Jules Berman

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Summary

Second year PhD Student in computer science with research focus on developing numerical methods for nonlinear model reduction and high dimensional PDEs using neural networks and other machine learning techniques.

Education

B.S. Computer Science, New York University. *2017*
Ph.D. Computer Science, New York University. *Est. Graduation 2026*

Experience

NYU, Courant Institute of Mathematical Sciences *Sept 2022 – Current*
Ph.D Candidate, advised by Benjamin Peherstorfer

Formulated new method for reduced order modeling using sparse approximations of deep networks to solve PDEs both an order of magnitude faster and more accurate than comperable methods.

Conducted research into the use score based diffusion models for uncertainty quantification of SDEs.

Flatiron Institute *May 2021 – Aug 2022*
Research Analyst, Center for Computational Neuroscience

Formulated novel model of a single neuron using normal mode decomposition.

Developed method which used point cloud representations to improve segmentation of 3D brain images.

Built software platform to train deep networks at scale. Trained 100k+ models, and built tools for analysis.

Bloomberg LP *April 2018 – April 2021*
Software Engineer, Global Infrastructure Team

Maintained the full stack of a company-wide infrastructure procurement web application.

Built a machine learning model which used historical data to project future infrastructure usage.

Publications

Randomized Sparse Neural Galerkin Schemes with Deep Networks Neurips 2023 • *Spotlight*
J. Berman, B. Peherstorfer [arxiv]

Representational Dissimilarity Metric Spaces for Stochastic Neural Networks ICLR 2023 • *Accepted*
L. Duong, J. Nassar, J. Zhou, **J. Berman**, J. Olieslagers, A Williams. [arxiv]

Nonlinear embeddings for conserving quantities with Neural Galerkin schemes SISC 2023 • *In Review*
P. Schwerdtner, P. Schulze, **J. Berman**, B. Peherstorfer [arxiv]

Neuronal Temporal Filters as Normal Mode Extractors Phys. Rev. Research 2022 • *In Review*
J. Berman, S. Golkar, S. Farashahi, D. Lipshutz, D.B. Chklovskii.

Bridging the Gap: Point Clouds for Merging Neurons in Connectomics MIDL 2022 • *Accepted*
J. Berman, J. Wu, D.B. Chklovskii. [arxiv]

Nonlinear Model Reduction via Pretrained Neural Galerkin Schemes 2023 • *In Preparation*
J. Berman, B. Peherstorfer

Skills

Machine learning, numerical analysis, deep learning, nonlinear model reduction, diffusion models

Python, Jax, Pytorch, Tensorflow, NumPy, Matlab, Chebfun, SLURM, Javascript