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.
Investigating mechanisms of human visual cognition - including face, object, and scene recognition - using neural network models of visual processing, perceptual experiments, and neuroimaging.

2017-2018 **Lab Manager**, *Computational Memory and Perception Laboratory*,
University of Massachusetts, Amherst
Advisor: Rosemary A. Cowell.
Used fMRI, psychophysics, and computational modeling to investigate human perception and memory with a focus on understanding the role of task and stimulus properties on processing in the human face perception network.

2015–2017 **Undergraduate Researcher**, *Cognitive Experiments, Models, and Neuroscience Lab*,
University of Massachusetts, Amherst
Advisor: David E. Huber.
Simulated repetition priming effects with a neural network model employing synaptic depression (nROUSE), and explored the effects of various forms of stochasticity in generating RT distributions. Investigated human color space representation and navigation, and related this perceptual navigation with spatial navigation in an honors thesis on entorhinal grid cells.

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.
Simulated deep convolutional neural networks to understand category selectivity, functional specialization, and localized representations in visual cortex.

Summer 2015 **Research Fellow**, *Summer Undergraduate Research Program*,
Center for Neural Science, New York University
Advisor: Denis G. Pelli.
Trained in psychophysics and performed studies on and modeling of the effects of superimposed and flanking patches of white noise on human sensitivity in peripheral visual letter identification.

Publications

In prep. Blauch, N., Behrmann M., Plaut, D.C. Computational insights into human expertise for unfamiliar and familiar face recognition.

Blauch, N., Cowell, R.A. Task demands modulate decodable information for faces in multiple human cortical areas.

Blauch, N., Aminoff E., Tarr, M.J. Does the hierarchy of primate face-selective areas constitute a cortical module?

Blauch, N., 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.

Conference papers: Blauch, N., 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.

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

Conference Talks

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

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

2019 Blauch, N., 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., 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., Aminoff E., Tarr, M.J. Understanding Cortical Face Selectivity. *1st Annual Cognitive Computational Neuroscience Conference.* New York, NY.

Awards and Honors

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 2019 TA for undergraduate Program in Neural Computation (uPNC)

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

Service and Leadership

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
2016	Historian, Theta Mu Chapter, Pi Kappa Phi Fraternity
2015	Scholarship Chair, Theta Mu Chapter, Pi Kappa Phi Fraternity

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, MNE-Python
Other:	High-performance cluster computing (HPC)