Nate Gillman
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EDUCATION

Brown University, Providence, RI
- **PhD** (Artificial Intelligence, Machine Learning, Generative AI) *2020 – present*
- **ScM** (Mathematics) *2022*

Wesleyan University, Middletown, CT
- **BA** (Mathematics, Computer Science, Hebrew; Class rank 1/748, Barry Goldwater Scholar) *2020*

RELEVANT TECHNICAL SKILLS

- *Programming languages I've used:* Python, C, Cython, Standard ML, R, LaTeX, SageMath, HTML, JavaScript
- *Data science/tooling:* PyTorch, Tensorflow, Numpy, Pandas, Matplotlib, AWS, GCP, Cuda, Docker
- *Expertise/interests:* deep learning, time series forecasting, computer vision, natural language processing, autonomous vehicles, machine learning, transportation logistics, cryptography and security

RELEVANT WORK/PROJECT/RESEARCH EXPERIENCE

Machine Learning Internships during PhD leave of absence, New York City *June 2022 – June 2023*

1) **Data Scientist**, American Express AI Labs *June 2022 – August 2022*
   - Created chatbot using open-source software; improved customer UX when disputing fraudulent charges
   - Managed end-to-end data science pipeline: data procurement, model design, testing/validation
2) **Machine Learning Engineer**, Akkio *August 2022 – January 2023*
   - Seed-stage no-code AI startup; designed and executed experiments to evaluate model shortcomings
   - Revamped PyTorch time series forecasting models to improve ML model performance by 30%
3) **Machine Learning Engineer**, Captions *January 2023 – June 2023*
   - ML research and development across our iOS app's audio processing stack; cleaned user production data
   - Trained PyTorch audio models (speaker separation, speaker diarisation, voice cloning) from scratch

Artificial Intelligence PhD Research, Brown University *2020-present*
- *Computer Vision:* developed novel architectures for pedestrian intention forecasting using generative AI; working with Honda self-driving datasets, collaborated with researchers at Honda Research Institute
- *Natural Language Processing, Machine Learning:* invented a rigorous mathematical method for measuring uniformity of spatial utilization of word embedding spaces; designed and executed numerical experiments using Numpy to evaluate properties of competing metrics; published results in conference
- *Cryptography:* researched digital signature schemes which are secure and efficient for autonomous vehicles

Pure Mathematics Research, lots of places *2016-2022*
- Conjectured and proved theorems about distribution of primes, and distribution of geometric invariants
- Work done at Wesleyan University, Budapest Semesters in Mathematics, Emory University, Brown University
- Published five peer-reviewed journal articles, presented technical results at five professional venues

PUBLICATIONS/PATENTS (see personal site for all)

- IsoScore: Measuring the Uniformity of Vector Space Utilization. *Findings of Association for Computational Linguistics* (2022). Code with *pip install*: https://github.com/bcbi-edu/p_eickhoff_isoscore
- *Methods and Systems for Dynamically Generating a Plurality of Machine Learning Systems During Processing of a User Data Set.* U.S. Patent Application No. 63/411,898, filed September 30, 2022. Patent pending.

LEADERSHIP/TEACHING EXPERIENCE

- *Seminar organization:* Brown math PhD student seminar (2021), arithmetic dynamics seminar (2020)
- *Teaching:* PhD student teacher training (2021), mentored a directed reading program in cryptography (2021), course assistant for algebra, analysis, calculus, discrete math, number theory (2017-2022)
- *Outreach:* organized activities "Numbers in Nature with Nate" and "Math Yoga" at youth summer camps