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Nicholas M. Blauch

Education

2018-2023 **Ph.D. Program in Neural Computation**, *Carnegie Mellon University*.
Center for the Neural Basis of Cognition | Neuroscience Institute

2013–2017 **B.S. in Individual Concentration**, *University of Massachusetts, Amherst*.
Concentration: Cognitive Computational Neuroscience | Minor: Physics

Experience

2018-2023 **Ph.D. Student**, *Visual Cognition Group*,
Department of Psychology, Carnegie Mellon University
Advisors: Marlene Behrmann, David C. Plaut.

Summer 2022 **Computational Neuroscience Intern**, *SPARK Neuro*,
Advisors: Geoff Brookshire and Shubhendu Trivedi.

2017–2018 **Lab Manager**, *Computational Memory and Perception Laboratory*,
University of Massachusetts, Amherst
Advisor: Rosemary A. Cowell.

2015–2017 **Undergraduate Researcher**, *Cognitive Experiments, Models, and Neuroscience Lab*,
University of Massachusetts, Amherst
Advisor: David E. Huber.

Summer 2016 **Research Fellow**, *Undergraduate Program in Neural Computation*,
Center for the Neural Basis of Cognition, Carnegie Mellon University
Advisors: Elissa Aminoff, Michael J. Tarr.

Summer 2015 **Research Fellow**, *Summer Undergraduate Research Program*,
Center for Neural Science, New York University
Advisor: Denis G. Pelli.

Publications

Full-length Articles

Blauch, N.M. Behrmann, M., Plaut, D.C. A connectivity-constrained computational account of topographic organization in primate high-level visual cortex (2022). *Proceedings of the National Academy of Sciences*, 119 (3).
Code: https://github.com/viscog-cmu/ITN

Blauch, N.M., Behrmann, M., Plaut, D.C. Computational insights into human perceptual expertise for unfamiliar and familiar face recognition (2021). *Cognition*, 208, 104341.
Code: https://github.com/viscog-cmu/familiarity_sims

Granovetter, M., Burlingham, C., **Blauch, N.M.**, Minshaw, C., Heeger, D., Behrmann, M. (2020) Uncharacteristic task-evoked pupillary responses implicate atypical locus coeruleus activity in autism. *Journal of Neuroscience*.
Code: https://github.com/michaelgrano/ASD_nback

Conference Papers

Blauch, N.M., Aminoff, E., Tarr, M.J. (2017). Functionally localized representations contain distributed information: insight from simulations of deep convolutional neural networks. Proceedings of the 39th Annual Meeting of the Cognitive Science Society.

Commentaries

Blauch, N.M., Behrmann, M. Plaut, D.C. (2021). Deep learning of shared perceptual representations for familiar and unfamiliar faces: Reply to commentaries. *Cognition*, 208, 104341.

Blauch, N.M., Behrmann, M. (2019). Representing faces in 3D. Nature Human Behavior.

Conference Talks

2022 Connectivity constraints, viewing biases, and task demands within a bi-hemispheric interactive topographic network account for the layout of human ventral temporal cortex. *Vision Sciences Society Annual Meeting*. St Pete Beach, FL.

2021 Developing topographic organization in a recurrent neural network with biological constraints. *Vision Sciences Society Annual Meeting*. Virtual.

2017 Functionally Localized Representations Contain Distributed Information: Insight from Simulations of Deep Convolutional Neural Networks.
39th Annual Meeting of the Cognitive Science Society. London, U.K.

2017 On Modularity in Mind and Brain
Massachusetts Undergraduate Research Conference. Amherst, MA.

Conference Posters

2022 **Blauch, N.M.**, Behrmann M., Plaut, D.C. A computational model of the cortical topography of human ventral temporal cortex *Organization for Human Brain Mapping.* Glasgow, Scotland, UK.

2020 **Blauch, N.M.**, Behrmann M., Plaut, D.C. Cortical organization as optimization. *Vision Sciences Society Annual Meeting.* Virtual.

2020 **Blauch, N.M.**, Maallo, A.M., Plaut, D.C., Behrmann M. Evidence for an interactive account of hemispheric specialization in visual perception of words and faces. *Conference of the Cognitive Neuroscience Society*. Virtual.

2020 **Blauch, N.M.**, Behrmann M., Plaut, D.C. Computational insights into human expertise for familiar and unfamiliar face recognition. *Conference of the Cognitive Neuroscience Society.* Virtual.

2019 De La Rosa-Rivera, N.M., Leger, K., **Blauch, N.M.**, Cowell, R.A. Neural correlates of recognition memory in the human ventral visual stream. *Conference of the Society for Neuroscience.*

2019 **Blauch, N.M.**, Behrmann M., Plaut, D.C. Visual Expertise and the Familiar Face Advantage. *3rd Annual Cognitive Computational Neuroscience Conference.* Berlin, Germany.

2019 **Blauch, N.M.**, De Avila Belbute Peres, F., Faroqui, J., Chaman Zar, A., Plaut, D., Behrmann, M. Assessing the Similarity of Cortical Object and Scene Perception with Cross-Validated Voxel-Encoding Models. *Vision Sciences Society Annual Meeting.* St. Pete Beach, FL.

2018 **Blauch, N.M.**, Cowell, R.A. Task Demands and Stimulus Normalization in Face Perception: an fMRI Study. *2nd Annual Cognitive Computational Neuroscience Conference.* Philadelphia, PA.

2017 **Blauch, N.M.**, Aminoff E., Tarr, M.J. Understanding Cortical Face Selectivity. *1st Annual Cognitive Computational Neuroscience Conference.* New York, NY.

Invited Talks

2022 Kanwisher Lab, MIT

2021 Vision Lab (PIs: Konkle and Alvarez), Harvard University

2021 Kietzmann Lab, Donders Institute. Remote.

2021 Center for the Neural Basis of Cognition, Carnegie Mellon University. Talk given in receipt of McClelland Prize

2019 Neuroscience Institute, Carnegie Mellon University. 3-minute data blitz given as part of a series for Presidential Fellowship recipients.

Awards and Honors

2022 Travel award, Vision Sciences Society

2022 Best poster, Neuroscience Institute mini-retreat (n=1 winner), Carnegie Mellon University.

2021 McClelland Prize for Best Graduate Student Paper (n=3 winners, Cognition, 2021)
Center for the Neural Basis of Cognition. Carnegie Mellon University

2019 Carnegie Mellon Neuroscience Institute Presidential Fellowship

2017 Cum Laude and Multidisciplinary Honors with Great Distinction
Commonwealth Honors College, University of Massachusetts Amherst.

2017 Excellence in Presentation
2017 Chapter Meeting, Western Massachusetts Society for Neuroscience

2013–2017 Dean's Scholar, University of Massachusetts, Amherst

2013–2017 John and Abigail Adams Scholar

2013–2017 Dean's List (6x), University of Massachusetts, Amherst

Teaching

Summer 2021 Project TA for Neuromatch Academy Computational Neuroscience course

Summer 2020 Head TA for undergraduate Program in Neural Computation (uPNC)
Center for the Neural Basis of Cognition, Carnegie Mellon University

Spring 2020 TA for Parallel Distributed Processing
Department of Psychology, Carnegie Mellon University

Summer 2019 TA for undergraduate Program in Neural Computation (uPNC)
Center for the Neural Basis of Cognition, Carnegie Mellon University

2017 Organized Coding and Computation in Psychology and Neuroscience workshop
UMass Neuroscience Club

2013–2015 Tutor in Math, Physics, and Computer Science.
UMass Amherst Learning Resource Center

Mentorship

2022- Ricky Huang, mathematics undergraduate student at Carnegie Mellon.

2020-2022 Raina Vin, computational neuroscience undergraduate student at Carnegie Mellon. Now: Ph.D student in Neuroscience at Yale.

2018-2019 Sandrine Jabbour, biochemistry & molecular biology undergraduate student at University of Massachusetts, Amherst. Now: Clinical deep brain stimulation specialist at Medtronic.

Service and Leadership

2021- General Member Representative, BRIDGE Center Steering Community

2020 Graduate Representative, Pittsburgh Vision Community Group

2020 Co-chair, Colloquium Committee, Center for the Neural Basis of Cognition

2016–2017 Undergraduate Representative, Organizing Committee for the Western Massachusetts Society for Neuroscience

2017 Senior Advisor, UMass Neuroscience Club

2015-2016 President, UMass Neuroscience Club

Research techniques

Languages: Proficient in Python and MATLAB, experience with BASH, R, Java.

Vision: Psychtoolbox, Psychopy, isoluminant color spaces

ML: Scikit-learn, PyTorch, PyTorch-Lightning, WandB

fMRI/MEG: Freesurfer, FMRIPREP, SPM, CoSMoMVPA, NiLearn, PyCortex, MNE-Python

Other: High-performance cluster computing (HPC), git, open-source code