BLAKE BORDELON

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EDUCATION

Harvard University *July 2019 - Present*
Program: PhD in Applied Mathematics Advisor: Cengiz Pehlevan GPA: 4.0/4.0
Washington University in St. Louis *August 2015 - May 2019*
Majors: Systems Engineering and Physics. Minor: Computer Science GPA: 4.0/4.0

REFEREED CONFERENCE PRECEEDINGS

Self-Consistent Dynamical Field Theory of Kernel Evolution in Wide Neural Networks *Bordelon*, Pehlevan, 2022. Accepted at *Neurips* 2022.
Neural Networks as Kernel Learners: The Silent Alignment Effect Atanasov* *Bordelon**, Pehlevan *International Conference of Learning Representations (ICLR)*, 2022
Capacity of Group-invariant Linear Readouts from Equivariant Representations, Farrell*, *Bordelon**, Trivedi, Pehlevan, *ICLR*, 2022
Learning Curves for SGD on Structured Features, *Bordelon*, Pehlevan, *ICLR*, 2022
Out-of-Distribution Generalization for Kernels, Canatar, *Bordelon*, Pehlevan, *Neurips* 2021
Efficient Online Inference for Nonparametric Mixture Models, Shaeffer, *Bordelon*, Khona, Pan, Fiete *Uncertainty in Artificial Intelligence* 2021
Spectrum Dependent Learning Curves in Kernel Regression and Wide Neural Networks, *Bordelon*, Canatar, and Pehlevan, *International Conference of Machine Learning*, 2020.

JOURNAL PUBLICATIONS

Spectral Bias and Task-Model Alignment Explain Generalization in Kernel Regression and Infinitely Wide Neural Networks, Canatar, *Bordelon*, Pehlevan, *Nature Comms.* 2021.
Dispersive optical model of Pb-208 generating a neutron-skin prediction beyond the mean field, Atkinson, Mahzoon, Keim, *Bordelon*, Pruitt, Charity, and Dickhoff, *Phys. Rev. C*, 2020
Pre-Synaptic Pool Modification (PSPM): A supervised learning procedure for recurrent spiking neural networks, Bagley, *Bordelon*, Moseley, Wessel, *PLOS ONE*, 2020

UNDER REVIEW

Population Codes Enable Learning from Few Examples By Shaping Inductive Bias *Bordelon*, Pehlevan, 2021. Under Review at *eLife*.
A Theory of NTK Alignment and Its Influence on Training, Shan*, *Bordelon**, 2021. Preparing submission.
Integration of flexible nanoelectronics with artificial intelligence-driven circuits for long-term stable and self-programmable brain decoding, Guo, Zhao, Tang, *Bordelon*, Partarrieu, Lee, Pehlevan, Liu, 2021. Under Review at *Nature Machine Intelligence*.

PRESENTATIONS AND INVITED TALKS

Field Theory of Deep Feature Learning Two Sigma Research Symposium 2022 (Invited Talk)
Infinite Neural Networks: Lazy and Rich Regimes Google Brain 2022 (Invited Talk)
Statistical Mechanics of Kernel Regression and Wide Neural Networks, APS 2022
When are Neural Networks Kernel Learners?, APS 2022.
Structured Neural Codes Enable Generalization Through Code-Task Alignment, APS 2022.

How many objects can be classified under all possible views?, Cosyne 2022
Learning Curves for SGD on Structured Features, Deepmath 2021 (Invited Talk)
Neural Populations Learn from Few Examples through Code-Task Alignment, Cosyne 2021.
Statistical Mechanics of Generalization in Kernel Regression Deepmath 2020

AWARDS

NSF Simons Harvard Center Quantitative Biology Fellowship *June 2021-2022*
McKelvey School of Engineering Valedictorian *May 2019*
Nishi Luthra Senior Prize in Physics *May 2019*

TEACHING EXPERIENCE

Teaching Fellow for Introduction to Applied Math *Spring 2022*
Teaching Fellow for Neural Computation (Certificate of Distinction) *Fall 2020*
Teaching Assistant for Engineering Math *August 2017-May 2018*

PROGRAMMING LANGUAGES

Strong Proficiency in Python (numpy, scipy, JAX, Pytorch, etc). Proficient in Matlab and C++.