Stanford Computer Forum and CS Industry Affiliates Annual Meeting

Agenda

Tuesday August 11

New Research Directions in CS & EE Hosted by the Stanford Computer Forum

10:00 – 11:20 Recorded talks and Live Q&A
- Jiajun Wu: Learning to See the Physical World
- Aviad Rubinstein: Budget-Smoothed Analysis for Submodular Maximization
- Tatsu Hashimoto: Beyond the average case: machine learning for atypical examples

11:20 – 12:00 Keynote
- Andrew Ng

Lunch Break
- 12:00 – 1:00 Student Research Digital Flipbook

1:00 – 3:05 Recorded Talks and Live Q&A
- Caroline Trippel: Application Reliability and Security via Formal Methods for Systems
- Priyanka Raina: Agile Design of Domain-Specific Architectures
- Fredrik Kjolstad: Sparse Tensor Algebra Compilation
- Nima Anari: Efficient Sampling from Distributions with Limited Correlations
- Karen Liu: Simulating Human Movement and Interaction with the World

Wednesday August 12

Algorithms and Applications in Data Science Hosted by the Stanford Data Science Initiative

10:00-11:00 Recorded Talks
- Jure Leskovec
- James Zou: Data, Markets and Machine Learning
- Matei Zaharia (TBD)

11:00-12:00 LIVE Panel
- with Faculty and Special Guest

Lunch Break
- 12:00-1:00 Student Research Digital Flipbook
Algorithms and Applications in AI Hosted by the Stanford AI Lab

1:00-2:00 Recorded Talks
- Christopher Manning: Natural Language Understanding: Improved Representations and Models
- Emma Brunskill: Learning from the Past to Make Better Future Decisions
- Tengyu Ma: Deep Learning for Small, Imbalanced, and Heteroskedastic Datasets

2:00-3:00 LIVE Panel
- with Faculty and Samir Dhir, President & Head of Americas at Virtusa

Thursday August 13

AI Safety Hosted by the Stanford Center for AI Safety

10:00-11:00 Recorded Talks
- Mykel Kochenderfer: Artificial Intelligence for Safety Critical Applications
- Dorsa Sadigh: Safe Robots that Collaborate with Risk-Aware Humans
- Clark Barrett: Parallelization Techniques for Verifying Neural Networks

11:00-12:00 LIVE Panel
- with Faculty and Jerry Lopez, Trusted Autonomy Researcher at GE Research

12:00-1:30 Lunch Break
- 12:00-1:30 Student Research Digital Flipbook

1:30-2:20 LIVE Discussion
Al Safety: Can regulations or industry self-policing bring us to a better place?
LIVE discussion moderated by Dan Boneh, Professor of Computer Science and Electrical Engineering
- Keith Winstein, Assistant Professor of Computer Science
- Abigail Wen, Sr. Director of Emerging AI Tech at Intel and Co-Chair of the Partnership on AI’s Expert Group for Fairness, Transparency and Accountability
**BIOS:**

**Nima Anari, Assistant Professor of Computer Science**
Nima Anari is an assistant professor in the Computer Science Theory Group at Stanford University. He obtained his Ph.D. in Computer Science at UC Berkeley. At Berkeley, he was advised by Satish Rao, and was part of the Theory Group. Before that, he received my B.Sc. in Computer Engineering and Mathematics from Sharif University of Technology in Tehran. He is broadly interested in the design and analysis of algorithms and more generally theoretical computer science. Some topics that I have worked on include: Geometry of Polynomials and Applications in Algorithms, Combinatorics, and Probability, Approximate Sampling and Counting, Spectral Graph Theory and Spectral Algorithms, Algorithmic Game Theory and Mechanism Design.

**Clark Barrett: Associate Professor (Research) of Computer Science, Stanford University**
Professor Barrett's expertise is in constraint solving and its applications to system verification and security. His work focuses on the theory, implementation, and application of solvers for satisfiability modulo theories (SMT). Applications include verification of hardware and software, automatic detection of security vulnerabilities, and developing techniques for ensuring the safety of AI/machine-learning systems.

**Dan Boneh: Professor of Computer Science and Electrical Engineering**
Professor Boneh heads the applied cryptography group and co-directs the center for blockchain research. Professor Boneh's research focuses on applications of cryptography to computer security. His work includes cryptosystems with novel properties, web security, security for mobile devices, cryptanalysis, and blockchains. He is the author of over a hundred publications in the field and is a Packard and Alfred P. Sloan fellow. He is a recipient of the 2014 ACM prize and the 2013 Godel prize. In 2016 Dr. Boneh was elected to the national academy of engineering. Professor Boneh received his Ph.D from Princeton University and joined Stanford in 1997.

**Emma Brunskill: Assistant Professor of Computer Science, Stanford University**
Emma Brunskill is an assistant professor in the Computer Science Department at Stanford University where she leads the AI for Human Impact group. Her work focuses on reinforcement learning in high stakes scenarios--how can an agent learn from experience to make good decisions when experience is costly or risky, such as in educational software, healthcare decision making, or people-facing applications. She was previously a professor at Carnegie Mellon University. She is the recipient of multiple early faculty career awards (National Science Foundation, Office of Naval Research, Microsoft Research) and her group has received several best research paper nominations (CHI, EDMx3) and awards (UAI, RLDM).

**Samir Dhir: President & Head of Americas, Virtusa Corporation**
Samir Dhir is the president of Virtusa Corporation, and is responsible for developing and executing Virtusa’s growth strategy and overall P&L management for all industry groups including sales, delivery, and operations in the Americas. The industry group comprises Banking & Financial Services, Healthcare, Insurance and Life Sciences, Telecom, Media and High-Tech. In addition, Samir oversees Virtusa’s global alliances, sales enablement, and xLabs. He is also a board member of Virtusa Consulting Services. He was earlier the president of the Banking and Financial Services business at Virtusa. He was instrumental in the acquisition and successful integration of Polaris Consulting & Services’ capabilities into Virtusa. Prior to this, as the chief delivery officer, Samir led the global delivery organization at Virtusa. Samir is a key member of NASSCOM’s IT Services Council, initiated to sustain and grow global leadership in IT. He previously worked for Wipro where he managed delivery for technology, media, transportation and services business. He also led the SAP Practice and ran the managed services business. Prior to Wipro, he held key leadership positions with Avaya and Lucent Technologies in the UK.
Tatsu Hashimoto: Assistant Professor of Computer Science

Tatsunori (Tatsu) Hashimoto is an Assistant Professor in the Computer Science department at Stanford. Prior to this, he was a post-doc for Professors Percy Liang and John Duchi at Stanford. He holds a Ph.D from MIT where he studied random walks and computational biology under Professors Tommi Jaakkola and David Gifford, and a B.S. from Harvard in Statistics and Math. His work has been recognized in NeurIPS 2018 (Oral), ICML 2018 (Best paper runner-up), and NeurIPS 2014 Workshop on Networks (Best student paper).

Fredrik Kjolstad: Assistant Professor at Stanford University

Fredrik Kjolstad is an. He works on topics in compilers and programming models. In particular, he is interested in compilers and programming models for sparse computing problems where we separate the algorithms from data representation. His research includes the TACO Sparse Tensor Algebra Compiler and the Simit language for computing on sparse systems. He received his PhD from MIT, his master's degree from the University of Illinois at Urbana-Champaign, and his bachelor's degree from the Norwegian University of Science and Technology in Gjøvik. He has won the Rosing Award, the Adobe Fellowship, and best/distinguished paper awards at EuroMPI and OOPSLA.

Mykel Kochenderfer: Associate Professor of Aeronautics and Astronautics, Stanford University

Professor Kochenderfer develops advanced algorithms and analytical methods for the design of robust decision making systems. Of particular interest are systems for air traffic control, unmanned aircraft, and automated driving where decisions must be made in uncertain, dynamic environments while maintaining safety and efficiency. Research at the Stanford Intelligent Systems Laboratory focuses on efficient computational methods for deriving optimal decision strategies from high-dimensional, probabilistic problem representations.

Jure Leskovec: Associate Professor of Computer Science, Stanford University

Professor Leskovec's research area is machine learning and data science for complex, richly-labeled relational structures, graphs, and networks for systems at all scales, from interactions of proteins in a cell to interactions between humans in a society. Applications include large-scale machine learning, graph representation learning, commonsense reasoning, recommender systems, social network analysis, computational social science, and computational biology with an emphasis on drug discovery.

Karen Liu: Associate Professor of Computer Science

C. Karen Liu is an associate professor in the Department of Computer Science at Stanford University. She received her Ph.D. degree in Computer Science from the University of Washington. Liu's research interests are in computer graphics and robotics, including physics-based animation, character animation, optimal control, reinforcement learning, and computational biomechanics. She developed computational approaches to modeling realistic and natural human movements, learning complex control policies for humanoids and assistive robots, and advancing fundamental numerical simulation and optimal control algorithms. The algorithms and software developed in her lab have fostered interdisciplinary collaboration with researchers in robotics, computer graphics, mechanical engineering, biomechanics, neuroscience, and biology. Liu received a National Science Foundation CAREER Award, an Alfred P. Sloan Fellowship, and was named Young Innovators Under 35 by Technology Review. In 2012, Liu received the ACM SIGGRAPH Significant New Researcher Award for her contribution in the field of computer graphics.
**Jerry Lopez:** Trusted Autonomy Researcher, GE Research
Jerry has been at GE Research for 13 years, working on many projects involving safety critical systems. His primary research is in the area of avionics and air traffic management. Recently, Jerry has launched the Trusted Autonomy program, which looks at how non-traditional software applications such as ML and AI could be introduced into systems that require DO-178 certification, or must perform to strict safety standards for DoD applications. Jerry is collaborating with the Stanford Center for AI Safety to perform research on applying formal verification to Deep Neural Networks, and also looking at novel mathematical methods for analyzing the safety properties of complex software algorithms. Jerry led a team that partnered with the FAA to demonstrate autonomous UAS collision avoidance in 2018 at NUAIR in Rome, NY. Prior to joining GE Research, Jerry worked at General Dynamics Advanced Information Systems in Pittsfield, MA, working on novel fiber-optic gyroscopes for the US Navy. Jerry holds a B.S. in Electrical Engineering from California State University, Northridge, an M.S. in Electrical Engineering from University of Southern California, and a Ph.D. in Electrical Engineering from the University of Wisconsin - Madison.

**Tengyu Ma:** Assistant Professor of Computer Science and Statistics, Stanford University
Professor Ma's interests broadly include topics in machine learning and algorithms, such as deep learning and its theory, (deep) reinforcement learning and its theory, representation learning, robustness, non-convex optimization, distributed optimization, and high-dimensional statistics. Tengyu's work brings together techniques from machine learning, theoretical computer science, applied mathematics, statistics, probability, and information theory. Many of his recent publications have involved developing theory and practical methods to improve the optimization and generalization of deep learning models in data-hungry, imbalanced, or heteroskedastic settings. In another line of his recent research, he studies sample-efficient deep reinforcement learning algorithms. Many of these results have been published in NeurIPS, ICML, ICLR, and COLT. He is a recipient of ACM Doctoral Dissertation Award Honorable Mention, NIPS'16 best student paper award, and COLT’18 best paper award.

**Christopher Manning:** Professor of Computer Science and Linguistics, Stanford University
Professor Manning is the Director of the Stanford Artificial Intelligence Laboratory, and Co-director of the Stanford Human-Centered Artificial Intelligence Institute. He works on software that can intelligently process, understand, and generate human language material. He is a leader in applying Deep Learning to Natural Language Processing, including exploring Tree Recursive Neural Networks, neural network dependency parsing, the GloVe model of word vectors, neural machine translation, question answering, and deep language understanding. He also focuses on computational linguistic approaches to parsing, natural language inference and multilingual language processing, including being a principal developer of Stanford Dependencies and Universal Dependencies. Manning is an ACM Fellow, a AAAI Fellow, an ACL Fellow, and a Past President of ACL. He has co-authored leading textbooks on statistical natural language processing and information retrieval. He is the founder of the Stanford NLP group (@stanfordnlp) and manages development of the Stanford CoreNLP software.

**Andrew Ng:** Adjunct Professor of Computer Science and Founder and CEO of Landing AI
Andrew Ng is VP & Chief Scientist of Baidu; Co-Chairman and Co-Founder of Coursera; and an Adjunct Professor at Stanford University. In 2011 he led the development of Stanford University’s main MOOC (Massive Open Online Courses) platform and also taught an online Machine Learning class that was offered to over 100,000 students, leading to the founding of Coursera.

**Priyanka Raina:** Assistant Professor of Electrical Engineering
Priyanka Raina is an Assistant Professor in Electrical Engineering at Stanford University. Previously, she was a Visiting Research Scientist in the Architecture Research Group at Nvidia Corporation. She received her Ph.D. and S.M. degrees in Electrical Engineering and Computer Science from MIT in 2018 and 2013 and her B.Tech. degree in Electrical Engineering from IIT Delhi in 2011. Priyanka's research interests include: designing energy-efficient and high-performance hardware accelerator architectures for computational imaging, vision, and machine learning; leverage emerging device technologies such as non-volatile memories in accelerators, and creating new methodologies and automation tools that improve hardware/software system design productivity.
Aviad Rubinstein: Assistant Professor in Computer Science

Aviad Rubinstein is a Computer Science assistant professor at Stanford University. Before coming to Stanford, Aviad received a PhD from the University of California, Berkeley, and spent one year as a Rabin Postdoctoral Fellow at Harvard University. Aviad received the PhD dissertation awards from EATCS, ACM Sigecom, and ACM.

Dorsa Sadigh: Assistant Professor of Computer Science and Electrical Engineering, Stanford University

Professor Sadigh’s research interests lie in the intersection of robotics, learning and control theory. Specifically, she is interested in developing efficient algorithms for safe, reliable, and adaptive human-robot interaction. Dorsa has received her doctoral degree in Electrical Engineering and Computer Sciences (EECS) at UC Berkeley in 2017, and has received her bachelor’s degree in EECS at UC Berkeley in 2012. She is awarded the NSF CAREER award, the Google Faculty Award, and the Amazon Faculty Research Award.

Caroline Trippel: Assistant Professor of Computer Science

Caroline Trippel is an Assistant Professor in the Computer Science and Electrical Engineering Departments at Stanford University working in the area of computer architecture. Prior to starting at Stanford, Trippel spent nine months as a Research Scientist at Facebook in the FAIR SysML group. Her work focuses on promoting correctness and security as first-order computer systems design metrics (akin to performance and power). A central theme of her work is leveraging formal methods techniques to design and verify hardware systems in order to ensure that they can provide correctness and security guarantees for the applications they intend to support. Additionally, Trippel has been recently exploring the role of architecture in enabling privacy-preserving machine learning, the role of machine learning in hardware systems optimizations, particularly in the context of neural recommendation, and opportunities for improving datacenter and at-scale machine learning reliability. Trippel’s research has influenced the design of the RISC-V ISA memory consistency model both via her formal analysis of its draft specification and her subsequent participation in the RISC-V Memory Model Task Group. Additionally, her work produced a novel methodology and tool that synthesized two new variants of the now-famous Meltdown and Spectre attacks. Trippel’s research has been recognized with IEEE Top Picks distinctions and the 2020 ACM SIGARCH/IEEE CS TCCA Outstanding Dissertation Award. She was also awarded an NVIDIA Graduate Fellowship (2017-2018) and selected to attend the 2018 MIT Rising Stars in EECS Workshop. Trippel completed her PhD in Computer Science at Princeton University and her BS in Computer Engineering at Purdue University.

Abigail Wen: Data Science Tech Evangelist & Host of Intel AI Podcast.

Abigail most recently served as Sr. Director, Emerging AI Tech and Technical Assistant, Office of the CTO, Artificial Intelligence Products Group (AIPG). She is the Co-Chair of the Partnership on AI’s Expert Group for Fairness, Transparency and Accountability and served as a business strategist and thought leader for next-gen AI emerging technologies and products. She speaks on AI and venture capital investing and has published on AI and Privacy in Fortune, AI and Bias in Forbes and Breakthroughs in AI in Forbes. Previously, Abigail partnered closely with Silicon Valley investors as legal lead for Intel Capital’s AI investments and strategic transactions. She has worked with more than a hundred startups from incorporation to IPO or acquisition. Exemplary transactions include Intel’s $4.1B investment in ASML and $740M in Cloudera. She serves as board observer for Two Bit Circus, a virtual reality entertainment company based in Los Angeles. Prior to joining Intel in 2012, Abigail advised clients on Wall Street and in DC with the corporate group of Sullivan & Cromwell LLP, clerked for the US Court of Appeals for the DC Circuit and worked on tech and innovation policy for the Senate Judiciary Committee, Subcommittee on Antitrust, Business Rights and Competition. Abigail holds a BA from Harvard in Government and International Relations and JD from Columbia. She is the New York Times best selling author of Loveboat, Taipei, a romantic comedy addressing issues of culture and the immigrant experience.
Keith Winstein: Assistant Professor of Computer, Stanford University
Professor Winstein’s research group creates new kinds of networked systems by rethinking abstractions around communication, compression and computing. Some of his research has found broader use, including the Mosh tool, the Puffer video-streaming site, the Lepton compression tool, the Mahimahi network emulators, the gg lambda-computing framework, and the use of a temporal reordering threshold to detect packet loss. His work has received the Sloan Research Fellowship, the Usenix NSDI Community Award (2020, 2017), the Applied Networking Research Prize (2021, 2014), the Usenix ATC Best Paper Award, a Google Faculty Research Award (2017, 2015), a Facebook Faculty Award, the ACM SIGCOMM Doctoral Dissertation Award, and a Sprows award for best doctoral thesis in computer science at MIT. Winstein previously served as a staff reporter at The Wall Street Journal, was one of the story consultants for HBO’s “Silicon Valley” and worked at Ksplice, a startup company (now part of Oracle) where he was the vice president of product management and business development and also cleaned the bathroom. He did his undergraduate and graduate work at MIT.

Jiajun Wu: Assistant Professor of Computer Science
Jiajun Wu is an Assistant Professor of Computer Science at Stanford University, working on computer vision, machine learning, and computational cognitive science. Before joining Stanford, he was a Visiting Faculty Researcher at Google Research. He received his PhD in Electrical Engineering and Computer Science at Massachusetts Institute of Technology and undergraduate degrees in Computer Science and in Economics at Tsinghua University. Wu’s research has been recognized through the ACM Doctoral Dissertation Award Honorable Mention, the MIT George M. Sprows PhD Thesis Award in Artificial Intelligence and Decision-Making, the IROS Best Paper Award on Cognitive Robotics, and fellowships from Facebook, Nvidia, Samsung, and Adobe.