

MITCH HILL

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EDUCATION

University of California, Los Angeles September 2014 - June 2020
Ph.D. Statistics
Dissertation: Learning and mapping energy functions of high-dimensional image data
Committee: Song-Chun Zhu, Ying Nian Wu, Qing Zhou, and Guido Montufar

University of Chicago September 2010 - June 2014
BSc. Mathematics and BA. Statistics

EMPLOYMENT

University of Central Florida August 2020 - present
Assistant Professor of Statistics and Data Science
Director of the Data Mining Lab in the Department of Statistics and Data Science

RESEARCH AREAS

- I Energy landscape mapping (identifying macroscopic structures of highly non-convex functions)
- II High-dimensional unsupervised learning (synthesis of realistic images, unsupervised clustering)
- III Adversarial Perturbation (attacks and defense for robust classification models)
- IV Metastability and emergentism (Hopfield memory, neurological attractor dynamics, protein folding)
- V Markov chain Monte Carlo (Langevin dynamics and HMC, latent space sampling)
- VI Deep learning (loss surfaces of deep networks, unsupervised deep learning)

PUBLICATIONS

On the Anatomy of MCMC-based Maximum Likelihood Learning of Energy-Based Models. E. Nijkamp*, M. Hill*, T. Han, S.C. Zhu, and Y.N. Wu (**equal contributions*). AAAI 2020 (oral).

Monte Carlo Methods. A. Barbu and S.C. Zhu (*Mitch Hill credited as contributing author for Chapters 9, 10, and 11*). Springer Singapore. 2020.

On Learning Non-convergent Non-persistent Short-run MCMC Toward Energy-Based Model. E. Nijkamp, M. Hill, S.C. Zhu, and Y.N. Wu. NeurIPS 2019.

Divergence Triangle for Joint Training of Generator Model, Energy-Based Model, and Inference Model. T. Han, E. Nijkamp, X. Fang, M. Hill, S.C. Zhu, and Y.N. Wu. CVPR 2019.

Building a Telescope to Look into High-Dimensional Image Spaces. M. Hill, E. Nijkamp, and S.C. Zhu. Quarterly of Applied Mathematics. 77(2): 269-321. 2019.

PRE-PRINTS

Stochastic Security: Adversarial Defense Using Long-Run Dynamics of Energy-Based Models. M. Hill*, J. Mitchell*, S.C. Zhu. (**equal contributions*). <https://arxiv.org/abs/2005.13525.pdf>

AWARDS AND GRANTS

UCLA Dissertation Year Fellowship (\$38,000). Award to support final year of dissertation. September 2019 – June 2020.

Extreme Science and Engineering Discovery Environment (XSEDE) ASC170063 (100,000 GPU hours). Grant for computing resources to support intensive deep learning projects. 2018 – 2020.

TEACHING EXPERIENCE

Undergraduate Level Instructor (at UCF)

Statistical Foundation of Data Science and Artificial Intelligence I (STA 4364). Fall 2020 (ongoing).
Data Science I (ISC 4241). Fall 2020 (ongoing).

Graduate Level Teaching Assistant (at UCLA)

Monte Carlo Methods for Optimization (STATS 202C). Spring 2016, 2017, 2018, and 2019.
Research Design, Sampling, and Analysis (STATS 201A). Fall 2017 and Fall 2018.
High-Dimensional Statistics (STATS 200C). Spring 2019.

TECHNICAL SKILLS

Languages & Software Python (Pytorch and Tensorflow), MATLAB, R, C, L^AT_EX