

Nicholas M. Blauch

Ph.D. student, CMU Program in Neural Computation

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Education

- 2018– **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

Research Experience

- 2018– **Ph.D. Student**, *Visual Cognition Group*,
Department of Psychology, Carnegie Mellon University
Advisors: Marlene Behrmann, David C. Plaut.
- 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 (in press). *Proceedings of the National Academy of Sciences*. Preprint: <https://doi.org/10.1101/2021.05.29.446297>.
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

- 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

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

- 2021 Vision Lab, 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

- 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- Raina Vin, computational neuroscience undergraduate student at Carnegie Mellon.
- 2018-2019 Sandrine Jabbour, biochemistry & molecular biology undergraduate student at University of Massachusetts, Amherst.

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
- fMRI/MEG: Freesurfer, FMRIprep, SPM, CoSMoMVPA, NiLearn, PyCortex, MNE-Python
- Other: High-performance cluster computing (HPC)