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Jennifer J. Sun

Appointments

Cornell University, Ithaca, NY. **08/2024–present**
Assistant Professor
Department of Computer Science

Google DeepMind, Los Angeles, CA. **08/2023–present**
Research Scientist

Education

California Institute of Technology, Pasadena, CA. **09/2017–09/2023**
Doctor of Philosophy in Computing and Mathematical Sciences
Advisors: Pietro Perona, Yisong Yue

University of Toronto, Toronto, Canada. **09/2012–06/2017**
Bachelor of Science in Engineering Science (Electrical and Computer Engineering)
Minor in Robotics and Mechatronics

Research Interests

My research centers on developing general expert-in-the-loop frameworks to accelerate scientific discovery. I build machine learning and computer vision methods that learn from both symbolic domain knowledge and experimental data. I collaborate closely with scientists across domains, such as behavioral neuroscientists and medical doctors, to integrate my methods in practice.

Honors and Awards

Ben P.C. Chou Doctoral Prize (Caltech).	**2023**
Rising Star in EECS (University of Texas at Austin).	**2022**
Caltech Chen Institute Diversity and Inclusion Award.	**2022**
Amazon AI4Science Fellowship.	**2022**
Rising Star in Data Science (University of Chicago).	**2021**
Best Student Paper Award, Conference on Computer Vision and Pattern Recognition (CVPR).	**2021**
Natural Sciences and Engineering Research Council of Canada (NSERC) Postgraduate Scholarships.	**2019**
Caltech Kortschak Scholar Program.	**2017**
University of Toronto W. S. Wilson Medal for top graduating student in engineering science.	**2017**

Publications

(* denotes equal contribution)

Peer-Reviewed Conference and Journal Publications

J. J. Sun, Toward collaborative artificial intelligence development for animal well-being. *Journal of the American Veterinary Medical Association (JAVMA)*. 2025.

D. Khalil, C. Liu, P. Perona, **J. J. Sun**, M. Marks, Learning Keypoints for Multi-Agent Behavior Analysis using Self-Supervision. *Winter Conference on Applications of Computer Vision (WACV)*. 2025.

L. Zhao, N. B. Gundavarapu, L. Yuan, H. Zhou, S. Yan, **J. J. Sun**, L. Friedman, R. Qian, T. Weyand, Y. Zhao, R. Hornung, F. Schroff, M. Yang, D. A. Ross, H. Wang, H. Adam, M. Sirotenko, T. Liu, B. Gong, VideoPrism: A foundational visual encoder for video understanding. *International Conference on Machine Learning (ICML)*. 2024.

A. Sehgal, A. Grayeli, **J. J. Sun**, S. Chaudhuri, Cosmos: Neurosymbolic Grounding for Compositional World Models. *International Conference on Learning Representations (ICLR)*. 2024.

J. J. Sun*, M. Marks*, A. Ulmer, D. Chakraborty, B. Geuther, E. Hayes, H. Jia, V. Kumar, S. Oleszko, Z. Partridge, M. Peelman, A. Robie, C. E. Schretter, K. Sheppard, C. Sun, P. Uttarwar, J. M. Wagner, E. Werner, J. Parker, P. Perona, Y. Yue, K, Branson, A. Kennedy. MABe22: A Multi-Species Multi-Task Benchmark for Learned Representations of Behavior. *International Conference on Machine Learning (ICML)*. 2023.

J. J. Sun*, P. Karashchuk*, A. Dravid*, S. Ryou, S. Fereidooni, J. Tuthill, A. Katsaggelos, B. Brunton, G. Gkioxari, A. Kennedy, Y. Yue, P. Perona. Self-Supervised 3D Keypoint Discovery in Multi-View Videos. *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. 2023.

K. Luxem*, **J. J. Sun***, S. P. Bradley, K. Krishnan, T. D. Pereira, E. A. Yttri, J. Zimmermann, M. Laubach, Open-Source Tools for Behavioral Video Analysis: Setup, Methods, and Development. *eLife*. 2023.

E. Zhan*, **J. J. Sun***, A. Kennedy, Y. Yue, S. Chaudhuri. Unsupervised Learning of Neurosymbolic Encoders. *Transactions on Machine Learning Research (TMLR)*. 2022.

J. J. Sun*, S. Ryou*, R. Goldshmid, B. Weissbourd, J. Dabiri, D. J. Anderson, A. Kennedy, Y. Yue, P. Perona. Self-Supervised Keypoint Discovery in Behavioral Videos. *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. 2022.

A. Tseng, **J. J. Sun**, Y. Yue. Automatic Synthesis of Diverse Weak Supervision Sources for Behavior Analysis. *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR).* 2022.

J. J. Sun, T. Karigo, D. Chakraborty, S. P. Mohanty, B. Wild, Q. Sun, C. Chen, D. J. Anderson, P. Perona, Y. Yue, A. Kennedy. The Multi-Agent Behavior Dataset: Mouse Dyadic Social Interactions. *In Neural Information Processing Systems (NeurIPS), Datasets and Benchmarks Track.* 2021.

J. J. Sun, A. Kennedy, E. Zhan, D. J. Anderson, Y. Yue, P. Perona. Task Programming: Learning Data Efficient Behavior Representations. *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR).* 2021. **(Oral) Best Student Paper Award.**

L. Zhao, Y. Wang, J. Zhao, L. Yuan, **J. J. Sun**, F. Schroff, H. Adam, X. Peng, D. Metaxas, T. Liu. Learning View-Disentangled Human Pose Representation by Contrastive Cross-View Mutual Information Maximization. *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR).* 2021. **(Oral)**

T. Liu*, **J. J. Sun***, L. Zhao, J. Zhao, L. Yuan, Y. Wang, L.C. Chen, F. Schroff, H. Adam. View-Invariant, Occlusion-Robust Probabilistic Embedding for Human Pose. *International Journal of Computer Vision (IJCV).* 2021.

C. Segalin, J. Williams, T. Karigo, M. Hui, M. Zelikowsky, **J. J. Sun**, P. Perona, D. J. Anderson, A. Kennedy. The Mouse Action Recognition System (MARS): a software pipeline for automated analysis of social behaviors in mice. *eLife.* 2021.

A. Shah*, E. Zhan*, **J. J. Sun**, A. Verma, Y. Yue, S. Chaudhuri. Learning Differentiable Programs with Admissible Neural Heuristics. *In Neural Information Processing Systems (NeurIPS).* 2020.

J. J. Sun, J. Zhao, L.C. Chen, F. Schroff, H. Adam, T. Liu. View-Invariant Probabilistic Embedding for Human Pose. *In Proceedings of the European Conference on Computer Vision (ECCV).* 2020. **(Spotlight)**

Peer-Reviewed Workshop Publications

J. Flashner, **J. J. Sun**, D. Ouyang, Y. Yue. Learning Expert-Interpretable Programs for Myocardial Infarction Localization. *AI for Science Workshop at NeurIPS.* 2023.

J. J. Sun*, M. Tjandrasuwita*, A. Sehgal*, A. Solar-Lezama, S. Chaudhuri, Y. Yue, O. Costilla-Reyes. Neurosymbolic Programming for Science. *AI for Science Workshop at NeurIPS.* 2022.

S. Talukder*, **J. J. Sun***, M. Leonard, B. Brunton, Y. Yue. Deep Neural Imputation: A Framework for Recovering Incomplete Brain Recordings. *Learning from Time Series for Health Workshop at NeurIPS.* 2022.

M. Tjandrasuwita, **J. J. Sun**, A. Kennedy, S. Chaudhuri, Y. Yue. Interpreting Expert Annotation Differences in Animal Behavior. *CV4Animals Workshop at CVPR.* 2021.

J. J. Sun, T. Liu, G. Prasad. GLA in MediaEval 2018 Emotional Impact of Movies Task. *MediaEval Workshop.* 2018.

Patents

J. Lam, A. Huda, **J. J. Sun**, Image processing method for generating training data. US Patent Number: US10672143B2.

A. M. Rotenstein, A. Bachoo, C. Sutanto, **J. J. Sun**, A. Kelman, Three-dimensional detection and tracking pipeline recommendation using performance prediction. US Patent Number: US20200105001A1

Invited Talks & Panels

Unifying AI Approaches towards Human and Animal Well-being
- Symposium on Artificial Intelligence in Veterinary Medicine, 2024
- CV4Animal workshop at CVPR, 2024

AI for Scientists: Perception & Discovery
- JAX Short Course on Application of Machine Learning for Automated Quantification of Behavior, 2023

The Role of Perception in Simulated Bodies
- Simulated Bodies: Whole Body Biomechanical Models Conference, 2023

Self-Supervised Learning for Behavioral Neuroscience
- CAJAL Training Course on Machine Learning in Neuroscience, 2023

AI for Scientists: Accelerating Discovery through Knowledge, Data & Learning
- Cornell University Computer Science Seminar, 2023
- Cornell Tech Seminar, 2023
- Microsoft Research Machine Learning Seminar, 2023
- University of Waterloo Computer Science Seminar, 2023
- MIT EECS / Broad Institute Seminar, 2023
- UCSD Cognitive Science Seminar, 2023
- Emory University Computer Science Seminar, 2023
- Georgia Tech Computational Science and Engineering Seminar, 2023
- UCI Computer Science Seminar, 2023
- UCSB Computer Science Seminar, 2023
- Duke Biostatics and Bioinformatics Seminar, 2023
- Rice Computer Science Seminar, 2023
- University of Toronto Computer Science Seminar, 2023
- Symposium on Frontiers of ML and AI at USC, 2022
- UCSD Halıcıoğlu Data Science Institute Seminar, 2022
- Rising Stars in EECS at UT Austin, 2022
- Neurosym Webinar Series at MIT, 2022
- ML Reading Group at the University of Arizona, 2022
- AI4Life Group at Harvard, 2022

AI for Science: Learning from Experts and Data
- Janelia Computing and Theory Seminar, 2022
- Rising Stars in Data Science at UChicago, 2021
- Vision & ML groups at UChicago/TTIC, 2021
- Cognitive Science Talk Series at MIT, 2021

Perception and Modeling of Human and Animal Behavior
- Disney Research, 2022

Machine Learning for Behavior: Methods and Datasets
- Chicago Sensorimotor Consortium, 2022
- Caltech Chen Building Seminar Series, 2022

Measuring Social Behavior from Video and Trajectory Data of Interacting Animals
- Automatic Behavior Recognition in Rodents Symposium at Measuring Behavior Conference, 2022

Behavior Quantification: Pose to Actions
- Behavior Quantification Symposium at the 8th Annual BRAIN Meeting, 2022

Neurosymbolic Programming Tutorial Series
- Summer school on Neurosymbolic Programming, 2022

Deep Learning Careers in Academia
- Neuromatch Professional Development Session Panel, 2022

Academic Services

Workshop & Tutorial Organization

Symposium on Artificial Intelligence in Veterinary Medicine. 2025.
Organizing Committee

The 11th Workshop on Fine-Grained Visual Categorization. Workshop at CVPR 2024.
Workshop Co-organizer

The 3rd Workshop on Multi-Agent Behavior: Properties, Computation, and Emergence (MABe). Workshop at CVPR 2023.
Workshop Co-organizer

Neurosymbolic Programming. Tutorial at NeurIPS 2022.
Co-organizer

The 2nd Workshop on Multi-Agent Behavior: Representation, Modeling, Measurement, and Applications (MABe). Workshop at CVPR 2022.
Workshop and Competition Co-organizer

The 1st Workshop on Multi-Agent Behavior: Representation, Modeling, Measurement, and Applications (MABe). Workshop at CVPR 2021.
Workshop and Competition Co-organizer

The 1st Workshop on Affective Understanding in Video (AUVi). Workshop at CVPR 2021.
Workshop and Competition Co-organizer

Area Chair

ICCV

ICLR

Reviewing

ICLR *(highlighted reviewer in 2022)*
NeurIPS
NeurIPS Datasets and Benchmarks
CVPR
ICML
ECCV
Artificial Intelligence Journal
IEEE Transactions on Geoscience and Remote Sensing
Nature Communications
International Journal of Computer Vision

Teaching Experience

CS4782 Deep Learning , **01/2025–05/2025**
Co-Instructor.

CS6784-2 Research Design for Machine Learning, **08/2024–12/2024**
Instructor.

Summer School on Machine Learning in Neuroscience, **07/2023–07/2023**
Instructor.
Designed a lecture and hands-on notebook for unsupervised and self-supervised learning for a group of students at the CAJAL Machine Learning in Neuroscience course.

Summer School on Neurosymbolic Programming, **07/2022–07/2022**
Co-Instructor.
Designed a tutorial on neurosymbolic programming for behavior analysis and led hands-on exercises for a group of graduate students in computer science.

Caltech CS159 Representation Learning for Science, **03/2022–06/2022**
Head Teaching Assistant.
Co-designed a machine learning course with a focus on representation learning in real-world scientific applications, and mentored multiple student projects end-to-end.

Computing and Mathematical Sciences Department, **09/2019–06/2021**
Teaching Fellow.
Mentored teaching assistants (TAs) in the department on effective and inclusive teaching, managed feedback between department and TAs, and designed teaching workshops.

Caltech CMS144 Networks: Structures and Economics, **01/2019–04/2019**
Head Teaching Assistant.
Coordinated a group of teaching assistants to support students in the course, designed assignments, and hosted office hours.

Computing and Mathematical Sciences Department, **09/2018–04/2019**
Preliminary Exam Prep Lead.
Mentored students on the preliminary exam process at Caltech and organized practice problems and discussions.

Professional Experience

Google DeepMind, *Venice, CA*. **08/2023–present**
Research Scientist
Developing methods for video understanding.

Google Research, *Venice, CA*. **06/2019–12/2019**
Mobile Vision Team, Research Intern
Developed a method for view-invariant probabilistic embedding of 2D poses (ECCV 2020 Spotlight)

Google Research, *Venice, CA*. **06/2018–09/2018**
Mobile Vision Team, Research Intern
Built a dataset and model for affective video analysis (led to the Affective Understanding in Video workshop at CVPR 2021)

University of Toronto, *Toronto, Canada*. **09/2016–04/2017**
Institute for Aerospace Studies, Undergraduate Thesis Student
Studied and developed methods to enable human-robot shared control of a mobile manipulator (mentor: Prof. Jonathan Kelly, STARS Lab).

Epson Research and Development, *Markham, Canada*. **05/2015–08/2016**
Robotics and AR Teams, Algorithm Research Intern
Developed algorithm prototypes for integration into augmented reality systems (led to two US patents).

ETH Zurich, *Zurich, Switzerland*. **05/2014–08/2014**
Institute for Dynamic Systems and Control, Summer Research Student
Worked on time-of-flight based localization algorithms for ultra-wideband radios.

University of Hamburg, *Hamburg, Germany*. **05/2013–08/2013**
Center for Free-Electron Laser Science, Summer Research Student
Profiled laser-generated plumes on water using interferometry.