Atish Agarwala

Contact Information

Address: 1600 Amphitheatre Parkway,
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Research interests

Machine learning: Deep learning theory, dynamical systems perspective on learning, high-dimensional optimization, loss landscape geometry, scaling laws, feature learning.

Theoretical biology: Ecology and evolution, fitness landscapes, machine learning for understanding dynamical systems.

Employment

Google Deep Mind, Mountain View, CA
Research Scientist — **March 2021 – Present**

Google Research, Mountain View, CA
AI Resident — **October 2019 – March 2021**

Education

Stanford University, Stanford, CA
PhD in Physics — **September 2013 – September 2019**

Swarthmore College, Swarthmore, PA
Bachelors degree in Physics and Math (Highest honors) — **August 2009 – May 2013**

Programming

Python, JAX, Tensorflow, Matlab, C++. Use UNIX/Linux and Google cloud compute.

Selected Publications

Agarwala, **Atish** and Yann Dauphin (2023). "SAM operates far from home: eigenvalue regularization as a dynamical phenomenon". In: *International Conference on Machine Learning*. PMLR, pp. 152–168.

Roulet, Vincent, **Atish Agarwala**, and Fabian Pedregosa (2023). "On the Interplay Between Stepsize Tuning and Progressive Sharpening". In: *arXiv preprint arXiv:2312.00209*.

Agarwala, **Atish**, Fabian Pedregosa, and Jeffrey Pennington (2022). "Second-order regression models exhibit progressive sharpening to the edge of stability". In: *arXiv preprint arXiv:2210.04860*.

Agarwala, **Atish** and Samuel S Schoenholz (2022). "Deep equilibrium networks are sensitive to initialization statistics". In: *International Conference on Machine Learning*. PMLR, pp. 136–160.

Pearce, Michael T, **Atish Agarwala**, and Daniel S Fisher (2020). "Stabilization of extensive fine-scale diversity by ecologically driven spatiotemporal chaos". In: *Proceedings of the National Academy of Sciences* 117.25, pp. 14572–14583.

Agarwala, **Atish** and Daniel S Fisher (2019). "Adaptive walks on high-dimensional fitness landscapes and seascapes with distance-dependent statistics". In: *Theoretical population biology* 130, pp. 13–49.

Li, Yuping, Sandeep Venkataram, **Atish Agarwala**, Barbara Dunn, et al. (2018). "Hidden complexity of yeast adaptation under simple evolutionary conditions". In: *Current Biology* 28.4, pp. 515–525.

Venkataram, Sandeep, Barbara Dunn, Yuping Li, **Atish Agarwala**, et al. (2016). "Development of a comprehensive genotype-to-fitness map of adaptation-driving mutations in yeast". In: *Cell* 166.6, pp. 1585–1596.

Honours and Awards

CEHG Fellow, 2018-2019
Stanford Bowes BioX Fellow, 2015-2018
William C. Elmore Prize, Swarthmore Physics Department, 2013
Finalist for 2013 Hertz Foundation Fellowship