Deborah A. Barany, Ph.D.

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RESEARCH INTERESTS

Goal-directed movement; Functional Neuroimaging; Neurostimulation; Neurorehabilitation

EDUCATION

2013 - 2016 **Ph.D.** Dynamical Neuroscience
University of California, Santa Barbara
Dissertation: *The Neural Dynamics of Continuous Movement*
Advisor: Dr. Scott Grafton

2011 - 2013 **M.A.** Psychology
University of California, Santa Barbara
Thesis: *Decoding Human Sensorimotor Transformations for Goal-Directed Movement*
Advisor: Dr. Scott Grafton

2007 - 2011 **B.A.** Neuroscience with honors and Mathematics with honors, *summa cum laude*
Hamilton College, Clinton, NY
Thesis: *Behavioral and Neural Correlates of Movement Preparation*
Advisor: Dr. Jonathan Vaughan

ACADEMIC APPOINTMENTS

2020 - **Assistant Professor**
Department of Kinesiology, University of Georgia

2020 - **Assistant Professor**
Augusta University/University of Georgia Medical Partnership

2018 - 2020 **Postdoctoral Fellow**
Department of Kinesiology, University of Georgia
Advisor: Dr. Tarkesh Singh

2016 - 2018 **Postdoctoral Fellow**
Department of Neurology, Emory University, Atlanta, GA
Advisors: Drs. Cathrin Buetefisch and Krish Sathian

GRANTS AND FELLOWSHIPS

2018 - 2020	American Heart Association Postdoctoral Fellowship AHA 18POST34060183
2017	NIH Georgia StrokeNet Fellow for Emory University NIH NINDS 1U10NS086607
2016	T32 Postdoctoral Training Grant, Translational Research in Neurology, Emory University NIH NINDS T32NS007480
2015	Affiliates Graduate Dissertation Fellowship, University of California, Santa Barbara
2014	Sigma Xi Grants-in-Aid of Research
2014	Graduate Teaching Fellowship, University of California, Santa Barbara
2011 - 2014	National Science Foundation Graduate Research Fellowship
2011	Elihu Root Fellowship for Graduate Study, Hamilton College
2010	Barry M. Goldwater Scholarship National award for undergraduates preparing for career in STEM
2010	University of Rochester Center for Visual Science Summer Fellowship
2010	Edward Huntington Memorial Mathematical Scholarship, Hamilton College
2008 - 2010	Dean of Faculty Summer Science Research Grant, Hamilton College

HONORS AND AWARDS

2017	Best poster award, Emory Postdoctoral Research Symposium
2014	Runner-up, Grad Slam 3-minute research talk competition Graduate Division, University of California, Santa Barbara
2013	Student Travel Award, American Psychological Association
2011	USA Today All-USA College Academic Third Team
2011	Senior Prize in Neuroscience, Hamilton College
2011	Sigma Xi Scientific Research Society, Hamilton College chapter
2011	Capital One Academic All-America Second Team (tennis)
2011	Milton H. Jannone Scholar-Athlete Award, Hamilton College
2010	Phi Beta Kappa, Hamilton College chapter
2010	Psi Chi Honor Society in Psychology, Hamilton College chapter

PUBLICATIONS

Barany, D. A., Revill, K. P., Caliban, A., Vernon, I., Shukla, A., Sathian, K., & Buetefisch, C. M. (2020). Primary motor cortical activity during unimanual movements with increasing demand on precision. *Journal of Neurophysiology.* doi: 10.1152/jn.00546.2019

*Latchoumane, C.V., ***Barany, D.A.,** Karumbaiah, L., & Singh, T. (2020). Neurostimulation and reach-to-grasp function recovery following acquired brain injury: insight from pre-clinical rodent models and human applications. *Frontiers in Neurology, 11,* 835. doi: 10.3389/fneur.2020.00835. **equal contribution*

Barany, D. A., Gómez-Granados, A., Schrayer, M., Cutts, S. A., & Singh, T. (2020). Perceptual decisions about object shape bias visuomotor coordination during rapid interception movements. *Journal of Neurophysiology, 123*(6):2235-2248. doi: 10.1152/jn.00098.2020

Marneweck, M., **Barany, D.A.**, Santello, M. & Grafton, S.T. (2018). Neural representations of sensorimotor memory- and digit position-based load force adjustments before the onset of dexterous object manipulation. *The Journal of Neuroscience, 38*(20), 4724-4737.

Barany, D.A., Shapiro, A.D., & Lee, T.G. (2015). Multivariate fMRI approaches to flexible sensorimotor maps in parietal cortex. *The Journal of Neuroscience, 35*(34), 11763-11765.

Barany, D.A., Della-Maggiore, V., Viswanathan, S., Cieslak, M., & Grafton, S. T. (2014). Feature interactions enable decoding of sensorimotor transformations for goal-directed movement. *The Journal of Neuroscience, 34*(20), 6860-6873.

Vaughan, J., **Barany, D.A.**, & Rios, T. (2012). The cost of moving with the left hand. *Experimental Brain Research, 220*(1), 11-22.

Vaughan, J., **Barany, D.A.**, Sali, A.W., Jax, S.A., & Rosenbaum, D.A. (2010). Extending Fitts' Law to three-dimensional obstacle-avoidance movements: Support for the posture-based motion planning model. *Experimental Brain Research, 207*(1-2), 133-138.

MANUSCRIPTS IN PREPARATION

Barany, D.A., Viswanathan, S., Cieslak, M., & Grafton, S. T. Dissociating neural activity patterns for continuous tracking of target location, current movement, and movement goal.

Barany, D. A., Pirog Revill, K., Caliban, A. Vernon, I., Sathian, K., & Buetefisch, C.M. Abnormally high activation in ipsilateral motor cortex after stroke: Reorganization or increased motor demand?

CONFERENCE PRESENTATIONS

Barany, D. A., Schrayer, M. Gomez Granados, A.M., Singh, T. (October 2019). Eye movements necessary for decision-making interfere with eye-hand coordination during rapid reaching. Poster presented at the Annual Meeting of the Society for Neuroscience, Chicago, IL.

Pirog Revill, K., **Barany, D.A**., Caliban, A., Vernon, I., Belagaje, S., Nahab, F., & Buetefisch, C.M. (October 2019). Task dependent contralesional motor cortex activation in the early subacute phase of stroke recovery. Poster presented at the Annual Meeting of the American Society of Neurorehabilitation, Chicago, IL.

Barany, D. A., Schrayer, M. Gomez Granados, A.M., Singh, T. (April 2019). Visual feedback processing during a rapid sensorimotor decision task. Poster presented at the 29th Annual Meeting of the Society for the Neural Control of Movement, Toyama, Japan.

Barany, D. A., Pirog Revill, K., Caliban, A. Vernon, I., Sathian, K., & Buetefisch, C.M. (July 2018). Primary motor cortical activity patterns during post-stroke hand movements of increasing demand. Poster presented at the Progress in Clinical Motor Control Conference, State College, PA.

Barany, D. A., Pirog Revill, K., Caliban, A. Vernon, I., Sathian, K., & Buetefisch, C.M. (November 2017). Abnormally high activation in ipsilateral motor cortex after stroke: Reorganization or increased motor demand? Poster presented at the Annual Meeting of the American Society of Neurorehabilitation, Baltimore, M.D.

Barany, D. A., Pirog Revill, K., Caliban, A. Sathian, K., & Buetefisch, C.M. (November 2017). Demand on accuracy of hand movements is associated with distinct neural activity patterns in primary motor cortex. Poster presented at the Annual Meeting of the Society for Neuroscience, Washington, D.C.

Marneweck, M., **Barany, D.A.,** & Grafton, S.T. (April 2017). Distinguishable cerebellar and sensorimotor representational patterns for anticipatory control of object manipulation at constrained and unconstrained grasp contacts. Poster presented at 27th Annual Meeting of the Society for the Neural Control of Movement, Dublin, Ireland.

Barany, D. A., Pirog Revill, K., Caliban, A. Sathian, K., & Buetefisch, C.M. (March 2017). Organization of human motor cortex during demand-dependent movement. Poster presented at the Brain Health Conference, Emory University, Atlanta, GA.

Barany, D. A., Viswanathan, S., & Grafton, S.T. (November 2016). Continuous decoding of movement from fMRI in a goal-directed manual tracking task. Poster presented at the Annual Meeting of the Society for Neuroscience, San Diego, CA.

Schaefer, R., Desai, M., **Barany, D.A.**, & Grafton, S.T. (July 2016). Neural activations of metaphor use in music performance. Poster presented at the International Conference for Music Perception and Cognition, San Francisco, CA.

Barany, D. A., Viswanathan, S., Cieslak, M., Caddigan, E., & Grafton, S.T. (October 2015). Decoding the cortical dynamics of continuous tracking movements from fMRI. Talk presented at the Annual Meeting of the Society for Neuroscience, Chicago, IL.

Lee, T.G., **Barany, D. A.**, & Grafton, S.T. (October 2015). Choking under pressure due to high incentives as a change in state distinct from motivated performance. Poster presented at the Annual Meeting of the Society for Neuroscience, Chicago, IL.

Barany, D. A., Viswanathan, S., Cieslak, M., Caddigan, E., & Grafton, S.T. (April 2015). Decoding directional selectivity in the human motor system from the dynamics of continuous tracking. Poster presented at 25th Annual Meeting of the Society for the Neural Control of Movement, Charleston, SC.

Barany, D. A., Gilbert, J., & Grafton, S.T. (March 2015). Planning interceptive actions to moving targets with ambiguous paths. Poster presented at 1st International Convention of Psychological Science, Amsterdam, The Netherlands.

Barany, D. A., Gilbert, J., & Grafton, S.T. (November 2014). Planning reaches to intercept targets with ambiguous moving paths. Poster presented at 55th Annual Meeting of the Psychonomic Society, Long Beach, CA.

Barany, D. A., Della-Maggiore, V., Viswanathan, S., Cieslak, M., & Grafton, S. T. (November 2013). Dissociating intrinsic and extrinsic reference frames in the human motor system. Poster presented at the Annual Meeting of the Society for Neuroscience, San Diego, CA.

Barany, D. A., Della-Maggiore, V., Viswanathan, S., Cieslak, M., & Grafton, S. T. (August 2013). Dissociating movement parameters in the human motor system. Poster presented at the 121st Annual Meeting of the American Psychological Association, Honolulu, HI.
**Abstract selected as finalist for the "Cutting-Edge Research From Emerging Psychological Scientists" poster session*

Cieslak, M., **Barany, D.A.**, Viswanathan, S., & Grafton, S.T. (October 2012). Dynamics of effector selection in a time-dependent decision task. Poster presented at the Annual Meeting of the Society for Neuroscience, New Orleans, LA.

Barany, D.A., Viswanathan, S., & Grafton, S.T. (April 2012). Limited visuomotor adaptation to variable amplitude gains within a movement trajectory. Poster presented at 22nd Annual Meeting of the Society for the Neural Control of Movement, Venice, Italy.

Vaughan, J., Keating, H., **Barany, D. A.**, & Rosenbaum, D. A. (November 2010). Dexterity and reaching around obstacles with a tool. Paper presented at 51st Annual Meeting of the Psychonomic Society, St. Louis, MO.

Barany, D.A., & DeAngelis, G.C. (July 2010). Deviations from optimality in the normalization model of multisensory integration. Poster presented at Center for Visual Science Undergraduate Summer Fellowship Poster Session, Rochester, NY.

Vaughan, J., **Barany, D.A**, Sali, A.W, Jax, S.A, & Rosenbaum, D.A. (November 2009). Movement time when circumventing obstacles in a 3-D workspace. Poster presented at 50th Annual Meeting of the Psychonomic Society, Boston, MA.

Barany, D.A, Sali, A.W, & Vaughan, J. (October 2009). Fitting Fitts' Law: Predicting movement times for an obstacle avoidance task in 3-D. Poster presented at Hamilton College Science Poster Session, Clinton, NY.

Barany, D.A, Sali, A.W, & Vaughan, J. (June 2009). Fitting Fitts' Law: Motor lab research in 3-D. Fifth International Conference for Posture-Based Movement, Moss Rehabilitation Research Institute, Philadelphia, PA.

INVITED AND CAMPUS TALKS

April 2020	*Flexible cortical representations for visually-guided movements.* University of Georgia, Athens, GA (virtual presentation)
March 2020	*Perceptual decisions about object shape bias visuomotor coordination during rapid interception movements.* Neuromechanics and Learning Journal Club (virtual presentation)
January 2020	*Somatosensory system organization.* AU/UGA Medical Partnership, Athens, GA
December 2019	*Flexible cortical representations for visually-guided movements*. San Diego State University, San Diego, CA
November 2019	*Flexible cortical representations for visually-guided movements*. Pennsylvania State University, State College, PA
May 2018	*Abnormally high activation in ipsilateral motor cortex after stroke: Reorganization or increased motor demand?* NIH StrokeNet Professional Development Webinar Series
May 2017	*Motor cortex reorganization in patients recovering from stroke.* Center for Neurodegenerative Disease Research Seminar, Emory University, Atlanta, GA
March 2017	*Organization of human motor cortex during demand-dependent movement in healthy subjects and stroke patients.* Neurorehabilitation Seminar, Emory University, Atlanta, GA
November 2015	*Multivoxel pattern analysis of continuous manual tracking.* Dynamical Neuroscience Seminar, University of California, Santa Barbara, Santa Barbara, CA
April 2015	*Using multivoxel pattern analysis of fMRI data to decode goal-directed movement*. Neuroimaging Group Seminar, Emory University, Atlanta, GA

February 2015 *Multisensory perception for action*. Cognition, Perception, and Cognitive Neuroscience Area Seminar, Department of Psychological and Brain Sciences, University of California, Santa Barbara, Santa Barbara, CA

September 2014 *Decoding goal-directed movements from human brain activity*. Psychology Department, Hamilton College, Clinton, NY

July 2014 *Big Ideas that Matter*. GRIT (Ground-breaking Research/Innovative Technology) talks series, University of California, Santa Barbara, Santa Barbara, CA

April 2014 *The Brain in Action*. Grad Slam graduate student competition for best three-minute research talk, University of California, Santa Barbara, Santa Barbara, CA

May 2013 *Dissociating intrinsic and extrinsic reference frames in the human motor system*. Graduate Mini-Convention of the Department of Psychological and Brain Sciences, University of California, Santa Barbara, Santa Barbara, CA

May 2011 *Behavioral and neural correlates of movement preparation: Implications for obstacle avoidance*. Hamilton College Senior Project Presentations in Neuroscience, Clinton, NY.

October 2010 Examining optimality in two models of multisensory integration. Hamilton College Math Department Colloquium, Clinton, NY.

ADDITIONAL RESEARCH TRAINING

May 2019 **KINARM Robotics Programming Training**
One-week course on programming custom tasks on robotic augmented reality system
Queens University, Kingston, Ontario, Canada
Directors: Drs. Stephen Scott and Ian Brown

December 2018 **Magnetic Resonance Spectroscopy (MRS) Editing School**
Three-day course covering MRS theory, acquisition, and analysis
Playa del Carmen, Mexico
Director: Dr. Richard Edden

August 2012 **Summer School in Computational Sensory-Motor Neuroscience**
Two-week course on applying computational approaches to sensorimotor neuroscience
Northwestern University, Evanston, IL
Directors: Drs. Gunnar Blohm and Konrad Körding

Summer 2010 **Undergraduate Fellowship Program in Vision Science**
Department of Brain & Cognitive Sciences, University of Rochester, Rochester, NY
Research: Developed models of multisensory integration at the single neuron level
Advisor: Dr. Greg DeAngelis

Summer 2009 **Undergraduate Researcher in Engel Vision & Imaging Lab**
Department of Psychology, University of Minnesota, Minneapolis, MN
Research: Designed psychophysics study to measure visual cue integration
Advisor: Dr. Stephen Engel

2007 - 2011 **Undergraduate Researcher in Motor Lab**
Department of Psychology, Hamilton College, Clinton, NY
Research: Developed experiments extending Fitts's Law to 3D workspaces
Advisor: Dr. Jonathan Vaughan

TEACHING EXPERIENCE

Instructor

Fall 2020 *M1 Small Group Learning Facilitator and Large Group Brain & Behavior Instructor*
AU/UGA Medical Partnership

Spring 2017 *Fundamentals of Behavioral Neuroscience*
Department of Educational Psychology, University of Georgia

Summer 2015 *The Biological Basis of Psychology*
Department of Psychological and Brain Sciences
University of California, Santa Barbara

Teaching Assistant

Fall 2014 *Introduction to Psychology*
Department of Psychological and Brain Sciences
University of California, Santa Barbara

Summer 2014 *Multimedia Learning*
Department of Psychological and Brain Sciences
University of California, Santa Barbara

Summer 2012 *Cognitive Psychology*
Department of Psychological and Brain Sciences
University of California, Santa Barbara

Outreach

July 2020 *Neuromatch Academy Computational Neuroscience Online Summer School*
Project mentor

September 2017 *STEM Research and Career Symposium*
Abstract and poster judge

March 2016 *University of California Graduate Research Advocacy Day*
Invited to speak to state legislators about research and the importance of graduate education, Sacramento, CA

2014 - 2015 *Science Women Achieving Greatness*
High school outreach group, Center for Science and Engineering Partnerships, University of California, Santa Barbara

2014 *our Brain in Action*
School for Scientific Thought (outreach program for high school students)
University of California, Santa Barbara

2012 – 2016 *UCSB Brain Imaging Center Tours*
Lead demonstrations of real-time fMRI for student groups
University of California, Santa Barbara

Guest Lecturer

March 2019 *MRI Analysis in MATLAB*
MATLAB for Sensorimotor Neuroscience, Graduate Course
Department of Kinesiology, University of Georgia

November 2015 *Magnetic Resonance Imaging in Neuroscience Research*
Lab in Biopsychology, Undergraduate course
Department of Psychological and Brain Sciences,
University of California, Santa Barbara

November 2014 *Neuroscience in the News*
Science in the News, Undergraduate course
University of Minnesota, Minneapolis, MN

June 2014 *Multi Voxel Pattern Analysis of fMRI Data*
Statistical Analysis of fMRI data, Graduate course
Department of Psychological and Brain Sciences,
University of California, Santa Barbara

PROFESSIONAL AFFILIATIONS

American Heart Association
American Society of Neurorehabilitation
Society for the Neural Control of Movement
Society for Neuroscience