

Stanford



Stefano Ermon

Assistant Professor of Computer Science and Center Fellow, by courtesy, at the Woods Institute for the Environment

Bio

BIO

I am an Assistant Professor in the Department of Computer Science at Stanford University, where I am affiliated with the Artificial Intelligence Laboratory and a fellow of the Woods Institute for the Environment.

My research is centered on techniques for scalable and accurate inference in graphical models, statistical modeling of data, large-scale combinatorial optimization, and robust decision making under uncertainty, and is motivated by a range of applications, in particular ones in the emerging field of computational sustainability.

ACADEMIC APPOINTMENTS

- Assistant Professor, Computer Science
- Center Fellow (By courtesy), Stanford Woods Institute for the Environment

HONORS AND AWARDS

- Sloan Research Fellowship, Alfred P. Sloan Foundation
- IJCAI Computers and Thought Award, IJCAI
- Microsoft Research Faculty Fellowship, Microsoft Research
- NSF CAREER Award, National Science Foundation
- ONR Young Investigator Award, Office of Naval Research
- AFOSR Young Investigator Award, Air Force Office of Scientific Research
- AWS Machine Learning Research Award, Amazon Web Services (AWS)
- Sony Faculty Innovation Award, Sony
- Hellman Fellowship, Hellman Foundation
- AAAI 2017 Outstanding Paper Award, AAAI
- Bloomberg Data Science Research Grant, Bloomberg
- 10 World Changing Ideas of 2016, Scientific American
- First Place, World Bank Big Data Innovation Challenge, World Bank
- Finalist, NVIDIA Global Impact Award, NVIDIA

PROFESSIONAL EDUCATION

- Ph.D., Cornell University, Computer Science (2015)

LINKS

- Personal Site: <https://cs.stanford.edu/~ermon/>
- Group Site: <https://cs.stanford.edu/~ermon/website/>

Teaching

COURSES

2019-20

- Data for Sustainable Development: CS 325B, EARTHSYS 162, EARTHSYS 262 (Aut)
- Deep Generative Models: CS 236 (Aut)
- Probabilistic Graphical Models: Principles and Techniques: CS 228 (Win)

2018-19

- Data for Sustainable Development: CS 325B, EARTHSYS 162, EARTHSYS 262 (Aut)
- Deep Generative Models: CS 236 (Aut)
- Probabilistic Graphical Models: Principles and Techniques: CS 228 (Win)

2017-18

- Artificial Intelligence: Principles and Techniques: CS 221 (Aut)
- Data for Sustainable Development: CS 325B, EARTHSYS 162, EARTHSYS 262 (Aut, Win)
- Probabilistic Graphical Models: Principles and Techniques: CS 228 (Win)

2016-17

- Automated Reasoning: Theory and Applications: CS 323 (Spr)
- Probabilistic Graphical Models: Principles and Techniques: CS 228 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Panos Achlioptas

Postdoctoral Faculty Sponsor

Andreas Schlueter, Burak Uzgent

Doctoral Dissertation Advisor (AC)

Rishi Sharma

Master's Program Advisor

Cheng-Min Chiang, Sarah Ciresi, Kyle Clark, Jonathan Gomes Selman, Apollo Kaneko, Lingjie Kong, Henrik Marklund, Shahab Mousavi, Rui Qiu, Evan Sheehan

Doctoral Dissertation Co-Advisor (AC)

Jayesh Gupta, Pratyusha Kalluri, Sharon Zhou, Michael Zhu

Doctoral (Program)

Kristy Choi, Chris Cundy, Aditya Grover, Jonathan Kuck, Rui Shu, Jiaming Song, Yang Song, Shengjia Zhao

Publications

PUBLICATIONS

- **Computational Sustainability: Computing for a Better World and a Sustainable Future** *COMMUNICATIONS OF THE ACM*
Gomes, C., Dietterich, T., Barrett, C., Conrad, J., Dilkina, B., Ermon, S., Fang, F., Farnsworth, A., Fern, A., Fern, X., Fink, D., Fisher, D., Flecker, et al
2019; 62 (9): 56–65
- **High-Voltage Charging-Induced Strain, Heterogeneity, and Micro-Cracks in Secondary Particles of a Nickel-Rich Layered Cathode Material** *ADVANCED FUNCTIONAL MATERIALS*
Mao, Y., Wang, X., Xia, S., Zhang, K., Wei, C., Bak, S., Shadike, Z., Liu, X., Yang, Y., Xu, R., Pianetta, P., Ermon, S., Stavitski, et al
2019; 29 (18)
- **InfoVAE: Balancing Learning and Inference in Variational Autoencoders**
Zhao, S., Song, J., Ermon, S., AAAI
ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2019: 5885–92
- **Tile2Vec: Unsupervised Representation Learning for Spatially Distributed Data**
Jean, N., Wang, S., Samar, A., Azzari, G., Lobell, D., Ermon, S., AAAI
ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2019: 3967–74
- **Rapid identification of pathogenic bacteria using Raman spectroscopy and deep learning.** *Nature communications*
Ho, C. S., Jean, N., Hogan, C. A., Blackmon, L., Jeffrey, S. S., Holodniy, M., Banaei, N., Saleh, A. A., Ermon, S., Dionne, J.
2019; 10 (1): 4927
- **Predicting Economic Development using Geolocated Wikipedia Articles**
Sheehan, E., Meng, C., Tan, M., UzKent, B., Jean, N., Burke, M., Lobell, D., Ermon, S., Assoc Comp Machinery
ASSOC COMPUTING MACHINERY.2019: 2698–2706
- **Using machine learning to discover shape descriptors for predicting emulsion stability in a microfluidic channel.** *Soft matter*
Khor, J. W., Jean, N., Luxenberg, E. S., Ermon, S., Tang, S. K.
2018
- **Learning with Weak Supervision from Physics and Data-Driven Constraints** *AI MAGAZINE*
Ren, H., Stewart, R., Song, J., Kuleshov, V., Ermon, S.
2018; 39 (1): 27–38
- **Bias and Generalization in Deep Generative Models: An Empirical Study**
Zhao, S., Ren, H., Yuan, A., Song, J., Goodman, N., Ermon, S., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018
- **The Information Autoencoding Family: A Lagrangian Perspective on Latent Variable Generative Models**
Zhao, S., Song, J., Ermon, S., Globerson, A., Silva, R.
AUAI PRESS.2018: 1031–41
- **Bayesian optimization and attribute adjustment**
Eismann, S., Levy, D., Shu, R., Bartzsch, S., Ermon, S., Globerson, A., Silva, R.
AUAI PRESS.2018: 1042–52
- **End-to-End Learning of Motion Representation for Video Understanding**
Fan, L., Huang, W., Gan, C., Ermon, S., Gong, B., Huang, J., IEEE
IEEE.2018: 6016–25
- **Semi-supervised Deep Kernel Learning: Regression with Unlabeled Data by Minimizing Predictive Variance**
Jean, N., Xie, S., Ermon, S., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018
- **Infrastructure Quality Assessment in Africa using Satellite Imagery and Deep Learning**
Oshri, B., Hu, A., Adelson, P., Chen, X., Dupas, P., Weinstein, J., Burke, M., Lobell, D., Ermon, S., ACM

ASSOC COMPUTING MACHINERY.2018: 616–25

- **Deep Transfer Learning for Crop Yield Prediction with Remote Sensing Data**
Wang, A. X., Tran, C., Desai, N., Lobell, D., Ermon, S., Assoc Comp Machinery
ASSOC COMPUTING MACHINERY.2018
- **Amortized Inference Regularization**
Shu, R., Bui, H. H., Zhao, S., Kochenderfer, M. J., Ermon, S., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018
- **Flow-GAN: Combining Maximum Likelihood and Adversarial Learning in Generative Models**
Grover, A., Dhar, M., Ermon, S., AAAI
ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2018: 3069–76
- **Boosted Generative Models**
Grover, A., Ermon, S., AAAI
ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2018: 3077–84
- **Approximate Inference via Weighted Rademacher Complexity**
Kuck, J., Sabharwal, A., Ermon, S., AAAI
ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2018: 6376–83
- **Deterministic Policy Optimization by Combining Pathwise and Score Function Estimators for Discrete Action Spaces**
Levy, D., Ermon, S., AAAI
ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2018: 3474–81
- **Constructing Unrestricted Adversarial Examples with Generative Models**
Song, Y., Shu, R., Kushman, N., Ermon, S., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018
- **Multi-Agent Generative Adversarial Imitation Learning**
Song, J., Ren, H., Sadigh, D., Ermon, S., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018
- **Streamlining Variational Inference for Constraint Satisfaction Problems**
Grover, A., Achim, T., Ermon, S., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018
- **Coupling between oxygen redox and cation migration explains unusual electrochemistry in lithium-rich layered oxides** *NATURE COMMUNICATIONS*
Gent, W. E., Lim, K., Liang, Y., Li, Q., Barnes, T., Ahn, S., Stone, K. H., McIntire, M., Hong, J., Song, J., Li, Y., Mehta, A., Ermon, et al
2017; 8
- **Autotuning Stencil Computations with Structural Ordinal Regression Learning**
Cosenza, B., Durillo, J. J., Ermon, S., Juurlink, B., IEEE
IEEE.2017: 287–96
- **A-NICE-MC: Adversarial Training for MCMC**
Song, J., Zhao, S., Ermon, S., Guyon, Luxburg, U. V., Bengio, S., Wallach, H., Fergus, R., Vishwanathan, S., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2017
- **InfoGAIL: Interpretable Imitation Learning from Visual Demonstrations**
Li, Y., Song, J., Ermon, S., Guyon, Luxburg, U. V., Bengio, S., Wallach, H., Fergus, R., Vishwanathan, S., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2017
- **Coupling between oxygen redox and cation migration explains unusual electrochemistry in lithium-rich layered oxides.** *Nature communications*
Gent, W. E., Lim, K., Liang, Y., Li, Q., Barnes, T., Ahn, S. J., Stone, K. H., McIntire, M., Hong, J., Song, J. H., Li, Y., Mehta, A., Ermon, et al
2017; 8 (1): 2091
- **Monitoring Ethiopian Wheat Fungus with Satellite Imagery and Deep Feature Learning**
Pryzant, R., Ermon, S., Lobell, D., IEEE

IEEE.2017: 1524–32

- **Unsupervised Data Mining in nanoscale X-ray Spectro-Microscopic Study of NdFeB Magnet** *SCIENTIFIC REPORTS*
Duan, X., Yang, F., Antono, E., Yang, W., Pianetta, P., Ermon, S., Mehta, A., Liu, Y.
2016; 6
- **Combining satellite imagery and machine learning to predict poverty.** *Science*
Jean, N., Burke, M., Xie, M., Davis, W. M., Lobell, D. B., Ermon, S.
2016; 353 (6301): 790-794