Networks**  
Lionel Martin, Andreas Loukas, Pierre Vandergheynst
- **Matrix Norms in Data Streams: Faster, Multi-Pass and Row-Order**  
Vladimir Braverman, Stephen Chestnut, Robert Krauthgamer, Yi Li, David Woodruff, Lin Yang

### Deep Learning (Neural Network Architectures)

Location: Victoria

- **Learn from Your Neighbor: Learning Multi-modal Mappings from Sparse Annotations**  
Ashwin Kalyan, Stefan Lee, Anitha Kannan, Dhruv Batra
- **Focused Hierarchical RNNs for Conditional Sequence Processing**  
Nan Ke, Konrad Zolna, Alessandro Sordani, MILA Zhouhan Lin, Adam Trischler, Yoshua Bengio, Joelle Pineau, Laurent Charlin, Christopher Pal
- **Learning long term dependencies via Fourier recurrent units**  
Jiong Zhang, Yibo Lin, Zhao Song, Inderjit Dhillon
- **Training Neural Machines with Trace-Based Supervision**  
Matthew Mirman, Dimitar Dimitrov, Pavle Djordjevic, Timon Gehr, Martin Vechev





## SESSION 2B - 2:30 PM - 3:30 PM

### Reinforcement Learning

Location: A1

- **The Mirage of Action-Dependent Baselines in Reinforcement Learning**  
George Tucker, Surya Bhupatiraju, Shixiang Gu, Richard E Turner, Zoubin Ghahramani, Sergey Levine
- **Smoothed Action Value Functions for Learning Gaussian Policies**  
Ofir Nachum, Mohammad Norouzi, George Tucker, Dale Schuurmans
- **Soft Actor-Critic: Off-Policy Maximum Entropy Deep Reinforcement Learning with a Stochastic Actor**  
Tuomas Haarnoja, Aurick Zhou, Pieter Abbeel, Sergey Levine
- **Addressing Function Approximation Error in Actor-Critic Methods**  
Scott Fujimoto, Herke van Hoof, David Meger

### Kernel Methods

Location: A3

- **Learning in Reproducing Kernel Kreĭn Spaces**  
Dino Oglıc, Thomas Gaertner
- **Differentially Private Database Release via Kernel Mean Embeddings**  
Matej Balog, Ilya Tosltikhin, Bernhard Schölkopf
- **To Understand Deep Learning We Need to Understand Kernel Learning**  
Mikhail Belkin, Siyuan Ma, Soumik Mandal
- **Kernel Recursive ABC: Point Estimation with Intractable Likelihood**  
Takafumi Kajihara, Motonobu Kanagawa, Keisuke Yamazaki, Kenji Fukumizu

### Graphical Models

Location: A4

- **Robust and Scalable Models of Microbiome Dynamics**  
Travis Gibson, Georg Gerber
- **Stein Variational Message Passing for Continuous Graphical Models**  
Dilin Wang, Zhe Zeng, Qiang Liu

- **A Fast and Scalable Joint Estimator for Integrating Additional Knowledge in Learning Multiple Related Sparse Gaussian Graphical Models**  
Beilun Wang, Arshdeep Sekhon, Yanjun Qi
- **Large-Scale Sparse Inverse Covariance Estimation via Thresholding and Max-Det Matrix Completion**  
Richard Zhang, Salar Fattahi, Somayeh Sojoudi
- **Bucket Renormalization for Approximate Inference**  
Sungsoo Ahn, Misha Chertkov, Adrian Weller, Jinwoo Shin

### Online Learning

Location: A5

- **Feasible Arm Identification**  
Julian Katz-Samuels, Clay Scott
- **Bandits with Delayed, Aggregated Anonymous Feedback**  
Ciara Pike-Burke, Shipra Agrawal, Csaba Szepesvari, Steffen Grünewälder
- **Make the Minority Great Again: First-Order Regret Bound for Contextual Bandits**  
Zeyuan Allen-Zhu, Sebastien Bubeck, Yuanzhi Li
- **Thompson Sampling for Combinatorial Semi-Bandits**  
Siwei Wang, Wei Chen

### Supervised Learning

Location: A6

- **Dimensionality-Driven Learning with Noisy Labels**  
Daniel Ma, Yisen Wang, Michael E. Houle, Shuo Zhou, Sarah Erfani, Shutao Xia, Sudanthi Wijewickrema, James Bailey
- **MentorNet: Learning Data-Driven Curriculum for Very Deep Neural Networks on Corrupted Labels**  
Lu Jiang, Zhengyuan Zhou, Thomas Leung, Li-Jia Li, Li Fei-Fei
- **Learning to Reweight Examples for Robust Deep Learning**  
Mengye Ren, Wenyuan Zeng, Bin Yang, Raquel Urtasun
- **Curriculum Learning by Transfer Learning: Theory and Experiments with Deep Networks**  
Daphna Weinshall, Gad A Cohen, Dan Amir
- **Improving Regression Performance with Distributional Losses**  
Ehsan Imani, Martha White



**SESSION 2B - 2:30 PM - 3:30 PM**

**Deep Learning (Adversarial)**

Location: A7

- **Black-box Adversarial Attacks with Limited Queries and Information**  
Andrew Ilyas, Logan Engstrom, Anish Athalye, Jessy Lin
- **Obfuscated Gradients Give a False Sense of Security: Circumventing Defenses to Adversarial Examples**  
Anish Athalye, Nicholas Carlini, David Wagner
- **Adversarial Attack on Graph Structured Data**  
Hanjun Dai, Hui Li, Tian Tian, huangxin Huang, Lin Wang, Jun Zhu, Le Song
- **GAIN: Missing Data Imputation using Generative Adversarial Nets**  
Jinsung Yoon, James Jordon, Mihaela van der Schaar

**Optimization (Convex)**

Location: A9

- **Alternating Randomized Block Coordinate Descent**  
Jelena Diakonikolas, Orecchia Lorenzo
- **Randomized Block Cubic Newton Method**  
Nikita Doikov, Abdullah Peter Richtarik
- **Accelerating Greedy Coordinate Descent Methods**  
Haihao Lu, Robert Freund, Vahab Mirrokni
- **On Acceleration with Noise-Corrupted Gradients**  
Michael Cohen, Jelena Diakonikolas, Orecchia Lorenzo

**Deep Learning (Theory)**

Location: K1

- **Tropical Geometry of Deep Neural Networks**  
Liwen Zhang, Gregory Naisat, Lek-Heng Lim
- **A Spline Theory of Deep Learning**  
Randall Balestriero, Richard Baraniuk
- **Neural Networks Should Be Wide Enough to Learn Disconnected Decision Regions**  
Quynh Nguyen, Mahesh Mukkamala, Matthias Hein
- **Stronger Generalization Bounds for Deep Nets via a Compression Approach**  
Sanjeev Arora, Rong Ge, Behnam Neyshabur, Yi Zhang

**Large Scale Learning and Big Data**

Location: K11

- **Near Optimal Frequent Directions for Sketching Dense and Sparse Matrices**  
Zengfeng Huang
- **Loss Decomposition for Fast Learning in Large Output Spaces**  
Ian Yen, Satyen Kale, Felix Xinnan Yu, Daniel Holtmann-Rice, Sanjiv Kumar, Pradeep Ravikumar
- **Ultra Large-Scale Feature Selection using Count-Sketches**  
Amirali Aghazadeh, Ryan Spring, Daniel LeJeune, Gautam Dasarathy, Anshumali Shrivastava, Richard Baraniuk
- **Approximate Leave-One-Out for Fast Parameter Tuning in High Dimensions**  
Shuaiwen Wang, Wenda Zhou, Haihao Lu, Arian Maleki, Vahab Mirrokni
- **Semi-Supervised Learning on Data Streams via Temporal Label Propagation**  
Tal Wagner, Sudipto Guha, Shiva Kasiviswanathan, Nina Mishra

**Deep Learning (Neural Network Architectures)**

Location: Victoria

- **Neural Dynamic Programming for Musical Self Similarity**  
Christian Walder, Dongwoo Kim
- **A Hierarchical Latent Vector Model for Learning Long-Term Structure in Music**  
Adam Roberts, Jesse Engel, Colin Raffel, Curtis "Fjord" Hawthorne, Douglas Eck
- **Fast Decoding in Sequence Models Using Discrete Latent Variables**  
Lukasz M Kaiser, Samy Bengio, Aurko Roy, Ashish Vaswani, Niki Parmar, Jakob Uszkoreit, Noam Shazeer
- **PixelSNAIL: An Improved Autoregressive Generative Model**  
Xi Chen, Nikhil Mishra, Mostafa Rohaninejad, Pieter Abbeel
- **Image Transformer**  
Niki Parmar, Ashish Vaswani, Jakob Uszkoreit, Lukasz M Kaiser, Noam Shazeer, Alexander Ku, Dustin Tran



**SESSION 3 - 4:00 PM - 6:00 PM**

**Reinforcement Learning**

Location: A1

- **Configurable Markov Decision Processes**  
Alberto Maria Metelli, Mirco Mutti, Marcello Restelli
- **Beyond the One-Step Greedy Approach in Reinforcement Learning**  
Yonathan Efroni, Gal Dalal, Bruno Scherrer, Shie Mannor
- **Policy and Value Transfer in Lifelong Reinforcement Learning**  
David Abel, Yuu Jinnai, Sophie Guo, George Konidaris, Michael L. Littman
- **Importance Weighted Transfer of Samples in Reinforcement Learning**  
Andrea Tirinzoni, Andrea Sessa, Matteo Pirota, Marcello Restelli

**Natural Language and Speech Processing**

Location: A3

- **Towards Binary-Valued Gates for Robust LSTM Training**  
Zhuohan Li, Di He, Fei Tian, Wei Chen, Tao Qin, Liwei Wang, Tie-Yan Liu
- **Towards End-to-End Prosody Transfer for Expressive Speech Synthesis with Tacotron**  
RJ Skerry-Ryan, Eric Battenberg, Ying Xiao, Yuxuan Wang, Daisy Stanton, Joel Shor, Ron Weiss, Rob Clark, Rif Saurous
- **Style Tokens: Unsupervised Style Modeling, Control and Transfer in End-to-End Speech Synthesis**  
Yuxuan Wang, Daisy Stanton, Yu Zhang, RJ-Skerry Ryan, Eric Battenberg, Joel Shor, Ying Xiao, Ye Jia, Fei Ren, Rif Saurous
- **Fitting New Speakers Based on a Short Untranscribed Sample**  
Eliya Nachmani, Adam Polyak, Yaniv Taigman, Lior Wolf

**Deep Learning (Bayesian)**

Location: A4

- **Variational Bayesian dropout: pitfalls and fixes**  
Jiri Hron, Alex Matthews, Zoubin Ghahramani
- **Calibrated Estimates of Predictive Uncertainty in Deep Learning**  
Volodymyr Kuleshov, Nathan Fenner, Stefano Ermon

- **Decomposition of Uncertainty in Bayesian Deep Learning for Efficient and Risk-sensitive Learning**  
Stefan Depeweg, Jose Hernandez-Lobato, Finale Doshi-Velez, Steffen Udluft
- **Scalable approximate Bayesian inference for particle tracking data**  
Ruoxi Sun, Department of Statistics Liam Paninski
- **Fast and Scalable Bayesian Deep Learning by Weight-Perturbation in Adam**  
Emti Khan, Didrik Nielsen, Voot Tangkaratt, Wu Lin, Yarin Gal, Akash Srivastava

**Online Learning**

Location: A5

- **Projection-Free Online Optimization with Stochastic Gradient: From Convexity to Submodularity**  
Lin Chen, Chris Harshaw, Hamed Hassani, Amin Karbasi
- **Practical Contextual Bandits with Regression Oracles**  
Dylan Foster, Alekh Agarwal, Miroslav Dudik, Haipeng Luo, Robert Schapire
- **Fast Stochastic AUC Maximization with  $\mathcal{O}(1/n)$ -Convergence Rate**  
Mingrui Liu, Xiaoxuan Zhang, Zaiyi Chen, Xiaoyu Wang, Tianbao Yang
- **Stochastic Proximal Algorithms for AUC Maximization**  
Michael Natole Jr, Yiming Ying, Siwei Lyu

**Supervised Learning**

Location: A6

- **Optimal Distributed Learning with Multi-pass Stochastic Gradient Methods**  
Junhong Lin, Volkan Cevher
- **Byzantine-Robust Distributed Learning: Towards Optimal Statistical Rates**  
Dong Yin, Yudong Chen, Kannan Ramchandran, Peter Bartlett
- **Functional Gradient Boosting based on Residual Network Perception**  
Atsushi Nitanda, Taiji Suzuki
- **Binary Classification with Karmic, Threshold-Quasi-Concave Metrics**  
Bowe Yan, Sanmi Koyejo, Kai Zhong, Pradeep Ravikumar



## SESSION 3 - 4:00 PM - 6:00 PM

### Deep Learning (Adversarial)

Location: A7

- **The Mechanics of n-Player Differentiable Games**  
David Balduzzi, Sebastien Racaniere, James Martens, Jakob Foerster, Karl Tuyls, Thore Graepel
- **K-Beam Minimax: Efficient Optimization for Deep Adversarial Learning**  
Jihun Hamm, Yung-Kyun Noh
- **First Order Generative Adversarial Networks**  
Calvin Seward, Thomas Unterthiner, Urs M Bergmann, Nikolay Jetchev, Sepp Hochreiter
- **Towards Fast Computation of Certified Robustness for ReLU Networks**  
Lily Weng, Huan Zhang, Hongge Chen, Zhao Song, Cho-Jui Hsieh, Luca Daniel, Duane Boning, Inderjit Dhillon
- **LaVAN: Localized and Visible Adversarial Noise**  
Danny Karmon, Daniel Zoran, Yoav Goldberg

### Optimization (Non-Convex)

Location: A9

- **Approximate message passing for amplitude based optimization**  
Junjie Ma, Ji Xu, Arian Maleki
- **Dissecting Adam: The Sign, Magnitude and Variance of Stochastic Gradients**  
Lukas Balles, Philipp Hennig
- **prDeep: Robust Phase Retrieval with a Flexible Deep Network**  
Christopher Metzler, Phil Schniter, Ashok Veeraraghavan, Richard Baraniuk
- **Accelerating Natural Gradient with Higher-Order Invariance**  
Yang Song, Jiaming Song, Stefano Ermon

### Deep Learning (Theory)

Location: K1

- **Understanding Generalization and Optimization Performance of Deep CNNs**  
Pan Zhou, Jiashi Feng
- **Reviving and Improving Recurrent Back-Propagation**  
Renjie Liao, Yuwen Xiong, Ethan Fetaya, Lisa Zhang, KiJung Yoon, xaq S Pitkow, Raquel Urtasun, Richard Zemel

- **Dynamical Isometry and a Mean Field Theory of RNNs: Gating Enables Signal Propagation in Recurrent Neural Networks**  
Minmin Chen, Jeffrey Pennington, Samuel Schoenholz
- **Invariance of Weight Distributions in Rectified MLPs**  
Russell Tsuchida, Fred Roosta, Marcus Gallagher
- **Learning Dynamics of Linear Denoising Autoencoders**  
Arnu Pretorius, Steve Kroon, Herman Kamper

### Optimization (Combinatorial)

Location: K11

- **Decentralized Submodular Maximization: Bridging Discrete and Continuous Settings**  
Aryan Mokhtari, Hamed Hassani, Amin Karbasi
- **Approximation Guarantees for Adaptive Sampling**  
Eric Balkanski, Yaron Singer
- **Greed is Still Good: Maximizing Monotone Submodular+Supermodular (BP) Functions**  
Wenruo Bai, Jeff Bilmes
- **Constrained Interacting Submodular Groupings**  
Andrew Cotter, Mahdi Milani Milani Fard, Seungil You, Maya Gupta, Jeff Bilmes
- **Fast Maximization of Non-Submodular, Monotonic Functions on the Integer Lattice**  
Alan Kuhnle, J. Smith, Victoria Crawford, My Thai

### Deep Learning (Neural Network Architectures)

Location: Victoria

- **Using Inherent Structures to design Lean 2-layer RBMs**  
Abhishek Bansal, Abhinav Anand, Chiru Bhattacharyya
- **Deep Asymmetric Multi-task Feature Learning**  
Hae Beom Lee, Eunho Yang, Sung Ju Hwang
- **Beyond Finite Layer Neural Networks: Bridging Deep Architectures and Numerical Differential Equations**  
Yiping Lu, Aoxiao Zhong, Quanzheng Li, Bin Dong
- **Extracting Automata from Recurrent Neural Networks Using Queries and Counterexamples**  
Gail Weiss, Yoav Goldberg, Eran Yahav
- **High Performance Zero-Memory Overhead Direct Convolutions**  
Jiyuan Zhang, Franz Franchetti, Tze Meng Low





- #1 **Large-Scale Sparse Inverse Covariance Estimation via Thresholding and Max-Det Matrix Completion**  
*Richard Zhang, Salar Fattahi, Somayeh Sojoudi*
- #2 **Robust and Scalable Models of Microbiome Dynamics**  
*Travis Gibson, Georg Gerber*
- #3 **Explicit Inductive Bias for Transfer Learning with Convolutional Networks**  
*Xuhong Li, Yves Grandvalet, Franck Davoine*
- #4 **GradNorm: Gradient Normalization for Adaptive Loss Balancing in Deep Multitask Networks**  
*Zhao Chen, Vijay Badrinarayanan, Chen-Yu Lee, Andrew Rabinovich*
- #5 **Optimizing the Latent Space of Generative Networks**  
*Piotr Bojanowski, Armand Joulin, David Lopez-Paz, Arthur Szlam*
- #6 **Theoretical Analysis of Image-to-Image Translation with Adversarial Learning**  
*Morino Pan, Mi Zhang, Daizong Ding*
- #7 **Soft Actor-Critic: Off-Policy Maximum Entropy Deep Reinforcement Learning with a Stochastic Actor**  
*Tuomas Haarnoja, Aurick Zhou, Pieter Abbeel, Sergey Levine*
- #8 **PIPPS: Flexible Model-Based Policy Search Robust to the Curse of Chaos**  
*Paavo Parmas, Carl E Rasmussen, Jan Peters, Kenji Doya*
- #9 **Probabilistic Recurrent State-Space Models**  
*Andreas Doerr, Christian Daniel, Martin Schiegg, Duy Nguyen-Tuong, Stefan Schaal, Marc Toussaint, Sebastian Trimpe*
- #10 **Structured Variationally Auto-encoded Optimization**  
*Xiaoyu Lu, Javier González, Zhenwen Dai, Neil Lawrence*
- #11 **A Robust Approach to Sequential Information Theoretic Planning**  
*Sue Zheng, Jason Pacheco, John Fisher*
- #12 **Error Estimation for Randomized Least-Squares Algorithms via the Bootstrap**  
*Miles Lopes, Shusen Wang, Michael Mahoney*
- #13 **Distributed Asynchronous Optimization with Unbounded Delays: How Slow Can You Go?**  
*Zhengyuan Zhou, Panayotis Mertikopoulos, Nicholas Bambos, Peter Glynn, Yinyu Ye, Li-Jia Li, Li Fei-Fei*
- #14 **Error Compensated Quantized SGD and its Applications to Large-scale Distributed Optimization**  
*Jiaxiang Wu, Weidong Huang, Junzhou Huang, Tong Zhang*
- #15 **Low-Rank Riemannian Optimization on Positive Semidefinite Stochastic Matrices with Applications to Graph Clustering**  
*Ahmed Douik, Babak Hassibi*
- #16 **Dissecting Adam: The Sign, Magnitude and Variance of Stochastic Gradients**  
*Lukas Balles, Philipp Hennig*
- #17 **Discovering and Removing Exogenous State Variables and Rewards for Reinforcement Learning**  
*Thomas Dietterich, George Trimonias, Zhitang Chen*
- #18 **Differentially Private Database Release via Kernel Mean Embeddings**  
*Matej Balog, Ilya Tosltikhin, Bernhard Schölkopf*
- #19 **Extracting Automata from Recurrent Neural Networks Using Queries and Counterexamples**  
*Gail Weiss, Yoav Goldberg, Eran Yahav*
- #20 **Neural Dynamic Programming for Musical Self Similarity**  
*Christian Walder, Dongwoo Kim*
- #21 **Learning long term dependencies via Fourier recurrent units**  
*Jiong Zhang, Yibo Lin, Zhao Song, Inderjit Dhillon*
- #22 **Autoregressive Convolutional Neural Networks for Asynchronous Time Series**  
*Mikolaj Binkowski, Gautier Marti, Philippe Donnat*
- #23 **Efficient Model-Based Deep Reinforcement Learning with Variational State Tabulation**  
*Dane Corneil, Wulfram Gerstner, Johanni Brea*
- #24 **Regret Minimization for Partially Observable Deep Reinforcement Learning**  
*Peter Jin, EECS Kurt Keutzer, Sergey Levine*
- #25 **Goodness-of-fit Testing for Discrete Distributions via Stein Discrepancy**  
*Jiasen Yang, Qiang Liu, Vinayak A Rao, Jennifer Neville*
- #26 **Unbiased Objective Estimation in Predictive Optimization**  
*Shinji Ito, Akihiro Yabe, Ryohei Fujimaki*
- #27 **Ultra Large-Scale Feature Selection using Count-Sketches**  
*Amirali Aghazadeh, Ryan Spring, Daniel LeJeune, Gautam Dasarathy, Anshumali Shrivastava, Richard Baraniuk*
- #28 **Matrix Norms in Data Streams: Faster, Multi-Pass and Row-Order**  
*Vladimir Braverman, Stephen Chestnut, Robert Krauthgamer, Yi Li, David Woodruff, Lin Yang*
- #29 **Can Deep Reinforcement Learning Solve Erdos-Selfridge-Spencer Games?**  
*Maithra Raghu, Alex Irpan, Jacob Andreas, Bobby Kleinberg, Quoc Le, Jon Kleinberg*
- #30 **The Mirage of Action-Dependent Baselines in Reinforcement Learning**  
*George Tucker, Surya Bhupatiraju, Shixiang Gu, Richard E Turner, Zoubin Ghahramani, Sergey Levine*
- #31 **Composite Marginal Likelihood Methods for Random Utility Models**  
*Zhibing Zhao, Lirong Xia*
- #32 **Ranking Distributions based on Noisy Sorting**  
*Adil El Mesaoudi-Paul, Eyke Hüllermeier, Robert Busa-Fekete*
- #33 **DICOD: Distributed Convolutional Coordinate Descent for Convolutional Sparse Coding**  
*CMLA Thomas Moreau, Laurent Oudre, CMLA Nicolas Vayatis*
- #34 **Exploring Hidden Dimensions in Accelerating Convolutional Neural Networks**  
*Zhihao Jia, Sina Lin, Charles Qi, Alex Aiken*
- #35 **Deep Models of Interactions Across Sets**  
*Jason Hartford, Devon Graham, Kevin Leyton-Brown, Siamak Ravanbakhsh*
- #36 **ContextNet: Deep learning for Star Galaxy Classification**  
*Noble Kennamer, University of California David Kirkby, Alex Ihler, University of California Francisco Javier Sanchez-Lopez*
- #37 **First Order Generative Adversarial Networks**  
*Calvin Seward, Thomas Unterthiner, Urs M Bergmann, Nikolay Jetchev, Sepp Hochreiter*
- #38 **Max-Mahalanobis Linear Discriminant Analysis Networks**  
*Tianyu Pang, Chao Du, Jun Zhu*



- #39 Learning Maximum-A-Posteriori Perturbation Models for Structured Prediction in Polynomial Time**  
*Asish Ghoshal, Jean Honorio*
- #40 Structured Output Learning with Abstention: Application to Accurate Opinion Prediction**  
*Alexandre Garcia, Telecom-ParisTech Chloé Clavel, Slim Essid, Florence d'Alche-Buc*
- #41 SBEED: Convergent Reinforcement Learning with Nonlinear Function Approximation**  
*Bo Dai, Albert Shaw, Lihong Li, Lin Xiao, Niao He, Zhen Liu, Jianshu Chen, Le Song*
- #42 Smoothed Action Value Functions for Learning Gaussian Policies**  
*Ofir Nachum, Mohammad Norouzi, George Tucker, Dale Schuurmans*
- #43 Towards End-to-End Prosody Transfer for Expressive Speech Synthesis with Tacotron**  
*RJ Skerry-Ryan, Eric Battenberg, Ying Xiao, Yuxuan Wang, Daisy Stanton, Joel Shor, Ron Weiss, Rob Clark, Rif Saurous*
- #44 Style Tokens: Unsupervised Style Modeling, Control and Transfer in End-to-End Speech Synthesis**  
*Yuxuan Wang, Daisy Stanton, Yu Zhang, RJ-Skerry Ryan, Eric Battenberg, Joel Shor, Ying Xiao, Ye Jia, Fei Ren, Rif Saurous*
- #45 AutoPrognosis: Automated Clinical Prognostic Modeling via Bayesian Optimization with Structured Kernel Learning**  
*Ahmed M. Alaa Ibrahim, M van der Schaar*
- #46 TAPAS: Tricks to Accelerate (encrypted) Prediction As a Service**  
*Amartya Sanyal, Matt Kusner, Adria Gascon, Varun Kanade*
- #47 End-to-End Learning for the Deep Multivariate Probit Model**  
*Di Chen, Yexiang Xue, Carla Gomes*
- #48 Differentiable Dynamic Programming for Structured Prediction and Attention**  
*Arthur Mensch, Mathieu Blondel*
- #49 Optimal Distributed Learning with Multi-pass Stochastic Gradient Methods**  
*Junhong Lin, Volkan Cevher*
- #50 Byzantine-Robust Distributed Learning: Towards Optimal Statistical Rates**  
*Dong Yin, Yudong Chen, Kannan Ramchandran, Peter Bartlett*
- #51 SQL-Rank: A Listwise Approach to Collaborative Ranking**  
*LIWEI WU, Cho-Jui Hsieh, University of California James Sharpnack*
- #52 Extreme Learning to Rank via Low Rank Assumption**  
*Minhao Cheng, Ian Davidson, Cho-Jui Hsieh*
- #53 Adversarial Attack on Graph Structured Data**  
*Hanjun Dai, Hui Li, Tian Tian, huangxin Huang, Lin Wang, Jun Zhu, Le Song*
- #54 Reinforcing Adversarial Robustness using Model Confidence Induced by Adversarial Training**  
*Xi Wu, Uyeong Jang, Jiefeng Chen, Lingjiao Chen, Somesh Jha*
- #55 Closed-form Marginal Likelihood in Gamma-Poisson Matrix Factorization**  
*Louis Filstroff, Alberto Lumbreras, Cedric Fevotte*
- #56 Learning Binary Latent Variable Models: A Tensor Eigenpair Approach**  
*Ariel Jaffe, Roi Weiss, Boaz Nadler, Shai Carmi, Yuval Kluger*
- #57 Thompson Sampling for Combinatorial Semi-Bandits**  
*Siwei Wang, Wei Chen*
- #58 Let's be Honest: An Optimal No-Regret Framework for Zero-Sum Games**  
*Ehsan Asadi Kangarshahi, Ya-Ping Hsieh, Mehmet Fatih Sahin, Volkan Cevher*
- #59 Deep Asymmetric Multi-task Feature Learning**  
*Hae Beom Lee, Eunho Yang, Sung Ju Hwang*
- #60 Learn from Your Neighbor: Learning Multi-modal Mappings from Sparse Annotations**  
*Ashwin Kalyan, Stefan Lee, Anitha Kannan, Dhruv Batra*
- #61 Stein Variational Message Passing for Continuous Graphical Models**  
*Dilin Wang, Zhe Zeng, Qiang Liu*
- #62 Discrete-Continuous Mixtures in Probabilistic Programming: Generalized Semantics and Inference Algorithms**  
*Yi Wu, Siddharth Srivastava, Nicholas Hay, Simon Du, Stuart Russell*
- #63 Towards Binary-Valued Gates for Robust LSTM Training**  
*Zhuohan Li, Di He, Fei Tian, Wei Chen, Tao Qin, Liwei Wang, Tie-Yan Liu*
- #64 Fitting New Speakers Based on a Short Untranscribed Sample**  
*Eliya Nachmani, Adam Polyak, Yaniv Taigman, Lior Wolf*
- #65 Stochastic Variance-Reduced Policy Gradient**  
*Matteo Papini, Damiano Binaghi, Giuseppe Canonaco, Matteo Pirodda, Marcello Restelli*
- #66 Convergent Tree Backup and Retrace with Function Approximation**  
*Ahmed Touati, Pierre-Luc Bacon, Doina Precup, Pascal Vincent*
- #67 Alternating Randomized Block Coordinate Descent**  
*Jelena Diakonikolas, Orecchia Lorenzo*
- #68 Shampoo: Preconditioned Stochastic Tensor Optimization**  
*Vineet Gupta, Tomer Koren, Yoram Singer*
- #69 Stochastic Wasserstein Barycenters**  
*Sebastian Claiici, Edward Chien, Justin Solomon*
- #70 Accelerating Natural Gradient with Higher-Order Invariance**  
*Yang Song, Jiaming Song, Stefano Ermon*
- #71 Learning unknown ODE models with Gaussian processes**  
*Markus Heinonen, Cagatay Yildiz, Henrik Mannerström, Jukka Intosalmi, Harri Lähdesmäki*
- #72 Constraining the Dynamics of Deep Probabilistic Models**  
*Marco Lorenzi, Maurizio Filippone*
- #73 Fast Decoding in Sequence Models Using Discrete Latent Variables**  
*Lukasz M Kaiser, Samy Bengio, Aurko Roy, Ashish Vaswani, Niki Parmar, Jakob Uszkoreit, Noam Shazeer*
- #74 High Performance Zero-Memory Overhead Direct Convolutions**  
*Jiyuan Zhang, Franz Franchetti, Tze Meng Low*
- #75 Approximate Leave-One-Out for Fast Parameter Tuning in High Dimensions**  
*Shuaiwen Wang, Wenda Zhou, Haihao Lu, Arian Maleki, Vahab Mirrokni*



- #76 Improved large-scale graph learning through ridge spectral sparsification**  
*Daniele Calandriello, Alessandro Lazaric, Ioannis Koutis, Michal Valko*
- #77 Distilling the Posterior in Bayesian Neural Networks**  
*Jackson Wang, Paul Vicol, James Lucas, Li Gu, Roger Grosse, Richard Zemel*
- #78 Scalable approximate Bayesian inference for particle tracking data**  
*Ruoxi Sun, Department of Statistics Liam Paninski*
- #79 Weakly Consistent Optimal Pricing Algorithms in Repeated Posted-Price Auctions with Strategic Buyer**  
*Alexey Drutsa*
- #80 Practical Contextual Bandits with Regression Oracles**  
*Dylan Foster, Alekh Agarwal, Miroslav Dudik, Haipeng Luo, Robert Schapire*
- #81 Stochastic Variance-Reduced Hamilton Monte Carlo Methods**  
*Difan Zou, Pan Xu, Quanquan Gu*
- #82 Asynchronous Stochastic Quasi-Newton MCMC for Non-Convex Optimization**  
*Umut Simsekli, Cagatay Yildiz, Thanh Huy Nguyen, Ali Cemgil, Gaël RICHARD*
- #83 GAIN: Missing Data Imputation using Generative Adversarial Nets**  
*Jinsung Yoon, James Jordan, Mihaela van der Schaar*
- #84 Synthesizing Programs for Images using Reinforced Adversarial Learning**  
*Yaroslav Ganin, Tejas Kulkarni, Igor Babuschkin, S. M. Ali Eslami, Oriol Vinyals*
- #85 Geometry Score: A Method For Comparing Generative Adversarial Networks**  
*Valentin Khruikov, Ivan Oseledets*
- #86 Addressing Function Approximation Error in Actor-Critic Methods**  
*Scott Fujimoto, Herke van Hoof, David Meger*
- #87 Fast Bellman Updates for Robust MDPs**  
*Clint Ho, Marek Petrik, Wolfram Wiesemann*
- #88 Configurable Markov Decision Processes**  
*Alberto Maria Metelli, Mirco Mutti, Marcello Restelli*
- #89 Prediction Rule Reshaping**  
*Matt Bonakdarpour, Sabyasachi Chatterjee, Rina Barber, John Lafferty*
- #90 Dimensionality-Driven Learning with Noisy Labels**  
*Daniel Ma, Yisen Wang, Michael E. Houle, Shuo Zhou, Sarah Erfani, Shutao Xia, Sudanthi Wijewickrema, James Bailey*
- #91 Learning Memory Access Patterns**  
*Milad Hashemi, Kevin Swersky, Jamie Smith, Grant Ayers, Heiner Litz, Jichuan Chang, Christos Kozyrakis, Partha Ranganathan*
- #92 Geodesic Convolutional Shape Optimization**  
*Pierre Baque, Edoardo Remelli, Francois Fleuret, EPFL Pascal Fua*
- #93 Visualizing and Understanding Atari Agents**  
*Samuel Greycanus, Anurag Koul, Jonathan Dodge, Alan Fern*
- #94 An Efficient, Generalized Bellman Update For Cooperative Inverse Reinforcement Learning**  
*Dhruv Malik, Andy Palaniappan, Jaime Fisac, Dylan Hadfield-Menell, Stuart Russell, EECS Anca Dragan*
- #95 Is Generator Conditioning Causally Related to GAN Performance?**  
*Augustus Odena, Jacob Buckman, Catherine Olsson, Tom B Brown, Christopher Olah, Colin Raffel, Ian Goodfellow*
- #96 K-Beam Minimax: Efficient Optimization for Deep Adversarial Learning**  
*Jihun Hamm, Yung-Kyun Noh*
- #97 Inductive Two-Layer Modeling with Parametric Bregman Transfer**  
*Vignesh Ganapathiraman, Zhan Shi, Xinhua Zhang, Yaoliang Yu*
- #98 Does Distributionally Robust Supervised Learning Give Robust Classifiers?**  
*Weihua Hu, Gang Niu, Issei Sato, Masashi Sugiyama*
- #99 Understanding Generalization and Optimization Performance of Deep CNNs**  
*Pan Zhou, Jiashi Feng*
- #100 The Multilinear Structure of ReLU Networks**  
*Thomas Laurent, James von Brecht*
- #101 Parallel and Streaming Algorithms for K-Core Decomposition**  
*Hossein Esfandiari, Silvio Lattanzi, Vahab Mirrokni*
- #102 Fast Approximate Spectral Clustering for Dynamic Networks**  
*Lionel Martin, Andreas Loukas, Pierre Vandergheynst*
- #103 Gradient Descent Learns One-hidden-layer CNN: Don't be Afraid of Spurious Local Minima**  
*Simon Du, Jason Lee, Yuandong Tian, Aarti Singh, Barnabás Póczos*
- #104 Neural Networks Should Be Wide Enough to Learn Disconnected Decision Regions**  
*Quynh Nguyen, Mahesh Mukkamala, Matthias Hein*
- #105 Greed is Still Good: Maximizing Monotone Submodular+Supermodular (BP) Functions**  
*Wenruo Bai, Jeff Bilmes*
- #106 Black-box Adversarial Attacks with Limited Queries and Information**  
*Andrew Ilyas, Logan Engstrom, Anish Athalye, Jessy Lin*
- #107 Using Inherent Structures to design Lean 2-layer RBMs**  
*Abhishek Bansal, Abhinav Anand, Chiru Bhattacharyya*
- #108 Not to Cry Wolf: Distantly Supervised Multitask Learning in Critical Care**  
*Patrick Schwab, Emanuela Keller, Carl Muroi, David J. Mack, Christian Strässle, Walter Karlen*
- #109 Composable Planning with Attributes**  
*Amy Zhang, Sainbayar Sukhbaatar, Adam Lerer, Arthur Szlam, Facebook Rob Fergus*
- #110 Measuring abstract reasoning in neural networks**  
*Adam Santoro, Felix Hill, David GT Barrett, Ari S Morcos, Tim Lillicrap*
- #111 Projection-Free Online Optimization with Stochastic Gradient: From Convexity to Submodularity**  
*Lin Chen, Chris Harshaw, Hamed Hassani, Amin Karbasi*
- #112 Self-Bounded Prediction Suffix Tree via Approximate String Matching**  
*Dongwoo Kim, Christian Walder*
- #113 MentorNet: Learning Data-Driven Curriculum for Very Deep Neural Networks on Corrupted Labels**  
*Lu Jiang, Zhengyuan Zhou, Thomas Leung, Li-Jia Li, Li Fei-Fei*





- #114 Curriculum Learning by Transfer Learning: Theory and Experiments with Deep Networks**  
*Daphna Weinshall, Gad A Cohen, Dan Amir*
- #115 Composite Functional Gradient Learning of Generative Adversarial Models**  
*Rie Johnson, Tong Zhang*
- #116 LaVAN: Localized and Visible Adversarial Noise**  
*Danny Karmon, Daniel Zoran, Yoav Goldberg*
- #117 Approximation Guarantees for Adaptive Sampling**  
*Eric Balkanski, Yaron Singer*
- #118 Constrained Interacting Submodular Groupings**  
*Andrew Cotter, Mahdi Milani Milani Fard, Seungil You, Maya Gupta, Jeff Bilmes*
- #119 Residual Unfairness in Fair Machine Learning from Prejudiced Data**  
*Nathan Kallus, Angela Zhou*
- #120 Adversarial Regression with Multiple Learners**  
*Liang Tong, Sixie Yu, Scott Alfeld, Yevgeniy Vorobeychik*
- #121 Representation Tradeoffs for Hyperbolic Embeddings**  
*Frederic Sala, Chris De Sa, Albert Gu, Christopher Re*
- #122 Improving Sign Random Projections With Additional Information**  
*Keegan Kang, Wei Pin Wong*
- #123 Bandits with Delayed, Aggregated Anonymous Feedback**  
*Ciara Pike-Burke, Shipra Agrawal, Csaba Szepesvari, Steffen Grünewälder*
- #124 Make the Minority Great Again: First-Order Regret Bound for Contextual Bandits**  
*Zeyuan Allen-Zhu, Sebastien Bubeck, Yuanzhi Li*
- #125 Learning Policy Representations in Multiagent Systems**  
*Aditya Grover, Maruan Al-Shedivat, Jayesh Gupta, Yura Burda, Harrison Edwards*
- #126 Learning to Coordinate with Coordination Graphs in Repeated Single-Stage Multi-Agent Decision Problems**  
*Eugenio Bargiacchi, Timothy Verstraeten, Diederik Roijers, Ann Nowé, Hado van Hasselt*
- #127 Beyond Finite Layer Neural Networks: Bridging Deep Architectures and Numerical Differential Equations**  
*Yiping Lu, Aoxiao Zhong, Quanzheng Li, Bin Dong*
- #128 Compressing Neural Networks using the Variational Information Bottleneck**  
*Bin Dai, Chen Zhu, Baining Guo, David Wipf*
- #129 Scalable Bilinear Pi Learning Using State and Action Features**  
*Yichen Chen, Lihong Li, Mengdi Wang*
- #130 Time Limits in Reinforcement Learning**  
*Fabio Pardo, Arash Tavakoli, Vitaly Levdiik, Petar Kormushev*
- #131 Semi-Supervised Learning on Data Streams via Temporal Label Propagation**  
*Tal Wagner, Sudipto Guha, Shiva Kasiviswanathan, Nina Mishra*
- #132 Implicit Regularization in Nonconvex Statistical Estimation: Gradient Descent Converges Linearly for Phase Retrieval and Matrix Completion**  
*Cong Ma, Kaizheng Wang, Yuejie Chi, Yuxin Chen*
- #133 A Fast and Scalable Joint Estimator for Integrating Additional Knowledge in Learning Multiple Related Sparse Gaussian Graphical Models**  
*Beilun Wang, Arshdeep Sekhon, Yanjun Qi*
- #134 Bucket Renormalization for Approximate Inference**  
*Sungsoo Ahn, Misha Chertkov, Adrian Weller, Jinwoo Shin*
- #135 Kernel Recursive ABC: Point Estimation with Intractable Likelihood**  
*Takafumi Kajihara, Motonobu Kanagawa, Keisuke Yamazaki, Kenji Fukumizu*
- #136 Modeling Others using Oneself in Multi-Agent Reinforcement Learning**  
*Roberta Raileanu, Emily Denton, Arthur Szlam, Facebook Rob Fergus*
- #137 Tropical Geometry of Deep Neural Networks**  
*Liwen Zhang, Gregory Naisat, Lek-Heng Lim*
- #138 Learning Dynamics of Linear Denoising Autoencoders**  
*Arnau Pretorius, Steve Kroon, Herman Kamper*
- #139 Nonparametric variable importance using an augmented neural network with multi-task learning**  
*Jean Feng, Brian Williamson, Noah Simon, Marco Carone*
- #140 Training Neural Machines with Trace-Based Supervision**  
*Matthew Mirman, Dimitar Dimitrov, Pavle Djordjevic, Timon Gehr, Martin Vechev*
- #141 Open Category Detection with PAC Guarantees**  
*Si Liu, Risheek Garrepalli, Thomas Dietterich, Alan Fern, Dan Hendrycks*
- #142 SAFFRON: an Adaptive Algorithm for Online Control of the False Discovery Rate**  
*Aaditya Ramdas, Tijana Zrnic, Martin Wainwright, Michael Jordan*
- #143 Learning Localized Spatio-Temporal Models From Streaming Data**  
*Muhammad Osama, Dave Zachariah, Thomas Schön*
- #144 Feasible Arm Identification**  
*Julian Katz-Samuels, Clay Scott*
- #145 Fast Maximization of Non-Submodular, Monotonic Functions on the Integer Lattice**  
*Alan Kuhnle, J. Smith, Victoria Crawford, My Thai*
- #146 Decentralized Submodular Maximization: Bridging Discrete and Continuous Settings**  
*Aryan Mokhtari, Hamed Hassani, Amin Karbasi*
- #147 Towards Fast Computation of Certified Robustness for ReLU Networks**  
*Lily Weng, Huan Zhang, Hongge Chen, Zhao Song, Cho-Jui Hsieh, Luca Daniel, Duane Boning, Inderjit Dhillon*
- #148 A Two-Step Computation of the Exact GAN Wasserstein Distance**  
*Huidong Liu, Xianfeng GU, Samaras Dimitris*
- #149 Spatio-temporal Bayesian On-line Changepoint Detection with Model Selection**  
*Jeremias Knoblauch, Theo Damoulas*
- #150 Fast Stochastic AUC Maximization with  $\mathcal{O}(1/n)$ -Convergence Rate**  
*Mingrui Liu, Xiaoxuan Zhang, Zaiyi Chen, Xiaoyu Wang, Tianbao Yang*
- #151 Calibrated Estimates of Predictive Uncertainty in Deep Learning**  
*Volodymyr Kuleshov, Nathan Fenner, Stefano Ermon*
- #152 Neural Autoregressive Flows**  
*Chin-Wei Huang, David Krueger, Alexandre Lacoste, Aaron Courville*





- #153 Probabilistic Boolean Tensor Decomposition**  
*Tammo Rukat, Christopher Holmes, Christopher Yu*
- #154 A Primal-Dual Analysis of Global Optimality in Nonconvex Low-Rank Matrix Recovery**  
*Xiao Zhang, Lingxiao Wang, Yaodong Yu, Quanquan Gu*
- #155 A Delay-tolerant Proximal-Gradient Algorithm for Distributed Learning**  
*Konstantin Mishchenko, Franck Iutzeler, Jérôme Malick, Massih-Reza Amini*
- #156 Randomized Block Cubic Newton Method**  
*Nikita Doikov, Abdullah Peter Richtarik*
- #157 Massively Parallel Algorithms and Hardness for Single-Linkage Clustering under  $\ell_p$  Distances**  
*Grigory Yaroslavtsev, Adithya Vadapalli*
- #158 Local Density Estimation in High Dimensions**  
*Xian Wu, Moses Charikar, Vishnu Natchu*
- #159 To Understand Deep Learning We Need to Understand Kernel Learning**  
*Mikhail Belkin, Siyuan Ma, Soumik Mandal*
- #160 Learning in Reproducing Kernel Krein Spaces**  
*Dino Ogljic, Thomas Gaertner*
- #161 Functional Gradient Boosting based on Residual Network Perception**  
*Atsushi Nitanda, Taiji Suzuki*
- #162 Binary Classification with Karmic, Threshold-Quasi-Concave Metrics**  
*Bowei Yan, Sanmi Koyejo, Kai Zhong, Pradeep Ravikumar*
- #163 Characterizing Implicit Bias in Terms of Optimization Geometry**  
*Suriya Gunasekar, Jason Lee, Daniel Soudry, Nati Srebro*
- #164 prDeep: Robust Phase Retrieval with a Flexible Deep Network**  
*Christopher Metzler, Phil Schniter, Ashok Veeraraghavan, Richard Baraniuk*
- #165 Adversarial Time-to-Event Modeling**  
*Paidamoyo Chapfuwa, Chenyang Tao, Chunyuan Li, Courtney Page, Benjamin Goldstein, Lawrence Carin, Ricardo Henao*
- #166 MAGAN: Aligning Biological Manifolds**  
*Matt Amodio, Smita Krishnaswamy*
- #167 Multicalibration: Calibration for the (Computationally-Identifiable) Masses**  
*Ursula Hebert-Johnson, Michael Kim, Omer Reingold, Guy Rothblum*
- #168 Improving the Privacy and Accuracy of ADMM-Based Distributed Algorithms**  
*Xueru Zhang, Mohammad Khalili, Mingyan Liu*
- #169 PixelSNAIL: An Improved Autoregressive Generative Model**  
*Xi Chen, Nikhil Mishra, Mostafa Rohaninejad, Pieter Abbeel*
- #170 Focused Hierarchical RNNs for Conditional Sequence Processing**  
*Nan Ke, Konrad Zolna, Alessandro Sordani, MILA Zhouhan Lin, Adam Trischler, Yoshua Bengio, Joelle Pineau, Laurent Charlin, Christopher Pal*
- #171 Noise2Noise: Learning Image Restoration without Clean Data**  
*Jaakko Lehtinen, Jacob Munkberg, Jon Hasselgren, Samuli Laine, Tero Karras, Miika Aittala, Timo Aila*
- #172 Learning to Reweight Examples for Robust Deep Learning**  
*Mengye Ren, Wenyuan Zeng, Bin Yang, Raquel Urtasun*
- #173 Policy and Value Transfer in Lifelong Reinforcement Learning**  
*David Abel, Yuu Jinnai, Sophie Guo, George Konidaris, Michael L. Littman*
- #174 GEP-PG: Decoupling Exploration and Exploitation in Deep Reinforcement Learning Algorithms**  
*Cédric Colas, Olivier Sigaud, Pierre-Yves Oudeyer*
- #175 A Hierarchical Latent Vector Model for Learning Long-Term Structure in Music**  
*Adam Roberts, Jesse Engel, Colin Raffel, Curtis "Fjord" Hawthorne, Douglas Eck*
- #176 Understanding the Loss Surface of Neural Networks for Binary Classification**  
*SHIYU LIANG, Ruoyu Sun, Yixuan Li, R Srikant*
- #177 Dynamical Isometry and a Mean Field Theory of RNNs: Gating Enables Signal Propagation in Recurrent Neural Networks**  
*Minmin Chen, Jeffrey Pennington, Samuel Schoenholz*
- #178 Reviving and Improving Recurrent Back-Propagation**  
*Renjie Liao, Yuwen Xiong, Ethan Fetaya, Lisa Zhang, Kilung Yoon, xaq S Pitkow, Raquel Urtasun, Richard Zemel*
- #179 Riemannian Stochastic Recursive Gradient Algorithm with Retraction and Vector Transport and Its Convergence Analysis**  
*Hiroyuki Kasai, Hiroyuki Sato, Bamdev Mishra*
- #180 Learning Compact Neural Networks with Regularization**  
*Samet Oymak*
- #181 Investigating Human Priors for Playing Video Games**  
*Rachit Dubey, Pulkit Agrawal, Deepak Pathak, Tom Griffiths, Alexei Efros*
- #182 Decoupling Gradient-Like Learning Rules from Representations**  
*Philip Thomas, Christoph Dann, Emma Brunskill*
- #183 Invariance of Weight Distributions in Rectified MLPs**  
*Russell Tsuchida, Fred Roosta, Marcus Gallagher*
- #184 Stronger Generalization Bounds for Deep Nets via a Compression Approach**  
*Sanjeev Arora, Rong Ge, Behnam Neyshabur, Yi Zhang*
- #185 Near Optimal Frequent Directions for Sketching Dense and Sparse Matrices**  
*Zengfeng Huang*
- #186 Loss Decomposition for Fast Learning in Large Output Spaces**  
*Ian Yen, Satyen Kale, Felix Xinnan Yu, Daniel Holtmann-Rice, Sanjiv Kumar, Pradeep Ravikumar*
- #187 Stochastic Proximal Algorithms for AUC Maximization**  
*Michael Natole Jr, Yiming Ying, Siwei Lyu*
- #188 Accelerated Spectral Ranking**  
*Arpit Agarwal, Prathamesh Patil, Shivani Agarwal*
- #189 Decomposition of Uncertainty in Bayesian Deep Learning for Efficient and Risk-sensitive Learning**  
*Stefan Depeweg, Jose Hernandez-Lobato, Finale Doshi-Velez, Steffen Udluft*
- #190 Fast and Scalable Bayesian Deep Learning by Weight-Perturbation in Adam**  
*Emti Khan, Didrik Nielsen, Voot Tangkaratt, Wu Lin, Yarin Gal, Akash Srivastava*



- #191 Learning One Convolutional Layer with Overlapping Patches**  
Surbhi Goel, Adam Klivans, Raghu Meka
- #192 A Spline Theory of Deep Learning**  
Randall Balestriero, Richard Baraniuk
- #193 Structured Variational Learning of Bayesian Neural Networks with Horseshoe Priors**  
Soumya Ghosh, Jiayu Yao, Finale Doshi-Velez
- #194 Variational Bayesian dropout: pitfalls and fixes**  
Jiri Hron, Alex Matthews, Zoubin Ghahramani
- #195 Adversarial Learning with Local Coordinate Coding**  
Jiezhong Cao, Yong Guo, Qingyao Wu, Chunhua Shen, Junzhou Huang, Mingkui Tan
- #196 Learning Representations and Generative Models for 3D Point Clouds**  
Panos Achlioptas, Olga Diamanti, Ioannis Mitliagkas, Leonidas Guibas
- #197 Bayesian Uncertainty Estimation for Batch Normalized Deep Networks**  
Mattias Teye, Hossein Azizpour, Kevin Smith
- #198 Noisy Natural Gradient as Variational Inference**  
Guodong Zhang, Shengyang Sun, David Duvenaud, Roger Grosse
- #199 Deep Variational Reinforcement Learning for POMDPs**  
Maximilian Igl, Luisa Zintgraf, Tuan Anh Le, Frank Wood, Shimon Whiteson
- #200 Recurrent Predictive State Policy Networks**  
Ahmed Hefny, Zita Marinho, Wen Sun, Siddhartha Srinivasa, Geoff Gordon
- #201 The Mechanics of n-Player Differentiable Games**  
David Balduzzi, Sebastien Racaniere, James Martens, Jakob Foerster, Karl Tuyls, Thore Graepel
- #202 Improved Training of Generative Adversarial Networks Using Representative Features**  
Duhyeon Bang, Hyunjung Shim
- #203 Hierarchical Multi-Label Classification Networks**  
Jonatas Wehrmann, Ricardo Cerri, Rodrigo Barros
- #204 Knowledge Transfer with Jacobian Matching**  
Suraj Srinivas, Francois Fleuret
- #205 Towards Black-box Iterative Machine Teaching**  
Weiyang Liu, Bo Dai, Xingguo Li, Zhen Liu, Jim Rehg, Le Song
- #206 Improving the Gaussian Mechanism for Differential Privacy: Analytical Calibration and Optimal Denoising**  
Borja de Balle Pigem, Yu-Xiang Wang
- #207 Importance Weighted Transfer of Samples in Reinforcement Learning**  
Andrea Tirinzoni, Andrea Sessa, Matteo Pirota, Marcello Restelli
- #208 Beyond the One-Step Greedy Approach in Reinforcement Learning**  
Yonathan Efroni, Gal Dalal, Bruno Scherrer, Shie Mannor
- #209 Optimization, fast and slow: optimally switching between local and Bayesian optimization**  
Mark McLeod, Stephen Roberts, Michael A Osborne
- #210 Batch Bayesian Optimization via Multi-objective Acquisition Ensemble for Automated Analog Circuit Design**  
Wenlong Lyu, Fan Yang, Changhao Yan, Dian Zhou, Xuan Zeng
- #211 Graphical Nonconvex Optimization via an Adaptive Convex Relaxation**  
Qiang Sun, Kean Ming Tan, Han Liu, Tong Zhang
- #212 Approximate message passing for amplitude based optimization**  
Junjie Ma, Ji Xu, Arian Maleki
- #213 Obfuscated Gradients Give a False Sense of Security: Circumventing Defenses to Adversarial Examples**  
Anish Athalye, Nicholas Carlini, David Wagner
- #214 Tempered Adversarial Networks**  
Mehdi S. M. Sajjadi, Giambattista Parascandolo, Arash Mehrjou, Bernhard Schölkopf
- #215 Fast Information-theoretic Bayesian Optimisation**  
Robin Ru, Michael A Osborne, Mark McLeod, Diego Granzio
- #216 Tight Regret Bounds for Bayesian Optimization in One Dimension**  
Jonathan Scarlett
- #217 Image Transformer**  
Niki Parmar, Ashish Vaswani, Jakob Uszkoreit, Lukasz M Kaiser, Noam Shazeer, Alexander Ku, Dustin Tran
- #218 Kernelized Synaptic Weight Matrices**  
Lorenz Müller, Julien Martel, Giacomo Indiveri
- #219 A Distributed Second-Order Algorithm You Can Trust**  
Celestine Dünnler, Aurelien Lucchi, Matilde Gargiani, An Bian, Thomas Hofmann, Martin Jaggi
- #220 On Acceleration with Noise-Corrupted Gradients**  
Michael Cohen, Jelena Diakonikolas, Orecchia Lorenzo
- #221 Gradient Coding from Cyclic MDS Codes and Expander Graphs**  
Netanel Raviv, Rashish Tandon, Alex Dimakis, Itzhak Tamo
- #222 Accelerating Greedy Coordinate Descent Methods**  
Haihao Lu, Robert Freund, Vahab Mirrokni
- #223 Finding Influential Training Samples for Gradient Boosted Decision Trees**  
Boris Sharchilev, Yuri Ustinovskiy, Pavel Serdyukov, Maarten de Rijke
- #224 Improving Regression Performance with Distributional Losses**  
Ehsan Imani, Martha White
- #225 QMIX: Monotonic Value Function Factorisation for Deep Multi-Agent Reinforcement Learning**  
Tabish Rashid, Mikayel Samvelyan, Christian Schroeder, Gregory Farquhar, Jakob Foerster, Shimon Whiteson
- #226 Learning to Act in Decentralized Partially Observable MDPs**  
Jilles Dibangoye, Olivier Buffet

# Friday

JULY 13TH | SESSIONS



TIME	DESCRIPTION	LOCATION	TIME	DESCRIPTION	LOCATION
9:00 am	<b>Test Of Time Award:</b> <b>Ronan Collobert and Jason Weston</b> A Unified Architecture for Natural Language Processing: Deep Neural Networks with Multitask Learning	A1	12 pm	<b>LUNCH (On Your Own)</b>	
9:30 am	<b>SESSION 1</b> Reinforcement Learning Time-Series Analysis Graphical Models Online Learning Society Impacts of Machine Learning Deep Learning (Adversarial) Optimization (Non-convex) Computer Vision Dimensionality Reduction Other Models and Methods	A1 A3 A4 A5 A6 A7 A9 K1 K11 Victoria	1:30 am	<b>Invited Talk: Joyce Chai</b> Language to Action: towards Interactive Task Learning with Physical Agents	A1
10:30 am	Coffee Break	Hall B	2:30 am	<b>Invited Talk: Josh Tenenbaum</b> Building Machines that Learn and Think Like People	A1
11:00 pm	<b>SESSION 2</b> Reinforcement Learning Transfer and Multi-Task Learning Gaussian Processes Online Learning Unsupervised Learning Generative Models Optimization (Convex) Deep Learning (Theory) Optimization (Combinatorial) Deep Learning (Neural Network Architectures)	A1 A3 A4 A5 A6 A7 A9 K1 K11 Victoria	3:30 pm	Coffee Break	Hall B
			4:00 pm	<b>SESSION 3</b> Reinforcement Learning Natural Language and Speech Processing Monte Carlo Methods Causal Inference Supervised Learning Generative Models Optimization (Convex) Deep Learning (Theory) Spectral Methods Deep Learning (Neural Network Architectures)	A1 A3 A4 A5 A6 A7 A9 K1 K11 Victoria
			6:15 pm	Poster Session	Hall B



## SESSION 1 - 9:30 AM - 10:30 PM

### Reinforcement Learning

Location: A1

- **RLlib: Abstractions for Distributed Reinforcement Learning**  
Eric Liang, Richard Liaw, Robert Nishihara, Philipp Moritz, Roy Fox, Ken Goldberg, Joseph Gonzalez, Michael Jordan, Ion Stoica
- **IMPALA: Scalable Distributed Deep-RL with Importance Weighted Actor-Learner Architectures**  
Lasse Espeholt, Hubert Soyer, Remi Munos, Karen Simonyan, Vlad Mnih, Tom Ward, Yotam Doron, Vlad Firoiu, Tim Harley, Iain Dunning, Shane Legg, koray kavukcuoglu
- **Mix & Match - Agent Curricula for Reinforcement Learning**  
Wojciech Czarnecki, Siddhant Jayakumar, Max Jaderberg, Leonard Hasenclever, Yee Teh, Nicolas Heess, Simon Osindero, Razvan Pascanu
- **Learning to Explore via Meta-Policy Gradient**  
Tianbing Xu, Qiang Liu, Liang Zhao, Jian Peng

### Time-Series Analysis

Location: A3

- **Learning Registered Point Processes from Idiosyncratic Observations**  
Hongteng Xu, Lawrence Carin, Hongyuan Zha
- **Deep Bayesian Nonparametric Tracking**  
Aonan Zhang, John Paisley
- **Learning Hidden Markov Models from Pairwise Co-occurrences with Application to Topic Modeling**  
Kejun Huang, Xiao Fu, Nicholas Sidiropoulos

### Graphical Models

Location: A4

- **Learning in Integer Latent Variable Models with Nested Automatic Differentiation**  
Daniel Sheldon, Kevin Winner, Debora Sujono
- **Sound Abstraction and Decomposition of Probabilistic Programs**  
Steven Holtzen, Guy Van den Broeck, Todd Millstein
- **Parallel Bayesian Network Structure Learning**  
Tian Gao, Dennis Wei

- **The Edge Density Barrier: Computational-Statistical Tradeoffs in Combinatorial Inference**

Hao Lu, Yuan Cao, Junwei Lu, Han Liu, Zhaoran Wang

- **Temporal Poisson Square Root Graphical Models**

Sinong Geng, Charles Kuang, Peggy Peissig, University of Wisconsin David Page

### Online Learning

Location: A5

- **Dynamic Regret of Strongly Adaptive Methods**  
Lijun Zhang, Tianbao Yang, rong jin, Zhi-Hua Zhou
- **Online Learning with Abstention**  
Corinna Cortes, Giulia DeSalvo, Claudio Gentile, Mehryar Mohri, Scott Yang
- **Multi-Fidelity Black-Box Optimization with Hierarchical Partitions**  
Rajat Sen, kirthevasan kandasamy, Sanjay Shakkottai
- **Adaptive Exploration-Exploitation Tradeoff for Opportunistic Bandits**  
Huasen Wu, Xueying Guo, Xin Liu
- **Firing Bandits: Optimizing Crowdfunding**  
Lalit Jain, Kevin Jamieson

### Society Impacts of Machine Learning

Location: A6

- **A Reductions Approach to Fair Classification**  
Alekh Agarwal, Alina Beygelzimer, Miroslav Dudik, John Langford, Hanna Wallach
- **Probably Approximately Metric-Fair Learning**  
Gal Yona, Guy Rothblum
- **Preventing Fairness Gerrymandering: Auditing and Learning for Subgroup Fairness**  
Michael Kearns, Seth V Neel, Aaron Roth, Zhiwei Wu
- **Blind Justice: Fairness with Encrypted Sensitive Attributes**  
Niki Kilbertus, Adria Gascon, Matt Kusner, Michael Veale, Krishna Gummadi, Adrian Weller





## SESSION 1 - 9:30 AM - 10:30 PM

### Deep Learning (Adversarial)

Location: A7

- **Augmented CycleGAN: Learning Many-to-Many Mappings from Unpaired Data**  
Amjad Almahairi, Sai Rajeswar, Alessandro Sordoni, Philip Bachman, Aaron Courville
- **Mixed batches and symmetric discriminators for GAN training**  
Thomas LUCAS, Corentin Tallec, Yann Ollivier, Jakob Verbeek
- **Mutual Information Neural Estimation**  
Mohamed Ishmael Belghazi, Aristide Baratin, Sai Rajeswar, Sherjil Ozair, Yoshua Bengio, R Devon Hjelm, Aaron Courville
- **Adversarially Regularized Autoencoders**  
Jake Zhao, Yoon Kim, Kelly Zhang, Alexander Rush, Yann LeCun
- **JointGAN: Multi-Domain Joint Distribution Learning with Generative Adversarial Nets**  
Yunchen Pu, Shuyang Dai, Zhe Gan, Weiyao Wang, Guoyin Wang, Yizhe Zhang, Ricardo Henao, Lawrence Carin

### Optimization (Non-convex)

Location: A9

- **Convergence guarantees for a class of non-convex and non-smooth optimization problems**  
Koulik Khamaru, Martin Wainwright
- **A Progressive Batching L-BFGS Method for Machine Learning**  
Raghu Bollapragada, Jorge Nocedal, Dheevatsa Mudigere, Hao-Jun M Shi, Ping Tak Tang
- **Gradient Primal-Dual Algorithm Converges to Second-Order Stationary Solution for Nonconvex Distributed Optimization Over Networks**  
Mingyi Hong, Meisam Razaviyayn, Jason Lee
- **Estimation of Markov Chain via Rank-constrained Likelihood**  
XUDONG LI, Mengdi Wang, Anru Zhang

### Computer Vision

Location: K1

- **Video Prediction with Appearance and Motion Conditions**  
Yunseok Jang, Gunhee Kim, Yale Song

- **Solving Partial Assignment Problems using Random Clique Complexes**  
Charu Sharma, Deepak Nathani, Manu Kaul
- **Generalized Earley Parser: Bridging Symbolic Grammars and Sequence Data for Future Prediction**  
Siyuan Qi, Baoxiong Jia, Song-Chun Zhu
- **Neural Program Synthesis from Diverse Demonstration Videos**  
Shao-Hua Sun, Hyeonwoo Noh, Sriram Somasundaram, Joseph Lim

### Dimensionality Reduction

Location: K11

- **Out-of-sample extension of graph adjacency spectral embedding**  
Keith Levin, Fred Roosta, Michael Mahoney, Carey Priebe
- **Bayesian Model Selection for Change Point Detection and Clustering**  
othmane mazhar, Cristian R. Rojas, Inst. of Technology Carlo Fischione, Mohammad Reza Hesamzadeh
- **An Iterative, Sketching-based Framework for Ridge Regression**  
Agnya Chowdhury, Jiasen Yang, Petros Drineas
- **Provable Variable Selection for Streaming Features**  
Jing Wang, Jie Shen, Ping Li
- **Learning Low-Dimensional Temporal Representations**  
Bing Su, Ying Wu

### Other Models and Methods

Location: Victoria

- **PDE-Net: Learning PDEs from Data**  
Zichao Long, Yiping Lu, Xianzhong Ma, Bin Dong
- **Interpretability Beyond Feature Attribution: Quantitative Testing with Concept Activation Vectors (TCAV)**  
Been Kim, Martin Wattenberg, Justin Gilmer, Carrie Cai, James Wexler, Fernanda B Viégas, Rory sayres
- **Learning equations for extrapolation and control**  
Subham S Sahoo, Christoph Lampert, Georg Martius
- **Transformation Autoregressive Networks**  
Junier Oliva, Avinava Dubey, Manzil Zaheer, Barnabás Póczos, Russ Salakhutdinov, Eric Xing, Jeff Schneider
- **Weightless: Lossy weight encoding for deep neural network compression**  
Brandon Reagen, Udit Gupta, Bob Adolf, Michael Mitzenmacher, Alexander Rush, Gu-Yeon Wei, David Brooks



## SESSION 2 - 11:00 AM - 12:00 PM

### Reinforcement Learning

Location: A1

- **Hierarchical Imitation and Reinforcement Learning**  
Hoang M Le, Nan Jiang, Alekh Agarwal, Miroslav Dudik, Yisong Yue, Hal Daume
- **Using Reward Machines for High-Level Task Specification and Decomposition in Reinforcement Learning**  
Rodrigo A Toro Icarte, Toryn Q Klassen, Richard Valenzano, Sheila McIlraith
- **State Abstractions for Lifelong Reinforcement Learning**  
David Abel, Dilip Arumugam, Lucas Lehnert, Michael L. Littman
- **Policy Optimization with Demonstrations**  
Bingyi Kang, Zequn Jie, Jiashi Feng

### Transfer and Multi-Task Learning

Location: A3

- **Adapting Images and Representations with Domain Adversarial Learning**  
Judy Hoffman, Eric Tzeng, Taesung Park, Jun-Yan Zhu, Philip Isola, Kate Saenko, Alexei Efros, Prof. Darrell
- **Learning Adversarially Fair and Transferable Representations**  
David Madras, Elliot Creager, Toniann Pitassi, Richard Zemel
- **Learning Semantic Representations for Unsupervised Domain Adaptation**  
Shaoan Xie, Zibin Zheng, Liang Chen, Chuan Chen
- **Rectify Heterogeneous Models with Semantic Mapping**  
Han-Jia Ye, De-Chuan Zhan, Yuan Jiang, Zhi-Hua Zhou
- **Detecting and Correcting for Label Shift with Black Box Predictors**  
Zachary Lipton, Yu-Xiang Wang, Alexander Smola

### Gaussian Processes

Location: A4

- **Scalable Gaussian Processes with Grid-Structured Eigenfunctions (GP-GRIEF)**  
Trefor Evans, Prasanth B Nair
- **State Space Gaussian Processes with Non-Gaussian Likelihood**  
Hannes Nickisch, Arno Solin, Alexander Grigorevskiy
- **Constant-Time Predictive Distributions for Gaussian Processes**  
Geoff Pleiss, Jacob Gardner, Kilian Weinberger, Andrew Wilson
- **Large-Scale Cox Process Inference using Variational Fourier Features**  
Ti John, James Hensman

### Online Learning

Location: A5

- **Online Linear Quadratic Control**  
Alon Cohen, Avinatan Hasidim, Tomer Koren, Nevena Lazic, Yishay Mansour, Kunal Talwar
- **Semiparametric Contextual Bandits**  
Akshay Krishnamurthy, Zhiwei Wu, Vasilis Syrgkanis
- **Minimax Concave Penalized Multi-Armed Bandit Model with High-Dimensional Covariates**  
xue wang, Mike Wei, Tao Yao
- **Racing Thompson: an Efficient Algorithm for Thompson Sampling with Non-conjugate Priors**  
Yichi Zhou, Jun Zhu, Jingwei Zhuo

### Unsupervised Learning

Location: A6

- **Theoretical Analysis of Sparse Subspace Clustering with Missing Entries**  
Manolis Tsakiris, Rene Vidal
- **Improved nearest neighbor search using auxiliary information and priority functions**  
Omid Keivani, Kaushik Sinha
- **QuantTree: Histograms for Change Detection in Multivariate Data Streams**  
Giacomo Boracchi, Diego Carrera, Cristiano Cervellera, Danilo Macciò
- **Topological mixture estimation**  
Steve Huntsman
- **Revealing Common Statistical Behaviors in Heterogeneous Populations**  
Andrey Zhitnikov, Rotem Mulayoff, Tomer Michaeli



## SESSION 2 - 11:00 AM - 12:00 PM

### Generative Models

Location: A7

- **Junction Tree Variational Autoencoder for Molecular Graph Generation**  
Wengong Jin, Regina Barzilay, Tommi Jaakkola
- **Semi-Amortized Variational Autoencoders**  
Yoon Kim, Sam Wiseman, Andrew Miller, David Sontag, Alexander Rush
- **Iterative Amortized Inference**  
Joe Marino, Yisong Yue, Stephan Mandt
- **DVAE++: Discrete Variational Autoencoders with Overlapping Transformations**  
Arash Vahdat, William Macreedy, Zhengbing Bian, Amir Khoshaman, Evgeny Andriyash

### Optimization (Convex)

Location: A9

- **A Conditional Gradient Framework for Composite Convex Minimization with Applications to Semidefinite Programming**  
Alp Yurtsever, Olivier Fercoq, Francesco Locatello, Volkan Cevher
- **Frank-Wolfe with Subsampling Oracle**  
Thomas Kerdreux, Fabian Pedregosa, Alex d'Aspremont
- **On Matching Pursuit and Coordinate Descent**  
Francesco Locatello, Anant Raj, Praneeth Karimireddy, Gunnar Raetsch, Bernhard Schölkopf, Sebastian Stich, Martin Jaggi
- **Adaptive Three Operator Splitting**  
Fabian Pedregosa, Gauthier Gidel

### Deep Learning (Theory)

Location: K1

- **Gradient descent with identity initialization efficiently learns positive definite linear transformations by deep residual networks**  
Peter Bartlett, Dave Helmbold, Phil Long
- **Spurious Local Minima are Common in Two-Layer ReLU Neural Networks**  
Itay Safran, Ohad Shamir
- **On the Power of Over-parametrization in Neural Networks with Quadratic Activation**  
Simon Du, Jason Lee
- **Optimization Landscape and Expressivity of Deep CNNs**  
Quynh Nguyen, Matthias Hein

### Optimization (Combinatorial)

Location: K11

- **Approximation Algorithms for Cascading Prediction Models**  
Matthew Streeter
- **Competitive Caching with Machine Learned Advice**  
Thodoris Lykouris, Sergei Vassilvitskii
- **Distributed Clustering via LSH Based Data Partitioning**  
Aditya Bhaskara, Maheshakya Wijewardena
- **Learning to Branch**  
Nina Balcan, Travis Dick, Tuomas Sandholm, Ellen Vitercik
- **Compiling Combinatorial Prediction Games**  
Frederic Koriche

### Deep Learning (Neural Network Architectures)

Location: Victoria

- **Learning Longer-term Dependencies in RNNs with Auxiliary Losses**  
Trieu H Trinh, Andrew Dai, Thang Luong, Quoc Le
- **Efficient Neural Audio Synthesis**  
Nal Kalchbrenner, Erich Elsen, Karen Simonyan, Seb Noury, Norman Casagrande, Edward Lockhart, Florian Stimberg, Aäron van den Oord, Sander Dieleman, koray kavukcuoglu
- **Understanding and Simplifying One-Shot Architecture Search**  
gbender Bender, Pieter-Jan Kindermans, Barret Zoph, Vijay Vasudevan, Quoc Le
- **Path-Level Network Transformation for Efficient Architecture Search**  
Han Cai, Jiacheng Yang, Weinan Zhang, Song Han, Yong Yu



## SESSION 3 - 4:00 - 6:00 PM

### Reinforcement Learning

Location: A1

- **Self-Imitation Learning**  
Junhyuk Oh, Yijie Guo, Satinder Singh, Honglak Lee
- **Global Convergence of Policy Gradient Methods for the Linear Quadratic Regulator**  
Maryam Fazel, Rong Ge, Sham Kakade, Mehran Mesbahi
- **Policy Optimization as Wasserstein Gradient Flows**  
RUIYI ZHANG, Changyou Chen, Chunyuan Li, Lawrence Carin
- **Clipped Action Policy Gradient**  
Yasuhiro Fujita, Shin-ichi Maeda
- **Fourier Policy Gradients**  
Matthew Fellows, Kamil Ciosek, Shimon Whiteson

### Natural Language and Speech Processing

Location: A3

- **Analyzing Uncertainty in Neural Machine Translation**  
Myle Ott, Michael Auli, David Grangier, Marc'Aurelio Ranzato
- **Generalization without Systematicity: On the Compositional Skills of Sequence-to-Sequence Recurrent Networks**  
Brenden Lake, Marco Baroni
- **Adaptive Sampled Softmax with Kernel Based Sampling**  
Guy Blanc, Steffen Rendle
- **Hierarchical Text Generation and Planning for Strategic Dialogue**  
Denis Yarats, Mike Lewis

### Monte Carlo Methods

Location: A4

- **Stein Variational Gradient Descent Without Gradient**  
Jun Han, Qiang Liu
- **Minibatch Gibbs Sampling on Large Graphical Models**  
Chris De Sa, Zhiting Chen, Wong
- **On Nesting Monte Carlo Estimators**  
Tom Rainforth, Rob Cornish, Hongseok Yang, andrew warrington, Frank Wood
- **On the Theory of Variance Reduction for Stochastic Gradient Monte Carlo**  
Niladri S Chatterji, Nicolas Flammarion, Yian Ma, Peter Bartlett, Michael Jordan

### Causal Inference

Location: A5

- **Budgeted Experiment Design for Causal Structure Learning**  
AmirEmad Ghassami, Saber Salehkaleybar, Negar Kiyavash, Elias Bareinboim
- **Causal Bandits with Propagating Inference**  
Akihiro Yabe, Daisuke Hatano, Hanna Sumita, Shinji Ito, Naonori Kakimura, Takuro Fukunaga, Ken-ichi Kawarabayashi
- **Characterizing and Learning Equivalence Classes of Causal DAGs under Interventions**  
Karren Yang, Abigail Katoff, Caroline Uhler
- **The Hierarchical Adaptive Forgetting Variational Filter**  
Vincent Moens

### Supervised Learning

Location: A6

- **Candidates vs. Noises Estimation for Large Multi-Class Classification Problem**  
Lei Han, Yiheng Huang, Tong Zhang
- **CRAFTML, an Efficient Clustering-based Random Forest for Extreme Multi-label Learning**  
Wissam Siblini, Frank Meyer, Pascale Kuntz
- **Attention-based Deep Multiple Instance Learning**  
Maximilian Ilse, Jakub Tomczak, Max Welling
- **Learning and Memorization**  
Sat Chatterjee
- **Trainable Calibration Measures for Neural Networks from Kernel Mean Embeddings**  
Aviral Kumar, Sunita Sarawagi, Ujjwal Jain

### Generative Models

Location: A7

- **Parallel WaveNet: Fast High-Fidelity Speech Synthesis**  
Aaron van den Oord, Yazhe Li, Igor Babuschkin, Karen Simonyan, Oriol Vinyals, koray kavukcuoglu, George van den Driessche, Edward Lockhart, Luis C Cobo, Florian Stimberg, Norman Casagrande, Dominik Grewe, Seb Noury, Sander Dieleman, Erich Elsen, Nal Kalchbrenner, Heiga Zen, Alex Graves, Helen King, Tom Walters, Dan Belov, Demis Hassabis
- **Autoregressive Quantile Networks for Generative Modeling**  
Georg Ostrovski, Will Dabney, Remi Munos
- **Stochastic Video Generation with a Learned Prior**  
Emily Denton, Rob Fergus
- **Disentangled Sequential Autoencoder**  
Yingzhen Li, Stephan Mandt





## SESSION 3 - 4:00 - 6:00 PM

### Optimization (Convex)

Location: A9

- **SADAGRAD: Strongly Adaptive Stochastic Gradient Methods**  
Zaiyi Chen, Yi Xu, Enhong Chen, Tianbao Yang
- **Level-Set Methods for Finite-Sum Constrained Convex Optimization**  
Qihang Lin, Runchao Ma, Tianbao Yang
- **Local Convergence Properties of SAGA/Prox-SVRG and Acceleration**  
Clarice Poon, Jingwei Liang, Carola-Bibiane Schönlieb
- **Continuous and Discrete-time Accelerated Stochastic Mirror Descent for Strongly Convex Functions**  
Pan Xu, Tianhao Wang, Quanquan Gu
- **Fast Gradient-Based Methods with Exponential Rate: A Hybrid Control Framework**  
Arman Sharifi Kolarijani, Peyman Mohajerin Esfahani, Tamas Keviczky

### Deep Learning (Theory)

Location: K1

- **A Boo(n) for Evaluating Architecture Performance**  
Ondrej Bajgar, Rudolf Kadlec, Jan Kleindienst
- **Efficient end-to-end learning for quantizable representations**  
Yeonwoo Jeong, Hyun Oh Song
- **High-Quality Prediction Intervals for Deep Learning: A Distribution-Free, Ensembled Approach**  
Tim Pearce, Alexandra Brintrup, Mohamed Zaki, Andy Neely
- **Entropy-SGD optimizes the prior of a PAC-Bayes bound**  
Gintare Karolina Dziugaite, Dan Roy
- **On the Limitations of First-Order Approximation in GAN Dynamics**  
Jerry Li, Aleksander Madry, John Peebles, Ludwig Schmidt

### Spectral Methods

Location: K11

- **Spectrally Approximating Large Graphs with Smaller Graphs**  
Andreas Loukas, Pierre Vandergheynst
- **On the Spectrum of Random Features Maps of High Dimensional Data**  
Zhenyu Liao, Romain Couillet
- **SMAC: Simultaneous Mapping and Clustering Using Spectral Decompositions**  
cbajaj bajaj, Tingran Gao, Zihang He, Qixing Huang, Zhenxiao Liang
- **Submodular Hypergraphs: p-Laplacians, Cheeger Inequalities and Spectral Clustering**  
Pan Li, Olgica Milenkovic
- **Rates of Convergence of Spectral Methods for Graphon Estimation**  
Jiaming Xu

### Deep Learning (Neural Network Architectures)

Location: Victoria

- **Progress & Compress: A scalable framework for continual learning**  
Jonathan Schwarz, Wojciech Czarnecki, Jelena Luketina, Agnieszka Grabska-Barwinska, Yee Teh, Razvan Pascanu, Raia Hadsell
- **Overcoming Catastrophic Forgetting with Hard Attention to the Task**  
Joan Serra, Didac Suris, Marius Miron, Alexandros Karatzoglou
- **Rapid Adaptation with Conditionally Shifted Neurons**  
Tsendsuren Munkhdalai, Xingdi Yuan, Soroush Mehri, Adam Trischler
- **Gradient-Based Meta-Learning with Learned Layerwise Metric and Subspace**  
Yoonho Lee, Seungjin Choi



- #1 Stein Points**  
*Wilson Ye Chen, Lester Mackey, Jackson Gorham, Francois-Xavier Briol, Chris J Oates*
- #2 Large-Scale Cox Process Inference using Variational Fourier Features**  
*Ti John, James Hensman*
- #3 SADAGRAD: Strongly Adaptive Stochastic Gradient Methods**  
*Zaiyi Chen, Yi Xu, Enhong Chen, Tianbao Yang*
- #4 Gradient Primal-Dual Algorithm Converges to Second-Order Stationary Solution for Nonconvex Distributed Optimization Over Networks**  
*Mingyi Hong, Meisam Razaviyayn, Jason Lee*
- #5 A Progressive Batching L-BFGS Method for Machine Learning**  
*Raghu Bollapragada, Jorge Nocedal, Dheevatsa Mudigere, Hao-Jun M Shi, Ping Tak Tang*
- #6 WSNet: Compact and Efficient Networks Through Weight Sampling**  
*Xiaojie Jin, Yingzhen Yang, Ning Xu, Jianchao Yang, Nebojsa Jojic, Jiashi Feng, Shuicheng Yan*
- #7 Entropy-SGD optimizes the prior of a PAC-Bayes bound**  
*Gintare Karolina Dziugaite, Dan Roy*
- #8 High-Quality Prediction Intervals for Deep Learning: A Distribution-Free, Ensembled Approach**  
*Tim Pearce, Alexandra Brintrup, Mohamed Zaki, Andy Neely*
- #9 Competitive Caching with Machine Learned Advice**  
*Thodoris Lykouris, Sergei Vassilvitskii*
- #10 Approximation Algorithms for Cascading Prediction Models**  
*Matthew Streeter*
- #11 Orthogonal Machine Learning: Power and Limitations**  
*Ilias Zadik, Lester Mackey, Vasilis Syrgkanis*
- #12 Causal Bandits with Propagating Inference**  
*Akihiro Yabe, Daisuke Hatano, Hanna Sumita, Shinji Ito, Naonori Kakimura, Takuro Fukunaga, Ken-ichi Kawarabayashi*
- #13 Mix & Match - Agent Curricula for Reinforcement Learning**  
*Wojciech Czarnecki, Siddhant Jayakumar, Max Jaderberg, Leonard Hasenclever, Yee Teh, Nicolas Heess, Simon Osindero, Razvan Pascanu*
- #14 The Uncertainty Bellman Equation and Exploration**  
*Brendan O'Donoghue, Ian Osband, Remi Munos, Vlad Mnih*
- #15 Hierarchical Imitation and Reinforcement Learning**  
*Hoang M Le, Nan Jiang, Alekh Agarwal, Miroslav Dudik, Yisong Yue, Hal Daume*
- #16 Policy Optimization with Demonstrations**  
*Bingyi Kang, Zequn Jie, Jiashi Feng*
- #17 Fast Gradient-Based Methods with Exponential Rate: A Hybrid Control Framework**  
*Arman Sharifi Kolarijani, Peyman Mohajerin Esfahani, Tamas Keviczky*
- #18 Level-Set Methods for Finite-Sum Constrained Convex Optimization**  
*Qihang Lin, Runchao Ma, Tianbao Yang*
- #19 A Theoretical Explanation for Perplexing Behaviors of Backpropagation-based Visualizations**  
*Weili Nie, Yang Zhang, Ankit Patel*
- #20 A Boo(n) for Evaluating Architecture Performance**  
*Ondrej Bajgar, Rudolf Kadlec, Jan Kleindienst*
- #21 RLlib: Abstractions for Distributed Reinforcement Learning**  
*Eric Liang, Richard Liaw, Robert Nishihara, Philipp Moritz, Roy Fox, Ken Goldberg, Joseph Gonzalez, Michael Jordan, Ion Stoica*
- #22 Global Convergence of Policy Gradient Methods for the Linear Quadratic Regulator**  
*Maryam Fazel, Rong Ge, Sham Kakade, Mehran Mesbahi*
- #23 The Edge Density Barrier: Computational-Statistical Tradeoffs in Combinatorial Inference**  
*Hao Lu, Yuan Cao, Junwei Lu, Han Liu, Zhaoran Wang*
- #24 Sound Abstraction and Decomposition of Probabilistic Programs**  
*Steven Holtzen, Guy Van den Broeck, Todd Millstein*
- #25 Parallel WaveNet: Fast High-Fidelity Speech Synthesis**  
*Aäron van den Oord, Yazhe Li, Igor Babuschkin, Karen Simonyan, Oriol Vinyals, koray kavukcuoglu, George van den Driessche, Edward Lockhart, Luis C Cobo, Florian Stimberg, Norman Casagrande, Dominik Grewe, Seb Noury, Sander Dieleman, Erich Elsen, Nal Kalchbrenner, Heiga Zen, Alex Graves, Helen King, Tom Walters, Dan Belov, Demis Hassabis*
- #26 Modeling Sparse Deviations for Compressed Sensing using Generative Models**  
*Manik Dhar, Aditya Grover, Stefano Ermon*
- #27 Revealing Common Statistical Behaviors in Heterogeneous Populations**  
*Andrey Zhitnikov, Rotem Mulyaoff, Tomer Michaeli*
- #28 Improved nearest neighbor search using auxiliary information and priority functions**  
*Omid Keivani, Kaushik Sinha*
- #29 Trainable Calibration Measures for Neural Networks from Kernel Mean Embeddings**  
*Aviral Kumar, Sunita Sarawagi, Ujjwal Jain*
- #30 QuantTree: Histograms for Change Detection in Multivariate Data Streams**  
*Giacomo Boracchi, Diego Carrera, Cristiano Cervellera, Danilo Macciò*
- #31 An Iterative, Sketching-based Framework for Ridge Regression**  
*Agniva Chowdhury, Jiasen Yang, Petros Drineas*
- #32 Learning Low-Dimensional Temporal Representations**  
*Bing Su, Ying Wu*
- #33 Rapid Adaptation with Conditionally Shifted Neurons**  
*Tsendsuren Munkhdalai, Xingdi Yuan, Soroush Mehri, Adam Trischler*
- #34 PDE-Net: Learning PDEs from Data**  
*Zichao Long, Yiping Lu, Xianzhong Ma, Bin Dong*
- #35 Theoretical Analysis of Sparse Subspace Clustering with Missing Entries**  
*Manolis Tsakiris, Rene Vidal*
- #36 Topological mixture estimation**  
*Steve Huntsman*
- #37 On Matching Pursuit and Coordinate Descent**  
*Francesco Locatello, Anant Raj, Praneeth Karimireddy, Gunnar Raetsch, Bernhard Schölkopf, Sebastian Stich, Martin Jaggi*
- #38 Frank-Wolfe with Subsampling Oracle**  
*Thomas Kerdreux, Fabian Pedregosa, Alex d'Aspremont*



- #39 Reinforcement Learning with Function-Valued Action Spaces for Partial Differential Equation Control**  
Yangchen Pan, Amir-massoud Farahmand, Martha White, Saleh Nabi, Piyush Grover, Daniel Nikovski
- #40 Fourier Policy Gradients**  
Matthew Fellows, Kamil Ciosek, Shimon Whiteson
- #41 Adaptive Three Operator Splitting**  
Fabian Pedregosa, Gauthier Gidel
- #42 A Conditional Gradient Framework for Composite Convex Minimization with Applications to Semidefinite Programming**  
Alp Yurtsever, Olivier Fercoq, Francesco Locatello, Volkan Cevher
- #43 Learning Semantic Representations for Unsupervised Domain Adaptation**  
Shaoan Xie, Zibin Zheng, Liang Chen, Chuan Chen
- #44 Learning Adversarially Fair and Transferable Representations**  
David Madras, Elliot Creager, Toniann Pitassi, Richard Zemel
- #45 Spurious Local Minima are Common in Two-Layer ReLU Neural Networks**  
Itay Safran, Ohad Shamir
- #46 Efficient end-to-end learning for quantizable representations**  
Yeonwoo Jeong, Hyun Oh Song
- #47 Solving Partial Assignment Problems using Random Clique Complexes**  
Charu Sharma, Deepak Nathani, Manu Kaul
- #48 Generalized Earley Parser: Bridging Symbolic Grammars and Sequence Data for Future Prediction**  
Siyuan Qi, Baoxiong Jia, Song-Chun Zhu
- #49 Convergence guarantees for a class of non-convex and non-smooth optimization problems**  
Koulik Khamaru, Martin Wainwright
- #50 Estimation of Markov Chain via Rank-constrained Likelihood**  
XUDONG LI, Mengdi Wang, Anru Zhang
- #51 Efficient First-Order Algorithms for Adaptive Signal Denoising**  
Dmitrii Ostrovskii, Zaid Harchaoui
- #52 Continuous and Discrete-time Accelerated Stochastic Mirror Descent for Strongly Convex Functions**  
Pan Xu, Tianhao Wang, Quanquan Gu
- #53 Noisin: Unbiased Regularization for Recurrent Neural Networks**  
Adji Bousso Dieng, Rajesh Ranganath, Jaan Altosaar, David Blei
- #54 Hierarchical Deep Generative Models for Multi-Rate Multivariate Time Series**  
Zhengping Che, Sanjay Purushotham, Max Guangyu Li, Bo Jiang, Yan Liu
- #55 Disentangled Sequential Autoencoder**  
Yingzhen Li, Stephan Mandt
- #56 Stochastic Video Generation with a Learned Prior**  
Emily Denton, Rob Fergus
- #57 Mutual Information Neural Estimation**  
Mohamed Ishmael Belghazi, Aristide Baratin, Sai Rajeswar, Sherjil Ozair, Yoshua Bengio, R Devon Hjelm, Aaron Courville
- #58 Adversarially Regularized Autoencoders**  
Jake Zhao, Yoon Kim, Kelly Zhang, Alexander Rush, Yann LeCun
- #59 Policy Optimization as Wasserstein Gradient Flows**  
RUIYI ZHANG, Changyou Chen, Chunyuan Li, Lawrence Carin
- #60 Self-Imitation Learning**  
Junhyuk Oh, Yijie Guo, Satinder Singh, Honglak Lee
- #61 Spectrally Approximating Large Graphs with Smaller Graphs**  
Andreas Loukas, Pierre Vandergheynst
- #62 On the Spectrum of Random Features Maps of High Dimensional Data**  
Zhenyu Liao, Romain Couillet
- #63 Learning Registered Point Processes from Idiosyncratic Observations**  
Hongteng Xu, Lawrence Carin, Hongyuan Zha
- #64 Deep Bayesian Nonparametric Tracking**  
Aonan Zhang, John Paisley
- #65 Learning and Memorization**  
Sat Chatterjee
- #66 Attention-based Deep Multiple Instance Learning**  
Maximilian Ilse, Jakub Tomczak, Max Welling
- #67 Classification from Pairwise Similarity and Unlabeled Data**  
Han Bao, Gang Niu, Masashi Sugiyama
- #68 Analyzing the Robustness of Nearest Neighbors to Adversarial Examples**  
Yizhen Wang, Somesh Jha, Kamalika Chaudhuri
- #69 On the Implicit Bias of Dropout**  
Poorya Mianjy, Raman Arora, Rene Vidal
- #70 Convolutional Imputation of Matrix Networks**  
Qingyun Sun, Mengyuan Yan, David Donoho, stephen boyd
- #71 Detecting and Correcting for Label Shift with Black Box Predictors**  
Zachary Lipton, Yu-Xiang Wang, Alexander Smola
- #72 Orthogonality-Promoting Distance Metric Learning: Convex Relaxation and Theoretical Analysis**  
Pengtao Xie, Wei Wu, Yichen Zhu, Eric Xing
- #73 Comparison-Based Random Forests**  
Siavash Haghighi, Damien Garreau, Ulrike von Luxburg
- #74 A Probabilistic Theory of Supervised Similarity Learning for Pointwise ROC Curve Optimization**  
Robin Vogel, Aurélien Bellet, Stéphan Cléménçon
- #75 Provable Variable Selection for Streaming Features**  
Jing Wang, Jie Shen, Ping Li
- #76 Out-of-sample extension of graph adjacency spectral embedding**  
Keith Levin, Fred Roosta, Michael Mahoney, Carey Priebe
- #77 Gradient Descent for Sparse Rank-One Matrix Completion for Crowd-Sourced Aggregation of Sparsely Interacting Workers**  
Yao Ma, Alexander Olshevsky, Csaba Szepesvari, Venkatesh Saligrama
- #78 Fast and Sample Efficient Inductive Matrix Completion via Multi-Phase Procrustes Flow**  
Xiao Zhang, Simon Du, Quanquan Gu



- #79 DCFNet: Deep Neural Network with Decomposed Convolutional Filters**  
*Qiang Qiu, Xiuyuan Cheng, robert Calderbank, Guillermo Sapiro*
- #80 Optimization Landscape and Expressivity of Deep CNNs**  
*Quynh Nguyen, Matthias Hein*
- #81 Scalable Gaussian Processes with Grid-Structured Eigenfunctions (GP-GRIEF)**  
*Trefor Evans, Prasanth B Nair*
- #82 Learning in Integer Latent Variable Models with Nested Automatic Differentiation**  
*Daniel Sheldon, Kevin Winner, Debora Sujono*
- #83 Adapting Images and Representations with Domain Adversarial Learning**  
*Judy Hoffman, Eric Tzeng, Taesung Park, Jun-Yan Zhu, Philip Isola, Kate Saenko, Alexei Efros, Prof. Darrell*
- #84 Rectify Heterogeneous Models with Semantic Mapping**  
*Han-Jia Ye, De-Chuan Zhan, Yuan Jiang, Zhi-Hua Zhou*
- #85 DVAE++: Discrete Variational Autoencoders with Overlapping Transformations**  
*Arash Vahdat, William Macready, Zhengbing Bian, Amir Khoshaman, Evgeny Andriyash*
- #86 Iterative Amortized Inference**  
*Joe Marino, Yisong Yue, Stephan Mandt*
- #87 Blind Justice: Fairness with Encrypted Sensitive Attributes**  
*Niki Kilbertus, Adria Gascon, Matt Kusner, Michael Veale, Krishna Gummadi, Adrian Weller*
- #88 Active Learning with Logged Data**  
*Songbai Yan, Kamalika Chaudhuri, Tara Javidi*
- #89 A Reductions Approach to Fair Classification**  
*Alekh Agarwal, Alina Beygelzimer, Miroslav Dudik, John Langford, Hanna Wallach*
- #90 Preventing Fairness Gerrymandering: Auditing and Learning for Subgroup Fairness**  
*Michael Kearns, Seth V Neel, Aaron Roth, Zhiwei Wu*
- #91 Bayesian Model Selection for Change Point Detection and Clustering**  
*othmane mazhar, Cristian R. Rojas, Inst. of Technology Carlo Fischione, Mohammad Reza Hesamzadeh*
- #92 A Unified Framework for Structured Low-rank Matrix Learning**  
*Pratik Kumar Jawanpuria, Bamdev Mishra*
- #93 Firing Bandits: Optimizing Crowdfunding**  
*Lalit Jain, Kevin Jamieson*
- #94 Multi-Fidelity Black-Box Optimization with Hierarchical Partitions**  
*Rajat Sen, kirthevasan kandasamy, Sanjay Shakkottai*
- #95 Compiling Combinatorial Prediction Games**  
*Frederic Koriche*
- #96 Rates of Convergence of Spectral Methods for Graphon Estimation**  
*Jiaming Xu*
- #97 Characterizing and Learning Equivalence Classes of Causal DAGs under Interventions**  
*Karren Yang, Abigail Katoff, Caroline Uhler*
- #98 Minimal I-MAP MCMC for Scalable Structure Discovery in Causal DAG Models**  
*Raj Agrawal, Caroline Uhler, Tamara Broderick*
- #99 StrassenNets: Deep Learning with a Multiplication Budget**  
*Michael Tschannen, Aran Khanna, Animashree Anandkumar*
- #100 Gradient-Based Meta-Learning with Learned Layerwise Metric and Subspace**  
*Yoonho Lee, Seungjin Choi*
- #101 Candidates vs. Noises Estimation for Large Multi-Class Classification Problem**  
*Lei Han, Yiheng Huang, Tong Zhang*
- #102 CRAFTML, an Efficient Clustering-based Random Forest for Extreme Multi-label Learning**  
*Wissam Siblini, Frank Meyer, Pascale Kuntz*
- #103 Overcoming Catastrophic Forgetting with Hard Attention to the Task**  
*Joan Serra, Didac Suris, Marius Miron, Alexandros Karatzoglou*
- #104 Deep k-Means: Re-Training and Parameter Sharing with Harder Cluster Assignments for Compressing Deep Convolutions**  
*Junru Wu, Yue Wang, Zhenyu Wu, Zhangyang Wang, Ashok Veeraraghavan, Yingyan Lin*
- #105 Efficient Neural Audio Synthesis**  
*Nal Kalchbrenner, Erich Elsen, Karen Simonyan, Seb Noury, Norman Casagrande, Edward Lockhart, Florian Stimberg, Aaron van den Oord, Sander Dieleman, koray kavukcuoglu*
- #106 Born Again Neural Networks**  
*Tommaso Furlanello, Zachary Lipton, Michael Tschannen, Laurent Itti, Anima Anandkumar*
- #107 Adaptive Sampled Softmax with Kernel Based Sampling**  
*Guy Blanc, Steffen Rendle*
- #108 The Hidden Vulnerability of Distributed Learning in Byzantium**  
*El Mahdi El Mhamdi, Rachid Guerraoui, Sébastien Rouault*
- #109 JointGAN: Multi-Domain Joint Distribution Learning with Generative Adversarial Nets**  
*Yunchen Pu, Shuyang Dai, Zhe Gan, Weiyao Wang, Guoyin Wang, Yizhe Zhang, Ricardo Henao, Lawrence Carin*
- #110 Autoregressive Quantile Networks for Generative Modeling**  
*Georg Ostrovski, Will Dabney, Remi Munos*
- #111 On the Power of Over-parametrization in Neural Networks with Quadratic Activation**  
*Simon Du, Jason Lee*
- #112 On the Limitations of First-Order Approximation in GAN Dynamics**  
*Jerry Li, Aleksander Madry, John Peebles, Ludwig Schmidt*
- #113 Learning to Explore via Meta-Policy Gradient**  
*Tianbing Xu, Qiang Liu, Liang Zhao, Jian Peng*
- #114 Mean Field Multi-Agent Reinforcement Learning**  
*Yaodong Yang, Rui Luo, M. Li, Ming Zhou, Weinan Zhang, Jun Wang*
- #115 Online Linear Quadratic Control**  
*Alon Cohen, Avinatan Hasidim, Tomer Koren, Nevena Lazic, Yishay Mansour, Kunal Talwar*
- #116 Online Learning with Abstention**  
*Corinna Cortes, Giulia DeSalvo, Claudio Gentile, Mehryar Mohri, Scott Yang*
- #117 Celer: a Fast Solver for the Lasso with Dual Extrapolation**  
*Mathurin MASSIAS, Joseph Salmon, Alexandre Gramfort*





- #118 Cut-Pursuit Algorithm for Regularizing Nonsmooth Functionals with Graph Total Variation**  
*Hugo Raguet, Ioïc Iandrieu*
- #119 Augmented CycleGAN: Learning Many-to-Many Mappings from Unpaired Data**  
*Amjad Almahairi, Sai Rajeswar, Alessandro Sordani, Philip Bachman, Aaron Courville*
- #120 Mixed batches and symmetric discriminators for GAN training**  
*Thomas LUCAS, Coirentin Tallec, Yann Ollivier, Jakob Verbeek*
- #121 An Algorithmic Framework of Variable Metric Over-Relaxed Hybrid Proximal Extra-Gradient Method**  
*Li Shen, Peng Sun, Yitong Wang, Wei Liu, Tong Zhang*
- #122 Local Convergence Properties of SAGA/Prox-SVRG and Acceleration**  
*Clarice Poon, Jingwei Liang, Carola-Bibiane Schönlieb*
- #123 Asynchronous Byzantine Machine Learning (the case of SGD)**  
*Georgios Damaskinos, El Mahdi El Mhamdi, Rachid Guerraoui, Rihcheek Patra, Mahsa Taziki*
- #124 Learning Hidden Markov Models from Pairwise Co-occurrences with Application to Topic Modeling**  
*Kejun Huang, Xiao Fu, Nicholas Sidiropoulos*
- #125 DRACO: Byzantine-resilient Distributed Training via Redundant Gradients**  
*Lingjiao Chen, Hongyi Wang, Zachary Charles, Dimitris Papailiopoulos*
- #126 Communication-Computation Efficient Gradient Coding**  
*Min Ye, Emmanuel Abbe*
- #127 Submodular Hypergraphs: p-Laplacians, Cheeger Inequalities and Spectral Clustering**  
*Pan Li, Olgica Milenkovic*
- #128 SMAC: Simultaneous Mapping and Clustering Using Spectral Decompositions**  
*cbajaj bajaj, Tingran Gao, Zihang He, Qixing Huang, Zhenxiao Liang*
- #129 On Nesting Monte Carlo Estimators**  
*Tom Rainforth, Rob Cornish, Hongseok Yang, andrew warrington, Frank Wood*
- #130 Stein Variational Gradient Descent Without Gradient**  
*Jun Han, Qiang Liu*
- #131 Detecting non-causal artifacts in multivariate linear regression models**  
*Dominik Janzing, Bernhard Schölkopf*
- #132 The Hierarchical Adaptive Forgetting Variational Filter**  
*Vincent Moens*
- #133 Junction Tree Variational Autoencoder for Molecular Graph Generation**  
*Wengong Jin, Regina Barzilay, Tommi Jaakkola*
- #134 Semi-Amortized Variational Autoencoders**  
*Yoon Kim, Sam Wiseman, Andrew Miller, David Sontag, Alexander Rush*
- #135 Adaptive Exploration-Exploitation Tradeoff for Opportunistic Bandits**  
*Huasen Wu, Xueying Guo, Xin Liu*
- #136 Semiparametric Contextual Bandits**  
*Akshay Krishnamurthy, Zhiwei Wu, Vasilis Syrgkanis*
- #137 Interpretability Beyond Feature Attribution: Quantitative Testing with Concept Activation Vectors (TCAV)**  
*Been Kim, Martin Wattenberg, Justin Gilmer, Carrie Cai, James Wexler, Fernanda B Viégas, Rory sayres*
- #138 Weightless: Lossy weight encoding for deep neural network compression**  
*Brandon Reagen, Udit Gupta, Bob Adolf, Michael Mitzenmacher, Alexander Rush, Gu-Yeon Wei, David Brooks*
- #139 Parallel Bayesian Network Structure Learning**  
*Tian Gao, Dennis Wei*
- #140 Temporal Poisson Square Root Graphical Models**  
*Sinong Geng, Charles Kuang, Peggy Peissig, University of Wisconsin David Page*
- #141 Minimax Concave Penalized Multi-Armed Bandit Model with High-Dimensional Covariates**  
*xue wang, Mike Wei, Tao Yao*
- #142 Dynamic Regret of Strongly Adaptive Methods**  
*Lijun Zhang, Tianbao Yang, rong jin, Zhi-Hua Zhou*
- #143 Distributed Clustering via LSH Based Data Partitioning**  
*Aditya Bhaskara, Maheshakya Wijewardena*
- #144 Learning to Branch**  
*Nina Balcan, Travis Dick, Tuomas Sandholm, Ellen Vitercik*
- #145 Minibatch Gibbs Sampling on Large Graphical Models**  
*Chris De Sa, Zhiting Chen, Wong*
- #146 On the Theory of Variance Reduction for Stochastic Gradient Monte Carlo**  
*Niladri S Chatterji, Nicolas Flammarion, Yian Ma, Peter Bartlett, Michael Jordan*
- #147 Using Reward Machines for High-Level Task Specification and Decomposition in Reinforcement Learning**  
*Rodrigo A Toro Icarte, Toryn Q Klassen, Richard Valenzano, Sheila McIlraith*
- #148 Generalization without Systematicity: On the Compositional Skills of Sequence-to-Sequence Recurrent Networks**  
*Brenden Lake, Marco Baroni*
- #149 Pathwise Derivatives Beyond the Reparameterization Trick**  
*Martin Jankowiak, Fritz Obermeyer*
- #150 Message Passing Stein Variational Gradient Descent**  
*Jingwei Zhuo, Chang Liu, Jiaxin Shi, Jun Zhu, Ning Chen, Bo Zhang*
- #151 State Space Gaussian Processes with Non-Gaussian Likelihood**  
*Hannes Nickisch, Arno Solin, Alexander Grigorevskiy*
- #152 Constant-Time Predictive Distributions for Gaussian Processes**  
*Geoff Pleiss, Jacob Gardner, Kilian Weinberger, Andrew Wilson*
- #153 Gradient descent with identity initialization efficiently learns positive definite linear transformations by deep residual networks**  
*Peter Bartlett, Dave Helmbold, Phil Long*
- #154 On the Generalization of Equivariance and Convolution in Neural Networks to the Action of Compact Groups**  
*Risi Kondor, Shubhendu Trivedi*
- #155 Racing Thompson: an Efficient Algorithm for Thompson Sampling with Non-conjugate Priors**  
*Yichi Zhou, Jun Zhu, Jingwei Zhuo*



- #156 Probably Approximately Metric-Fair Learning**  
*Gal Yona, Guy Rothblum*
- #157 Neural Program Synthesis from Diverse Demonstration Videos**  
*Shao-Hua Sun, Hyeonwoo Noh, Sriram Somasundaram, Joseph Lim*
- #158 Video Prediction with Appearance and Motion Conditions**  
*Yunseok Jang, Gunhee Kim, Yale Song*
- #159 CRVI: Convex Relaxation for Variational Inference**  
*Ghazal Fazelnia, John Paisley*
- #160 Bayesian Coreset Construction via Greedy Iterative Geodesic Ascent**  
*Trevor Campbell, Tamara Broderick*
- #161 Transformation Autoregressive Networks**  
*Junier Oliva, Avinava Dubey, Manzil Zaheer, Barnabás Póczos, Russ Salakhutdinov, Eric Xing, Jeff Schneider*
- #162 Learning equations for extrapolation and control**  
*Subham S Sahoo, Christoph Lampert, Georg Martius*
- #163 Analyzing Uncertainty in Neural Machine Translation**  
*Myle Ott, Michael Auli, David Grangier, Marc'Aurelio Ranzato*
- #164 Hierarchical Text Generation and Planning for Strategic Dialogue**  
*Denis Yarats, Mike Lewis*
- #165 Budgeted Experiment Design for Causal Structure Learning**  
*AmirEmad Ghassami, Saber Salehkaleybar, Negar Kiyavash, Elias Bareinboim*
- #166 Accurate Inference for Adaptive Linear Models**  
*Yash Deshpande, Lester Mackey, Vasilis Syrgkanis, Matt Taddy*
- #167 Path-Level Network Transformation for Efficient Architecture Search**  
*Han Cai, Jiacheng Yang, Weinan Zhang, Song Han, Yong Yu*
- #168 Progress & Compress: A scalable framework for continual learning**  
*Jonathan Schwarz, Wojciech Czarnecki, Jelen Luketina, Agnieszka Grabska-Barwinska, Yee Teh, Razvan Pascanu, Raia Hadsell*
- #169 Learning Longer-term Dependencies in RNNs with Auxiliary Losses**  
*Trieu H Trinh, Andrew Dai, Thang Luong, Quoc Le*
- #170 Understanding and Simplifying One-Shot Architecture Search**  
*gbender Bender, Pieter-Jan Kindermans, Barret Zoph, Vijay Vasudevan, Quoc Le*
- 171 Fully Decentralized Multi-Agent Reinforcement Learning with Networked Agents**  
*Kaiqing Zhang, Zhuoran Yang, Han Liu, Tong Zhang, Tamer Basar*
- #172 State Abstractions for Lifelong Reinforcement Learning**  
*David Abel, Dilip Arumugam, Lucas Lehnert, Michael L. Littman*
- #173 Bounding and Counting Linear Regions of Deep Neural Networks**  
*Thiago Serra, Christian Tjandraatmadja, Srikumar Ramalingam*
- #174 Bounds on the Approximation Power of Feedforward Neural Networks**  
*Mohammad Mehrabi, Aslan Tchamkerten, MANSOOR I YOUSEFI*
- #175 Clipped Action Policy Gradient**  
*Yasuhiro Fujita, Shin-ichi Maeda*
- #176 IMPALA: Scalable Distributed Deep-RL with Importance Weighted Actor-Learner Architectures**  
*Lasse Espeholt, Hubert Soyer, Remi Munos, Karen Simonyan, Vlad Mnih, Tom Ward, Yotam Doron, Vlad Firoiu, Tim Harley, Iain Dunning, Shane Legg, Koray Kavukcuoglu*
- #177 Inter and Intra Topic Structure Learning with Word Embeddings**  
*He Zhao, Lan Du, Wray Buntine, Mingyuan Zhou*
- #178 oi-VAE: Output Interpretable VAEs for Nonlinear Group Factor Analysis**  
*Samuel Ainsworth, Nick J Foti, Adrian KC Lee, Emily Fox*

# Friday Workshops


JULY 13TH - 8:30AM - 6PM



<b>Joint Workshop on AI in Health (day 1)</b>	<b>B2</b>
<b>The 3rd International workshop on biomedical informatics with optimization and machine learning (BOOM)</b>	<b>B3</b>
<b>The 3rd International Workshop on Knowledge Discovery in Healthcare Data</b>	<b>B5</b>
<b>Linguistic and Cognitive Approaches To Dialog Agents (LaCATODA 2018)</b>	<b>B9</b>
<b>FCA4AI 2018</b>	<b>K12</b>
<b>Autonomy in Teams -- Joint Workshop on Sharing Autonomy in Human-Robot Interaction</b>	<b>K16</b>
<b>Fairness, Interpretability, and Explainability Federation of Workshops (day 1)</b>	<b>K2</b>
<b>Tenth International Workshop Modelling and Reasoning in Context (MRC)</b>	<b>K22</b>
<b>31st International Workshop on Qualitative Reasoning (QR 2018)</b>	<b>K23</b>
<b>6th Goal Reasoning Workshop</b>	<b>K24</b>
<b>Towards learning with limited labels: Equivariance, Invariance, and Beyond</b>	<b>T3</b>
<b>Computer Games Workshop</b>	<b>T4</b>
<b>Learning and Reasoning: Principles &amp; Applications to Everyday Spatial and Temporal Knowledge (day 1)</b>	<b>K22</b>

# Saturday Workshops


JULY 14TH - 8:30AM - 6PM

- 
- Fairness, Interpretability, and Explainability Federation of Workshops (day 2-3) (day 1) A3
  - Lifelong Learning: A Reinforcement Learning Approach A4
  - Theoretical Foundations and Applications of Deep Generative Models (day 1) A5
  - Modern Trends in Nonconvex Optimization for Machine Learning A6
  - Goal Specifications for Reinforcement Learning A7
  - 10th International Workshop on Agents in Traffic and Transportation (ATT 2018) B10
  - Joint Workshop on AI in Health (day 2) B2
  - Cognitive Vision: Integrated Vision and AI for Embodied Perception and Interaction B3
  - Adaptive and Learning Agents 2018 (day 1) B4
  - Bridging the Gap between Human and Automated Reasoning B5
  - International Workshop on Automated Negotiation (ACAN) B9
  - Enabling Reproducibility in Machine Learning MLTrain@RML C2
  - Eighth International Workshop on Statistical Relational AI C3
  - The 2018 Joint Workshop on Machine Learning for Music C7
  - Joint ICML and IJCAI Workshop on Computational Biology 2018 C8
  - AutoML 2018 K1
  - Engineering Multi-Agent Systems (day 1) K12
  - International Workshop on Optimization in Multi-Agent Systems (OptMAS) K13
  - ALAW - Agents Living in Augmented Worlds K14
  - Game-Theoretic Mechanisms for Data and Information K15
  - TRUST Workshop K16
  - The AAMAS-IJCAI Workshop on Agents and Incentives in Artificial Intelligence (day 1) K2
  - Learning and Reasoning: Principles & Applications to Everyday Spatial and Temporal Knowledge (day 2) K22
  - 19th International Workshop on Multi-Agent-Based Simulation (MABS 2018) K23
  - AI-MHRI (AI for Multimodal Human-Robot Interaction) (day 1) K24
  - AI and Computational Psychology: Theories, Algorithms and Applications (CompPsy) T1
  - First international workshop on socio-cognitive systems T3
  - Data Science meets Optimization T4
  - Theory of Deep Learning Victoria
  - Workshop on Efficient Credit Assignment in Deep Learning and Deep Reinforcement Learning (ECA) (day 1) A7
  - International Workshop on Massively Multi-Agent Systems B2
  - Domain Adaptation for Visual Understanding B3



# Sunday Workshops

JULY 15TH - 8:30AM - 6PM

- 
- Fairness, Interpretability, and Explainability Federation of Workshops (day 2-3) (day 2) A3
  - Geometry in Machine Learning (GiMLi) A4
  - Theoretical Foundations and Applications of Deep Generative Models (day 2) A5
  - Machine learning for Causal Inference, Counterfactual Prediction, and Autonomous Action (CausalML) A6
  - Workshop on Efficient Credit Assignment in Deep Learning and Deep Reinforcement Learning (ECA) (day 2) A7
  - Tractable Probabilistic Models B10
  - Prediction and Generative Modeling in Reinforcement Learning B2
  - 2nd International Joint Conference on Artificial Intelligence (IJCAI) Workshop on Artificial Intelligence in Affective Computing B3
  - Adaptive and Learning Agents 2018 (day 2) B4
  - International Workshop on Real Time compliant Multi-Agent Systems (RTcMAS) B5
  - Joint Workshop on Multimedia for Cooking and Eating Activities and Multimedia Assisted Dietary Management (CEA/MADiMa2018) B9
  - Privacy in Machine Learning and Artificial Intelligence (PiMLAI) C2
  - Federated AI for Robotics Workshop (F-Rob-2018) C3
  - Planning and Learning (PAL-18) C7
  - Architectures and Evaluation for Generality, Autonomy and Progress in AI (AEGAP) C8
  - Neural Abstract Machines & Program Induction Workshop v2.0 (NAMPI\_v2) K1
  - Engineering Multi-Agent Systems (day 2) K12
  - ABMUS-18 - Agent-Based Modelling of Urban Systems K13
  - AI for Aging, Rehabilitation and Independent Assisted Living (ARIAL) and Intelligent Conversation Agents in Home and Geriatric Care Applications K14
  - The Joint International Workshop on Social Influence Analysis and Mining Actionable Insights from Social Networks (SocInf+MAISoN 2018) K16
  - The AAMAS-IJCAI Workshop on Agents and Incentives in Artificial Intelligence (day 2) K2
  - Artificial Intelligence for Knowledge Management K22
  - AI for Synthetic Biology 2 K23
  - AI-MHRI (AI for Multimodal Human-Robot Interaction) (day 2) K24
  - Exploration in Reinforcement Learning T1
  - Humanizing AI (HAI) T3
  - First Workshop on Deep Learning for Safety-Critical in Engineering Systems T4
  - Machine Learning: The Great Debates (MLGD2018) Victoria
  - Workshop on AI for Internet of Things A5
  - Artificial Intelligence for Wildlife Conservation (AIWC) Workshop B3



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Martha White  
Michael Wick  
Jenna Wiens  
Chris Williams  
David Wingate  
Ole Winther  
Sam Wiseman  
Guillaume Wisniewski  
Christian Wolf  
David Woodruff  
Jiajun Wu  
Qiang Wu  
Shanshan Wu  
Zhiwei Steven Wu  
Jianxin Wu  
Lingfei Wu  
Si Wu  
Wei Wu  
Xiang Wu  
Yan Wu

Jonas Wulff  
Lin Xiao  
Lingxi Xie  
Pengtao Xie  
Saining Xie  
Yao Xie  
Bo Xie  
Bowen Xu  
Chang Xu  
Minjie Xu  
Huan Xu  
Huazhe Xu  
Kelvin Xu  
Linli Xu  
Miao Xu  
Min Xu  
Peng Xu  
Weiyu Xu  
Jun-Ming Xu  
Xinxing Xu  
Yan Xu  
Yanxun Xu  
Zenglin Xu  
Zhiqiang Xu  
Yexiang Xue  
Makoto Yamada  
Kota Yamaguchi  
Yoshihiro Yamanishi  
Keisuke Yamazaki  
Ming Yan  
Bowei Yan  
Xinchen Yan  
Songbai Yan  
Haiqin Yang  
Hongseok Yang  
Jimei Yang  
Jun Yang  
Jianwei Yang  
Ming-Hsuan Yang  
Tianbao Yang  
Jiasen Yang  
Eunho Yang  
Scott Yang  
Yun Yang  
Zhirong Yang  
Hengshuai Yao  
Quanming Yao  
Li Yao  
Yuan Yao  
Grigory Yaroslavtsev  
Christopher Yao  
Min Ye  
Nan Ye  
Ian Yen  
Dit-Yan Yeung  
Florian YGER  
Aphinyanaphongs  
Yindalon  
Li Yingzhen  
Dani Yogatama  
Chun-Nam Yu  
Felix Yu  
Fisher Yu  
Lei Yu  
Hsiang-Fu Yu  
Shipeng Yu  
Adams Wei Yu  
Yaoliang Yu  
Rose Yu  
Yang Yu  
Changhe Yuan  
Xiaotong Yuan  
Matsumoto Yuji  
Ersin Yumer  
Hyokun Yun  
Se-Young Yun  
Mikhail Yurochkin  
Oleksandr Zadorozhnyi  
Manzil Zaheer  
Martina Zambelli  
Fabio Massimo  
Zanzotto

Giovanni Zappella  
Ali Zaregade  
Neil Zeghidour  
De-Chuan Zhan  
Aonan Zhang  
Cheng Zhang  
Chicheng Zhang  
Chiyuan Zhang  
Cyril Zhang  
Debing Zhang  
Daoqiang Zhang  
Hongyang Zhang  
Hongyi Zhang  
Jiji Zhang  
Kai Zhang  
Li Zhang  
Liang Zhang  
Nevin Zhang  
Michael Zhang  
Ning Zhang  
Quan Zhang  
Qin Zhang  
Shiqi Zhang  
Shaoting Zhang  
Xiangliang Zhang  
Xiang Zhang  
Yizhe Zhang  
Yu Zhang  
Yi Zhang  
Min-Ling Zhang  
Teng Zhang  
Xinhua Zhang  
Zhenjie Zhang  
Zhaoxiang Zhang  
Lijun Zhang  
Yuting Zhang  
Ziming Zhang  
Peilin Zhao  
Qibin Zhao  
Tuo Zhao  
Shandian Zhe  
Elena Zheleva  
Stephan Zheng  
Yin Zheng  
Kai Zhong  
Jiayu Zhou  
Joey Tianyi Zhou  
Ding-Xuan Zhou  
Mingyuan Zhou  
Tianyi Zhou  
Wenxin Zhou  
Guang-Tong Zhou  
Jun-Yan Zhu  
Linhong Zhu  
Xiaodan Zhu  
Yue Zhu  
Jingwei Zhuo  
Arthur Zimek  
Rob Zinkov  
Masrour Zoghi  
James Zou  
Anastasios Zouzias  
Piotr Ziernik

# AUTHOR INDEX

- Abbe, Emmanuel:** Oral Fri in Parallel and Distributed Learning, Pos. Fri #126
- Abbeel, Pieter:** Oral Wed in Reinforcement Learning, Pos. Wed #15, Pos. Wed #106, Pos. Wed #61, Pos. Wed #135, Oral Thu in Deep Learning (Neural Network Architectures), Oral Thu in Reinforcement Learning, Pos. Thu #7, Pos. Thu #169
- Abeille, Marc:** Oral Wed in Reinforcement Learning, Pos. Wed #198
- Abel, David:** Oral Thu in Reinforcement Learning, Pos. Thu #173, Oral Fri in Reinforcement Learning, Pos. Fri #172
- Acharya, Jayadev:** Oral Wed in Privacy, Anonymity, and Security, Pos. Wed #59
- Achlioptas, Panagiotis:** Oral Thu in Generative Models, Pos. Thu #196
- Adel, Tameem:** Oral Wed in Representation Learning, Pos. Wed #191
- Adolf, Bob:** Oral Fri in Other Models and Methods, Pos. Fri #138
- Agarwal, Arpit:** Oral Thu in Ranking and Preference Learning, Pos. Thu #188
- Agarwal, Shivani:** Oral Thu in Ranking and Preference Learning, Pos. Thu #188
- Agarwal, Alekh:** Oral Thu in Online Learning, Pos. Thu #80, Oral Fri in Society Impacts of Machine Learning, Oral Fri in Reinforcement Learning, Pos. Fri #15, Pos. Fri #89
- Agarwal, Shipra:** Oral Wed in Optimization (Combinatorial), Pos. Wed #56
- Aghazadeh, Amirali:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #27
- Agrawal, Raj:** Oral Fri in Causal Inference, Pos. Fri #98
- Agrawal, Shipra:** Oral Thu in Online Learning, Pos. Thu #123
- Agrawal, Pulkit:** Oral Thu in Reinforcement Learning, Pos. Thu #181
- Ahn, Sung-Soo:** Oral Thu in Graphical Models, Pos. Thu #134
- Aiken, Alex:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #34
- Aila, Timo:** Oral Thu in Supervised Learning, Pos. Thu #171
- Ainsworth, Samuel:** Oral Fri in Generative Models, Pos. Fri #178
- Aittala, Miika:** Oral Thu in Supervised Learning, Pos. Thu #171
- Antonoglou, Ioannis:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Wed #92
- Arenz, Oleg:** Oral Wed in Approximate Inference, Pos. Wed #213
- Arora, Raman:** Oral Wed in Dimensionality Reduction, Pos. Wed #114, Pos. Wed #17, Oral Fri in Matrix Factorization, Pos. Fri #69
- Arora, Sanjeev:** Tutorial Tue in Victoria, Oral Wed in Deep Learning (Theory), Pos. Wed #188, Oral Thu in Deep Learning (Theory), Pos. Thu #184
- Arous, Gerard:** Oral Wed in Deep Learning (Theory), Pos. Wed #168
- Arumugam, Dilip:** Oral Fri in Reinforcement Learning, Pos. Fri #172
- Asadi, Kavosh:** Oral Wed in Reinforcement Learning, Pos. Wed #173
- Asadi Kangarshahi, Ehsan:** Oral Thu in Online Learning, Pos. Thu #58
- Ash, Jordan:** Oral Wed in Deep Learning (Theory), Pos. Wed #14
- Athalye, Anish:** Oral Wed in Deep Learning (Adversarial), Pos. Wed #73, Oral Thu in Deep Learning (Adversarial), Pos. Thu #213, Pos. Thu #106
- Auli, Michael:** Oral Fri in Natural Language and Speech Processing, Pos. Fri #163
- Awasthi, Pranjal:** Oral Wed in Unsupervised Learning, Oral Wed in Clustering, Pos. Wed #31, Pos. Wed #39
- Ayers, Grant:** Oral Thu in Other Applications, Pos. Thu #91
- Aziz, LAMIAE:** Tutorial Tue in K1 + K2
- Azizpour, Hossein:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #197
- Azizzadenesheli, Kamyar:** Oral Wed in Optimization (Non-convex), Pos. Wed #72
- Babuschkin, Igor:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #84, Oral Fri in Generative Models, Pos. Fri #25
- Bacciu, Davide:** Oral Wed in Representation Learning, Pos. Wed #138
- Bachman, Philip:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #119
- Bacon, Pierre-Luc:** Oral Thu in Reinforcement Learning, Pos. Thu #66
- Badrinarayanan, Vijay:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #4
- Bahri, Yasaman:** Oral Wed in Deep Learning (Theory), Pos. Wed #171
- Bai, Wenruo:** Oral Thu in Optimization (Combinatorial), Pos. Thu #105
- Bailey, James:** Oral Thu in Supervised Learning, Pos. Thu #90
- Baity-Jesi, Marco:** Oral Wed in Deep Learning (Theory), Pos. Wed #168
- bajaj, chandrajit:** Oral Fri in Spectral Methods, Pos. Fri #128
- Bajgar, Ondrej:** Oral Fri in Deep Learning (Theory), Pos. Fri #20
- Balakrishnan, Sivaraman:** Oral Wed in Statistical Learning Theory, Pos. Wed #142
- Balcan, Nina:** Tutorial Tue in A9, Oral Fri in Optimization (Combinatorial), Pos. Fri #144
- Balduzzi, David:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #201
- Balestrieri, Randall:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #1
- Balestrieri, Randall:** Oral Thu in Deep Learning (Theory), Pos. Thu #192
- Balkanski, Eric:** Oral Wed in Optimization (Combinatorial), Pos. Wed #55, Oral Thu in Optimization (Combinatorial), Pos. Thu #117
- Balles, Lukas:** Oral Thu in Optimization (Non-convex), Pos. Thu #16
- Balog, Matej:** Oral Thu in Kernel Methods, Pos. Thu #18
- Bambos, Nicholas:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #13
- Bamler, Robert:** Oral Wed in Representation Learning, Pos. Wed #201
- Bang, Duhyeon:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #202
- Bansal, Abhishek:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #107
- Bao, Han:** Oral Fri in Statistical Learning Theory, Pos. Fri #67
- Baptista, Ricardo:** Oral Wed in Optimization (Bayesian), Pos. Wed #44
- Baquet, Pierre:** Oral Thu in Other Applications, Pos. Thu #92
- Baraniuk, Richard:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Wed #1, Oral Thu in Deep Learning (Theory),
- Oral Thu in Large Scale Learning and Big Data, Oral Thu in Optimization (Non-convex), Pos. Thu #164, Pos. Thu #192, Pos. Thu #27
- Baratin, Aristide:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #57
- Barbara Hammer, CITEC:** Oral Wed in Representation Learning, Pos. Wed #10
- Barber, Rina:** Oral Thu in Supervised Learning, Pos. Thu #89
- Bareinboim, Elias:** Oral Fri in Causal Inference, Pos. Fri #165
- Bargiacchi, Eugenio:** Oral Thu in Multi-Agent Learning, Pos. Thu #126
- Barman, Siddharth:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #175
- Baroni, Marco:** Oral Fri in Natural Language and Speech Processing, Pos. Fri #148
- Barreto, Andre:** Oral Wed in Reinforcement Learning, Pos. Wed #163
- Barrett, David:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #110
- Barros, Rodrigo:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #203
- Bartlett, Peter:** Oral Thu in Statistical Learning Theory, Pos. Thu #50, Oral Fri in Deep Learning (Theory), Oral Fri in Monte Carlo Methods, Pos. Fri #153, Pos. Fri #146
- Barzilay, Regina:** Oral Fri in Generative Models, Pos. Fri #133
- Basar, Tamer:** Oral Fri in Reinforcement Learning, Pos. Fri #171
- Bassily, Raef:** Oral Wed in Optimization (Convex), Pos. Wed #204
- Batra, Dhruv:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #60
- Battaglia, Peter:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #84
- Battenberg, Eric:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #43, Pos. Thu #44
- Becigneul, Gary:** Oral Wed in Representation Learning, Pos. Wed #100
- Behpour, Sima:** Oral Wed in Structured Prediction, Pos. Wed #65
- Belghazi, Mohamed:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #57
- Belgrave, Danielle:** Tutorial Tue in K1 + K2
- Belkin, Mikhail:** Oral Wed in Optimization (Convex), Pos. Wed #204, Oral Thu in Kernel Methods, Pos. Thu #159
- Bellet, Aurélien:** Oral Fri in Statistical Learning Theory, Pos. Fri #74
- Below, Dan:** Oral Fri in Generative Models, Pos. Fri #25
- Bender, Gabriel:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #170
- Bengio, Yoshua:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #170, Oral Fri in Deep Learning (Adversarial), Pos. Fri #57
- Bengio, Samy:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #73
- Bergmann, Urs:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #37
- Bernstein, Jeremy:** Oral Wed in Optimization (Non-convex), Pos. Wed #72
- Bethge, Matthias:** Oral Wed in Computer Vision, Pos. Wed #12
- Beygelzimer, Alina:** Oral Fri in Society Impacts of Machine Learning, Pos. Fri #89
- Bhaskara, Aditya:** Oral Fri in Optimization (Combinatorial), Pos. Fri #143
- Bhattacharyya, Chiranjib:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #107
- Bhattacharyya, Arnab:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #175
- Bhupatiraju, Surya:** Oral Thu in Reinforcement Learning, Pos. Thu #30
- Bian, An:** Oral Thu in Optimization (Convex), Pos. Thu #219
- Bian, Zhengbing:** Oral Fri in Generative Models, Pos. Fri #85
- Bilmes, Jeff:** Oral Thu in Optimization (Combinatorial), Pos. Thu #118, Pos. Thu #105
- Binaghi, Damiano:** Oral Thu in Reinforcement Learning, Pos. Thu #65
- Binder, Alexander:** Oral Wed in Unsupervised Learning, Pos. Wed #147
- Binkowski, Mikolaj:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #22
- Biroli, Giulio:** Oral Wed in Deep Learning (Theory), Pos. Wed #168
- Blanc, Guy:** Oral Fri in Natural Language and Speech Processing, Pos. Fri #107



# AUTHOR INDEX

- Blanco, Saúl:** Oral Wed in Reinforcement Learning, Pos. Wed #98
- Blei, David:** Oral Wed in Feature Selection, Oral Wed in Approximate Inference, Pos. Wed #212, Pos. Wed #37, Oral Fri in Generative Models, Pos. Fri #53
- Blondel, Mathieu:** Oral Wed in Structured Prediction, Pos. Wed #66, Oral Thu in Structured Prediction, Pos. Thu #48
- Blundell, Charles:** Oral Wed in Reinforcement Learning, Pos. Wed #209
- Bojanowski, Piotr:** Oral Thu in Generative Models, Pos. Thu #5
- Bojchevski, Aleksandar:** Oral Wed in Networks and Relational Learning, Pos. Wed #58
- Bollapragada, Vijaya Raghavendra:** Oral Fri in Optimization (Non-convex), Pos. Fri #5
- Bonakdarpour, Matt:** Oral Thu in Supervised Learning, Pos. Thu #89
- Bonilla, Edwin:** Oral Wed in Statistical Learning Theory, Pos. Wed #95
- Boning, Duane:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #147
- Boracchi, Giacomo:** Oral Fri in Unsupervised Learning, Pos. Fri #30
- Borsa, Diana:** Oral Wed in Reinforcement Learning, Pos. Wed #163
- Botvinick, Matthew:** Oral Wed in Reinforcement Learning, Pos. Wed #208, Pos. Wed #209
- boyd, stephen:** Oral Fri in Matrix Factorization, Pos. Fri #70
- Braverman, Vladimir:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #28
- Brea, Johanni:** Oral Thu in Reinforcement Learning, Pos. Thu #23
- Brintrup, Alexandra:** Oral Fri in Deep Learning (Theory), Pos. Fri #8
- Briol, Francois-Xavier:** Oral Wed in Gaussian Processes, Pos. Wed #125, Oral Fri in Approximate Inference, Pos. Fri #1
- Broderick, Tamara:** Tutorial Tue in Victoria, Oral Fri in Approximate Inference, Oral Fri in Causal Inference, Pos. Fri #160, Pos. Fri #98
- Brooks, David:** Oral Fri in Other Models and Methods, Pos. Fri #138
- Brown, Tom:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #95
- Brukhim, Nataly:** Oral Wed in Structured Prediction, Pos. Wed #5
- Brunskill, Emma:** Oral Wed in Reinforcement Learning, Pos. Wed #16, Oral Thu in Reinforcement Learning, Pos. Thu #182
- Bubeck, Sebastien:** Oral Thu in Online Learning, Pos. Thu #124
- Buchholz, Alexander:** Oral Wed in Approximate Inference, Pos. Wed #54
- Buckman, Jacob:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #95
- Buffet, Olivier:** Oral Thu in Multi-Agent Learning, Pos. Thu #226
- Buntine, Wray:** Oral Fri in Generative Models, Pos. Fri #177
- Burda, Yura:** Oral Thu in Multi-Agent Learning, Pos. Thu #125
- Burdick, Joel:** Oral Wed in Optimization (Bayesian), Pos. Wed #43
- Burnaev, Evgeny:** Oral Wed in Representation Learning, Pos. Wed #200
- Busa-Fekete, Robert:** Oral Thu in Ranking and Preference Learning, Pos. Thu #32
- Cai, Han:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #167
- Cai, Jianfei:** Oral Wed in Gaussian Processes, Pos. Wed #124
- Cai, Carrie:** Oral Fri in Other Models and Methods, Pos. Fri #137
- Calandriello, Daniele:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #76
- Calderbank, robert:** Oral Fri in Deep Learning (Theory), Pos. Fri #79
- Cammarota, Chiara:** Oral Wed in Deep Learning (Theory), Pos. Wed #168
- Campbell, Trevor:** Oral Fri in Approximate Inference, Pos. Fri #160
- Canonaco, Giuseppe:** Oral Thu in Reinforcement Learning, Pos. Thu #65
- Cao, Jiezhang:** Oral Thu in Generative Models, Pos. Thu #195
- Cao, Yuan:** Oral Fri in Graphical Models, Pos. Fri #23
- Cardie, Claire:** Oral Wed in Structured Prediction, Pos. Wed #66
- Carin, Lawrence:** Oral Wed in Deep Learning (Bayesian), Oral Wed in Generative Models, Pos. Wed #113, Pos. Wed #192, Pos. Wed #215, Oral Thu in Deep Learning (Adversarial), Pos. Thu #165, Oral Fri in Time-Series Analysis, Oral Fri in Deep Learning (Adversarial), Oral Fri in Reinforcement Learning, Pos. Fri #109, Pos. Fri #59, Pos. Fri #63
- Carlini, Nicholas:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #213
- Carlo Fischione, Inst. of Technology:** Oral Fri in Dimensionality Reduction, Pos. Fri #91
- Carmi, Shai:** Oral Thu in Matrix Factorization, Pos. Thu #56
- Carone, Marco:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #139
- Carrera, Diego:** Oral Fri in Unsupervised Learning, Pos. Fri #30
- Casagrande, Norman:** Oral Fri in Deep Learning (Neural Network Architectures), Oral Fri in Generative Models, Pos. Fri #25, Pos. Fri #105
- Castro, Daniel:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #50
- Celis, Elisa:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #111
- Cemgil, Ali:** Oral Thu in Monte Carlo Methods, Pos. Thu #82
- Cerri, Ricardo:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #203
- Cervellera, Cristiano:** Oral Fri in Unsupervised Learning, Pos. Fri #30
- Cevher, Volkan:** Oral Wed in Statistical Learning Theory, Pos. Wed #119, Oral Thu in Statistical Learning Theory, Oral Thu in Online Learning, Pos. Thu #58, Pos. Thu #49, Oral Fri in Optimization (Convex), Pos. Fri #42
- Ceylan, Ciwan:** Oral Wed in Unsupervised Learning, Pos. Wed #202
- Chai, Joyce:** Invited Talk Fri in A1
- Chang, Jichuan:** Oral Thu in Other Applications, Pos. Thu #91
- Chapfuwa, Paidamoyo:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #165
- Chaplot, Devendra Singh:** Oral Wed in Reinforcement Learning, Pos. Wed #134
- Charikar, Moses:** Oral Wed in Clustering, Pos. Wed #48, Oral Thu in Dimensionality Reduction, Pos. Thu #158
- Charles, Zachary:** Oral Wed in Statistical Learning Theory, Pos. Wed #118, Oral Fri in Parallel and Distributed Learning, Pos. Fri #125
- Charlin, Laurent:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #170
- Chatterjee, Sabyasachi:** Oral Thu in Supervised Learning, Pos. Thu #89
- Chatterjee, Satrajit:** Oral Fri in Supervised Learning, Pos. Fri #65
- Chatterji, Niladri:** Oral Fri in Monte Carlo Methods, Pos. Fri #146
- Chatziafratis, Evangelos:** Oral Wed in Clustering, Pos. Wed #48
- Chaudhuri, Kamalika:** Oral Fri in Statistical Learning Theory, Pos. Fri #88, Pos. Fri #68
- Chaudhuri, Swarat:** Oral Wed in Reinforcement Learning, Pos. Wed #33
- Che, Zhengping:** Oral Fri in Generative Models, Pos. Fri #54
- Chen, Yuxin:** Oral Thu in Matrix Factorization, Pos. Thu #132
- Chen, Wei:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #63
- Chen, Jianshu:** Oral Thu in Reinforcement Learning, Pos. Thu #41
- Chen, Yichen:** Oral Thu in Reinforcement Learning, Pos. Thu #129
- Chen, Di:** Oral Thu in Structured Prediction, Pos. Thu #47
- Chen, Jianbo:** Oral Wed in Feature Selection, Pos. Wed #63
- Chen, Hongge:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #147
- Chen, Ting:** Oral Wed in Representation Learning, Pos. Wed #190
- Chen, Xi:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #169
- Chen, Lingjiao:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #54, Oral Fri in Parallel and Distributed Learning, Pos. Fri #125
- Chen, Vincent:** Oral Fri in Monte Carlo Methods, Pos. Fri #145
- Chen, Jinghui:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #167
- Chen, Lin:** Oral Wed in Optimization (Combinatorial), Pos. Wed #96, Oral Thu in Online Learning, Pos. Thu #111
- Chen, Liqun:** Oral Wed in Deep Learning (Bayesian), Oral Wed in Generative Models, Pos. Wed #113, Pos. Wed #215
- Chen, Zhitang:** Oral Thu in Reinforcement Learning, Pos. Thu #17
- Chen, Changyou:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #192, Oral Fri in Reinforcement Learning, Pos. Fri #59
- Chen, Jiefeng:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #54
- Chen, Jianfei:** Oral Wed in Networks and Relational Learning, Pos. Wed #75
- Chen, Liqun:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #192
- Chen, Enhong:** Oral Fri in Optimization (Convex), Pos. Fri #3
- Chen, Zaiyi:** Oral Thu in Online Learning, Pos. Thu #150, Oral Fri in Optimization (Convex), Pos. Fri #3
- Chen, Ning:** Oral Fri in Approximate Inference, Pos. Fri #150
- Chen, Wilson Ye:** Oral Fri in Approximate Inference, Pos. Fri #1
- Chen, Yudong:** Oral Thu in Statistical Learning Theory, Pos. Thu #50
- Chen, Zhao:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #4
- Chen, Liang:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #43
- Chen, Minmin:** Oral Thu in Deep Learning (Theory), Pos. Thu #177
- Chen, Chuan:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #43
- Chen, Wei:** Oral Thu in Online Learning, Pos. Thu #57
- Cheng, Xiuyuan:** Oral Fri in Deep Learning (Theory), Pos. Fri #79
- Cheng, Minhao:** Oral Thu in Ranking and Preference Learning, Pos. Thu #52
- Cheng, Guang:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #159
- Cheng, James:** Oral Wed in Optimization (Convex), Pos. Wed #205
- Chertkov, Michael:** Oral Thu in Graphical Models, Pos. Thu #134
- Chestnut, Stephen:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #28
- Chi, Yuejie:** Oral Thu in Matrix Factorization, Pos. Thu #132
- Chiang, Mung:** Oral Wed in Other Applications, Pos. Wed #87
- Chien, Edward:** Oral Thu in Optimization (Non-convex), Pos. Thu #69
- Chierichetti, Flavio:** Oral Wed in Ranking and Preference Learning, Pos. Wed #30
- Chloé Clavel, Telecom-ParisTech:** Oral Thu in Structured Prediction, Pos. Thu #40
- Choi, Jaesik:** Oral Wed in Reinforcement Learning, Pos. Wed #22
- Choi, Seungjin:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #100
- Choromanski, Krzysztof:** Oral Wed in Reinforcement Learning, Pos. Wed #34
- Chow, Yinlam:** Oral Wed in Reinforcement Learning, Pos. Wed #62, Pos. Wed #172
- Chowdhury, Agniva:** Oral Fri in Dimensionality Reduction, Pos. Fri #31
- Ciosek, Kamil:** Oral Fri in Reinforcement Learning, Pos. Fri #40
- Cisse, Mouhamadou Moustapha:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #49
- Claici, Sebastian:** Oral Thu in Optimization (Non-convex), Pos. Thu #69
- Clark, Robert:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #43
- Clopath, Claudia:** Oral Wed in Reinforcement Learning, Pos. Wed #26
- Clune, Jeff:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #7
- Cléménçon, Stéphan:** Oral Fri in Statistical Learning Theory, Pos. Fri #74
- Co-Reyes, John:** Oral Wed in Reinforcement Learning, Pos. Wed #15
- Cobo, Luis:** Oral Fri in Generative Models, Pos. Fri #25
- Cohen, Gad:** Oral Thu in Supervised Learning, Pos. Thu #114
- Cohen, Alon:** Oral Fri in Online Learning, Pos. Fri #115
- Cohen, Michael:** Oral Thu in Optimization (Convex), Pos. Thu #220
- Cohen, Nadav:** Oral Wed in Deep Learning (Theory), Pos. Wed #188
- Colas, Cédric:** Oral Thu in Reinforcement Learning, Pos. Thu #174
- Corbett-Davies, Sam:** Tutorial Tue in K1 + K2



# AUTHOR INDEX

- Cormode, Graham:** Oral Wed in Dimensionality Reduction, Pos. Wed #40
- Corneil, Dane:** Oral Thu in Reinforcement Learning, Pos. Thu #23
- Cornish, Rob:** Oral Fri in Monte Carlo Methods, Pos. Fri #129
- Cortes, Corinna:** Oral Fri in Online Learning, Pos. Fri #116
- Cosentino, Romain:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #1
- Cotter, Andrew:** Oral Thu in Optimization (Combinatorial), Pos. Thu #118
- Couillet, Romain:** Oral Wed in Deep Learning (Theory), Pos. Wed #189, Oral Fri in Spectral Methods, Pos. Fri #62
- Courville, Aaron:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #152
- Courville, Aaron:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #119, Pos. Fri #57
- Crawford, Victoria:** Oral Thu in Optimization (Combinatorial), Pos. Thu #145
- Creager, Elliot:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #44
- Cremer, Chris:** Oral Wed in Approximate Inference, Pos. Wed #176
- Criminisi, Antonio:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #50
- Culurciello, Eugenio:** Oral Wed in Computer Vision, Pos. Wed #126
- Czarnecki, Wojciech:** Oral Fri in Reinforcement Learning, Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #168, Pos. Fri #13
- d'Alche-Buc, Florence:** Oral Thu in Structured Prediction, Pos. Thu #40
- d'Aspremont, Alexandre:** Oral Fri in Optimization (Convex), Pos. Fri #38
- Dabney, Will:** Oral Wed in Reinforcement Learning, Pos. Wed #3, Oral Fri in Generative Models, Pos. Fri #110
- Dai, Zhenwen:** Oral Thu in Gaussian Processes, Pos. Thu #10
- Dai, Bin:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #128
- Dai, Andrew:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #169
- Dai, Bo:** Oral Wed in Representation Learning, Pos. Wed #109, Oral Thu in Reinforcement Learning, Oral Thu in Other Models and Methods, Pos. Thu #205, Pos. Thu #41
- Dai, Shuyang:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #109
- Dai, Hanjun:** Oral Wed in Reinforcement Learning, Pos. Wed #109, Oral Thu in Deep Learning (Adversarial), Pos. Thu #53
- Dalal, Gal:** Oral Thu in Reinforcement Learning, Pos. Thu #208
- Damaskinos, Georgios:** Oral Fri in Parallel and Distributed Learning, Pos. Fri #123
- Damoulas, Theodoros:** Oral Thu in Online Learning, Pos. Thu #149
- Daneshmand, Hadi:** Oral Wed in Optimization (Non-convex), Pos. Wed #206
- Daniel, Luca:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #147
- Daniel, Christian:** Oral Thu in Gaussian Processes, Pos. Thu #9
- Dann, Christoph:** Oral Thu in Reinforcement Learning, Pos. Thu #182
- Darrell, Trevor:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #83
- Dasarathy, Gautam:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #27
- Dasgupta, Sanjoy:** Tutorial Tue in A9
- Daume, Hal:** Oral Fri in Reinforcement Learning, Pos. Fri #15
- David Kirkby, University of California:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #36
- David Page, University of Wisconsin:** Oral Fri in Graphical Models, Pos. Fri #140
- Davidson, Ian:** Oral Thu in Ranking and Preference Learning, Pos. Thu #52
- Davoine, Franck:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #3
- Dayan, Peter:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #121
- de A. Mello Pereira, Felipe:** Oral Wed in Optimization (Combinatorial), Pos. Wed #148
- de Balle Pigem, Borja:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #206
- de Rijke, Maarten:** Oral Thu in Supervised Learning, Pos. Thu #223
- De Sa, Chris:** Oral Thu in Dimensionality Reduction, Pos. Thu #121, Oral Fri in Monte Carlo Methods, Pos. Fri #145
- Dean, Sarah:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #110
- Dean, Jeff:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #185
- Deecke, Lucas:** Oral Wed in Unsupervised Learning, Pos. Wed #147
- Degrave, Jonas:** Oral Wed in Reinforcement Learning, Pos. Wed #41
- Deisenroth, Marc:** Oral Wed in Active Learning, Pos. Wed #199
- Deng, Cheng:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #210
- Denton, Emily:** Oral Thu in Multi-Agent Learning, Pos. Thu #136, Oral Fri in Generative Models, Pos. Fri #56
- Depeweg, Stefan:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #189
- DeSalvo, Giulia:** Oral Fri in Online Learning, Pos. Fri #116
- Deshpande, Amit Jayant:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #111
- Deshpande, Yash:** Oral Fri in Causal Inference, Pos. Fri #166
- Dezfouli, Amir:** Oral Wed in Statistical Learning Theory, Pos. Wed #95
- Dhar, Manik:** Oral Fri in Generative Models, Pos. Fri #26
- Dhillon, Inderjit:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #181, Oral Thu in Deep Learning (Neural Network Architectures), Oral Thu in Deep Learning (Adversarial), Pos. Thu #21, Pos. Thu #147
- Diakonikolas, Ilias:** Oral Wed in Statistical Learning Theory, Pos. Wed #154
- Diakonikolas, Jelena:** Oral Thu in Optimization (Convex), Pos. Thu #220, Pos. Thu #67
- Diamanti, Olga:** Oral Thu in Generative Models, Pos. Thu #196
- Dibangoye, Jilles:** Oral Thu in Multi-Agent Learning, Pos. Thu #226
- Dick, Travis:** Oral Fri in Optimization (Combinatorial), Pos. Fri #144
- Dickens, Charlie:** Oral Wed in Dimensionality Reduction, Pos. Wed #40
- Dieleman, Sander:** Oral Fri in Deep Learning (Neural Network Architectures), Oral Fri in Generative Models, Pos. Fri #25, Pos. Fri #105
- Dieng, Adji Bousso:** Oral Wed in Approximate Inference, Pos. Wed #212, Oral Fri in Generative Models, Pos. Fri #53
- Dietterich, Thomas:** Oral Thu in Other Models and Methods, Oral Thu in Reinforcement Learning, Pos. Thu #17, Pos. Thu #141
- Dillon, Joshua:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #214
- Dimakis, Alexandros:** Oral Thu in Optimization (Convex), Pos. Thu #221
- Dimakopoulou, Maria:** Oral Wed in Reinforcement Learning, Pos. Wed #107
- Dimitris, Samaras:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #148
- Dimitrov, Dimitar:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #140
- Ding, Daizong:** Oral Thu in Generative Models, Pos. Thu #6
- Djordjevic, Pavle:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #140
- Dodge, Jonathan:** Oral Thu in Reinforcement Learning, Pos. Thu #93
- Doerr, Andreas:** Oral Thu in Gaussian Processes, Pos. Thu #9
- Doikov, Nikita:** Oral Thu in Optimization (Convex), Pos. Thu #156
- Dong, Bin:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #127, Oral Fri in Other Models and Methods, Pos. Fri #34
- Donnat, Philippe:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #22
- Donoho, David:** Oral Fri in Matrix Factorization, Pos. Fri #70
- Doron, Yotam:** Oral Fri in Reinforcement Learning, Pos. Fri #176
- Doshi-Velez, Finale:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #189, Pos. Thu #193
- Douik, Ahmed:** Oral Thu in Optimization (Non-convex), Pos. Thu #15
- Doya, Kenji:** Oral Thu in Reinforcement Learning, Pos. Thu #8
- Draxler, Felix:** Oral Wed in Deep Learning (Theory), Pos. Wed #122
- Drineas, Petros:** Oral Fri in Dimensionality Reduction, Pos. Fri #31
- Drutsa, Alexey:** Oral Thu in Online Learning, Pos. Thu #79
- Du, Lan:** Oral Fri in Generative Models, Pos. Fri #177
- Du, Chao:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #38
- Du, Simon:** Oral Thu in Deep Learning (Theory), Oral Thu in Monte Carlo Methods, Pos. Thu #103, Pos. Thu #62, Oral Fri in Deep Learning (Theory), Oral Fri in Matrix Factorization, Pos. Fri #78, Pos. Fri #111
- Dubey, Rachit:** Oral Thu in Reinforcement Learning, Pos. Thu #181
- Dubey, Kumar Avinava:** Oral Fri in Other Models and Methods, Pos. Fri #161
- Dubrawski, Artur:** Oral Wed in Statistical Learning Theory, Pos. Wed #142
- Dudik, Miroslav:** Oral Thu in Online Learning, Pos. Thu #80, Oral Fri in Society Impacts of Machine Learning, Oral Fri in Reinforcement Learning, Pos. Fri #15, Pos. Fri #89
- Dunning, Iain:** Oral Fri in Reinforcement Learning, Pos. Fri #176
- Duvenaud, David:** Oral Wed in Approximate Inference, Pos. Wed #176, Oral Thu in Deep Learning (Bayesian), Pos. Thu #198
- Dvurechenskii, Pavel:** Oral Wed in Optimization (Convex), Pos. Wed #117
- Dyer, Chris:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #121
- Dziugaite, Gintare Karolina:** Oral Fri in Deep Learning (Theory), Pos. Fri #7
- Dünner, Celestine:** Oral Thu in Optimization (Convex), Pos. Thu #219
- Eck, Douglas:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #175
- Ecker, Alexander:** Oral Wed in Computer Vision, Pos. Wed #12
- Edwards, Harrison:** Oral Thu in Multi-Agent Learning, Pos. Thu #125
- Efroni, Yonathan:** Oral Thu in Reinforcement Learning, Pos. Thu #208
- Efros, Alexei:** Oral Thu in Reinforcement Learning, Pos. Thu #181, Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #83
- Ekwdike, Emmanuel:** Oral Wed in Reinforcement Learning, Pos. Wed #162
- El Mesaoudi-Paul, Adil:** Oral Thu in Ranking and Preference Learning, Pos. Thu #32
- El Mhamdi, El Mahdi:** Oral Fri in Parallel and Distributed Learning, Pos. Fri #123, Pos. Fri #108
- Elsen, Erich:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #105
- Elsen, Erich:** Oral Fri in Generative Models, Pos. Fri #25
- Engel, Jesse:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #175
- Engstrom, Logan:** Oral Wed in Deep Learning (Adversarial), Pos. Wed #73, Oral Thu in Deep Learning (Adversarial), Pos. Thu #106
- Erfani, Sarah:** Oral Thu in Supervised Learning, Pos. Thu #90
- Erhan, Dumitru:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #131
- Ermon, Stefano:** Oral Thu in Deep Learning (Bayesian), Oral Thu in Optimization (Non-convex), Pos. Thu #70, Pos. Thu #151, Oral Fri in Generative Models, Pos. Fri #26
- Errica, Federico:** Oral Wed in Representation Learning, Pos. Wed #138
- Esfandiari, Hossein:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #101
- Eslami, S. M. Ali:** Oral Wed in Deep Learning (Neural Network Architectures), Oral Wed in Representation Learning, Oral Wed in Reinforcement Learning, Pos. Wed #101, Pos. Wed #208, Pos. Wed #130, Oral Thu in Deep Learning (Adversarial), Pos. Thu #84
- Espeholt, Lasse:** Oral Fri in Reinforcement Learning, Pos. Fri #176
- Essid, Slim:** Oral Thu in Structured Prediction, Pos. Thu #40
- Evans, Trevor:** Oral Fri in Gaussian Processes, Pos. Fri #81
- Eysenbach, Benjamin:** Oral Wed in Reinforcement Learning, Pos. Wed #15
- Falahatgar, Moein:** Oral Wed in Ranking and Preference Learning, Pos. Wed #36
- Falkner, Stefan:** Oral Wed in Optimization (Bayesian), Pos. Wed #157

# AUTHOR INDEX

- Farahmand, Amir-massoud:** Oral Fri in Reinforcement Learning, Pos. Fri #39
- Farajtabar, Mehrdad:** Oral Wed in Reinforcement Learning, Pos. Wed #62
- Farquhar, Gregory:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #102, Oral Thu in Multi-Agent Learning, Pos. Thu #225
- Fathony, Rizal:** Oral Wed in Structured Prediction, Pos. Wed #65
- Fattahi, Salar:** Oral Thu in Graphical Models, Pos. Thu #1
- Fazel, Maryam:** Oral Fri in Reinforcement Learning, Pos. Fri #22
- Fazelinia, Ghazal:** Oral Fri in Approximate Inference, Pos. Fri #159
- Fei-Fei, Li:** Oral Thu in Supervised Learning, Pos. Thu #113
- Fei-Fei, Li:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #13
- Feldman, Moran:** Oral Wed in Optimization (Combinatorial), Pos. Wed #96
- Fellows, Matthew:** Oral Fri in Reinforcement Learning, Pos. Fri #40
- Feng, Jianfeng:** Oral Wed in Generative Models, Pos. Wed #113
- Feng, Jiashi:** Oral Thu in Deep Learning (Theory), Pos. Thu #99, Oral Fri in Reinforcement Learning, Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #16, Pos. Fri #6
- Feng, Jean:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #139
- Fenner, Nathan:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #151
- Fercoq, Olivier:** Oral Fri in Optimization (Convex), Pos. Fri #42
- Fergus, Rob:** Oral Fri in Generative Models, Pos. Fri #56
- Fern, Alan:** Oral Thu in Reinforcement Learning, Oral Thu in Other Models and Methods, Pos. Thu #93, Pos. Thu #141
- Fetaya, Ethan:** Oral Wed in Networks and Relational Learning, Pos. Wed #76, Oral Thu in Deep Learning (Theory), Pos. Thu #178
- Fevotte, Cedric:** Oral Thu in Matrix Factorization, Pos. Thu #55
- Filippone, Maurizio:** Oral Thu in Gaussian Processes, Pos. Thu #72
- Filstroff, Louis:** Oral Thu in Matrix Factorization, Pos. Thu #55
- Finn, Chelsea:** Oral Wed in Reinforcement Learning, Pos. Wed #106
- Firoiu, Vlad:** Oral Fri in Reinforcement Learning, Pos. Fri #176
- Fisac, Jaime:** Oral Thu in Reinforcement Learning, Pos. Thu #94
- Fischer, Ian:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #214
- Fisher, John:** Oral Thu in Monte Carlo Methods, Pos. Thu #11
- Flammarion, Nicolas:** Oral Fri in Monte Carlo Methods, Pos. Fri #146
- Fleuret, Francois:** Oral Wed in Deep Learning (Neural Network Architectures), Oral Wed in Deep Learning (Theory), Pos. Wed #49, Pos. Wed #170, Oral Thu in Other Applications, Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #204, Pos. Thu #92
- Florensa, Carlos:** Oral Wed in Reinforcement Learning, Pos. Wed #135
- Foerster, Jakob:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #102, Oral Thu in Multi-Agent Learning, Oral Thu in Deep Learning (Adversarial), Pos. Thu #201, Pos. Thu #225
- Foster, Dylan:** Oral Thu in Online Learning, Pos. Thu #80
- Foti, Nicholas:** Oral Fri in Generative Models, Pos. Fri #178
- Fowlkes, Charless:** Oral Wed in Computer Vision, Pos. Wed #13
- Fox, Roy:** Oral Fri in Reinforcement Learning, Pos. Fri #21
- Fox, Emily:** Oral Fri in Generative Models, Pos. Fri #178
- Fraccaro, Marco:** Oral Wed in Representation Learning, Pos. Wed #101
- Franca, Guilherme:** Oral Wed in Optimization (Convex), Pos. Wed #136
- Franceschi, Luca:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #67
- Franca, Guilherme:** Oral Wed in Optimization (Convex), Pos. Wed #136
- Franceschi, Luca:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #67
- Franchetti, Franz:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #74
- Francisco Javier Sanchez-Lopez, University of California:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #36
- Frasconi, Paolo:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #67
- Freund, Robert:** Oral Thu in Optimization (Convex), Pos. Thu #222
- Friedman, Tal:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #180
- Fruit, Ronan:** Oral Wed in Reinforcement Learning, Pos. Wed #91
- Fu, Xiao:** Oral Fri in Time-Series Analysis, Pos. Fri #124
- Fu, Yanwei:** Oral Wed in Feature Selection, Pos. Wed #81
- Fujimaki, Ryohei:** Oral Thu in Other Models and Methods, Pos. Thu #26
- Fujimoto, Scott:** Oral Thu in Reinforcement Learning, Pos. Thu #86
- Fujita, Yasuhiro:** Oral Fri in Reinforcement Learning, Pos. Fri #175
- Fukumizu, Kenji:** Oral Thu in Kernel Methods, Pos. Thu #135
- Fukunaga, Takuro:** Oral Fri in Causal Inference, Pos. Fri #12
- Furlanello, Tommaso:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #106
- Gaboardi, Marco:** Oral Wed in Privacy, Anonymity, and Security, Pos. Wed #89
- Gaertner, Thomas:** Oral Thu in Kernel Methods, Pos. Thu #160
- Gal, Yarin:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #190
- Gallagher, Marcus:** Oral Thu in Deep Learning (Theory), Pos. Thu #183
- Galluccio, Claudio:** Oral Wed in Representation Learning, Pos. Wed #10
- Gan, Zhe:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #109
- Ganapathiraman, Vignesh:** Oral Thu in Supervised Learning, Pos. Thu #97
- Ganea, Octavian-Eugen:** Oral Wed in Representation Learning, Pos. Wed #100
- Ganian, Robert:** Oral Wed in Ranking and Preference Learning, Pos. Wed #69
- Ganin, Iaroslav:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #84
- Gao, Yuanxiang:** Oral Wed in Reinforcement Learning, Pos. Wed #105
- Gao, Zhifeng:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #194
- Gao, Tingran:** Oral Fri in Spectral Methods, Pos. Fri #128
- Gao, Jun:** Oral Wed in Statistical Learning Theory, Pos. Wed #24
- Gao, Tian:** Oral Fri in Graphical Models, Pos. Fri #139
- Garcia, Alexandre:** Oral Fri in Structured Prediction, Pos. Thu #40
- Gardner, Jacob:** Oral Fri in Gaussian Processes, Pos. Fri #152
- Gargiani, Matilde:** Oral Thu in Optimization (Convex), Pos. Thu #219
- Garnelo, Marta:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #130
- Garreau, Damien:** Oral Fri in Statistical Learning Theory, Pos. Fri #73
- Garrepalli, Rishiek:** Oral Thu in Other Models and Methods, Pos. Thu #141
- Gascon, Adria:** Oral Thu in Other Applications, Pos. Thu #46, Oral Fri in Society Impacts of Machine Learning, Pos. Fri #87
- Gasnikov, Alexander:** Oral Wed in Optimization (Convex), Pos. Wed #117
- Gavves, Efstratios:** Oral Wed in Optimization (Bayesian), Pos. Wed #156
- Ge, Rong:** Oral Thu in Deep Learning (Theory), Pos. Thu #184, Oral Fri in Reinforcement Learning, Pos. Fri #22
- Gehr, Timon:** Oral Wed in Deep Learning (Adversarial), Pos. Wed #74, Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #140
- Geiger, Andreas:** Oral Wed in Generative Models, Pos. Wed #77
- Geiger, Mario:** Oral Wed in Deep Learning (Theory), Pos. Wed #168
- Gelman, Andrew:** Oral Wed in Approximate Inference, Pos. Wed #150
- Geng, Xinyang:** Oral Wed in Reinforcement Learning, Pos. Wed #135
- Geng, Sinong:** Oral Fri in Graphical Models, Pos. Fri #140
- Gentile, Claudio:** Oral Fri in Online Learning, Pos. Fri #116
- GEORGOGIANNIS, ALEXANDROS:** Oral Wed in Statistical Learning Theory, Pos. Wed #216
- Gerber, Georg:** Oral Thu in Graphical Models, Pos. Thu #2
- Gerstner, Wulfram:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #2, Oral Thu in Reinforcement Learning, Pos. Thu #23
- Ghahramani, Zoubin:** Oral Wed in Representation Learning, Pos. Wed #191, Oral Thu in Reinforcement Learning, Oral Thu in Deep Learning (Bayesian), Pos. Thu #194, Pos. Thu #30
- Ghassami, AmirEmad:** Oral Fri in Causal Inference, Pos. Fri #165
- Ghavamzadeh, Mohammad:** Oral Wed in Reinforcement Learning, Pos. Wed #62, Pos. Wed #172
- Ghods, Ramina:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #174
- Ghosh, Soumya:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #193
- Ghoshal, Ashish:** Oral Thu in Structured Prediction, Pos. Thu #39
- Ghoshal, Suprovat:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #175
- Gibson, Travis:** Oral Thu in Graphical Models, Pos. Thu #2
- Gidel, Gauthier:** Oral Fri in Optimization (Convex), Pos. Fri #41
- Gilmer, Justin:** Oral Fri in Other Models and Methods, Pos. Fri #137
- Gilra, Aditya:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #2
- Girolami, Mark:** Oral Wed in Gaussian Processes, Pos. Wed #125
- Globerson, Amir:** Oral Wed in Structured Prediction, Oral Wed in Optimization (Combinatorial), Pos. Wed #55, Pos. Wed #5
- Glocker, Ben:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #50
- Glotin, Herve:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #1
- Glynn, Peter:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #13
- Goel, Surbhi:** Oral Thu in Deep Learning (Theory), Pos. Thu #191
- Goel, Sharad:** Tutorial Tue in K1 + K2
- Goldberg, Ken:** Oral Fri in Reinforcement Learning, Pos. Fri #21
- Goldberg, Yoav:** Oral Thu in Deep Learning (Neural Network Architectures), Oral Thu in Deep Learning (Adversarial), Pos. Thu #116, Pos. Thu #19
- Goldstein, Tom:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #174
- Goldstein, Benjamin:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #165
- Golightly, Andrew:** Oral Wed in Approximate Inference, Pos. Wed #151
- Gomes, Carla:** Oral Thu in Structured Prediction, Pos. Thu #47
- Gomez Rodriguez, Manuel:** Tutorial Tue in K1 + K2
- Gonzalez, Joseph:** Oral Fri in Reinforcement Learning, Pos. Fri #21
- González, Javier:** Oral Thu in Gaussian Processes, Pos. Thu #10
- Goodfellow, Ian:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #95
- Gordon, Geoff:** Oral Thu in Reinforcement Learning, Pos. Thu #200
- Gorham, Jackson:** Oral Fri in Approximate Inference, Pos. Fri #1
- Grabska-Barwinska, Agnieszka:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #168
- Graepel, Thore:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #201
- Graham, Devon:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #35
- Gramfort, Alexandre:** Oral Fri in Optimization (Convex), Pos. Fri #117
- Grandvalet, Yves:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #3
- Grangier, David:** Oral Fri in Natural Language and Speech Processing, Pos. Fri #163
- Granzio, Diego:** Oral Thu in Optimization (Bayesian), Pos. Thu #215
- Graves, Alex:** Oral Fri in Generative Models, Pos. Fri #25
- Grazzi, Riccardo:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #67
- Grewe, Dominik:** Oral Fri in Generative Models, Pos. Fri #25
- Greydanus, Samuel:** Oral Thu in Reinforcement Learning, Pos. Thu #93
- Griffiths, Tom:** Oral Thu in Reinforcement Learning, Pos. Thu #181
- Grigorevskiy, Alexander:** Oral Fri in Gaussian Processes, Pos. Fri #151



# AUTHOR INDEX

- Grosse, Roger:** Oral Wed in Gaussian Processes, Pos. Wed #196, Oral Thu in Deep Learning (Bayesian), Pos. Thu #198, Pos. Thu #77
- Grover, Aditya:** Oral Thu in Multi-Agent Learning, Pos. Thu #125, Oral Fri in Generative Models, Pos. Fri #26
- Grover, Piyush:** Oral Fri in Reinforcement Learning, Pos. Fri #39
- Grünwälder, Steffen:** Oral Thu in Online Learning, Pos. Thu #123
- Gu, Li:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #77
- Gu, Quanquan:** Oral Wed in Sparsity and Compressed Sensing, Oral Wed in Optimization (Non-convex), Pos. Wed #167, Pos. Wed #187, Oral Thu in Matrix Factorization, Oral Thu in Monte Carlo Methods, Pos. Thu #81, Pos. Thu #154, Oral Fri in Optimization (Convex), Oral Fri in Matrix Factorization, Pos. Fri #52, Pos. Fri #78
- Gu, Albert:** Oral Thu in Dimensionality Reduction, Pos. Thu #121
- GU, Xianfeng:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #148
- Gu, Shixiang:** Oral Thu in Reinforcement Learning, Pos. Thu #30
- Gu, Bin:** Oral Wed in Parallel and Distributed Learning, Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #210, Pos. Wed #93
- Guan, Melody:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #185
- Guerraoui, Rachid:** Oral Fri in Parallel and Distributed Learning, Pos. Fri #123, Pos. Fri #108
- Guez, Arthur:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #92
- Guha, Sudipto:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #131
- Guibas, Leonidas:** Oral Thu in Generative Models, Pos. Thu #196
- Gummadi, Krishna:** Oral Fri in Society Impacts of Machine Learning, Pos. Fri #87
- Gunasekar, Suriya:** Oral Thu in Optimization (Convex), Pos. Thu #163
- Guo, Baining:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #128
- Guo, Yong:** Oral Thu in Generative Models, Pos. Thu #195
- Guo, Yijie:** Oral Fri in Reinforcement Learning, Pos. Fri #60
- Guo, Xueying:** Oral Fri in Online Learning, Pos. Fri #135
- Guo, Sophie:** Oral Thu in Reinforcement Learning, Pos. Thu #173
- Gupta, Maya:** Oral Thu in Optimization (Combinatorial), Pos. Thu #118
- Gupta, Vineet:** Oral Thu in Optimization (Convex), Pos. Thu #68
- Gupta, Jayesh:** Oral Thu in Multi-Agent Learning, Pos. Thu #125
- Gupta, Abhishek:** Oral Wed in Reinforcement Learning, Pos. Wed #15
- Gupta, Udit:** Oral Fri in Other Models and Methods, Pos. Fri #138
- Gutmann, Michael:** Oral Wed in Unsupervised Learning, Pos. Wed #202
- Gyorgy, Andras:** Oral Wed in Statistical Learning Theory, Pos. Wed #165
- Görnitz, Nico:** Oral Wed in Unsupervised Learning, Pos. Wed #147
- Günemann, Stephan:** Oral Wed in Networks and Relational Learning, Pos. Wed #58
- Haarnoja, Tuomas:** Oral Wed in Reinforcement Learning, Pos. Wed #61, Oral Thu in Reinforcement Learning, Pos. Thu #7
- Hada, Tetsuya:** Oral Wed in Representation Learning, Pos. Wed #108
- Hadfield-Menell, Dylan:** Oral Thu in Reinforcement Learning, Pos. Thu #94
- Hadsell, Raia:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #84, Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #168
- Hafner, Roland:** Oral Wed in Reinforcement Learning, Pos. Wed #41
- Haghir, Siavash:** Oral Fri in Statistical Learning Theory, Pos. Fri #73
- Hamilton, Will:** Oral Wed in Networks and Relational Learning, Pos. Wed #45
- Hamm, Jihun:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #96
- Hamprecht, Fred:** Oral Wed in Deep Learning (Theory), Pos. Wed #122
- Han, Kuan:** Oral Wed in Computer Vision, Pos. Wed #126
- Han, Jun:** Oral Fri in Monte Carlo Methods, Pos. Fri #130
- Han, Lei:** Oral Fri in Supervised Learning, Pos. Fri #101
- Han, Song:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #167
- Harchaoui, Zaid:** Oral Fri in Optimization (Convex), Pos. Fri #51
- Harley, Tim:** Oral Fri in Reinforcement Learning, Pos. Fri #176
- Harshaw, Christopher:** Oral Thu in Online Learning, Pos. Thu #111
- Hartford, Jason:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #35
- Hartikainen, Kristian:** Oral Wed in Reinforcement Learning, Pos. Wed #61
- Hasenclever, Leonard:** Oral Fri in Reinforcement Learning, Pos. Fri #13
- Hashemi, Milad:** Oral Thu in Other Applications, Pos. Thu #91
- Hashimoto, Tatsunori:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #80
- Hasidim, Avinatan:** Oral Fri in Online Learning, Pos. Fri #115
- Hassabi, Demis:** Oral Fri in Generative Models, Pos. Fri #25
- Hassani, Hamed:** Oral Thu in Online Learning, Pos. Thu #111
- Hassani, Hamed:** Oral Thu in Optimization (Combinatorial), Pos. Thu #146
- Hasselgren, Jon:** Oral Thu in Supervised Learning, Pos. Thu #171
- Hassibi, Babak:** Oral Thu in Optimization (Non-convex), Pos. Thu #15
- Hatano, Daisuke:** Oral Fri in Causal Inference, Pos. Fri #12
- Hawthorne, Curtis:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #175
- Hay, Nicholas:** Oral Thu in Monte Carlo Methods, Pos. Thu #62
- Hazan, Elad:** Oral Wed in Deep Learning (Theory), Pos. Wed #188
- He, Zihang:** Oral Fri in Spectral Methods, Pos. Fri #128
- He, Di:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #63
- He, Niao:** Oral Thu in Reinforcement Learning, Pos. Thu #41
- Hebert-Johnson, Ursula:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #167
- Heess, Nicolas:** Oral Wed in Deep Learning (Neural Network Architectures), Oral Wed in Reinforcement Learning, Pos. Wed #84, Pos. Wed #41, Oral Fri in Reinforcement Learning, Pos. Fri #13
- Hefny, Ahmed:** Oral Thu in Reinforcement Learning, Pos. Thu #200
- Hegde, Chinmay:** Oral Wed in Statistical Learning Theory, Pos. Wed #94
- Hein, Matthias:** Oral Thu in Deep Learning (Theory), Pos. Thu #104, Oral Fri in Deep Learning (Theory), Pos. Fri #80
- Heinonen, Markus:** Oral Thu in Gaussian Processes, Pos. Thu #71
- Held, David:** Oral Wed in Reinforcement Learning, Pos. Wed #135
- Helfrich, Kyle:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #103
- Helmbold, Dave:** Oral Fri in Deep Learning (Theory), Pos. Fri #153
- Henao, Ricardo:** Oral Wed in Deep Learning (Bayesian), Oral Wed in Generative Models, Pos. Wed #113, Pos. Wed #215, Oral Thu in Deep Learning (Adversarial), Pos. Thu #165, Oral Fri in Deep Learning (Adversarial), Pos. Fri #109
- Hendrycks, Dan:** Oral Thu in Other Models and Methods, Pos. Thu #141
- Hennig, Philipp:** Oral Thu in Optimization (Non-convex), Pos. Thu #16
- Hensman, James:** Oral Fri in Gaussian Processes, Pos. Fri #2
- Hernandez-Lobato, Jose:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #189
- Hesamzadeh, Mohammad Reza:** Oral Fri in Dimensionality Reduction, Pos. Fri #91
- Hessel, Matteo:** Oral Wed in Reinforcement Learning, Pos. Wed #163
- Hill, Feilix:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #110
- Hjelm, R Devon:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #57
- Ho, Chin Pang:** Oral Thu in Reinforcement Learning, Pos. Thu #87
- Hochreiter, Sepp:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #37
- Hoffman, Judy:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #83
- Hofmann, Thomas:** Oral Wed in Representation Learning, Oral Wed in Optimization (Non-convex), Pos. Wed #206, Pos. Wed #100, Oral Thu in Optimization (Convex), Pos. Thu #219
- Holmes, Christopher:** Oral Thu in Matrix Factorization, Pos. Thu #153
- Holtmann-Rice, Daniel:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #186
- Holtzen, Steven:** Oral Fri in Graphical Models, Pos. Fri #24
- Honda, Junya:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #79
- Hong, Mingyi:** Oral Fri in Optimization (Non-convex), Pos. Fri #4
- Hong, Bin:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #161
- Honorio, Jean:** Oral Thu in Structured Prediction, Pos. Thu #39
- Houle, Michael:** Oral Thu in Supervised Learning, Pos. Thu #90
- Hron, Jiri:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #194
- Hsieh, Ya-Ping:** Oral Thu in Online Learning, Pos. Thu #58
- Hsieh, Cho-Jui:** Oral Wed in Optimization (Convex), Pos. Wed #140, Oral Thu in Ranking and Preference Learning, Oral Thu in Deep Learning (Adversarial), Pos. Thu #52, Pos. Thu #51, Pos. Thu #147
- Hu, Weihua:** Oral Thu in Supervised Learning, Pos. Thu #98
- Hu, Bin:** Oral Wed in Optimization (Convex), Pos. Wed #137
- Huang, Xin:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #53
- Huang, Heng:** Oral Wed in Parallel and Distributed Learning, Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #210, Pos. Wed #93
- Huang, Furong:** Oral Wed in Deep Learning (Theory), Pos. Wed #14
- Huang, Weidong:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #14
- Huang, Chin-Wei:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #152
- Huang, Junzhou:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #144, Oral Thu in Parallel and Distributed Learning, Oral Thu in Generative Models, Pos. Thu #14, Pos. Thu #195
- Huang, Zengfeng:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #185
- Huang, Qixing:** Oral Fri in Spectral Methods, Pos. Fri #128
- Huang, Yiheng:** Oral Fri in Supervised Learning, Pos. Fri #101
- Huang, Kejun:** Oral Fri in Time-Series Analysis, Pos. Fri #124
- Huntsman, Steve:** Oral Fri in Unsupervised Learning, Pos. Fri #36
- Huo, Zhouyuan:** Oral Wed in Parallel and Distributed Learning, Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #210, Pos. Wed #93
- Hutter, Frank:** Oral Wed in Optimization (Bayesian), Pos. Wed #157
- Hwang, Sung Ju:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #59
- Hyunjik Kim, DeepMind:** Oral Wed in Representation Learning, Pos. Wed #90
- Hüllermeier, Eyke:** Oral Thu in Ranking and Preference Learning, Pos. Thu #32
- Ibrahim, Ahmed M. Alaa:** Oral Wed in Other Applications, Pos. Wed #179, Oral Thu in Other Applications, Pos. Thu #45
- Igl, Maximilian:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #193
- Igl, Maximilian:** Oral Thu in Reinforcement Learning, Pos. Thu #199
- Ihler, Alexander:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #36
- Ilse, Maximilian:** Oral Fri in Supervised Learning, Pos. Fri #66
- Ilyas, Andrew:** Oral Wed in Deep Learning (Adversarial), Pos. Wed #73, Oral Thu in Deep Learning (Adversarial), Pos. Thu #106
- Imamura, Hideaki:** Oral Wed in Unsupervised Learning, Pos. Wed #146
- Imani, Ehsan:** Oral Thu in Supervised Learning, Pos. Thu #224
- Indiveri, Giacomo:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #218
- Inouye, David:** Oral Wed in Unsupervised Learning, Pos. Wed #32
- Intosalmi, Jukka:** Oral Thu in Gaussian Processes, Pos. Thu #71
- Irpan, Alexander:** Oral Thu in Reinforcement Learning, Pos. Thu #29

# AUTHOR INDEX

- Isola, Philip:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #83
- Ito, Shinji:** Oral Thu in Other Models and Methods, Pos. Thu #26, Oral Fri in Causal Inference, Pos. Fri #12
- Itti, Laurent:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #106
- Iutzeler, Franck:** Oral Thu in Optimization (Convex), Pos. Thu #155
- Ivanov, Sergey:** Oral Wed in Representation Learning, Pos. Wed #200
- Iyad Kanj, DePaul:** Oral Wed in Ranking and Preference Learning, Pos. Wed #69
- J. Rezende, Danilo:** Oral Wed in Deep Learning (Neural Network Architectures), Oral Wed in Representation Learning, Pos. Wed #101, Pos. Wed #130
- Jaakkola, Tommi:** Oral Fri in Generative Models, Pos. Fri #133
- Jabri, Allan:** Oral Wed in Reinforcement Learning, Pos. Wed #106
- Jaderberg, Max:** Oral Fri in Reinforcement Learning, Pos. Fri #13
- Jaffe, Ariel:** Oral Thu in Matrix Factorization, Pos. Thu #56
- Jaggi, Martin:** Oral Thu in Optimization (Convex), Pos. Thu #219, Oral Fri in Optimization (Convex), Pos. Fri #37
- Jain, Lalit:** Oral Fri in Online Learning, Pos. Fri #93
- Jain, Ayush:** Oral Wed in Ranking and Preference Learning, Pos. Wed #36
- Jain, Ujjwal:** Oral Fri in Supervised Learning, Pos. Fri #29
- Jain, Prateek:** Oral Wed in Privacy, Anonymity, and Security, Pos. Wed #6
- James Sharpnack, University of California:** Oral Thu in Ranking and Preference Learning, Pos. Thu #51
- Jamieson, Kevin:** Oral Fri in Online Learning, Pos. Fri #93
- Jang, Yunseok:** Oral Fri in Computer Vision, Pos. Fri #158
- Jang, Wooyeong:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #54
- Jang, Jennifer:** Oral Wed in Clustering, Pos. Wed #28
- Jankowiak, Martin:** Oral Fri in Approximate Inference, Pos. Fri #149
- Janzing, Dominik:** Oral Fri in Causal Inference, Pos. Fri #131
- Javidi, Tara:** Oral Fri in Statistical Learning Theory, Pos. Fri #88
- Jawanpuria, Pratik Kumar:** Oral Fri in Matrix Factorization, Pos. Fri #92
- Jayakumar, Siddhant:** Oral Wed in Reinforcement Learning, Pos. Wed #209, Oral Fri in Reinforcement Learning, Pos. Fri #13
- Jegelka, Stefanie:** Oral Wed in Networks and Relational Learning, Pos. Wed #57
- Jeong, Yeonwoo:** Oral Fri in Deep Learning (Theory), Pos. Fri #46
- Jetchev, Nikolay:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #37
- Jha, Somesh:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #54, Oral Fri in Statistical Learning Theory, Pos. Fri #68
- Jia, Baoxiang:** Oral Fri in Computer Vision, Pos. Fri #48
- Jia, Zhihao:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #34
- Jia, Ye:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #44
- Jiang, Heinrich:** Oral Wed in Clustering, Pos. Wed #28
- Jiang, Yuan:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #84
- Jiang, Daniel:** Oral Wed in Reinforcement Learning, Pos. Wed #162
- Jiang, Nan:** Oral Fri in Reinforcement Learning, Pos. Fri #15
- Jiang, Lu:** Oral Thu in Supervised Learning, Pos. Thu #113
- Jiang, Bo:** Oral Fri in Generative Models, Pos. Fri #54
- Jiao, Yunlong:** Oral Wed in Ranking and Preference Learning, Pos. Wed #35
- Jie, Zequn:** Oral Fri in Reinforcement Learning, Pos. Fri #16
- Jin, Jiashun:** Oral Wed in Statistical Learning Theory, Pos. Wed #217
- jin, rong:** Oral Fri in Online Learning, Pos. Fri #142
- Jin, Wengong:** Oral Fri in Generative Models, Pos. Fri #133
- Jin, Peter:** Oral Thu in Reinforcement Learning, Pos. Thu #24
- Jin, Xiaojie:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #6
- Jinnai, Yuu:** Oral Thu in Reinforcement Learning, Pos. Thu #173
- Johari, Ramesh:** Oral Wed in Reinforcement Learning, Pos. Wed #99
- John, ST:** Oral Fri in Gaussian Processes, Pos. Fri #2
- Johnson, Rie:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #115
- Jojić, Nebojsa:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #6
- Jordan, Michael:** Oral Wed in Feature Selection, Pos. Wed #63, Oral Thu in Other Models and Methods, Pos. Thu #142, Oral Fri in Reinforcement Learning, Oral Fri in Monte Carlo Methods, Pos. Fri #21, Pos. Fri #146
- Jordon, James:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #195, Oral Thu in Deep Learning (Adversarial), Pos. Thu #83
- Jose, Cijo:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #49
- Joulin, Armand:** Oral Thu in Generative Models, Pos. Thu #5
- Kadlec, Rudolf:** Oral Fri in Deep Learning (Theory), Pos. Fri #20
- Kaelbling, Leslie:** Oral Wed in Active Learning, Pos. Wed #129
- Kahembwe, Emmanuel:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #51
- Kaiser, Lukasz:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #217, Pos. Thu #73
- Kajihara, Takafumi:** Oral Thu in Kernel Methods, Pos. Thu #135
- Kakade, Sham:** Oral Fri in Reinforcement Learning, Pos. Fri #22
- Kakimura, Naonori:** Oral Fri in Causal Inference, Pos. Fri #12
- Kalchbrenner, Nal:** Oral Thu in Deep Learning (Neural Network Architectures), Oral Fri in Generative Models, Pos. Fri #25, Pos. Fri #105
- Kale, Satyen:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #186
- Kalimeris, Dimitrios:** Oral Wed in Networks and Relational Learning, Pos. Wed #29
- Kallummil, Sreejith:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #19
- Kallus, Nathan:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #119
- Kalyan, Ashwin:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #60
- Kalyani, Sheetal:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #19
- Kamath, Gautam:** Oral Wed in Privacy, Anonymity, and Security, Pos. Wed #59
- Kamnitsas, Konstantinos:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #50
- Kamper, Herman:** Oral Thu in Deep Learning (Theory), Pos. Thu #138
- Kanade, Varun:** Oral Thu in Other Applications, Pos. Thu #46
- Kanagawa, Motonobu:** Oral Thu in Kernel Methods, Pos. Thu #135
- kandasamy, kirthevasan:** Oral Fri in Online Learning, Pos. Fri #94
- Kang, Bingyi:** Oral Fri in Reinforcement Learning, Pos. Fri #16
- Kang, Keegan:** Oral Thu in Dimensionality Reduction, Pos. Thu #122
- Kannan, Anitha:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #60
- Kaplanis, Christos:** Oral Wed in Reinforcement Learning, Pos. Wed #26
- Karatzoglou, Alexandros:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #103
- Karbasi, Amin:** Oral Wed in Optimization (Combinatorial), Pos. Wed #166, Pos. Wed #96, Pos. Wed #97, Oral Thu in Online Learning, Oral Thu in Optimization (Combinatorial), Pos. Thu #111, Pos. Thu #146
- Karimreddy, Sai Praneeth Reddy:** Oral Fri in Optimization (Convex), Pos. Fri #37
- Karlen, Walter:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #108
- Karmon, Danny:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #116
- Karras, Tero:** Oral Thu in Supervised Learning, Pos. Thu #171
- Karrenbauer, Andreas:** Oral Wed in Optimization (Combinatorial), Pos. Wed #115
- Kasai, Hiroyuki:** Oral Thu in Optimization (Non-convex), Pos. Thu #179
- Kasiviswanathan, Shiva:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #131
- Katharopoulos, Angelos:** Oral Wed in Deep Learning (Theory), Pos. Wed #170
- Kathuria, Tarun:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #111
- Katoff, Abigail:** Oral Fri in Causal Inference, Pos. Fri #97
- Katz-Samuels, Julian:** Oral Thu in Online Learning, Pos. Thu #144
- Kaul, Manu:** Oral Fri in Computer Vision, Pos. Fri #47
- kavukcuoglu, koray:** Oral Fri in Reinforcement Learning, Oral Fri in Deep Learning (Neural Network Architectures), Oral Fri in Generative Models, Pos. Fri #176, Pos. Fri #25, Pos. Fri #105
- Kawarabayashi, Ken-ichi:** Oral Wed in Networks and Relational Learning, Pos. Wed #57, Oral Fri in Causal Inference, Pos. Fri #12
- Kazemi, Ehsan:** Oral Wed in Optimization (Combinatorial), Pos. Wed #166, Pos. Wed #97
- Ke, Nan:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #170
- Ke, Zheng:** Oral Wed in Statistical Learning Theory, Pos. Wed #217
- Kearns, Michael:** Oral Fri in Society Impacts of Machine Learning, Pos. Fri #90
- Keivani, Omid:** Oral Fri in Unsupervised Learning, Pos. Fri #28
- Keller, Emanuela:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #108
- Kenamer, Noble:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #36
- Kerdreux, Thomas:** Oral Fri in Optimization (Convex), Pos. Fri #38
- Keswani, Vijay:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #111
- Keviczky, Tamas:** Oral Fri in Optimization (Convex), Pos. Fri #17
- Khalili, Mohammad:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #168
- Khamaru, Koulik:** Oral Fri in Optimization (Non-convex), Pos. Fri #49
- Khan, Mohammad Emtyaz:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #190
- Khanna, Aran:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #99
- Khoshaman, Amir:** Oral Fri in Generative Models, Pos. Fri #85
- Khrulkov, Valentin:** Oral Thu in Generative Models, Pos. Thu #85
- Kiela, Douwe:** Oral Wed in Representation Learning, Pos. Wed #139
- Kilbertus, Niki:** Oral Wed in Representation Learning, Pos. Wed #78, Oral Fri in Society Impacts of Machine Learning, Pos. Fri #87
- Kim, Michael:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #167
- Kim, Yoon:** Oral Fri in Deep Learning (Adversarial), Oral Fri in Generative Models, Pos. Fri #134, Pos. Fri #58
- Kim, Sol-A:** Oral Wed in Reinforcement Learning, Pos. Wed #22
- Kim, Gunhee:** Oral Fri in Computer Vision, Pos. Fri #158
- Kim, Dongwoo:** Oral Thu in Deep Learning (Neural Network Architectures), Oral Thu in Online Learning, Pos. Thu #20, Pos. Thu #112
- Kim, Minyoung:** Oral Wed in Gaussian Processes, Pos. Wed #197
- Kim, Been:** Oral Fri in Other Models and Methods, Pos. Fri #137
- Kindermans, Pieter-Jan:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #170
- King, Helen:** Oral Fri in Generative Models, Pos. Fri #25
- Kipf, Thomas:** Oral Wed in Networks and Relational Learning, Pos. Wed #76
- Kiyavash, Negar:** Oral Fri in Causal Inference, Pos. Fri #165
- Klabjan, Diego:** Oral Wed in Reinforcement Learning, Pos. Wed #25
- Klassen, Toryn:** Oral Fri in Reinforcement Learning, Pos. Fri #147
- Klein, Aaron:** Oral Wed in Optimization (Bayesian), Pos. Wed #157
- Kleinberg, Bobby:** Oral Wed in Optimization (Non-convex), Pos. Wed #85, Oral Thu in Reinforcement Learning, Pos. Thu #29



# AUTHOR INDEX

- Kleinberg, Jon:** Oral Thu in Reinforcement Learning, Pos. Thu #29
- Kleindessner, Matthäus:** Oral Wed in Unsupervised Learning, Pos. Wed #31
- Kleindienst, Jan:** Oral Fri in Deep Learning (Theory), Pos. Fri #20
- Klivans, Adam:** Oral Thu in Deep Learning (Theory), Pos. Thu #191
- Kloft, Marius:** Oral Wed in Unsupervised Learning, Pos. Wed #147
- Kluger, Yuval:** Oral Thu in Matrix Factorization, Pos. Thu #56
- Knoblauch, Jeremias:** Oral Thu in Online Learning, Pos. Thu #149
- Koepl, Heinz:** Oral Wed in Networks and Relational Learning, Pos. Wed #46
- Kohler, Jonas:** Oral Wed in Optimization (Non-convex), Pos. Wed #206
- Kohli, Pushmeet:** Oral Wed in Reinforcement Learning, Oral Wed in Deep Learning (Adversarial), Pos. Wed #132, Pos. Wed #33
- Kolter, Zico:** Oral Wed in Deep Learning (Adversarial), Pos. Wed #20
- Komiyama, Junpei:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #79
- Kondor, Risi:** Oral Fri in Deep Learning (Theory), Pos. Fri #154
- Konidaris, George:** Oral Thu in Reinforcement Learning, Pos. Thu #173
- Koren, Tomer:** Oral Thu in Optimization (Convex), Pos. Thu #68, Oral Fri in Online Learning, Pos. Fri #115
- Koriche, Frederic:** Oral Fri in Optimization (Combinatorial), Pos. Fri #95
- Kormushev, Petar:** Oral Thu in Reinforcement Learning, Pos. Thu #130
- Kosiolek, Adam:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #193
- Koul, Anurag:** Oral Thu in Reinforcement Learning, Pos. Thu #93
- Koutis, Ioannis:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #76
- Koyejo, Sanmi:** Oral Thu in Statistical Learning Theory, Pos. Thu #162
- Kozareva, Zornitsa:** Oral Wed in Representation Learning, Pos. Wed #109
- Kozyrakis, Christos:** Oral Thu in Other Applications, Pos. Thu #91
- Kpotufe, Samory:** Tutorial Tue in A9, Oral Wed in Clustering, Pos. Wed #28
- Krause, Ben:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #51
- Krauthgamer, Robert:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #28
- Krishnamurthy, Akshay:** Oral Fri in Online Learning, Pos. Fri #136
- Krishnaswamy, Smita:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #166
- Kroon, Steve:** Oral Thu in Deep Learning (Theory), Pos. Thu #138
- Kroshnin, Alexey:** Oral Wed in Optimization (Convex), Pos. Wed #117
- Krueger, David:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #152
- Ku, Alexander:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #217
- Kuang, Zhaobin:** Oral Fri in Graphical Models, Pos. Fri #140
- Kuhnle, Alan:** Oral Thu in Optimization (Combinatorial), Pos. Thu #145
- Kuleshov, Volodymyr:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #151
- Kulkarni, Tejas:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #84
- Kumar, Ravi:** Oral Wed in Ranking and Preference Learning, Pos. Wed #30
- Kumar, Sanjiv:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #186
- Kumar, Aviral:** Oral Fri in Supervised Learning, Pos. Fri #29
- Kuntz, Pascale:** Oral Fri in Supervised Learning, Pos. Fri #102
- Kurt Keutzer, EECS:** Oral Thu in Reinforcement Learning, Pos. Thu #24
- Kurth-Nelson, Zeb:** Oral Wed in Reinforcement Learning, Pos. Wed #209
- Kusner, Matt:** Oral Thu in Other Applications, Pos. Thu #46, Oral Fri in Society Impacts of Machine Learning, Pos. Fri #87
- Kuzborskij, Ilja:** Oral Wed in Statistical Learning Theory, Pos. Wed #164
- Kwok, James:** Oral Wed in Sparsity and Compressed Sensing, Oral Wed in Optimization (Convex), Pos. Wed #183, Pos. Wed #152
- Kwok, Kevin:** Oral Wed in Deep Learning (Adversarial), Pos. Wed #73
- Laber, Eduardo:** Oral Wed in Optimization (Combinatorial), Pos. Wed #148
- Lacoste, Alexandre:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #152
- Lacroix, Timothee:** Oral Wed in Networks and Relational Learning, Pos. Wed #203
- Lafferty, John:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #158, Oral Thu in Supervised Learning, Pos. Thu #89
- Laine, Samuli:** Oral Thu in Supervised Learning, Pos. Thu #171
- Lake, Brenden:** Oral Fri in Natural Language and Speech Processing, Pos. Fri #148
- Lampe, Thomas:** Oral Wed in Reinforcement Learning, Pos. Wed #41
- Lampert, Christoph:** Oral Wed in Statistical Learning Theory, Pos. Wed #164, Oral Fri in Other Models and Methods, Pos. Fri #162
- Lan, Andrew:** Oral Wed in Other Applications, Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #87, Pos. Wed #174
- landrieu, loic:** Oral Fri in Optimization (Convex), Pos. Fri #118
- Lange, Jan-Hendrik:** Oral Wed in Optimization (Combinatorial), Pos. Wed #115
- Langford, John:** Oral Fri in Society Impacts of Machine Learning, Pos. Fri #89
- Langford, John:** Oral Wed in Deep Learning (Theory), Pos. Wed #14
- Lattanzi, Silvio:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #101
- Laurent, Thomas:** Oral Wed in Deep Learning (Theory), Pos. Wed #123, Oral Thu in Deep Learning (Theory), Pos. Thu #100
- Lawrence, Neil:** Oral Thu in Gaussian Processes, Pos. Thu #10
- Lazarcic, Alessandro:** Oral Wed in Reinforcement Learning, Pos. Wed #91, Pos. Wed #198, Oral Thu in Large Scale Learning and Big Data, Pos. Thu #76
- Lazic, Nevena:** Oral Fri in Online Learning, Pos. Fri #115
- Le, Quoc:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #185, Oral Thu in Reinforcement Learning, Pos. Thu #29, Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #170
- Le, Hoang:** Tutorial Tue in Victoria, Oral Fri in Reinforcement Learning, Pos. Fri #15
- Le, Tuan Anh:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #193, Oral Thu in Reinforcement Learning, Pos. Thu #199
- Le Folgoc, Loic:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #50
- LE MORVAN, Marine:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #160
- LeCun, Yann:** Oral Wed in Deep Learning (Theory), Pos. Wed #168, Oral Fri in Deep Learning (Adversarial), Pos. Fri #58
- Lee, Honglak:** Oral Fri in Reinforcement Learning, Pos. Fri #60
- Lee, Stefan:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #60
- Lee, Adrian:** Oral Fri in Generative Models, Pos. Fri #178
- Lee, Chen-Yu:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #4
- Lee, Seong-Whan:** Oral Wed in Reinforcement Learning, Pos. Wed #22
- Lee, Hae Beom:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #59
- Lee, Honglak:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #131
- Lee, Jason:** Oral Thu in Optimization (Convex), Oral Thu in Deep Learning (Theory), Pos. Thu #103, Pos. Thu #163, Oral Fri in Optimization (Non-convex), Oral Fri in Deep Learning (Theory), Pos. Fri #111
- Lee, Lisa:** Oral Wed in Reinforcement Learning, Pos. Wed #134
- Lee, Yoonho:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #100
- Lee, kywoon:** Oral Wed in Reinforcement Learning, Pos. Wed #22
- Legg, Shane:** Oral Fri in Reinforcement Learning, Pos. Fri #176
- Lehnert, Lucas:** Oral Fri in Reinforcement Learning, Pos. Fri #172
- Lehtinen, Jaakko:** Oral Thu in Supervised Learning, Pos. Thu #171
- Lei, Qi:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #181
- LeJeune, Daniel:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #27
- Lerer, Adam:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #109
- Leskovec, Jure:** Oral Wed in Networks and Relational Learning, Pos. Wed #45
- Lessard, Laurent:** Oral Wed in Optimization (Convex), Pos. Wed #141, Pos. Wed #137
- Leung, Thomas:** Oral Thu in Supervised Learning, Pos. Thu #113
- Levdik, Vitaly:** Oral Thu in Reinforcement Learning, Pos. Thu #130
- Levin, Keith:** Oral Fri in Dimensionality Reduction, Pos. Fri #76
- Levine, Sergey:** Oral Wed in Reinforcement Learning, Pos. Wed #106, Pos. Wed #15, Pos. Wed #61, Oral Thu in Reinforcement Learning, Pos. Thu #30, Pos. Thu #24, Pos. Thu #7
- Lewis, Mike:** Oral Fri in Natural Language and Speech Processing, Pos. Fri #164
- Leyton-Brown, Kevin:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #35
- Li, Xuechen:** Oral Wed in Approximate Inference, Pos. Wed #176
- Li, Yuanzhi:** Oral Wed in Optimization (Non-convex), Oral Wed in Statistical Learning Theory, Pos. Wed #85, Pos. Wed #143, Oral Thu in Online Learning, Pos. Thu #124
- Li, Yingzhen:** Oral Fri in Generative Models, Pos. Fri #55
- Li, Jerry:** Oral Fri in Deep Learning (Theory), Pos. Fri #112
- Li, Ping:** Oral Fri in Dimensionality Reduction, Pos. Fri #75
- Li, Chengtao:** Oral Wed in Networks and Relational Learning, Pos. Wed #57
- Li, Qianxiao:** Oral Wed in Deep Learning (Theory), Pos. Wed #169
- LI, XUDONG:** Oral Fri in Optimization (Non-convex), Pos. Fri #50
- Li, Zhuohan:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #63
- Li, Xingguo:** Oral Thu in Other Models and Methods, Pos. Thu #205
- Li, Yixuan:** Oral Thu in Deep Learning (Theory), Pos. Thu #176
- Li, Yan:** Oral Wed in Optimization (Non-convex), Pos. Wed #186
- Li, Li-Jia:** Oral Thu in Parallel and Distributed Learning, Oral Thu in Supervised Learning, Pos. Thu #113, Pos. Thu #13
- Li, Baochun:** Oral Wed in Reinforcement Learning, Pos. Wed #105
- Li, Yi:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #28
- Li, Yazhe:** Oral Fri in Generative Models, Pos. Fri #25
- Li, Max Guanyu:** Oral Fri in Generative Models, Pos. Fri #54
- Li, Minne:** Oral Fri in Reinforcement Learning, Pos. Fri #114
- Li, Quanzheng:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #127
- Li, Hui:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #53
- Li, Pan:** Oral Fri in Spectral Methods, Pos. Fri #127
- Li, Jiaman:** Oral Wed in Gaussian Processes, Pos. Wed #196
- Li, Xuhong:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #3
- Li, Lihong:** Oral Thu in Reinforcement Learning, Pos. Thu #129, Pos. Thu #41
- Li, Chunyuan:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #192, Oral Thu in Deep Learning (Adversarial), Pos. Thu #165, Oral Fri in Reinforcement Learning, Pos. Fri #59
- Li Chen, Department of Electrical and Computer:** Oral Wed in Reinforcement Learning, Pos. Wed #105
- Liam Paninski, Department of Statistics:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #78
- Lian, Xiangru:** Oral Wed in Optimization (Non-convex), Pos. Wed #86, Pos. Wed #207
- Liang, Jingwei:** Oral Fri in Optimization (Convex), Pos. Fri #122
- Liang, Yitao:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #180
- Liang, Zhenxiao:** Oral Fri in Spectral Methods, Pos. Fri #128
- Liang, Percy:** Oral Wed in Active Learning, Oral Wed in Society Impacts of Machine Learning, Pos. Wed #128, Pos. Wed #80
- Liang, Eric:** Oral Fri in Reinforcement Learning, Pos. Fri #21
- LIANG, SHIYU:** Oral Thu in Deep Learning (Theory), Pos. Thu #176
- Liao, Zhenyu:** Oral Wed in Deep Learning (Theory), Pos. Wed #189, Oral Fri in Spectral Methods, Pos. Fri #62

# AUTHOR INDEX

- Liao, Renjie:** Oral Thu in Deep Learning (Theory), Pos. Thu #178
- Liaw, Richard:** Oral Fri in Reinforcement Learning, Pos. Fri #21
- Lillicrap, Timothy:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #121, Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #110
- Lim, Lek-Heng:** Oral Thu in Deep Learning (Theory), Pos. Thu #137
- Lim, Joseph:** Oral Fri in Computer Vision, Pos. Fri #157
- Lin, Wu:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #190
- Lin, Chengyu:** Oral Wed in Dimensionality Reduction, Pos. Wed #18
- Lin, Jessy:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #106
- Lin, Sina:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #34
- Lin, Junhong:** Oral Wed in Statistical Learning Theory, Pos. Wed #119, Oral Thu in Statistical Learning Theory, Pos. Thu #49
- Lin, Yibo:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #21
- Lin, Qihang:** Oral Fri in Optimization (Convex), Pos. Fri #18
- Lin, Yingyan:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #104
- Lipton, Zachary:** Oral Fri in Transfer and Multi-Task Learning, Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #71, Pos. Fri #106
- Littman, Michael:** Oral Wed in Reinforcement Learning, Pos. Wed #173, Oral Thu in Reinforcement Learning, Pos. Thu #173, Oral Fri in Reinforcement Learning, Pos. Fri #172
- Litz, Heiner:** Oral Thu in Other Applications, Pos. Thu #91
- Liu, Yu Xuan:** Oral Wed in Reinforcement Learning, Pos. Wed #15
- Liu, Han:** Oral Fri in Graphical Models, Pos. Fri #23
- Liu, Zhen:** Oral Thu in Reinforcement Learning, Oral Thu in Other Models and Methods, Pos. Thu #205, Pos. Thu #41
- Liu, Mingrui:** Oral Thu in Online Learning, Pos. Thu #150
- Liu, Zhongming:** Oral Wed in Computer Vision, Pos. Wed #126
- Liu, Han:** Oral Thu in Optimization (Non-convex), Pos. Thu #211
- Liu, Weiyang:** Oral Thu in Other Models and Methods, Pos. Thu #205
- Liu, Jiashang:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #211
- Liu, Wei:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #161, Oral Fri in Optimization (Convex), Pos. Fri #121
- Liu, Si:** Oral Thu in Other Models and Methods, Pos. Thu #141
- Liu, Ji:** Oral Wed in Optimization (Non-convex), Pos. Wed #86, Pos. Wed #207
- Liu, Lydia T.:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #110
- Liu, Yan:** Oral Fri in Generative Models, Pos. Fri #54
- Liu, Huidong:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #148
- Liu, Xin:** Oral Fri in Online Learning, Pos. Fri #135
- Liu, Chang:** Oral Fri in Approximate Inference, Pos. Fri #150
- Liu, Haitao:** Oral Wed in Gaussian Processes, Pos. Wed #124
- Liu, Tie-Yan:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #8
- Liu, Han:** Oral Wed in Reinforcement Learning, Pos. Wed #162, Oral Fri in Reinforcement Learning, Pos. Fri #171
- Liu, Wei:** Oral Wed in Other Applications, Pos. Wed #64
- Liu, Mingyan:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #168
- Liu, Tie-Yan:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #63
- Liu, Qiang:** Oral Thu in Graphical Models, Oral Thu in Other Models and Methods, Pos. Thu #25, Pos. Thu #61, Oral Fri in Reinforcement Learning, Oral Fri in Monte Carlo Methods, Pos. Fri #130, Pos. Fri #113
- Locatello, Francesco:** Oral Fri in Optimization (Convex), Pos. Fri #37
- Locatello, Francesco:** Oral Fri in Optimization (Convex), Pos. Fri #42
- Lockhart, Edward:** Oral Fri in Generative Models, Pos. Fri #25
- Lockhart, Edward:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #105
- Long, Zichao:** Oral Fri in Other Models and Methods, Pos. Fri #34
- Long, Phil:** Oral Fri in Deep Learning (Theory), Pos. Fri #153
- Long, Mingsheng:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #194
- Lopes, Miles:** Oral Thu in Monte Carlo Methods, Pos. Thu #12
- Lopez-Paz, David:** Oral Thu in Generative Models, Pos. Thu #5
- Lorenzi, Marco:** Oral Thu in Gaussian Processes, Pos. Thu #72
- Lorenzo, Orecchia:** Oral Thu in Optimization (Convex), Pos. Thu #220, Pos. Thu #67
- Loukas, Andreas:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #102, Oral Fri in Spectral Methods, Pos. Fri #61
- Low, Tze Meng:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #74
- Lu, Haihao:** Oral Thu in Large Scale Learning and Big Data, Oral Thu in Optimization (Convex), Pos. Thu #222, Pos. Thu #75
- Lu, Xiaoyu:** Oral Thu in Gaussian Processes, Pos. Thu #10
- Lu, Hao:** Oral Fri in Graphical Models, Pos. Fri #23
- Lu, Yiping:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #127, Oral Fri in Other Models and Methods, Pos. Fri #34
- Lu, Junwei:** Oral Fri in Graphical Models, Pos. Fri #23
- Lucas, James:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #77
- LUCAS, Thomas:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #120
- Lucchi, Aurelien:** Oral Wed in Optimization (Non-convex), Pos. Wed #206, Oral Thu in Optimization (Convex), Pos. Thu #219
- Luketina, Jelena:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #168
- Lumbreras, Alberto:** Oral Thu in Matrix Factorization, Pos. Thu #55
- Luo, Wenhan:** Oral Wed in Other Applications, Pos. Wed #64
- Luo, Rui:** Oral Fri in Reinforcement Learning, Pos. Fri #114
- Luo, Shengming:** Oral Wed in Statistical Learning Theory, Pos. Wed #217
- Luo, Haipeng:** Oral Thu in Online Learning, Pos. Thu #80
- Luong, Thang:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #169
- Lykouris, Thodoris:** Oral Fri in Optimization (Combinatorial), Pos. Fri #9
- Lyu, Siwei:** Oral Thu in Online Learning, Pos. Thu #187
- Lyu, Wenlong:** Oral Thu in Optimization (Bayesian), Pos. Thu #210
- Lähdesmäki, Harri:** Oral Thu in Gaussian Processes, Pos. Thu #71
- Ma, Lin:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #161
- Ma, Cong:** Oral Thu in Matrix Factorization, Pos. Thu #132
- Ma, Xingjun:** Oral Thu in Supervised Learning, Pos. Thu #90
- Ma, Yao:** Oral Fri in Matrix Factorization, Pos. Fri #77
- Ma, Runchao:** Oral Fri in Optimization (Convex), Pos. Fri #18
- Ma, Xianzhong:** Oral Fri in Other Models and Methods, Pos. Fri #34
- Ma, Jian:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #167
- Ma, Junjie:** Oral Thu in Optimization (Non-convex), Pos. Thu #212
- Ma, Yian:** Oral Fri in Monte Carlo Methods, Pos. Fri #146
- Ma, Siyuan:** Oral Wed in Optimization (Convex), Pos. Wed #204, Oral Thu in Kernel Methods, Pos. Thu #159
- Macciò, Danilo:** Oral Fri in Unsupervised Learning, Pos. Fri #30
- Mack, David:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #108
- Mackey, Lester:** Oral Fri in Causal Inference, Oral Fri in Approximate Inference, Pos. Fri #166, Pos. Fri #1, Pos. Fri #11
- Macready, William:** Oral Fri in Generative Models, Pos. Fri #85
- Maddison, Chris:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #193
- Maddison, Chris:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #130
- Madras, David:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #44
- Madry, Aleksander:** Oral Wed in Generative Models, Pos. Wed #133, Oral Fri in Deep Learning (Theory), Pos. Fri #112
- Maeda, Shin-ichi:** Oral Fri in Reinforcement Learning, Pos. Fri #175
- Maehara, Takanori:** Oral Wed in Computer Vision, Pos. Wed #127
- Mahoney, Michael:** Oral Thu in Monte Carlo Methods, Pos. Thu #12, Oral Fri in Dimensionality Reduction, Pos. Fri #76
- Maleki, Arian:** Oral Thu in Large Scale Learning and Big Data, Oral Thu in Optimization (Non-convex), Pos. Thu #212, Pos. Thu #75
- Malick, Jérôme:** Oral Thu in Optimization (Convex), Pos. Thu #155
- Malik, Dhruv:** Oral Thu in Reinforcement Learning, Pos. Thu #94
- Mandal, Soumik:** Oral Thu in Kernel Methods, Pos. Thu #159
- Mandt, Stephan:** Oral Wed in Representation Learning, Oral Wed in Approximate Inference, Pos. Wed #54, Pos. Wed #201, Oral Fri in Generative Models, Pos. Fri #55, Pos. Fri #86
- Mankowitz, Daniel:** Oral Wed in Reinforcement Learning, Pos. Wed #163
- Mannerström, Henrik:** Oral Thu in Gaussian Processes, Pos. Thu #71
- Mannon, Shie:** Oral Thu in Reinforcement Learning, Pos. Thu #208
- Mansour, Yishay:** Oral Fri in Online Learning, Pos. Fri #115
- Marinho, Zita:** Oral Thu in Reinforcement Learning, Pos. Thu #200
- Marino, Joseph:** Oral Fri in Generative Models, Pos. Fri #86
- Marinov, Teodor Vanislavov:** Oral Wed in Dimensionality Reduction, Pos. Wed #114
- Martel, Julien:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #218
- Martens, James:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #201
- Marti, Gautier:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #22
- Martin, Lionel:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #102
- Martius, Georg:** Oral Fri in Other Models and Methods, Pos. Fri #162
- MASSIAS, Mathurin:** Oral Fri in Optimization (Convex), Pos. Fri #117
- Matthews, Alexander:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #194
- mazhar, othmane:** Oral Fri in Dimensionality Reduction, Pos. Fri #91
- McGough, Stephen:** Oral Wed in Approximate Inference, Pos. Wed #151
- McIlraith, Sheila:** Oral Fri in Reinforcement Learning, Pos. Fri #147
- McLeod, Mark:** Oral Thu in Optimization (Bayesian), Pos. Thu #215
- McLeod, Mark:** Oral Thu in Optimization (Bayesian), Pos. Thu #209
- Meger, David:** Oral Thu in Reinforcement Learning, Pos. Thu #86
- Mehrabani, Mohammad:** Oral Fri in Deep Learning (Theory), Pos. Fri #174
- Mehri, Soroush:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #33
- Mehrjou, Arash:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #214
- Meir, Ron:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #68
- Meka, Raghu:** Oral Thu in Deep Learning (Theory), Pos. Thu #191
- Mensch, Arthur:** Oral Thu in Structured Prediction, Pos. Thu #48
- Merel, Josh:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #84
- Mertikopoulos, Panayotis:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #13
- Mesbahi, Mehran:** Oral Fri in Reinforcement Learning, Pos. Fri #22
- Mescheder, Lars:** Oral Wed in Generative Models, Pos. Wed #77
- Metelli, Alberto Maria:** Oral Thu in Reinforcement Learning, Pos. Thu #88
- Metzler, Christopher:** Oral Thu in Optimization (Non-convex), Pos. Thu #164
- Meyer, Frank:** Oral Fri in Supervised Learning, Pos. Fri #102
- Meyerson, Elliot:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #145
- Mianjy, Poorya:** Oral Wed in Dimensionality Reduction, Pos. Wed #114, Pos. Wed #17, Oral Fri in Matrix Factorization, Pos. Fri #69

# AUTHOR INDEX

- Michaeli, Tomer:** Oral Fri in Unsupervised Learning, Pos. Fri #27
- Michaelis, Claudio:** Oral Wed in Computer Vision, Pos. Wed #12
- Micheli, Alessio:** Oral Wed in Representation Learning, Pos. Wed #138, Pos. Wed #10
- Miconi, Thomas:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #7
- Miikkulainen, Risto:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #145
- Milani Fard, Mahdi:** Oral Thu in Optimization (Combinatorial), Pos. Thu #118
- Milenkovic, Olgica:** Oral Fri in Spectral Methods, Pos. Fri #127
- Miller, Andrew:** Oral Fri in Generative Models, Pos. Fri #134
- Millstein, Todd:** Oral Fri in Graphical Models, Pos. Fri #24
- Min, Martin:** Oral Wed in Representation Learning, Pos. Wed #190
- Miranda, Zachery:** Oral Wed in Active Learning, Pos. Wed #129
- Mirman, Matthew:** Oral Wed in Deep Learning (Adversarial), Pos. Wed #74, Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #140
- Miron, Marius:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #103
- Mirroknji, Vahab:** Oral Wed in Optimization (Combinatorial), Pos. Wed #56, Oral Thu in Large Scale Learning and Big Data, Oral Thu in Optimization (Convex), Pos. Thu #222, Pos. Thu #101, Pos. Thu #75
- Misener, Ruth:** Oral Wed in Active Learning, Pos. Wed #199
- Mishchenko, Konstantin:** Oral Thu in Optimization (Convex), Pos. Thu #155
- Mishra, Nikhil:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #169
- Mishra, Bamdev:** Oral Thu in Optimization (Non-convex), Pos. Thu #179, Oral Fri in Matrix Factorization, Pos. Fri #92
- Mishra, Nina:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #131
- Misra, Dipendra:** Oral Wed in Reinforcement Learning, Pos. Wed #173
- Mitliagkas, Ioannis:** Oral Thu in Generative Models, Pos. Thu #196
- Mitrovic, Marko:** Oral Wed in Optimization (Combinatorial), Pos. Wed #97
- Mitrovic, Slobodan:** Oral Wed in Optimization (Combinatorial), Pos. Wed #149
- Mitzenmacher, Michael:** Oral Fri in Other Models and Methods, Pos. Fri #138
- Mnih, Vlad:** Oral Wed in Reinforcement Learning, Pos. Wed #41, Oral Fri in Reinforcement Learning, Pos. Fri #14, Pos. Fri #176
- Mnih, Andriy:** Oral Wed in Representation Learning, Pos. Wed #90
- Moens, Vincent:** Oral Fri in Causal Inference, Pos. Fri #132
- Mohajerin Esfahani, Peyman:** Oral Fri in Optimization (Convex), Pos. Fri #17
- Mohamed, Shakir:** Oral Wed in Generative Models, Pos. Wed #112
- Mohri, Mehryar:** Oral Fri in Online Learning, Pos. Fri #116
- Mokhtari, Aryan:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #83, Oral Thu in Optimization (Combinatorial), Pos. Thu #146
- Molinaro, Marco:** Oral Wed in Optimization (Combinatorial), Pos. Wed #148
- Morcos, Ari:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #110
- Moritz, Philipp:** Oral Fri in Reinforcement Learning, Pos. Fri #21
- Moritz Hardt, University of California:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #110
- Mou, Wenlong:** Oral Wed in Statistical Learning Theory, Pos. Wed #24
- Mousavifar, Aidasadat:** Oral Wed in Optimization (Combinatorial), Pos. Wed #149
- Mudigere, Dheevatsa:** Oral Fri in Optimization (Non-convex), Pos. Fri #5
- Mukkamala, Mahesh:** Oral Thu in Deep Learning (Theory), Pos. Thu #104
- Mulayoff, Rotem:** Oral Fri in Unsupervised Learning, Pos. Fri #27
- Munkberg, Jacob:** Oral Thu in Supervised Learning, Pos. Thu #171
- Munkhdalai, Tsendsuren:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #33
- Munos, Remi:** Oral Wed in Deep Learning (Neural Network Architectures), Oral Wed in Reinforcement Learning, Pos. Wed #92, Pos. Wed #3, Pos. Wed #163, Oral Fri in Reinforcement Learning, Oral Fri in Generative Models, Pos. Fri #110, Pos. Fri #176, Pos. Fri #14
- Murali, Vijayaraghavan:** Oral Wed in Reinforcement Learning, Pos. Wed #33
- Muroi, Carl:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #108
- Murphy, Kevin:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #214
- Murray, Iain:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #51
- Musmann, Stephen:** Oral Wed in Active Learning, Pos. Wed #128
- Muthakana, Hariank:** Oral Wed in Statistical Learning Theory, Pos. Wed #142
- Mutti, Mirco:** Oral Thu in Reinforcement Learning, Pos. Thu #88
- Müller, Lorenz:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #218
- Müller, Emmanuel:** Oral Wed in Unsupervised Learning, Pos. Wed #147
- Nabi, Saleh:** Oral Fri in Reinforcement Learning, Pos. Fri #39
- Nachmani, Eliya:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #64
- Nachum, Ofir:** Oral Wed in Reinforcement Learning, Pos. Wed #172, Oral Thu in Reinforcement Learning, Pos. Thu #42
- Nadler, Boaz:** Oral Thu in Matrix Factorization, Pos. Thu #56
- Nair, Prasanth:** Oral Fri in Gaussian Processes, Pos. Fri #81
- Naisat, Gregory:** Oral Thu in Deep Learning (Theory), Pos. Thu #137
- Namkoong, Hongseok:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #80
- Namrata Vaswani, Iowa:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #70
- Narayanamurthy, Praneeth:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #70
- Natchu, Vishnu:** Oral Thu in Dimensionality Reduction, Pos. Thu #158
- Nathani, Deepak:** Oral Fri in Computer Vision, Pos. Fri #47
- Natole Jr, Michael:** Oral Thu in Online Learning, Pos. Thu #187
- Neel, Seth:** Oral Wed in Privacy, Anonymity, and Security, Pos. Wed #88, Oral Fri in Society Impacts of Machine Learning, Pos. Fri #90
- Neely, Andy:** Oral Fri in Deep Learning (Theory), Pos. Fri #8
- Neumann, Gerhard:** Oral Wed in Approximate Inference, Pos. Wed #213
- Neunert, Michael:** Oral Wed in Reinforcement Learning, Pos. Wed #41
- Neville, Jennifer:** Oral Thu in Other Models and Methods, Pos. Thu #25
- Neyshabur, Behnam:** Oral Thu in Deep Learning (Theory), Pos. Thu #184
- Nguyen, Phuc:** Oral Wed in Computer Vision, Pos. Wed #13
- Nguyen, Thanh Huy:** Oral Thu in Monte Carlo Methods, Pos. Thu #82
- Nguyen, Thanh:** Oral Wed in Statistical Learning Theory, Pos. Wed #94
- Nguyen, Quynh:** Oral Thu in Deep Learning (Theory), Pos. Thu #104, Oral Fri in Deep Learning (Theory), Pos. Fri #80
- NGUYEN, PHUONG HA:** Oral Wed in Optimization (Convex), Pos. Wed #116
- Nguyen, Lam:** Oral Wed in Optimization (Convex), Pos. Wed #116
- Nguyen-Tuong, Duy:** Oral Thu in Gaussian Processes, Pos. Thu #9
- Ni, Lionel:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #152
- Niazadeh, Rad:** Oral Wed in Clustering, Pos. Wed #48
- Nickel, Maximilian:** Oral Wed in Representation Learning, Pos. Wed #139
- Nickisch, Hannes:** Oral Fri in Gaussian Processes, Pos. Fri #151
- Nicolas Vayatis, CMLA:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #33
- Niculae, Vlad:** Oral Wed in Structured Prediction, Pos. Wed #66
- Nie, Weili:** Oral Fri in Deep Learning (Theory), Pos. Fri #19
- Nielsen, Didrik:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #190
- Nikovski, Daniel:** Oral Fri in Reinforcement Learning, Pos. Fri #39
- Nishihara, Robert:** Oral Fri in Reinforcement Learning, Pos. Fri #21
- Nitanda, Atsushi:** Oral Thu in Statistical Learning Theory, Pos. Thu #161
- Niu, Gang:** Oral Thu in Supervised Learning, Pos. Thu #98, Oral Fri in Statistical Learning Theory, Pos. Fri #67
- Nocedal, Jorge:** Oral Fri in Optimization (Non-convex), Pos. Fri #5
- Nock, Richard:** Oral Wed in Statistical Learning Theory, Pos. Wed #95
- Noh, Yung-Kyun:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #96
- Noh, Hyeonwoo:** Oral Fri in Computer Vision, Pos. Fri #157
- Nori, Aditya:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #50
- Norouzi, Mohammad:** Oral Thu in Reinforcement Learning, Pos. Thu #42
- Norouzi-Fard, Ashkan:** Oral Thu in Optimization (Combinatorial), Pos. Wed #149
- Noury, Seb:** Oral Fri in Deep Learning (Neural Network Architectures), Oral Fri in Generative Models, Pos. Fri #25, Pos. Fri #105
- Nowozin, Sebastian:** Oral Wed in Generative Models, Pos. Wed #77
- Nowé, Ann:** Oral Thu in Multi-Agent Learning, Pos. Thu #126
- O'Donoghue, Brendan:** Oral Wed in Deep Learning (Adversarial), Pos. Wed #132, Oral Fri in Reinforcement Learning, Pos. Fri #14
- Oates, Chris:** Oral Fri in Approximate Inference, Pos. Fri #1
- Obermeyer, Fritz:** Oral Fri in Approximate Inference, Pos. Fri #149
- Obozinski, Guillaume:** Oral Wed in Networks and Relational Learning, Pos. Wed #203
- Odena, Augustus:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #95
- Oglic, Dino:** Oral Thu in Kernel Methods, Pos. Thu #160
- Oh, ChangYong:** Oral Wed in Optimization (Bayesian), Pos. Wed #156
- Oh, Junhyuk:** Oral Fri in Reinforcement Learning, Pos. Fri #60
- Okatani, Takayuki:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #184
- Okuno, Akifumi:** Oral Wed in Representation Learning, Pos. Wed #108
- Olah, Christopher:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #95
- Oliva, Junier:** Oral Fri in Other Models and Methods, Pos. Fri #161
- Ollivier, Yann:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #120
- Olofsson, Simon:** Oral Wed in Active Learning, Pos. Wed #199
- Olshevsky, Alexander:** Oral Fri in Matrix Factorization, Pos. Fri #77
- Olsson, Catherine:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #95
- ONG, Yew Soon:** Oral Wed in Gaussian Processes, Pos. Wed #124
- Ordyniak, Sebastian:** Oral Wed in Ranking and Preference Learning, Pos. Wed #69
- Orlitsky, Alon:** Oral Wed in Ranking and Preference Learning, Pos. Wed #36
- Ortner, Ronald:** Oral Wed in Reinforcement Learning, Pos. Wed #91
- Osama, Muhammad:** Oral Thu in Online Learning, Pos. Thu #143
- Osband, Ian:** Oral Fri in Reinforcement Learning, Pos. Fri #14
- Osborne, Michael:** Oral Thu in Optimization (Bayesian), Pos. Thu #215, Pos. Thu #209
- Oseledets, Ivan:** Oral Thu in Generative Models, Pos. Thu #85
- Osindero, Simon:** Oral Fri in Reinforcement Learning, Pos. Fri #13
- Ostrovski, Georg:** Oral Wed in Reinforcement Learning, Pos. Wed #3, Oral Fri in Generative Models, Pos. Fri #110
- Ostrovskii, Dmitrii:** Oral Fri in Optimization (Convex), Pos. Fri #51
- Ott, Myle:** Oral Fri in Natural Language and Speech Processing, Pos. Fri #163
- Oudeyer, Pierre-Yves:** Oral Thu in Reinforcement Learning, Pos. Thu #174
- Oudre, Laurent:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #33
- Oymak, Samet:** Oral Thu in Optimization (Non-convex), Pos. Thu #180
- Ozair, Sherjil:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #57
- Ozay, Mete:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #184



# AUTHOR INDEX

- Paaßen, Benjamin:** Oral Wed in Representation Learning, Pos. Wed #10
- Pacheco, Jason:** Oral Thu in Monte Carlo Methods, Pos. Thu #11
- Page, Courtney:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #165
- Paisley, John:** Oral Fri in Time-Series Analysis, Oral Fri in Approximate Inference, Pos. Fri #64, Pos. Fri #159
- Pal, Christopher:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #170
- Palaniappan, Malayandi:** Oral Thu in Reinforcement Learning, Pos. Thu #94
- Palla, Konstantina:** Tutorial Tue in K1 + K2
- Pan, Xingyuan:** Oral Wed in Structured Prediction, Pos. Wed #153
- Pan, Yangchen:** Oral Fri in Reinforcement Learning, Pos. Fri #39
- Pan, Xudong:** Oral Thu in Generative Models, Pos. Thu #6
- Pang, Tianyu:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #38
- Papailiopoulos, Dimitris:** Oral Wed in Statistical Learning Theory, Pos. Wed #118, Oral Fri in Parallel and Distributed Learning, Pos. Fri #125
- Papini, Matteo:** Oral Thu in Reinforcement Learning, Pos. Thu #65
- Parascandolo, Giambattista:** Oral Wed in Representation Learning, Pos. Wed #78, Oral Thu in Deep Learning (Adversarial), Pos. Thu #214
- Pardo, Fabio:** Oral Thu in Reinforcement Learning, Pos. Thu #130
- Parisotto, Emilio:** Oral Wed in Reinforcement Learning, Pos. Wed #134
- Park, Taesung:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #83
- Parmar, Niki:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #73
- Parmar, Niki:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #217
- Parmas, Paavo:** Oral Thu in Reinforcement Learning, Pos. Thu #8
- Pascal Fua, EPFL:** Oral Thu in Other Applications, Pos. Thu #92
- Pascanu, Razvan:** Oral Wed in Reinforcement Learning, Pos. Wed #209, Oral Fri in Reinforcement Learning, Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #168, Pos. Fri #113
- Patel, Ankit:** Oral Fri in Deep Learning (Theory), Pos. Fri #19
- Pathak, Deepak:** Oral Thu in Reinforcement Learning, Pos. Thu #181
- Patil, Prathamesh:** Oral Thu in Ranking and Preference Learning, Pos. Thu #188
- Patra, Rhicheek:** Oral Fri in Parallel and Distributed Learning, Pos. Fri #123
- Pearce, Tim:** Oral Fri in Deep Learning (Theory), Pos. Fri #8
- Pedregosa, Fabian:** Oral Fri in Optimization (Convex), Pos. Fri #41, Pos. Fri #38
- Peebles, John:** Oral Fri in Deep Learning (Theory), Pos. Fri #112
- Peissig, Peggy:** Oral Fri in Graphical Models, Pos. Fri #140
- Peng, Jian:** Oral Fri in Reinforcement Learning, Pos. Fri #113
- Pennington, Jeffrey:** Oral Wed in Deep Learning (Theory), Pos. Wed #171, Oral Thu in Deep Learning (Theory), Pos. Thu #177
- Perbet, Frank:** Oral Wed in Reinforcement Learning, Pos. Wed #208
- Peter Richtarik, Abdullah:** Oral Thu in Optimization (Convex), Pos. Thu #156
- Peters, Jan:** Oral Thu in Reinforcement Learning, Pos. Thu #8
- Petrik, Marek:** Oral Thu in Reinforcement Learning, Pos. Thu #87
- Pham, Hieu:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #185
- Pichapati, Venkatadheeraj:** Oral Wed in Ranking and Preference Learning, Pos. Wed #36
- Pike-Burke, Ciara:** Oral Thu in Online Learning, Pos. Thu #123
- Pineau, Joelle:** Oral Wed in Reinforcement Learning, Pos. Wed #4, Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #170
- Pirotta, Matteo:** Oral Wed in Reinforcement Learning, Pos. Wed #91, Oral Thu in Reinforcement Learning, Pos. Thu #207, Pos. Thu #65
- Pitassi, Toniann:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #44
- Pitkow, Zachary:** Oral Thu in Deep Learning (Theory), Pos. Thu #178
- Pleiss, Geoff:** Oral Fri in Gaussian Processes, Pos. Fri #152
- Poloczek, Matthias:** Oral Wed in Optimization (Bayesian), Pos. Wed #44
- Polyak, Adam:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #64
- Pontil, Massimiliano:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #67
- Poole, Ben:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #214
- Poon, Clarice:** Oral Fri in Optimization (Convex), Pos. Fri #122
- Posner, Herbert Ingmar:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #52
- Pouliot, Guillaume:** Oral Wed in Clustering, Pos. Wed #27
- Prangle, Dennis:** Oral Wed in Approximate Inference, Pos. Wed #151
- Precup, Doina:** Oral Thu in Reinforcement Learning, Pos. Thu #66
- Pretorius, Arnau:** Oral Thu in Deep Learning (Theory), Pos. Thu #138
- Priebe, Carey:** Oral Fri in Dimensionality Reduction, Pos. Fri #76
- Pritzel, Alexander:** Oral Wed in Representation Learning, Pos. Wed #101
- Pu, Yewen:** Oral Wed in Active Learning, Pos. Wed #129
- Pu, Yunchen:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #192, Oral Fri in Deep Learning (Adversarial), Pos. Fri #109
- Purushotham, Sanjay:** Oral Fri in Generative Models, Pos. Fri #54
- Póczos, Barnabás:** Oral Thu in Deep Learning (Theory), Pos. Thu #103, Oral Fri in Other Models and Methods, Pos. Fri #161
- Qi, Siyuan:** Oral Fri in Computer Vision, Pos. Fri #48
- Qi, Yanjun:** Oral Thu in Graphical Models, Pos. Thu #133
- Qi, Charles:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #34
- Qian, Hui:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #83
- Qiao, Siyuan:** Oral Wed in Computer Vision, Pos. Wed #11
- Qiao, Mingda:** Oral Wed in Statistical Learning Theory, Pos. Wed #23
- Qin, Tao:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #8, Oral Thu in Natural Language and Speech Processing, Pos. Thu #63
- Qiu, Qiang:** Oral Fri in Deep Learning (Theory), Pos. Fri #79
- qu, chao:** Oral Wed in Optimization (Non-convex), Pos. Wed #186
- Quan, John:** Oral Wed in Reinforcement Learning, Pos. Wed #163
- Rabadan, Raul:** Oral Wed in Feature Selection, Pos. Wed #37
- Rabinovich, Andrew:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #4
- Rabinowitz, Neil:** Oral Wed in Reinforcement Learning, Pos. Wed #208
- Racaniere, Sebastien:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #201
- Rae, Jack:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #121
- Raetsch, Gunnar:** Oral Fri in Optimization (Convex), Pos. Fri #37
- Raffel, Colin:** Oral Thu in Deep Learning (Adversarial), Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #175, Pos. Thu #95
- Raghu, Maithra:** Oral Thu in Reinforcement Learning, Pos. Thu #29
- Raguet, Hugo:** Oral Fri in Optimization (Convex), Pos. Fri #118
- Raileanu, Roberta:** Oral Thu in Multi-Agent Learning, Pos. Thu #136
- Rainforth, Tom:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #193, Oral Fri in Monte Carlo Methods, Pos. Fri #129
- Raj, Anant:** Oral Fri in Optimization (Convex), Pos. Fri #37
- Rajeswar, Sai:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #119, Pos. Fri #57
- Ramalho, Tiago:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #130
- Ramalingam, Srikumar:** Oral Fri in Deep Learning (Theory), Pos. Fri #173
- Ramanan, Deva:** Oral Wed in Computer Vision, Pos. Wed #13
- Ramchandran, Kannan:** Oral Thu in Statistical Learning Theory, Pos. Thu #50
- Ramdas, Aaditya:** Oral Thu in Other Models and Methods, Pos. Thu #142
- Ranganath, Rajesh:** Oral Fri in Generative Models, Pos. Fri #53
- Ranganathan, Parthasarathy:** Oral Thu in Other Applications, Pos. Thu #91
- Ranzato, Marc'Aurelio:** Oral Fri in Natural Language and Speech Processing, Pos. Fri #163
- Rao, Vinayak:** Oral Thu in Other Models and Methods, Pos. Thu #25
- Rashid, Tabish:** Oral Thu in Multi-Agent Learning, Pos. Thu #225
- Rasmussen, Carl:** Oral Thu in Reinforcement Learning, Pos. Thu #8
- Ravanbakhsh, Siamak:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #35
- Ravikumar, Pradeep:** Oral Wed in Unsupervised Learning, Pos. Wed #32, Oral Thu in Large Scale Learning and Big Data, Oral Thu in Statistical Learning Theory, Pos. Thu #162, Pos. Thu #186
- Ravindrakumar, Vaishakh:** Oral Wed in Ranking and Preference Learning, Pos. Wed #36
- Raviv, Netanel:** Oral Thu in Optimization (Convex), Pos. Thu #221
- Ravuri, Suman:** Oral Wed in Generative Models, Pos. Wed #112
- Razaviyayn, Meisam:** Oral Fri in Optimization (Non-convex), Pos. Fri #4
- Re, Christopher:** Oral Thu in Dimensionality Reduction, Pos. Thu #121
- Reagen, Brandon:** Oral Fri in Other Models and Methods, Pos. Fri #138
- Recht, Benjamin:** Tutorial Tue in A9, Oral Wed in Reinforcement Learning, Pos. Wed #104
- Rehg, James:** Oral Thu in Other Models and Methods, Pos. Thu #205
- Reingold, Omer:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #167
- Remelli, Edoardo:** Oral Thu in Other Applications, Pos. Thu #92
- Ren, Fei:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #44
- Ren, Xiang:** Oral Wed in Networks and Relational Learning, Pos. Wed #45
- Ren, Mengye:** Oral Thu in Supervised Learning, Pos. Thu #172
- Renals, Steve:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #51
- Rendle, Steffen:** Oral Fri in Natural Language and Speech Processing, Pos. Fri #107
- Restelli, Marcello:** Oral Thu in Reinforcement Learning, Pos. Thu #207, Pos. Thu #65, Pos. Thu #88
- RICHARD, Gaël:** Oral Thu in Monte Carlo Methods, Pos. Thu #82
- Richtarik, Peter:** Oral Wed in Optimization (Convex), Pos. Wed #116
- Riedmiller, Martin:** Oral Wed in Deep Learning (Neural Network Architectures), Oral Wed in Reinforcement Learning, Pos. Wed #41, Pos. Wed #84
- Ritter, Samuel:** Oral Wed in Reinforcement Learning, Pos. Wed #209
- Rob Fergus, Facebook:** Oral Thu in Multi-Agent Learning, Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #136, Pos. Thu #109
- Roberts, Adam:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #175
- Roberts, Stephen:** Oral Thu in Optimization (Bayesian), Pos. Thu #209
- Robinson, Daniel:** Oral Wed in Optimization (Convex), Pos. Wed #136
- Rocktäschel, Tim:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #102
- Rogers, Ryan:** Oral Wed in Privacy, Anonymity, and Security, Pos. Wed #89
- Rohaninejad, Mostafa:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #169
- Rojers, Diederik:** Oral Thu in Multi-Agent Learning, Pos. Thu #126
- Rojas, Cristian:** Oral Fri in Dimensionality Reduction, Pos. Fri #91
- Rojas-Carulla, Mateo:** Oral Wed in Representation Learning, Pos. Wed #78
- Rolf, Esther:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #110
- Ronitt Rubinfeld, MIT:** Oral Wed in Statistical Learning Theory, Pos. Wed #154
- Roosta, Fred:** Oral Thu in Deep Learning (Theory), Pos. Thu #183, Oral Fri in Dimensionality Reduction, Pos. Fri #76
- Rosca, Mihaela:** Oral Wed in Generative Models, Pos. Wed #112
- Rosenbaum, Dan:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #130



# AUTHOR INDEX

- Rosenfeld, Nir:** Oral Wed in Optimization (Combinatorial), Pos. Wed #55
- Roth, Aaron:** Oral Wed in Privacy, Anonymity, and Security, Pos. Wed #88, Oral Fri in Society Impacts of Machine Learning, Pos. Fri #90
- Rothblum, Guy:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #167, Oral Fri in Society Impacts of Machine Learning, Pos. Fri #156
- Rouault, Sébastien:** Oral Fri in Parallel and Distributed Learning, Pos. Fri #108
- Rowland, Mark:** Oral Wed in Reinforcement Learning, Pos. Wed #34
- Roy, Aurko:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #73
- Roy, Daniel:** Oral Fri in Deep Learning (Theory), Pos. Fri #7
- Ru, Binxin:** Oral Thu in Optimization (Bayesian), Pos. Thu #215
- Rueckert, Daniel:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #50
- Ruff, Lukas:** Oral Wed in Unsupervised Learning, Pos. Wed #147
- Ruiz, Francisco:** Oral Wed in Approximate Inference, Pos. Wed #212
- Rukat, Tammo:** Oral Thu in Matrix Factorization, Pos. Thu #153
- Rush, Alexander:** Oral Fri in Deep Learning (Adversarial), Oral Fri in Other Models and Methods, Oral Fri in Generative Models, Pos. Fri #134, Pos. Fri #138, Pos. Fri #58
- Russell, Stuart:** Oral Thu in Monte Carlo Methods, Pos. Thu #62
- Russell, Stuart:** Oral Thu in Reinforcement Learning, Pos. Thu #94
- Ryan, RJ-Skerry:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #44
- Ryder, Tom:** Oral Wed in Approximate Inference, Pos. Wed #151
- Saenko, Kate:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #83
- Safran, Itay:** Oral Fri in Deep Learning (Theory), Pos. Fri #45
- Sagun, Levent:** Oral Wed in Deep Learning (Theory), Pos. Wed #168
- Sahin, Mehmet Fatih:** Oral Thu in Online Learning, Pos. Thu #58
- Sahoo, Subham:** Oral Fri in Other Models and Methods, Pos. Fri #162
- Sajjadi, Mehdi S. M.:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #214
- Sala, Frederic:** Oral Thu in Dimensionality Reduction, Pos. Thu #121
- Salakhutdinov, Ruslan:** Oral Wed in Reinforcement Learning, Pos. Wed #42, Pos. Wed #134, Oral Fri in Other Models and Methods, Pos. Fri #161
- Salehkaleybar, Saber:** Oral Fri in Causal Inference, Pos. Fri #165
- Saligram, Venkatesh:** Oral Fri in Matrix Factorization, Pos. Fri #77
- Salmhofer, Manfred:** Oral Wed in Deep Learning (Theory), Pos. Wed #122
- Salmon, Joseph:** Oral Fri in Optimization (Convex), Pos. Fri #117
- Salter, Sasha:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #52
- Salzo, Saverio:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #67
- Samvelyan, Mikayel:** Oral Thu in Multi-Agent Learning, Pos. Thu #225
- Sanchez, Alvaro:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #84
- Sandholm, Tuomas:** Tutorial Tue in A9, Oral Fri in Optimization (Combinatorial), Pos. Fri #144
- Santoro, Adam:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #110
- Santurkar, Shibani:** Oral Wed in Generative Models, Pos. Wed #133
- Sanyal, Amartya:** Oral Thu in Other Applications, Pos. Thu #46
- Sapiro, Guillermo:** Oral Fri in Deep Learning (Theory), Pos. Fri #79
- Sarawagi, Sunita:** Oral Fri in Supervised Learning, Pos. Fri #29
- Sato, Hiroyuki:** Oral Thu in Optimization (Non-convex), Pos. Thu #179
- Sato, Issei:** Oral Wed in Unsupervised Learning, Pos. Wed #146, Oral Thu in Supervised Learning, Pos. Thu #98
- Saurous, Rif:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #214, Oral Thu in Natural Language and Speech Processing, Pos. Thu #43, Pos. Thu #44
- Saxton, David:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #130
- sayres, Rory:** Oral Fri in Other Models and Methods, Pos. Fri #137
- Scarlett, Jonathan:** Oral Thu in Optimization (Bayesian), Pos. Thu #216
- Schaal, Stefan:** Oral Thu in Gaussian Processes, Pos. Thu #9
- Schapiro, Robert:** Oral Wed in Deep Learning (Theory), Pos. Wed #14, Oral Thu in Online Learning, Pos. Thu #80
- Schau, Tom:** Oral Wed in Reinforcement Learning, Pos. Wed #163
- Scheinberg, Katya:** Oral Wed in Optimization (Convex), Pos. Wed #116
- Scherrer, Bruno:** Oral Thu in Reinforcement Learning, Pos. Thu #208
- Schiegg, Martin:** Oral Thu in Gaussian Processes, Pos. Thu #9
- Schmidt, Ludwig:** Oral Wed in Generative Models, Pos. Wed #133, Oral Fri in Deep Learning (Theory), Pos. Fri #112
- Schmit, Sven:** Oral Wed in Reinforcement Learning, Pos. Wed #99
- Schneider, Jeff:** Oral Fri in Other Models and Methods, Pos. Fri #161
- Schniter, Phillip:** Oral Thu in Optimization (Non-convex), Pos. Thu #164
- Schoenholz, Samuel:** Oral Wed in Deep Learning (Theory), Pos. Wed #171, Oral Thu in Deep Learning (Theory), Pos. Thu #177
- Schroeder, Christian:** Oral Thu in Multi-Agent Learning, Pos. Thu #225
- Schuermans, Dale:** Oral Thu in Reinforcement Learning, Pos. Thu #42
- Schwab, Patrick:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #108
- Schwarz, Jonathan:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #168
- Schölkopf, Bernhard:** Oral Wed in Representation Learning, Pos. Wed #78, Oral Thu in Deep Learning (Adversarial), Oral Thu in Kernel Methods, Pos. Thu #214, Pos. Thu #18, Oral Fri in Optimization (Convex), Oral Fri in Causal Inference, Pos. Fri #37, Pos. Fri #131
- Schön, Thomas:** Oral Thu in Online Learning, Pos. Thu #143
- Schönlieb, Carola-Bibiane:** Oral Fri in Optimization (Convex), Pos. Fri #122
- Scott, Clay:** Oral Thu in Online Learning, Pos. Thu #144
- Sekhon, Arshdeep:** Oral Thu in Graphical Models, Pos. Thu #133
- Sen, Rajat:** Oral Fri in Online Learning, Pos. Fri #94
- Serdyukov, Pavel:** Oral Thu in Supervised Learning, Pos. Thu #223
- Serra, Thiago:** Oral Fri in Deep Learning (Theory), Pos. Fri #173
- Serrà, Joan:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #103
- Sessa, Andrea:** Oral Thu in Reinforcement Learning, Pos. Thu #207
- Seward, Calvin:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #37
- Shakkottai, Sanjay:** Oral Fri in Online Learning, Pos. Fri #94
- Shamir, Ohad:** Oral Fri in Deep Learning (Theory), Pos. Fri #45
- Shanahan, Murray:** Oral Wed in Reinforcement Learning, Pos. Wed #26
- Shanahan, Murray:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #130
- Shang, Fanhua:** Oral Wed in Optimization (Convex), Pos. Wed #205
- Shang, Zuofeng:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #159
- Sharchilev, Boris:** Oral Thu in Supervised Learning, Pos. Thu #223
- Sharifi Kolarijani, Arman:** Oral Fri in Optimization (Convex), Pos. Fri #17
- Sharma, Charu:** Oral Fri in Computer Vision, Pos. Fri #47
- Shaw, Albert:** Oral Thu in Reinforcement Learning, Pos. Thu #41
- Shazeer, Noam:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #120, Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #73, Pos. Thu #217
- Shchur, Oleksandr:** Oral Wed in Networks and Relational Learning, Pos. Wed #58
- Sheffet, Or:** Oral Wed in Privacy, Anonymity, and Security, Pos. Wed #60
- Sheldon, Daniel:** Oral Fri in Graphical Models, Pos. Fri #82
- Shen, Li:** Oral Fri in Optimization (Convex), Pos. Fri #121
- Shen, Wei:** Oral Wed in Computer Vision, Pos. Wed #11
- Shen, Jie:** Oral Fri in Dimensionality Reduction, Pos. Fri #75
- Shen, Zebang:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #83
- Shen, Chunhua:** Oral Thu in Generative Models, Pos. Thu #195
- Sheng, Ying:** Oral Wed in Dimensionality Reduction, Pos. Wed #18
- Shi, Zhan:** Oral Thu in Supervised Learning, Pos. Thu #97
- Shi, Junxing:** Oral Wed in Computer Vision, Pos. Wed #126
- Shi, Hao-Jun:** Oral Fri in Optimization (Non-convex), Pos. Fri #5
- Shi, Jiaxin:** Oral Wed in Approximate Inference, Pos. Wed #53, Oral Fri in Approximate Inference, Pos. Fri #150
- Shiarlis, Kyriacos:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #52
- Shim, Hyunjung:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #202
- Shimao, Hajime:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #79
- Shimodaira, Hidetoshi:** Oral Wed in Representation Learning, Pos. Wed #108
- Shin, Jinwoo:** Oral Thu in Graphical Models, Pos. Thu #134
- Shor, Joel:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #43, Pos. Thu #44
- Shrivastava, Anshumali:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #27
- Shroff, Ness:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #211
- Shuji Hao, IHPC:** Oral Wed in Deep Learning (Theory), Pos. Wed #169
- Siblini, Wissam:** Oral Fri in Supervised Learning, Pos. Fri #102
- Siddiqui, Shoaib Ahmed:** Oral Wed in Unsupervised Learning, Pos. Wed #147
- Sidiropoulos, Nicholas:** Oral Fri in Time-Series Analysis, Pos. Fri #124
- Sigaud, Olivier:** Oral Thu in Reinforcement Learning, Pos. Thu #174
- Silver, David:** Oral Wed in Deep Learning (Neural Network Architectures), Oral Wed in Reinforcement Learning, Pos. Wed #163, Pos. Wed #92, Pos. Wed #3
- Simchowitz, Max:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #110
- Simon, Noah:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #139
- Simonyan, Karen:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #92, Oral Fri in Reinforcement Learning, Oral Fri in Deep Learning (Neural Network Architectures), Oral Fri in Generative Models, Pos. Fri #105, Pos. Fri #25, Pos. Fri #176
- Simpson, Daniel:** Oral Wed in Approximate Inference, Pos. Wed #150
- Simsekli, Umut:** Oral Thu in Monte Carlo Methods, Pos. Thu #82
- Sindhwani, Vikas:** Oral Wed in Reinforcement Learning, Pos. Wed #34
- Singer, Yoram:** Oral Wed in Statistical Learning Theory, Pos. Wed #143
- Singer, Yaron:** Oral Wed in Networks and Relational Learning, Oral Wed in Optimization (Combinatorial), Pos. Wed #55, Pos. Wed #29, Oral Thu in Optimization (Combinatorial), Pos. Thu #117
- Singer, Yoram:** Oral Thu in Optimization (Convex), Pos. Thu #68
- Singh, Aarti:** Oral Wed in Statistical Learning Theory, Pos. Wed #142
- Singh, Satinder:** Oral Fri in Reinforcement Learning, Pos. Fri #60
- Singh, Aarti:** Oral Thu in Deep Learning (Theory), Pos. Thu #103
- Singh, Rishabh:** Oral Wed in Reinforcement Learning, Pos. Wed #33
- Sinha, Kaushik:** Oral Wed in Clustering, Pos. Wed #47, Oral Fri in Unsupervised Learning, Pos. Fri #28
- Skerry-Ryan, RJ:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #43
- Smith, Kevin:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #197
- Smith, Jamie:** Oral Thu in Other Applications, Pos. Thu #91
- Smith, J.:** Oral Thu in Optimization (Combinatorial), Pos. Thu #145

# AUTHOR INDEX

**Smith, Matthew:** Oral Wed in Reinforcement Learning, Pos. Wed #4

**Smola, Alexander:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #71

**Smola, Alex:** Oral Wed in Representation Learning, Pos. Wed #109

**Sohl-Dickstein, Jascha:** Oral Wed in Deep Learning (Theory), Pos. Wed #171

**Sojoudi, Somayeh:** Oral Thu in Graphical Models, Pos. Thu #1

**Solar-Lezama, Armando:** Oral Wed in Active Learning, Pos. Wed #129

**Solin, Arno:** Oral Fri in Gaussian Processes, Pos. Fri #151

**Solomon, Justin:** Oral Thu in Optimization (Non-convex), Pos. Thu #69

**Somasundaram, Sriram:** Oral Fri in Computer Vision, Pos. Fri #157

**Song, Yale:** Oral Fri in Computer Vision, Pos. Fri #158

**Song, Zhao:** Oral Thu in Deep Learning (Neural Network Architectures), Oral Thu in Deep Learning (Adversarial), Pos. Thu #21, Pos. Thu #147

**Song, Hyun Oh:** Oral Fri in Deep Learning (Theory), Pos. Fri #46

**Song, Yang:** Oral Thu in Optimization (Non-convex), Pos. Thu #70

**Song, Francis:** Oral Wed in Reinforcement Learning, Pos. Wed #208

**Song, Le:** Oral Wed in Feature Selection, Oral Wed in Representation Learning, Oral Wed in Networks and Relational Learning, Pos. Wed #63, Pos. Wed #75, Pos. Wed #109, Oral Thu in Reinforcement Learning, Oral Thu in Deep Learning (Adversarial), Oral Thu in Other Models and Methods, Pos. Thu #53, Pos. Thu #41, Pos. Thu #205

**Song, Dawn:** Invited Talk Wed in A1

**Song, Jiaming:** Oral Thu in Optimization (Non-convex), Pos. Thu #70

**Soni, Akshay:** Oral Wed in Statistical Learning Theory, Pos. Wed #94

**Sonobe, Tomohiro:** Oral Wed in Networks and Relational Learning, Pos. Wed #57

**Sontag, David:** Oral Fri in Generative Models, Pos. Fri #134

**Sordoni, Alessandro:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #170, Oral Fri in Deep Learning (Adversarial), Pos. Fri #119

**Soudry, Daniel:** Oral Thu in Optimization (Convex), Pos. Thu #163

**Soyer, Hubert:** Oral Fri in Reinforcement Learning, Pos. Fri #176

**Spigler, Stefano:** Oral Wed in Deep Learning (Theory), Pos. Wed #168

**Spring, Ryan:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #27

**Springenberg, Jost:** Oral Wed in Deep Learning (Neural Network Architectures), Oral Wed in Reinforcement Learning, Pos. Wed #41, Pos. Wed #84

**Srebro, Nati:** Oral Thu in Optimization (Convex), Pos. Thu #163

**Srikant, R:** Oral Thu in Deep Learning (Theory), Pos. Thu #176

**Srikumar, Vivek:** Oral Wed in Structured Prediction, Pos. Wed #153

**Srinivas, Suraj:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #204

**Srinivas, Aravind:** Oral Wed in Reinforcement Learning, Pos. Wed #106

**Srinivasa, Siddhartha:** Oral Thu in Reinforcement Learning, Pos. Thu #200

**Srivastava, Siddharth:** Oral Thu in Monte Carlo Methods, Pos. Thu #62

**Srivastava, Megha:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #80

**Srivastava, Akash:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #190

**Srouji, Mario:** Oral Wed in Reinforcement Learning, Pos. Wed #42

**Stanley, Kenneth:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #7

**Stanton, Daisy:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #43, Pos. Thu #44

**Stern, Mitchell:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #120

**Stich, Sebastian:** Oral Fri in Optimization (Convex), Pos. Fri #37

**Stimberg, Florian:** Oral Fri in Deep Learning (Neural Network Architectures), Oral Fri in Generative Models, Pos. Fri #25, Pos. Fri #105

**Stoica, Ion:** Oral Fri in Reinforcement Learning, Pos. Fri #21

**Straszak, Damian:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #111

**Streeter, Matthew:** Oral Fri in Optimization (Combinatorial), Pos. Fri #10

**Strässle, Christian:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #108

**Studer, Christoph:** Oral Wed in Other Applications, Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #87, Pos. Wed #174

**Su, Bing:** Oral Fri in Dimensionality Reduction, Pos. Fri #32

**Subbian, Karthik:** Oral Wed in Networks and Relational Learning, Pos. Wed #29

**SUGANUMA, Masanori:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #184

**Sugiyama, Masashi:** Oral Wed in Unsupervised Learning, Pos. Wed #146, Oral Thu in Supervised Learning, Pos. Thu #98, Oral Fri in Statistical Learning Theory, Pos. Fri #67

**Sui, Yanan:** Oral Wed in Optimization (Bayesian), Pos. Wed #43

**Sujono, Debora:** Oral Fri in Graphical Models, Pos. Fri #82

**Sukhbaatar, Sainbayar:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #109

**Sumita, Hanna:** Oral Fri in Causal Inference, Pos. Fri #12

**Sun, Ruoxi:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #78

**Sun, Xinwei:** Oral Wed in Feature Selection, Pos. Wed #81

**Sun, Defeng:** Oral Wed in Optimization (Convex), Pos. Wed #182

**Sun, Yan:** Oral Wed in Feature Selection, Pos. Wed #38

**Sun, Qingyun:** Oral Fri in Matrix Factorization, Pos. Fri #70

**Sun, Shengyang:** Oral Wed in Gaussian Processes, Oral Wed in Approximate Inference, Pos. Wed #196, Pos. Wed #53, Oral Thu in Deep Learning (Bayesian), Pos. Thu #198

**Sun, Yizhou:** Oral Wed in Representation Learning, Pos. Wed #190

**Sun, Peng:** Oral Wed in Other Applications, Pos. Wed #64, Oral Fri in Optimization (Convex), Pos. Fri #121

**Sun, Ruoyu:** Oral Thu in Deep Learning (Theory), Pos. Thu #176

**Sun, Shao-Hua:** Oral Fri in Computer Vision, Pos. Fri #157

**Sun, Wen:** Oral Thu in Reinforcement Learning, Pos. Thu #200

**Sun, Qiang:** Oral Thu in Optimization (Non-convex), Pos. Thu #211

**Sun, Ziteng:** Oral Wed in Privacy, Anonymity, and Security, Pos. Wed #59

**Suris, Didac:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #103

**Suzuki, Taiji:** Oral Thu in Statistical Learning Theory, Pos. Thu #161

**Svensson, Ola:** Oral Wed in Optimization (Combinatorial), Pos. Wed #149

**Swersky, Kevin:** Oral Thu in Other Applications, Pos. Thu #91

**Syrkanis, Vasilis:** Oral Fri in Online Learning, Oral Fri in Causal Inference, Pos. Fri #166, Pos. Fri #136, Pos. Fri #111

**Szeider, Stefan:** Oral Wed in Ranking and Preference Learning, Pos. Wed #69

**Szepesvari, Csaba:** Oral Wed in Statistical Learning Theory, Pos. Wed #165

**Szepesvari, Csaba:** Oral Thu in Online Learning, Pos. Thu #123

**Szepesvari, Csaba:** Oral Fri in Matrix Factorization, Pos. Fri #77

**Szlam, Arthur:** Oral Thu in Multi-Agent Learning, Pos. Thu #136

**Szlam, Arthur:** Oral Thu in Generative Models, Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #5, Pos. Thu #109

**Taddy, Matt:** Oral Fri in Causal Inference, Pos. Fri #166

**Taigman, Yaniv:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #64

**Takac, Martin:** Oral Wed in Optimization (Convex), Pos. Wed #116

**Takeda, Akiko:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #79

**Tallec, Corentin:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #120

**Talvitie, Erik:** Oral Wed in Reinforcement Learning, Pos. Wed #21

**Talwar, Kunal:** Oral Fri in Online Learning, Pos. Fri #115

**Tamo, Itzhak:** Oral Thu in Optimization (Convex), Pos. Thu #221

**Tan, Kean Ming:** Oral Thu in Optimization (Non-convex), Pos. Thu #211

**Tan, Xu:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #8

**Tan, Minghui:** Oral Thu in Generative Models, Pos. Thu #195

**Tandon, Rashish:** Oral Thu in Optimization (Convex), Pos. Thu #221

**Tang, Peter:** Oral Fri in Optimization (Non-convex), Pos. Fri #5

**Tang, Hanlin:** Oral Wed in Optimization (Non-convex), Pos. Wed #207

**Tangkaratt, Voot:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #190

**Taniai, Tatsunori:** Oral Wed in Computer Vision, Pos. Wed #127

**Tanno, Ryutaro:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #50

**Tansey, Wesley:** Oral Wed in Feature Selection, Pos. Wed #37

**Tao, Chenyang:** Oral Wed in Deep Learning (Bayesian), Oral Wed in Generative Models, Pos. Wed #113, Pos. Wed #215, Oral Thu in Deep Learning (Adversarial), Pos. Thu #165

**Tao, Chao:** Oral Wed in Reinforcement Learning, Pos. Wed #98

**Tarnawski, Jakub:** Oral Wed in Optimization (Combinatorial), Pos. Wed #149

**Tavakoli, Arash:** Oral Thu in Reinforcement Learning, Pos. Thu #130

**Taylor, Adrien:** Oral Wed in Optimization (Convex), Pos. Wed #141

**Taziki, Mahsa:** Oral Fri in Parallel and Distributed Learning, Pos. Fri #123

**Tchamkerten, Aslan:** Oral Fri in Deep Learning (Theory), Pos. Fri #174

**Teh, Yee:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #130, Oral Fri in Reinforcement Learning, Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #168, Pos. Fri #13

**Teh, Yee Whye:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #193

**Tenenbaum, Josh:** Invited Talk Fri in A1

**Teye, Mattias:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #197

**Thai, My:** Oral Thu in Optimization (Combinatorial), Pos. Thu #145

**Thakkar, Om Dipakbhai:** Oral Wed in Privacy, Anonymity, and Security, Pos. Wed #6

**Thakurta, Abhradeep:** Oral Wed in Privacy, Anonymity, and Security, Pos. Wed #6

**Thomas, Philip:** Oral Thu in Reinforcement Learning, Pos. Thu #182

**Thomas Moreau, CMLA:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #33

**Tian, Fei:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #8, Oral Thu in Natural Language and Speech Processing, Pos. Thu #63

**Tian, Yonglong:** Oral Wed in Networks and Relational Learning, Pos. Wed #57

**Tian, Tian:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #53

**Tian, Yuandong:** Oral Thu in Deep Learning (Theory), Pos. Thu #103

**Tian, Kevin:** Oral Wed in Representation Learning, Pos. Wed #9

**Tirinzoni, Andrea:** Oral Thu in Reinforcement Learning, Pos. Thu #207

**Titsias, Michalis:** Oral Wed in Approximate Inference, Pos. Wed #212

**Tjandraatmadja, Christian:** Oral Fri in Deep Learning (Theory), Pos. Fri #173

**Toh, Kim-Chuan:** Oral Wed in Optimization (Convex), Pos. Wed #182

**Tomczak, Jakub:** Oral Fri in Supervised Learning, Pos. Fri #66

**Tomkins, Andrew:** Oral Wed in Ranking and Preference Learning, Pos. Wed #30

**Tong, Liang:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #120

**Toro Icarte, Rodrigo:** Oral Fri in Reinforcement Learning, Pos. Fri #147

**Torres Martins, Andre Filipe:** Oral Wed in Structured Prediction, Pos. Wed #66

**Tostikhin, Ilya:** Oral Thu in Kernel Methods, Pos. Thu #18

**Touati, Ahmed:** Oral Thu in Reinforcement Learning, Pos. Thu #66

**Toussaint, Marc:** Oral Thu in Gaussian Processes, Pos. Thu #9



# AUTHOR INDEX

- Tran, Dustin:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #217
- Trimpe, Sebastian:** Oral Thu in Gaussian Processes, Pos. Thu #9
- Trimonias, George:** Oral Thu in Reinforcement Learning, Pos. Thu #17
- Trinh, Trieu:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #169
- Trischler, Adam:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #170, Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #33
- Trivedi, Shubhendu:** Oral Fri in Deep Learning (Theory), Pos. Fri #154
- Tsakiris, Manolis:** Oral Fri in Unsupervised Learning, Pos. Fri #35
- Tschannen, Michael:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #99, Pos. Fri #106
- Tsuchida, Susumu:** Oral Thu in Deep Learning (Theory), Pos. Thu #183
- Tu, Stephen:** Oral Wed in Reinforcement Learning, Pos. Wed #104
- Tucker, George:** Oral Thu in Reinforcement Learning, Pos. Thu #42, Pos. Thu #30
- Turner, Richard:** Oral Wed in Reinforcement Learning, Pos. Wed #34, Oral Thu in Reinforcement Learning, Pos. Thu #30
- Tuyls, Karl:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #201
- Tzeng, Eric:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #83
- Udluft, Steffen:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #189
- Uesato, Jonathan:** Oral Wed in Deep Learning (Adversarial), Pos. Wed #132
- Uhler, Caroline:** Oral Fri in Causal Inference, Pos. Fri #97, Pos. Fri #98
- Unterthiner, Thomas:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #37
- Urtasun, Raquel:** Oral Thu in Supervised Learning, Oral Thu in Deep Learning (Theory), Pos. Thu #172, Pos. Thu #178
- Ustinovskiy, Yury:** Oral Thu in Supervised Learning, Pos. Thu #223
- Usunier, Nicolas:** Oral Wed in Networks and Relational Learning, Pos. Wed #203
- Uszkoreit, Jakob:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #217, Pos. Thu #73
- Vadapalli, Adithya:** Oral Thu in Dimensionality Reduction, Pos. Thu #157
- Vahdat, Arash:** Oral Fri in Generative Models, Pos. Fri #85
- Valenzano, Richard:** Oral Fri in Reinforcement Learning, Pos. Fri #147
- Valera, Isabel:** Tutorial Tue in K1 + K2
- Valko, Michal:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #76
- Van de Wiele, Tom:** Oral Wed in Reinforcement Learning, Pos. Wed #41
- Van den Broeck, Guy:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #180, Oral Fri in Graphical Models, Pos. Fri #24
- van den Driessche, George:** Oral Fri in Generative Models, Pos. Fri #25
- van den Oord, Aaron:** Oral Wed in Deep Learning (Adversarial), Pos. Wed #132, Oral Fri in Deep Learning (Neural Network Architectures), Oral Fri in Generative Models, Pos. Fri #25, Pos. Fri #105
- van der Schaar, M:** Oral Wed in Other Applications, Pos. Wed #179, Oral Thu in Other Applications, Pos. Thu #45
- van der Schaar, Mihaela:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #195, Oral Thu in Deep Learning (Adversarial), Pos. Thu #83
- van Dijk, Marten:** Oral Wed in Optimization (Convex), Pos. Wed #116
- van Hasselt, Hado:** Oral Thu in Multi-Agent Learning, Pos. Thu #126
- van Hoof, Herke:** Oral Wed in Reinforcement Learning, Pos. Wed #4, Oral Thu in Reinforcement Learning, Pos. Thu #86
- Van Roy, Benjamin:** Oral Wed in Reinforcement Learning, Pos. Wed #107
- Van Scoy, Bryan:** Oral Wed in Optimization (Convex), Pos. Wed #141
- Vandergheynst, Pierre:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #102, Oral Fri in Spectral Methods, Pos. Fri #61
- Vandermeulen, Robert:** Oral Wed in Unsupervised Learning, Pos. Wed #147
- Vassilvitskii, Sergei:** Oral Fri in Optimization (Combinatorial), Pos. Fri #9
- Vasudevan, Vijay:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #170
- Vaswani, Ashish:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #217, Pos. Thu #73
- Veale, Michael:** Oral Fri in Society Impacts of Machine Learning, Pos. Fri #87
- Vechev, Martin:** Oral Wed in Deep Learning (Adversarial), Pos. Wed #74, Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #140
- Veeraraghavan, Ashok:** Oral Thu in Optimization (Non-convex), Pos. Thu #164, Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #104
- Vehtari, Aki:** Oral Wed in Approximate Inference, Pos. Wed #150
- Verbeek, Jakob:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #120
- Verma, Abhinav:** Oral Wed in Reinforcement Learning, Pos. Wed #33
- Verstraeten, Timothy:** Oral Thu in Multi-Agent Learning, Pos. Thu #126
- Vert, Jean-Philippe:** Oral Wed in Sparsity and Compressed Sensing, Oral Wed in Ranking and Preference Learning, Pos. Wed #160, Pos. Wed #35
- Veschgini, Kambis:** Oral Wed in Deep Learning (Theory), Pos. Wed #122
- Vicol, Paul:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #77
- Vidal, Rene:** Oral Wed in Optimization (Convex), Pos. Wed #136, Oral Fri in Unsupervised Learning, Oral Fri in Matrix Factorization, Pos. Fri #35, Pos. Fri #69
- Vijayaraghavan, Aravindan:** Oral Wed in Clustering, Pos. Wed #39
- Villegas, Ruben:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #131
- Vincent, Pascal:** Oral Thu in Reinforcement Learning, Pos. Thu #66
- Vinyals, Oriol:** Oral Wed in Deep Learning (Neural Network Architectures), Oral Wed in Generative Models, Pos. Wed #92, Pos. Wed #112, Oral Thu in Deep Learning (Adversarial), Pos. Thu #84, Oral Fri in Generative Models, Pos. Fri #25
- Viola, Fabio:** Oral Wed in Representation Learning, Pos. Wed #101
- Vishnoi, Nisheeth:** Oral Wed in Society Impacts of Machine Learning, Pos. Wed #111
- Vitercik, Ellen:** Tutorial Tue in A9, Oral Fri in Optimization (Combinatorial), Pos. Fri #144
- Viégas, Fernanda:** Oral Fri in Other Models and Methods, Pos. Fri #137
- Vogel, Robin:** Oral Fri in Statistical Learning Theory, Pos. Fri #74
- von Brecht, James:** Oral Wed in Deep Learning (Theory), Pos. Wed #123, Oral Thu in Deep Learning (Theory), Pos. Thu #100
- von Luxburg, Ulrike:** Oral Fri in Statistical Learning Theory, Pos. Fri #73
- Vorobeychik, Yevgeniy:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #120
- Wagner, Tal:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #131
- Wagner, David:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #213
- Wainwright, Martin:** Oral Wed in Feature Selection, Pos. Wed #63, Oral Thu in Other Models and Methods, Pos. Thu #142, Oral Fri in Optimization (Non-convex), Pos. Fri #49
- Walder, Christian:** Oral Thu in Deep Learning (Neural Network Architectures), Oral Thu in Online Learning, Pos. Thu #20, Pos. Thu #112
- Walker, Ian:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #50
- Wallach, Hanna:** Oral Fri in Society Impacts of Machine Learning, Pos. Fri #89
- Walters, Tom:** Oral Fri in Generative Models, Pos. Fri #25
- Wang, Wenlin:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #192
- Wang, Shuaiwen:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #75
- Wang, Shusen:** Oral Thu in Monte Carlo Methods, Pos. Thu #12
- Wang, Jun:** Oral Fri in Reinforcement Learning, Pos. Fri #114
- WANG, Yaqing:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #152
- Wang, Kaizheng:** Oral Thu in Matrix Factorization, Pos. Thu #132
- Wang, Mengdi:** Oral Thu in Reinforcement Learning, Pos. Thu #129, Oral Fri in Optimization (Non-convex), Pos. Fri #50
- Wang, Xiaoyu:** Oral Thu in Online Learning, Pos. Thu #150
- wang, xue:** Oral Fri in Online Learning, Pos. Fri #141
- Wang, Yue:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #104
- Wang, May:** Oral Wed in Other Applications, Pos. Wed #178
- Wang, Bo:** Oral Wed in Computer Vision, Pos. Wed #11
- Wang, Zhangyang:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #104
- Wang, Liwei:** Oral Wed in Statistical Learning Theory, Pos. Wed #24, Oral Thu in Natural Language and Speech Processing, Pos. Thu #63
- Wang, Lin:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #53
- Wang, Yizhou:** Oral Wed in Feature Selection, Oral Wed in Other Applications, Pos. Wed #64, Pos. Wed #81
- Wang, Weiyao:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #109
- Wang, Lingxiao:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #167, Oral Thu in Matrix Factorization, Pos. Thu #154
- Wang, Jianmin:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #194
- Wang, Yi:** Oral Wed in Gaussian Processes, Pos. Wed #124
- Wang, Yizhen:** Oral Fri in Statistical Learning Theory, Pos. Fri #68
- Wang, Dilin:** Oral Thu in Graphical Models, Pos. Thu #61
- Wang, Yunbo:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #194
- Wang, Siwei:** Oral Thu in Online Learning, Pos. Thu #57
- Wang, Yitong:** Oral Fri in Optimization (Convex), Pos. Fri #121
- Wang, Yixin:** Oral Wed in Feature Selection, Pos. Wed #37
- Wang, Zhaoran:** Oral Fri in Graphical Models, Pos. Fri #23
- Wang, Sinong:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #211
- Wang, Jane:** Oral Wed in Reinforcement Learning, Pos. Wed #209
- Wang, Jing:** Oral Fri in Dimensionality Reduction, Pos. Fri #75
- Wang, Beilun:** Oral Thu in Graphical Models, Pos. Thu #133
- Wang, Chaoqi:** Oral Wed in Gaussian Processes, Pos. Wed #196
- Wang, Tianhao:** Oral Fri in Optimization (Convex), Pos. Fri #52
- Wang, Yisen:** Oral Thu in Supervised Learning, Pos. Thu #90
- Wang, Yu-Xiang:** Oral Wed in Optimization (Non-convex), Pos. Wed #72, Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #206, Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #71
- Wang, Hongyi:** Oral Fri in Parallel and Distributed Learning, Pos. Fri #125
- Wang, Yuxuan:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #43, Pos. Thu #44
- Wang, Guoyin:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #109
- Wang, Kuan-Chieh:** Oral Wed in Networks and Relational Learning, Pos. Wed #76, Oral Thu in Deep Learning (Bayesian), Pos. Thu #77
- Ward, Tom:** Oral Fri in Reinforcement Learning, Pos. Fri #176
- warrington, andrew:** Oral Fri in Monte Carlo Methods, Pos. Fri #129
- Wattenberg, Martin:** Oral Fri in Other Models and Methods, Pos. Fri #137
- Weber, Theophane:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #92
- Wehrmann, Jonatas:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #203
- Wei, Mingcheng:** Oral Fri in Online Learning, Pos. Fri #141
- WEI, Ying:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #144
- Wei, Gu-Yeon:** Oral Fri in Other Models and Methods, Pos. Fri #138
- Wei, Dennis:** Oral Fri in Graphical Models, Pos. Fri #139
- Weinberger, Kilian:** Oral Fri in Gaussian Processes, Pos. Fri #152
- Weinsberg, Udi:** Oral Wed in Networks and Relational Learning, Pos. Wed #29

# AUTHOR INDEX

- Weinshall, Daphna:** Oral Thu in Supervised Learning, Pos. Thu #114
- Weiss, Gail:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #19
- Weiss, Roi:** Oral Thu in Matrix Factorization, Pos. Thu #56
- Weiss, Ron:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #43
- Weisz, Gellért:** Oral Wed in Statistical Learning Theory, Pos. Wed #165
- Weller, Adrian:** Oral Wed in Reinforcement Learning, Oral Wed in Representation Learning, Pos. Wed #34, Pos. Wed #191, Oral Thu in Graphical Models, Pos. Thu #134, Oral Fri in Society Impacts of Machine Learning, Pos. Fri #87
- Welling, Max:** Oral Wed in Optimization (Bayesian), Pos. Wed #156, Invited Talk Thu in A1
- Welling, Max:** Oral Wed in Networks and Relational Learning, Pos. Wed #76, Oral Fri in Supervised Learning, Pos. Fri #66
- Wen, Haiguang:** Oral Wed in Computer Vision, Pos. Wed #126
- Weng, Tsui-Wei (Lily):** Oral Thu in Deep Learning (Adversarial), Pos. Thu #147
- Wenzel, Florian:** Oral Wed in Approximate Inference, Pos. Wed #54
- Wexler, James:** Oral Fri in Other Models and Methods, Pos. Fri #137
- White, Martha:** Oral Thu in Supervised Learning, Pos. Thu #224, Oral Fri in Reinforcement Learning, Pos. Fri #39
- Whiteson, Shimon:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #102, Pos. Wed #52, Oral Thu in Multi-Agent Learning, Oral Thu in Reinforcement Learning, Pos. Thu #225, Pos. Thu #199, Oral Fri in Reinforcement Learning, Pos. Fri #40
- Wichers, Nevan:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #131
- Wierstra, Daan:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #92
- Wiesemann, Wolfram:** Oral Thu in Reinforcement Learning, Pos. Thu #87
- Wijewardena, Pruthuvi:** Oral Fri in Optimization (Combinatorial), Pos. Fri #143
- Wijewickrema, Sudanthi:** Oral Thu in Supervised Learning, Pos. Thu #90
- Williamson, Brian:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #139
- Willmott, Devin:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #103
- Wilson, Andrew:** Oral Fri in Gaussian Processes, Pos. Fri #152
- Winner, Kevin:** Oral Fri in Graphical Models, Pos. Fri #82
- Wipf, David:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #128
- Wiseman, Sam:** Oral Fri in Generative Models, Pos. Fri #134
- Wolf, Lior:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #64
- Wong, Wei Pin:** Oral Thu in Dimensionality Reduction, Pos. Thu #122
- Wong, Eric:** Oral Wed in Deep Learning (Adversarial), Pos. Wed #20
- Wong, :** Oral Fri in Monte Carlo Methods, Pos. Fri #145
- Wood, Frank:** Oral Thu in Reinforcement Learning, Pos. Thu #199
- Wood, Frank:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #193, Oral Fri in Monte Carlo Methods, Pos. Fri #129
- Woodruff, David:** Oral Wed in Dimensionality Reduction, Pos. Wed #40, Oral Thu in Large Scale Learning and Big Data, Pos. Thu #28
- Wright, Stephen:** Oral Wed in Optimization (Convex), Pos. Wed #137
- Wu, Xi:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #54
- Wu, Xian:** Oral Thu in Dimensionality Reduction, Pos. Thu #158
- Wu, Hang:** Oral Wed in Other Applications, Pos. Wed #178
- WU, LIWEI:** Oral Thu in Ranking and Preference Learning, Pos. Thu #51
- Wu, Zhiwei:** Oral Fri in Society Impacts of Machine Learning, Oral Fri in Online Learning, Pos. Fri #90, Pos. Fri #136
- Wu, Zhenyu:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #104
- Wu, Yi:** Oral Thu in Monte Carlo Methods, Pos. Thu #62
- Wu, Junru:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #104
- Wu, Wei:** Oral Fri in Optimization (Convex), Pos. Fri #72
- Wu, Ying:** Oral Fri in Dimensionality Reduction, Pos. Fri #32
- Wu, Qingyao:** Oral Thu in Generative Models, Pos. Thu #195
- Wu, Huasen:** Oral Fri in Online Learning, Pos. Fri #135
- Wu, Jiayang:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #14
- Wulfmeier, Markus:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #52
- Wyart, Matthieu:** Oral Wed in Deep Learning (Theory), Pos. Wed #168
- Xi, Xiaoyue:** Oral Wed in Gaussian Processes, Pos. Wed #125
- Xia, Shutao:** Oral Thu in Supervised Learning, Pos. Thu #90
- Xia, Yingce:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #8
- Xia, Lirong:** Oral Thu in Ranking and Preference Learning, Pos. Thu #31
- Xiao, Lin:** Oral Thu in Reinforcement Learning, Pos. Thu #41
- Xiao, Lechao:** Oral Wed in Deep Learning (Theory), Pos. Wed #171
- Xiao, Ying:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #43, Pos. Thu #44
- Xie, Pengtao:** Oral Wed in Feature Selection, Pos. Wed #82, Oral Fri in Optimization (Convex), Pos. Fri #72
- Xie, Shaoan:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #43
- Xing, Eric:** Oral Wed in Feature Selection, Oral Wed in Deep Learning (Neural Network Architectures), Oral Wed in Reinforcement Learning, Pos. Wed #82, Pos. Wed #102, Pos. Wed #134, Oral Fri in Other Models and Methods, Oral Fri in Optimization (Convex), Pos. Fri #161, Pos. Fri #72
- Xingyu Wang, IEMS:** Oral Wed in Reinforcement Learning, Pos. Wed #25
- Xiong, Yuwen:** Oral Thu in Deep Learning (Theory), Pos. Thu #178
- Xu, Tianbing:** Oral Fri in Reinforcement Learning, Pos. Fri #113
- Xu, Ji:** Oral Thu in Optimization (Non-convex), Pos. Thu #212
- Xu, Yi:** Oral Fri in Optimization (Convex), Pos. Fri #3
- Xu, Ning:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #6
- Xu, Keyulu:** Oral Wed in Networks and Relational Learning, Pos. Wed #57
- Xu, Huan:** Oral Wed in Optimization (Non-convex), Pos. Wed #186
- Xu, Jiaming:** Oral Fri in Spectral Methods, Pos. Fri #96
- Xu, Yichong:** Oral Wed in Statistical Learning Theory, Pos. Wed #142
- Xu, Ganggang:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #159
- Xu, Hongteng:** Oral Fri in Time-Series Analysis, Pos. Fri #63
- Xu, Jingyi:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #180
- Xu, Pan:** Oral Wed in Sparsity and Compressed Sensing, Oral Wed in Optimization (Non-convex), Pos. Wed #187, Pos. Wed #167, Oral Thu in Monte Carlo Methods, Pos. Thu #81, Oral Fri in Optimization (Convex), Pos. Fri #52
- Xuanqing Liu, University of California:** Oral Wed in Optimization (Convex), Pos. Wed #140
- Xue, Yexiang:** Oral Thu in Structured Prediction, Pos. Thu #47
- Yabe, Akihiro:** Oral Thu in Other Models and Methods, Pos. Thu #26, Oral Fri in Causal Inference, Pos. Fri #12
- Yahav, Eran:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #19
- Yamazaki, Keisuke:** Oral Thu in Kernel Methods, Pos. Thu #135
- Yan, Mengyuan:** Oral Fri in Matrix Factorization, Pos. Fri #70
- Yan, Changhao:** Oral Thu in Optimization (Bayesian), Pos. Thu #210
- Yan, Songbai:** Oral Fri in Statistical Learning Theory, Pos. Fri #88
- Yan, Bowei:** Oral Thu in Statistical Learning Theory, Pos. Thu #162
- Yan, Ming:** Oral Wed in Optimization (Non-convex), Pos. Wed #207
- Yan, Shuicheng:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #6
- Yang, Qian:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #93
- Yang, Tianbao:** Oral Thu in Online Learning, Pos. Thu #150, Oral Fri in Online Learning, Oral Fri in Optimization (Convex), Pos. Fri #3, Pos. Fri #18, Pos. Fri #142
- Yang, Hongseok:** Oral Fri in Monte Carlo Methods, Pos. Fri #129
- Yang, Jiacheng:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #167
- Yang, Zhuoran:** Oral Fri in Reinforcement Learning, Pos. Fri #171
- Yang, Qiang:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #144
- Yang, Jiasen:** Oral Thu in Other Models and Methods, Pos. Thu #25, Oral Fri in Dimensionality Reduction, Pos. Fri #31
- Yang, Bin:** Oral Thu in Supervised Learning, Pos. Thu #172
- Yang, Jianchao:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #6
- Yang, Sikun:** Oral Wed in Networks and Relational Learning, Pos. Wed #46
- Yang, Yaodong:** Oral Fri in Reinforcement Learning, Pos. Fri #114
- Yang, Yingzhen:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #6
- Yang, Fan:** Oral Thu in Optimization (Bayesian), Pos. Thu #210
- Yang, Eunho:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #59
- Yang, Scott:** Oral Fri in Online Learning, Pos. Fri #116
- Yang, Karren:** Oral Fri in Causal Inference, Pos. Fri #97
- Yang, Lin:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #28
- Yao, Jiayu:** Oral Thu in Deep Learning (Bayesian), Pos. Thu #193
- Yao, Yuling:** Oral Wed in Approximate Inference, Pos. Wed #150
- Yao, Quanming:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #152
- Yao, Yuan:** Oral Wed in Feature Selection, Pos. Wed #81
- Yao, Tao:** Oral Fri in Online Learning, Pos. Fri #141
- Yarats, Denis:** Oral Fri in Natural Language and Speech Processing, Pos. Fri #164
- Yaroslavtsev, Grigory:** Oral Thu in Dimensionality Reduction, Pos. Thu #157
- Yau, Christopher:** Oral Thu in Matrix Factorization, Pos. Thu #153
- Ye, Mao:** Oral Wed in Feature Selection, Pos. Wed #38
- Ye, Min:** Oral Fri in Parallel and Distributed Learning, Pos. Fri #126
- Ye, Han-Jia:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #84
- Ye, Qiang:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #103
- Ye, Yinyu:** Oral Thu in Parallel and Distributed Learning, Pos. Thu #13
- Yen, En-Hsu:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #186
- Yildiz, Cagatay:** Oral Thu in Gaussian Processes, Pos. Thu #71
- Yildiz, Cagatay:** Oral Thu in Monte Carlo Methods, Pos. Thu #82
- Yin, Dong:** Oral Thu in Statistical Learning Theory, Pos. Thu #50
- Yin, Mingzhang:** Oral Wed in Approximate Inference, Pos. Wed #177
- Ying, Rex (Zhitao):** Oral Wed in Networks and Relational Learning, Pos. Wed #45
- Ying, Yiming:** Oral Thu in Online Learning, Pos. Thu #187
- Yona, Gal:** Oral Fri in Society Impacts of Machine Learning, Pos. Fri #156
- Yoon, Kijung:** Oral Thu in Deep Learning (Theory), Pos. Thu #178
- Yoon, Jinsung:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #195, Oral Thu in Deep Learning (Adversarial), Pos. Thu #83
- You, Seungil:** Oral Thu in Optimization (Combinatorial), Pos. Thu #118
- You, Jiaxuan:** Oral Wed in Networks and Relational Learning, Pos. Wed #45
- YOUSEFI, MANSOOR:** Oral Fri in Deep Learning (Theory), Pos. Fri #174
- Yu, Nenghai:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #8



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JULY 13th - 18th 2020**

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# AUTHOR INDEX

- Yu, Yaodong:** Oral Thu in Matrix Factorization, Pos. Thu #154
- Yu, Felix Xinnan:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #186
- Yu, Yaoliang:** Oral Thu in Supervised Learning, Pos. Thu #97
- Yu, Sixie:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #120
- Yu, Philip:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #194
- Yu, Yong:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #167
- Yuan, Yang:** Oral Wed in Optimization (Non-convex), Pos. Wed #85
- Yuan, Xingdi:** Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #33
- Yuan, Yancheng:** Oral Wed in Optimization (Convex), Pos. Wed #182
- Yue, Yisong:** Tutorial Tue in Victoria, Oral Wed in Optimization (Bayesian), Pos. Wed #43, Oral Fri in Reinforcement Learning, Oral Fri in Generative Models, Pos. Fri #15, Pos. Fri #86
- Yuille, Alan:** Oral Wed in Computer Vision, Pos. Wed #11
- Yurtsever, Alp:** Oral Fri in Optimization (Convex), Pos. Fri #42
- Zachariah, Dave:** Oral Thu in Online Learning, Pos. Thu #143
- Zadik, Ilias:** Oral Fri in Causal Inference, Pos. Fri #11
- Zadimoghaddam, Morteza:** Oral Wed in Optimization (Combinatorial), Pos. Wed #166, Pos. Wed #97, Pos. Wed #56
- Zaheer, Manzil:** Oral Fri in Other Models and Methods, Pos. Fri #161
- Zaki, Mohamed:** Oral Fri in Deep Learning (Theory), Pos. Fri #8
- Zandieh, Amir:** Oral Wed in Optimization (Combinatorial), Pos. Wed #149
- Zanette, Andrea:** Oral Wed in Reinforcement Learning, Pos. Wed #16
- Zemel, Richard:** Oral Wed in Networks and Relational Learning, Pos. Wed #76, Oral Thu in Deep Learning (Theory), Oral Thu in Deep Learning (Bayesian), Pos. Thu #178, Pos. Thu #77, Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #44
- Zen, Heiga:** Oral Fri in Generative Models, Pos. Fri #25
- Zeng, Xuan:** Oral Thu in Optimization (Bayesian), Pos. Thu #210
- Zeng, Zhe:** Oral Thu in Graphical Models, Pos. Thu #61
- Zeng, Wenyuan:** Oral Wed in Gaussian Processes, Pos. Wed #196, Oral Thu in Supervised Learning, Pos. Thu #172
- Zha, Hongyuan:** Oral Fri in Time-Series Analysis, Pos. Fri #63
- Zhan, De-Chuan:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #84
- Zhang, Hongbao:** Oral Wed in Feature Selection, Pos. Wed #82
- ZHANG, RUIYI:** Oral Wed in Deep Learning (Bayesian), Pos. Wed #215, Oral Fri in Reinforcement Learning, Pos. Fri #59
- Zhang, Weizhong:** Oral Wed in Sparsity and Compressed Sensing, Pos. Wed #161
- Zhang, Yu:** Oral Wed in Transfer and Multi-Task Learning, Pos. Wed #144
- Zhang, Zilu:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #180
- Zhang, Chiyuan:** Oral Wed in Reinforcement Learning, Pos. Wed #208
- Zhang, Anru:** Oral Fri in Optimization (Non-convex), Pos. Fri #50
- Zhang, Mi:** Oral Thu in Generative Models, Pos. Thu #6
- Zhang, Tong:** Oral Wed in Sparsity and Compressed Sensing, Oral Wed in Other Applications, Pos. Wed #64, Pos. Wed #161, Oral Thu in Parallel and Distributed Learning, Oral Thu in Deep Learning (Adversarial), Oral Thu in Optimization (Non-convex), Pos. Thu #115, Pos. Thu #14, Pos. Thu #211, Oral Fri in Supervised Learning, Oral Fri in Reinforcement Learning, Oral Fri in Optimization (Convex), Pos. Fri #121, Pos. Fri #171, Pos. Fri #101
- Zhang, Ce:** Oral Wed in Optimization (Non-convex), Pos. Wed #86, Pos. Wed #207
- Zhang, Lijun:** Oral Fri in Online Learning, Pos. Fri #142
- Zhang, Jiyuan:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #74
- Zhang, Xuerui:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #168
- Zhang, Wei:** Oral Wed in Optimization (Non-convex), Pos. Wed #86
- Zhang, Weinan:** Oral Fri in Deep Learning (Neural Network Architectures), Oral Fri in Reinforcement Learning, Pos. Fri #167, Pos. Fri #114
- Zhang, Aonan:** Oral Fri in Time-Series Analysis, Pos. Fri #64
- Zhang, Yu:** Oral Thu in Natural Language and Speech Processing, Pos. Thu #44
- Zhang, Kaiqing:** Oral Fri in Reinforcement Learning, Pos. Fri #171
- Zhang, Yizhe:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #109
- Zhang, Zhishuai:** Oral Wed in Computer Vision, Pos. Wed #11
- Zhang, Huan:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #147
- Zhang, Jian:** Oral Wed in Reinforcement Learning, Pos. Wed #42
- Zhang, Xiaoxuan:** Oral Thu in Online Learning, Pos. Thu #150
- Zhang, Xinhua:** Oral Wed in Structured Prediction, Pos. Wed #65, Oral Thu in Supervised Learning, Pos. Thu #97
- Zhang, Liwen:** Oral Thu in Deep Learning (Theory), Pos. Thu #137
- Zhang, Kelly:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #58
- Zhang, Xiao:** Oral Thu in Matrix Factorization, Pos. Thu #154, Oral Fri in Matrix Factorization, Pos. Fri #78
- Zhang, Richard:** Oral Thu in Graphical Models, Pos. Thu #1
- Zhang, Guodong:** Oral Wed in Gaussian Processes, Pos. Wed #196, Oral Thu in Deep Learning (Bayesian), Pos. Thu #198
- Zhang, Yang:** Oral Fri in Deep Learning (Theory), Pos. Fri #19
- Zhang, Amy:** Oral Thu in Transfer and Multi-Task Learning, Pos. Thu #109
- Zhang, Lisa:** Oral Thu in Deep Learning (Theory), Pos. Thu #178
- Zhang, Bo:** Oral Fri in Approximate Inference, Pos. Fri #150
- Zhang, Yi:** Oral Thu in Deep Learning (Theory), Pos. Thu #184
- Zhang, HuanYu:** Oral Wed in Privacy, Anonymity, and Security, Pos. Wed #59
- Zhang, Jiong:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #181, Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #21
- Zhang, Yizhen:** Oral Wed in Computer Vision, Pos. Wed #126
- Zhang, Teng:** Oral Wed in Representation Learning, Pos. Wed #9
- Zhao, Jake:** Oral Fri in Deep Learning (Adversarial), Pos. Fri #58
- Zhao, Zhibing:** Oral Thu in Ranking and Preference Learning, Pos. Thu #31
- Zhao, Bo:** Oral Wed in Feature Selection, Pos. Wed #81
- Zhao, Liang:** Oral Fri in Reinforcement Learning, Pos. Fri #113
- Zhao, He:** Oral Fri in Generative Models, Pos. Fri #177
- Zhao, Peilin:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #83
- Zheng, Zibin:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #43
- Zheng, Shuai:** Oral Wed in Optimization (Convex), Pos. Wed #183
- Zheng, Sue:** Oral Thu in Monte Carlo Methods, Pos. Thu #11
- Zhitnikov, Andrey:** Oral Fri in Unsupervised Learning, Pos. Fri #27
- Zhong, Fangwei:** Oral Wed in Other Applications, Pos. Wed #64
- Zhong, Aoxiao:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #127
- Zhong, Peilin:** Oral Wed in Dimensionality Reduction, Pos. Wed #18
- Zhong, Mingjun:** Oral Wed in Approximate Inference, Pos. Wed #213
- Zhong, Kai:** Oral Thu in Statistical Learning Theory, Pos. Thu #162
- Zhong, Ruiqi:** Oral Wed in Dimensionality Reduction, Pos. Wed #18
- Zhou, Ming:** Oral Fri in Reinforcement Learning, Pos. Fri #114
- Zhou, Zhi-Hua:** Oral Fri in Online Learning, Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #84, Pos. Fri #142
- Zhou, Dongruo:** Oral Wed in Optimization (Non-convex), Pos. Wed #187
- Zhou, Wenda:** Oral Thu in Large Scale Learning and Big Data, Pos. Thu #75
- Zhou, Zhengyuan:** Oral Thu in Parallel and Distributed Learning, Oral Thu in Supervised Learning, Pos. Thu #113, Pos. Thu #13
- Zhou, Yichi:** Oral Fri in Online Learning, Pos. Fri #155
- Zhou, Shuo:** Oral Thu in Supervised Learning, Pos. Thu #90
- Zhou, Yuchen:** Oral Wed in Statistical Learning Theory, Pos. Wed #24
- Zhou, Angela:** Oral Thu in Privacy, Anonymity, and Security, Pos. Thu #119
- Zhou, Aurick:** Oral Thu in Reinforcement Learning, Pos. Thu #7
- Zhou, Yuan:** Oral Wed in Reinforcement Learning, Pos. Wed #98
- Zhou, Tengfei:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #83
- Zhou, Dian:** Oral Thu in Optimization (Bayesian), Pos. Thu #210
- Zhou, Kaiwen:** Oral Wed in Optimization (Convex), Pos. Wed #205
- Zhou, Mingyuan:** Oral Wed in Approximate Inference, Pos. Wed #177, Oral Fri in Generative Models, Pos. Fri #177
- Zhou, Pan:** Oral Thu in Deep Learning (Theory), Pos. Thu #99
- Zhouhan Lin, MILA:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #170
- Zhu, Jun-Yan:** Oral Fri in Transfer and Multi-Task Learning, Pos. Fri #83
- Zhu, Song-Chun:** Oral Fri in Computer Vision, Pos. Fri #48
- Zhu, Chen:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #128
- Zhu, Jun:** Oral Wed in Networks and Relational Learning, Oral Wed in Approximate Inference, Pos. Wed #53, Pos. Wed #75, Oral Thu in Deep Learning (Adversarial), Pos. Thu #53, Pos. Thu #38, Oral Fri in Online Learning, Oral Fri in Approximate Inference, Pos. Fri #155, Pos. Fri #150
- Zhu, Yichen:** Oral Wed in Feature Selection, Pos. Wed #82, Oral Fri in Optimization (Convex), Pos. Fri #72
- Zhu, Yuancheng:** Oral Wed in Parallel and Distributed Learning, Pos. Wed #158
- Zhuang, Vincent:** Oral Wed in Optimization (Bayesian), Pos. Wed #43
- Zhuo, Jingwei:** Oral Fri in Online Learning, Oral Fri in Approximate Inference, Pos. Fri #150, Pos. Fri #155
- Zidek, Augustin:** Oral Wed in Reinforcement Learning, Pos. Wed #163
- Ziebart, Brian:** Oral Wed in Structured Prediction, Pos. Wed #65
- Zintgraf, Luisa:** Oral Thu in Reinforcement Learning, Pos. Thu #199
- Zolna, Konrad:** Oral Thu in Deep Learning (Neural Network Architectures), Pos. Thu #170
- Zoph, Barret:** Oral Wed in Deep Learning (Neural Network Architectures), Pos. Wed #185, Oral Fri in Deep Learning (Neural Network Architectures), Pos. Fri #170
- Zoran, Daniel:** Oral Thu in Deep Learning (Adversarial), Pos. Thu #116
- Zou, James:** Oral Wed in Representation Learning, Pos. Wed #9
- Zou, Difan:** Oral Thu in Monte Carlo Methods, Pos. Thu #81
- Zrnic, Tijana:** Oral Thu in Other Models and Methods, Pos. Thu #142
- Zwols, Yori:** Oral Wed in Representation Learning, Pos. Wed #101
- Zügner, Daniel:** Oral Wed in Networks and Relational Learning, Pos. Wed #58