

# Jordan Lei

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## Education

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<b>New York University • GPA : 3.9/4.0</b> <ul style="list-style-type: none"><li>Pursuing a <b>Ph.D. in Neuroscience</b>, Center for Neural Science</li><li>Rotation Advisors: Wei Ji Ma, Eero Simoncelli, Robert Froemke</li></ul>	<b>2021 - Present</b> New York, NY
<b>University of Pennsylvania • GPA : 4.0/4.0 • Summa Cum Laude</b> <ul style="list-style-type: none"><li><b>M.S.E. in Computer Science, Thesis: "Object-Based Attention Through Internal Gating"</b></li><li>Special topics: Deep Learning, Computational Linguistics, Machine Learning, Computer Vision, Artificial Intelligence, Big Data Analytics, Statistical Inference, Linear Algebra</li></ul>	<b>2021</b> Philadelphia, PA
<b>University of Pennsylvania • GPA : 3.9/4.0 • Summa Cum Laude</b> <ul style="list-style-type: none"><li>Jerome Fisher Program in Management and Technology (M&amp;T)</li><li><b>B. S. Engineering in Computer Science, School of Engineering and Applied Sciences</b></li><li><b>B. S. Economics in Operations/ Information/ Decisions, The Wharton School</b></li></ul>	<b>2020</b> Philadelphia, PA
<b>Westview HS • GPA : 4.7/4.0 • Valedictorian (rank 1<sup>st</sup> of 603)</b> <ul style="list-style-type: none"><li>National Merit Scholar, Presidential Scholar Semifinalist, National AP Scholar</li></ul>	<b>2016</b> Portland, OR

## Fellowships

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- Henry M. MacCracken Fellowship, 2021
  - IVADO PhD Excellence Scholarship, 2021 (declined)
  - Lila R. Gleitman MINDCORE Summer Fellowship, 2020
  - Penn Undergraduate Research Mentorship Fellowship, 2017

## Research Experience

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<b>Lila R. Gleitman MINDCORE Summer Fellow   Gold Lab, Penn</b> <ul style="list-style-type: none"><li>Goal: Assess limitations of Reward Modulated Hebbian Learning relative to Deep Reinforcement Learning in auditory discrimination tasks</li><li>Analyzed common failure modes of traditional linear learning agents, including task complexity, network complexity, and catastrophic forgetting. Technologies: PyTorch</li><li>Preliminary results and figures submitted as part of a major grant proposal; presented early findings at Neuromatch Conference 2020</li></ul>	<b>Summer 2020</b> Philadelphia, PA
<b>Independent Study   Kording Lab, Penn</b> <ul style="list-style-type: none"><li>Goal: use neuroscience insights about attention to develop priors about learning in visual tasks</li><li>Used recurrence, encoder-decoder architectures, and targeted loss functions to model object-based attention for classification tasks</li><li>Developed neuro-physiologically inspired attention models for Computer Vision using Deep Neural Networks. Technologies: PyTorch</li></ul>	<b>2019 - Present</b> Philadelphia, PA
<b>Penn Undergraduate Research Mentorship Fellow   Balasubramanian Lab, Penn</b> <ul style="list-style-type: none"><li>Goal: develop insights into deeper layers of the visual cortex using Deep Learning</li><li>Modeled visual pathway of the brain using Deep Neural Networks trained on Computer Vision tasks. Modeled visual stimuli and retinal behavior. Technologies: Tensorflow, Keras, MATLAB</li><li>Research funded as part of Center for Undergraduate Research and Fellowships (CURF). Work presented at CURF Research Expo, 2017.</li></ul>	<b>Summer 2017</b> Philadelphia, PA
<b>Independent Study   PEI Lab, CMU</b> <ul style="list-style-type: none"><li>Researched the use of footstep-induced vibrations for occupant monitoring and detection</li><li>Co-authored one paper (submitted), patent submitted for sensor model (pending)</li></ul>	<b>Summer 2015</b> Mountain View, CA
<b>Research Intern   Pediatric Cardiology, Oregon Health and Science University</b> <ul style="list-style-type: none"><li>Studied the effect of rotation on global strain using real-time 3D echocardiography</li><li>Co-authored 3 published abstracts, presented findings at American College of Cardiology Conference 2015 poster session</li></ul>	<b>Summer 2014</b> Portland, OR

## Poster Presentations and Demos

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- Kathleen Martin, Colin Bredenberg, Cristina Savin, Jordan Lei, Eero Simoncelli, Robert Froemke, New York University. "Experience early in auditory conditioning impacts across-animal variability in neural tuning", COSYNE 2022 <https://tinyurl.com/leicosyne2022>
- "Assessing Limitations of Three-Factor Hebbian Learning Relative to Deep Reinforcement Learning", 2020 Neuromatch Conference 3.0 [https://neuromatch.io/abstract/?submission\\_id=rec3SIk5XIqDVWSb8](https://neuromatch.io/abstract/?submission_id=rec3SIk5XIqDVWSb8)
- "Modeling Learning in Auditory Discrimination Tasks Using Reinforcement Learning", Leila R. Gleitman Undergraduate Summer Program in Interdisciplinary Mind and Brain Studies Poster Session (2020)
- "From Neurons to Nodes: Using Deep Learning to Infer the Visual Pathway of the Brain", Center for Undergraduate Research and Fellowships Expo (2017)
- "Effect of Rotation on Myocardial Strain Determination Using Real-Time Three-Dimensional Echocardiography", American College of Cardiology 64th Annual Scientific Session & Expo (ACC 2015).

## Publications

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### Papers

- (Submitted to NeurIPS 2021) [Lei, Jordan](#), Ari S. Benjamin, and Konrad P. Kording. "Object Based Attention Through Internal Gating." arXiv preprint arXiv:2106.04540 (2021). <https://arxiv.org/abs/2106.04540>

### Abstracts

- D. Sahn, [H. Lei](#), P. Mathur, K. Hastie, G. Farland, M. Ashraf, C. Streiff, L. Tam, M. Zhu. "Effect of Rotation on Myocardial Strain Determination Using Real-Time Three-Dimensional Echocardiography." *Journal of the American College of Cardiology* 65.10S (2015): A1236. [https://www.onlinejacc.org/content/65/10\\_Supplement/A1236](https://www.onlinejacc.org/content/65/10_Supplement/A1236)
- D. Sahn, P. Mathur, [H. Lei](#), K. Hastie, G. Farland, M. Ashraf, C. Streiff, M. Zhu. "Using 4D Echocardiography Imaging to Evaluate the Effect of Stroke Volume on Myocardial Strain." *Journal of the American College of Cardiology* 65.10S (2015): A1237. [https://www.onlinejacc.org/content/65/10\\_Supplement/A1237](https://www.onlinejacc.org/content/65/10_Supplement/A1237)
- D. Sahn, J. Anderson, C. Streiff, L. Tam, H. Tam, [H. Lei](#), M. Ashraf, M. Zhu. "Three-Dimensional Echocardiographic Evaluation of Ventricular Septal Circumferential Strain in the Presence of Interventricular Dyssynchrony." *Journal of the American College of Cardiology* 65.10S (2015): A914. [https://www.onlinejacc.org/content/65/10\\_Supplement/A914](https://www.onlinejacc.org/content/65/10_Supplement/A914)
- K. Gadd, L. Tam, M. Ashraf, [H. Lei](#), C. Streiff, M. Zhu, D. Sahn. "Feasibility of New Real-Time 3-Dimensional Echocardiographic Imaging in a Mitral Valve Stenosis Model: A Comparison With 2D Imaging", *Circulation* 132.suppl\_3 (2015): A9923. [https://www.ahajournals.org/doi/abs/10.1161/circ.132.suppl\\_3.9923](https://www.ahajournals.org/doi/abs/10.1161/circ.132.suppl_3.9923)

## Teaching Experience

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### Teaching Assistant, CIS 522 Deep Learning | Penn

- Prepared course material, developed and graded homework assignments, held recitations and weekly office hours, led project meetings. Special topics: Neural Network Debugging (HW), GANs (recitation, slides), NLP/Transformers (slides)

Spring 2020

Philadelphia, PA

### Teaching Assistant, CIS 519 Machine Learning | Penn

- Prepared course material, including slides and in-class activities, graded exams and homework. Special topics: Decision Trees, Perceptrons, Bayesian Inference, AI and Data ethics

Spring, Fall 2019

Philadelphia, PA

## Work Experience

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### Unilever Summer Intern | Unilever

- Worked in Sales and Operations Planning to automate reporting of statement of cash flows
- Created a full-stack web app for sales and operations using Python, Flask, and Dash

Summer 2019

Englewood Cliffs, NJ

### Startup Intern | Tovola

- Performed data analysis on advertising to estimate customer acquisition costs
- Created a dynamic prediction model for packaging using historical weather data in python

Summer 2018

Chicago, IL

## Skills

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- Research: Computational Neuroscience, Deep Learning (Reinforcement Learning, Computer Vision), Data Analytics
- **Computer Science Languages:** Python (PyTorch, TensorFlow, Keras), Java, JavaScript, React, HTML/CSS, Android, C
- **Hobbies:** Art (digital, painting, sketch), Piano, Guitar, Swimming

## Outreach

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<b>Percentage Project Lead Web Developer   Percentage Project Nonprofit</b>	2020
<ul style="list-style-type: none"><li>• A 501(c)(3) nonprofit dedicated to conveying through art and data the challenges that minorities / underrepresented groups face in STEM, both in academia and the workplace</li><li>• Designed website, data visualizations, and participated in social media campaign.</li><li>• Link: <a href="https://percentageproject.com">https://percentageproject.com</a></li></ul>	
<b>Student Wellness Advisory Group   Penn</b>	2020
<ul style="list-style-type: none"><li>• Nominated by staff members at Penn to represent the student body in meetings surrounding wellness and mental health on campus. Directly consulted the Chief Wellness Officer at Penn, Dr. Benoit Dube, with a panel of student representatives.</li></ul>	

## Projects

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<b>Neuromatch Academy   Neuromatch</b>	2020
<ul style="list-style-type: none"><li>• A 3-week project-driven bootcamp for Computational Neuroscience research (Interactive Track). Team project: Predicting future confidence based on past confidence and reward dynamics in two-alternative forced choice tasks.</li><li>• Link: <a href="https://github.com/jordanlei/neuromatch-project">https://github.com/jordanlei/neuromatch-project</a></li></ul>	
<b>Jordan's Medium Blog   Medium</b>	2020
<ul style="list-style-type: none"><li>• A blog dedicated to questions around machine learning, neuroscience, and art. Featured posts have been published by The Startup, Medium's largest active publication</li><li>• Link: <a href="https://medium.com/@jordanlei">https://medium.com/@jordanlei</a></li><li>• (Human) Domain Expertise in the Age of Deep Learning: <a href="https://medium.com/swlh/human-domain-expertise-in-the-age-of-deep-learning-89b3381c5cba">https://medium.com/swlh/human-domain-expertise-in-the-age-of-deep-learning-89b3381c5cba</a></li><li>• Machine Minds: <a href="https://medium.com/swlh/machine-minds-a59cfb8d8d14">https://medium.com/swlh/machine-minds-a59cfb8d8d14</a></li></ul>	
<b>Deep Reinforcement Learning with Cartpole in PyTorch</b>	2020
<ul style="list-style-type: none"><li>• Comparing different Deep Reinforcement Learning algorithms (Deep Q Networks, Policy Gradient, Advantage Actor Critic) for CartPole by OpenAI Gym. Technologies: PyTorch</li><li>• Link: <a href="https://github.com/jordanlei/deep-reinforcement-learning-cartpole">https://github.com/jordanlei/deep-reinforcement-learning-cartpole</a></li></ul>	
<b>AI Word Processor   Deep Learning Course Project</b>	2019
<ul style="list-style-type: none"><li>• Designed a context-aware word processor using bi-directional LSTMs (team of 2). Technologies: PyTorch</li><li>• Link: <a href="https://github.com/jordanlei/neural-network-autocorrect">https://github.com/jordanlei/neural-network-autocorrect</a></li></ul>	
<b>Gigfitter   Senior Design Project</b>	2019
<ul style="list-style-type: none"><li>• Developed a predictive revenue model for gig economy contractors and other ridesharing workers. Technologies: Python, Flask, Sklearn</li><li>• Link: <a href="https://github.com/jordanlei/gig-economy">https://github.com/jordanlei/gig-economy</a></li></ul>	
<b>Polymaker   Software Engineering Course Project</b>	2019
<ul style="list-style-type: none"><li>• Created a full-stack app for microfinancing policymakers (team of 5).</li></ul>	
<b>Ad Revenue Estimation   Wharton Analytics Fellows</b>	2018
<ul style="list-style-type: none"><li>• Estimated revenue for prospective customers using machine learning for our client</li><li>• Models: decision trees, linear models, deep neural networks. Technologies: Python, R</li></ul>	