Jerome L. Greene Science Center
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Qihong Lu

Education & Academic Appointments

2023/12-present **Alan Kanzer Postdoctoral Fellow, Columbia University**.
Affiliations: Center for Theoretical Neuroscience & Zuckerman Mind, Brain and Behavior Institute
PIs: Stefano Fusi, Daphna Shohamy

2023/05-12 **Postdoctoral Research Associate** (transitional position), **Princeton University**.
Advisor: Ken Norman

2017-2023 **Ph.D. & M.A., Cognitive Psychology, Princeton University**.
Advisors: Ken Norman, Uri Hasson
Dissertation Committee: Ken Norman, Uri Hasson, Tom Griffiths, Sam Gershman, Jeff Zacks

2013-2017 **B.S., Mathematics & Psychology, University of Wisconsin-Madison**.
Graduated with Comprehensive Honors (college-level highest honors)
Certificate (Minor) in Computer Science

Research Internships

2022/05-09 **Research Scientist Intern**, **CTRL-labs, Reality Labs, Meta**.
Computational modeling and machine learning for wrist-based EMG neural interfaces.
Managers: Abigail Russo, Diogo Peixoto & David Sussillo

2015/05-09, 2016/05-09 **Research Intern**, **The Parallel Distributed Processing Lab, Stanford University**.
Built neural network models of mathematical cognition.
P.I.: James L. McClelland

Papers & Preprints

Lu, Q., Nguyen, T., Zhang Q., Hasson, U., Griffiths, T. L., Zacks, J. M., Gershman, S. J., Norman, K. A. (2023). Toward a more biologically plausible neural network model of latent cause inference. aXiv.

Lu, Q., Hasson, U., Norman, K.A. (2022). A neural network model of when to retrieve and encode episodic memories. eLife, 11, e74445.

Kumar, M., Anderson, M.J., Antony, J.W., Baldassano C., Brooks, P.P., Cai, M.B., Chen, P.H.C., Ellis, C.T., Henselman-Petrusek, G., Huberdeau, D., Hutchinson, J.B., Li, P.Y., **Lu, Q.**, Manning, J.R., Mennen, A.C., Nastase, S.A., Hugo, R., Schapiro, A.C., Schuck, N.W., Shvartsman, M., Sundaram, N., Suo, D., Turek, J.S., Vo, V.A., Wallace, G., Wang, Y., Zhang, H., Zhu, X., Capota, M., Cohen, J.D., Hasson, U., Li, K., Ramadge, P.J., Turk-Browne, N.B., Willke, T.L. & Norman, K.A. (2022). BrainIAK: The Brain Imaging Analysis Kit. Aperture Neuro, 1(4).

Rogers, T. T., Cox, C., **Lu, Q.**, Shimotake, A., Kikuch, T., Kunieda, T., Miyamoto, S., Takahashi, R., Ikeda, A., Matsumoto, R., Lambon Ralph, M. A. (2021). Evidence for a deep, distributed and dynamic semantic code in human ventral anterior temporal cortex. eLife, 10, e66276.

Chen, C., **Lu, Q.**, Beukers, A., Baldassano, C., & Norman, K. A. (2021). Learning to perform role-filler binding with schematic knowledge. PeerJ, 9, e11046.

Lu, Q., Hasson, U., Norman, K.A., (2020). Learning to use episodic memory for event prediction. bioRxiv.

Kumar, M., Ellis, C. T., **Lu, Q.**, Zhang, H., Capotă, M., Willke, T. L., Ramadge, P. J., Turk-Browne, N. B., & Norman, K. A. (2020). BrainIAK tutorials: User-friendly learning materials for advanced fMRI analysis. PLoS Computational Biology, 16(1), e1007549.

Lu, Q., Chen, P. H., Pillow, J. W., Ramadge, P. J., Norman, K. A., & Hasson, U. (2018). Shared Representational Geometry Across Neural Networks. Workshop on Integration of Deep Learning Theories, 32nd Conference on Neural Information Processing Systems (NeurIPS).

McClelland, J. L., Mickey, K., Hansen, S., Yuan, X., & **Lu, Q.** (2016). A Parallel-Distributed Processing Approach to Mathematical Cognition. Manuscript, Stanford University.

Selected External Talks

2023/11 Mattar Lab. New York University. PI: Marcelo Mattar

2023/10 Department of Psychology, The University of Hong Kong. Host PI: Xiaoqing Hu

2023/09 Shohamy Lab. Columbia University. PI: Daphna Shohamy

2022/03 Penn Computational Cognitive Neuroscience Lab. University of Pennsylvania. PI: Anna Schapiro

2022/02 State Key Laboratory of Cognitive Sciences and Learning. Beijing Normal University. PI: Yunzhe Liu

2022/02 Mila Neural-AI Reading Group. Mila - Quebec AI Institute

2021/07 Honey Lab & Chen Lab. Johns Hopkins University. PI: Chris Honey & Janice Chen

2021/07 Contextual Dynamics Lab. Dartmouth College. PI: Jeremy Manning

2021/06 Oxford Neurotheory Lab. University of Oxford. PI: Andrew Saxe

2021/03 Google DeepMind. PI: Matthew Botvinick

2021/02 Dynamic Memory Lab. University of California, Davis. PI: Charan Ranganath

2021/03 Invited Symposium on How Prior Knowledge Shapes Encoding of New Memories. Cognitive Neuroscience Society Annual Meeting (CNS)

2020/08 Context and Episodic Memory Symposium (CEMS)

2020/03 Neuromatch Conference (NMC)

Conference Proceedings & Posters

Lu, Q., Nguyen, T., Hasson, U., Griffiths, T. L., Zacks, J. M., Gershman, S. J., & Norman, K. A. (2023). Toward a More Neurally Plausible Neural Network Model of Latent Cause Inference. Poster presented at the Conference on Cognitive Computational Neuroscience (CCN).

Dong, C., **Lu, Q.**, & Norman, K. A. (2023). Strategic Control of Episodic Memory Through Post-Gating. Poster presented at the Conference on Cognitive Computational Neuroscience (CCN).

Kumar, M., Ellis, C.T., **Lu, Q.**, Zhang, H., Capotă, M., Willke, T.L., Ramadge, P.J., Turk-Browne, N.B., & Norman, K.A. (2020). BrainIAK tutorials: user-friendly learning materials for advanced fMRI analysis. Poster presented at The Organization for Human Brain Mapping Annual Meeting (OHBM).

Lu, Q., Fan, Z. Y., Hasson, U., & Norman, K. A. (2019) Optimal Timing for Episodic Retrieval and Encoding for Event Understanding. The Conference on Cognitive Computational Neuroscience (CCN).

Lu, Q., Fan, Z. Y., Hasson, U., & Norman, K. A. (2019) Patience is a virtue: A normative account of why waiting to encode and retrieve memories benefits event understanding. Poster presented at the Context and Episodic Memory Symposium (CEMS).

Kumar, M., Ellis, C.T., Lu, Q., Zhang, H., Capotă, M., Willke, T.L., Ramadge, P.J., Turk-Browne, N.B., & Norman, K.A. (2019). BrainIAK tutorials: user-friendly learning materials for advanced fMRI

analysis. Poster presented at The Organization for Human Brain Mapping Annual Meeting (OHBM).

Lu, Q., Chen, P. H., Pillow, J. W., Ramadge, P. J., Norman, K. A., & Hasson, U. (2018). Shared Representational Geometry Across Neural Networks. Poster presented at the workshop on Integration of Deep Learning Theories, 32nd Conference on Neural Information Processing Systems (NeurIPS).

Kumar, M., Ellis, C. T., **Lu, Q.**, Zhang, H., Ramadge P. J., Norman, K. A., & Turk-Browne N. B. (2018). BrainIAK education: user-friendly tutorials for advanced, computationally-intensive fMRI analysis. Poster presented at the 48th Annual Meeting of the Society for Neuroscience (SfN).

Lu, Q., Hasson, U., & Norman, K. A. (2018). Modeling hippocampal-cortical dynamics during event processing. The Conference on Cognitive Computational Neuroscience (CCN).

Yu, J. **Lu, Q.**, Hasson, U., Norman, K. A., & Pillow, J. W. (2018). Performance optimization is insufficient for building accurate models for neural representation. The Conference on Cognitive Computational Neuroscience (CCN).

Chen, C., **Lu, Q.**, Beukers, A. Baldassano, C., & Norman, K.A. (2018). Generalized schema learning by neural networks. The Conference on Cognitive Computational Neuroscience (CCN).

Lu, Q., Ramadge, P., Norman, K. A. & Hasson, U. (2018). Measuring representational similarity across neural networks. Poster to be presented at the 40th Annual Meeting of the Cognitive Science Society (CogSci).

Lu, Q., & Rogers, T. T. (2016). An interactive model accounts for both ultra-rapid superordinate classification and basic-level advantage in object recognition. Poster presented at the 38th Annual Meeting of the Cognitive Science Society (CogSci).

Lu, Q., & McClelland, J. L. (2016). Teaching a neural network to count: reinforcement learning with "social scaffolding". Poster presented at the 15th Neural Computation and Psychology Workshop.

Cox, C. R., **Lu, Q.** & Rogers, T. T. (2015). Iterative Lasso: An even-handed approach to whole brain multivariate pattern analysis. Poster presented at the 22nd Cognitive Neuroscience Society annual conference (CNS).

Ad Hoc Review

Journal	Journal of Cognitive Neuroscience Scientific Reports Neurobiology of Learning and Memory ReScience
Conference	Conference on Cognitive Computational Neuroscience (CCN) Neural Information Processing Systems (NeurIPS) International Conference for Learning Representations (ICLR) Conference on the Mathematical Theory of Deep Neural Networks (DeepMath)

Teaching

2021/07-08	**TA**, Deep Learning. Neuromatch Academy
2021 Spring 2018 Fall	**TA**, ELE|NEU|PSY 480 fMRI Decoding: Reading Minds Using Brain Scans. Prof: Ken Norman & Peter Ramadge; Princeton University
2020 Spring 2018 Spring	**TA**, NEU 350 Laboratory in Principles of Neuroscience (2-week fMRI lab). Prof: Alan Gelperin & Anthony Ambrosini; Princeton University
2019 Spring	**TA**, NEU|PSY 330 Computational Modeling of Psychological Function. Prof: Jon Cohen; Princeton University
2019/11, 2019/01	**Guest lecturer**, Functional Alignment for fMRI data. BrainIAK workshop at Princeton University

2018/08 **Guest lecturer**, Introduction to Multivariate Pattern Analysis.
BrainIAK workshop at Princeton University

Research Mentoring

2020-2021 Carson Wardell, Senior Thesis, Princeton. Learning to Imagine: Using Memory-Augmented Neural Networks to Model Cortical-Hippocampal Interaction During Mental Simulation.

2018-2019 Kathy Fan, Senior Thesis, Princeton. Learning When to Encode and Retrieve Episodic Memories with Memory-Augmented Neural Networks.

2018 Summer Noam Miller, Summer Research, Princeton. Leabra7: A Python Software for Modeling Hippocampal-Cortical Interactions in Learning.

2017-2018 Catherine Chen, Senior Thesis, Princeton. Learning the Schematic Structure of a World: Contextual Understanding of Stochastically Generated Stories in Neural Networks.

Honors, Awards & Fellowships

2023-2025 **Alan Kanzer Postdoctoral Fellowship**, Zuckerman Institute, Columbia University.
$80,000 annual costs

2021-2022 **Graduate Student Fellowship in Cognitive Science**, Princeton University.

2021 **Certificate of Excellence**, for teaching a Deep learning course @ NeuromatchAcademy.

2018 **Charles W. Lummis Scholarship**, Princeton University.

2017 **College of Letters & Science Dean's Prize**, UW-Madison.
The highest undergraduate honor awarded by the dean to the three most academically outstanding students of the 2017 class.

2017 **Undergraduate Academic Achievement Award**, UW-Madison.

2017 **Outstanding Undergraduate Research Scholar Award**, UW-Madison.
Department level nomination-based award in the Department of Psychology

2016 **David H. Durra Scholarship**, UW-Madison.
High achieving student in physical sciences or mathematics.

2016 **Undergraduate Travel Awards**, UW-Madison.

2015 **Hilldale Undergraduate Research Fellowship**, UW-Madison.
$4,000 of research funds

2015 **Phi Beta Kappa as a junior**, UW-Madison.

2015 **Bromley Research Conference Travel Grant**, UW-Madison.

2015 **CSLI Summer Research Internship**, Stanford University.

2014, 2015 **Undergraduate Research Scholar Award**, UW-Madison.
Nominated by Dr.Maryellen MacDonald & Dr.Timothy Rogers

2014 **Welton Summer Sophomore Research Grant**, UW-Madison.
$2,500 of research funds

2014 **International Undergraduate Writing Contest 3rd Place**, UW-Madison.

2014 **Margaret E. and Allard Smith Scholarship**, UW-Madison.
High achieving first-year student

Service

2020-2023 **Contributor/Code review**, Brain Imaging Analysis Kit, PNI-Intel collaboration.

2019-2023 **Photographer**, Works featured on the Princeton University website (e.g., 1, 2, 3, 4).

2023 **Application Mentor**, Graduate Program Application Support Group, Empowering Diversity and Promoting Scientific Equity at Princeton Neuroscience Institute (EPSP).

2020-2021 **Member of the Social committee**, Psychology Graduate Student Committee.
Co-initiated a peer-mentoring program to support first-year graduate students during COVID19.

2018-2021 **Organizer**, The Parallel Distributed Processing (PDP) meeting, Princeton.

2020 **Co-organizer**, Conference on the Mathematical Theory of Deep Neural Networks.

2014-2017 **Student Representative**, Faculty Honors Committee, UW-Madison.
Reviewed scholarship and research grant applications.

2013-2014 **Tutor for Calculus**, Greater University Tutoring Service, UW-Madison.

Open Source Contributions

python BrainIAK: Brain Imaging Analysis Kit, PsyNeuLink

Technical Skills

Python (pytorch, keras), Git, bash script, Matlab, R, LaTeX, Adobe Photoshop & Lightroom

Languages

Mandarin Chinese (native), English