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Benjamin Y. Hayden

Associate Professor, Neuroscience and Biomedical Engineering, University of Minnesota
Director, Minnesota Consortium for Human Intracranial Physiology
Director, Addiction Connectome Project

CAREER HISTORY

Associate professor Neuroscience and Center for Magnetic Resonance Research University of Minnesota	Sept 2017 – present Minneapolis, MN
Associate professor Assistant professor Brain and Cognitive Sciences, University of Rochester	July 2016-Sept 2017 July 2011-June 2016 Rochester, NY
Post-doctoral fellow (laboratory of Michael Platt) Duke University	Nov 2005 – June 2011 Durham, NC
Ph.D. (Molecular and Cell Biology, advisor: Jack Gallant) Thesis title: <i>Mechanisms of working memory, attention, and decision in visual area V4</i> University of California, Berkeley	August 2000 –Oct 2005 Berkeley, CA
B.A. (Chemistry) Rice University	August 1996 – May 2000 Houston, TX

EMPIRICAL PAPERS (for reprints, please visit <http://www.haydenlab.com/papers>)

- Azab, H. and **Hayden, B. Y.** (2020). Partial integration of the components of value in anterior cingulate cortex. *Behavioral Neuroscience*.
- Cash-Padgett, T., and **Hayden, B. Y.** (2020). Behavioral variability contributes to overstaying in patchy foraging. *Biology Letters*.
- Yoo, S. B. M., Tu, J. C., Piantadosi, S. T., and **Hayden, B. Y.** (2020). The neural basis of predictive pursuit. *Nature Neuroscience*.
- Yoo, S. B. M., and **Hayden, B. Y.** (2020). The transition from evaluation to selection involves neural subspace reorganization in core reward regions. *Neuron*.
- Ebitz, R. B., Sleezer, B. J., Jedema, H., Bradberry, C., and **Hayden, B. Y.** Tonic exploration governs both flexibility and lapses. *PLoS Computational Biology*.
- Balasubramani, P. P., Pesce, M. C., and **Hayden, B. Y.** (2019). Activity in orbitofrontal neuronal ensembles reflect inhibitory control. *European Journal of Neuroscience*.
- Smith, E. H., Horga, G., Yates, M. J., Mikell, C. B., Banks, G. P., Pathak, Y. J., Schevon, C. A., McKhann, G. M., **Hayden B. Y.**, Botvinick, M. M. and Sheth, S. A. (2019). Widespread temporal coding of cognitive control in human prefrontal cortex. *Nature Neuroscience*.
- Eisenreich, B., **Hayden, B. Y.**, and Zimmermann, J. (2019). Macaques are risk-averse in a freely moving foraging task. *Scientific Reports*.
- Farashahi, S., Donahue, C., **Hayden, B. Y.**, Lee, D., and Soltani, A. (2019). Flexible combination of reward information during choice under uncertainty. *Nature Human Behavior*.

- Mehta, P. S., Tu, J. C., LoConte, G. A., Pesce, M. C., and **Hayden, B. Y.** (2019). Ventromedial prefrontal cortex tracks multiple environmental variables during search. *Journal of Neuroscience*.
- Wang, M. and **Hayden, B. Y.** (2019). Monkeys are curious about counterfactual outcomes. *Cognition*.
- Cash-Padgett, T., Azab, H., Yoo, S. B., and **Hayden, B. Y.** (2018). Opposing pupil responses to offered and anticipated reward values. *Animal Cognition*.
- Farashahi, S., Azab, H., **Hayden, B. Y.**, and Soltani, A. (2018). On the flexibility of basic risk attitudes in monkeys. *Journal of Neuroscience*.
- Yoo, S. B. M., Sleezer, B. J., and **Hayden, B. Y.** (2018). Robust encoding of spatial information in orbitofrontal cortex and striatum. *Journal of Cognitive Neuroscience*.
- Azab, H. and **Hayden, B. Y.** (2018). Correlates of economic choice processes in dorsal and subgenual anterior cingulate cortices. *European Journal of Neuroscience*.
- Alonso-Diaz, S., Piantadosi, S. T., **Hayden, B. Y.**, and Cantlon, J. F. (2018). Intrinsic whole number bias in humans. *Journal of Experimental Psychology: Human Perception and Performance*.
- Blanchard, T. C., Piantadosi, S., and **Hayden, B. Y.** (2018). Robust mixture modeling reveals category-free selectivity in reward region neuronal ensembles. *Journal of Neurophysiology*.
- Pirrone, A., Azab, H., **Hayden, B. Y.**, Stafford, T., and Marshall, J. A. (2018). Evidence for the speed-value tradeoff: human and monkey decision-making is magnitude sensitive. *Decision*.
- Azab, H. and **Hayden, B. Y.** (2017). Correlates of decision dynamics in the dorsal anterior cingulate cortex. *PLoS Biology*.
- Wang, Z. M. and **Hayden, B. Y.** (2017). Reactivation of associative structure specific neural responses to outcomes during prospective evaluation. *Nature Communications*.
- Sleezer, B. J., Loconte, G., Castagno, M.D., and **Hayden, B.Y.** (2017). Neuronal responses support a role for orbitofrontal cortex in cognitive set reconfiguration. *European Journal of Neuroscience*.
- Sleezer, B. J., Castagno, M. D., and **Hayden, B. Y.** (2016). Rule encoding in orbitofrontal cortex and striatum guides action selection. *Journal of Neuroscience*.
- Sleezer, B. J. and **Hayden, B. Y.** (2016) Differential contributions of ventral and dorsal striatum to early and late phases of cognitive set reconfiguration. *Journal of Cognitive Neuroscience*.
- Strait, C. E., Sleezer, B. J., Blanchard, T. C., Azab, H., Castagno, M. D., and **Hayden, B. Y.** (2016) Neuronal selectivity for spatial position of offers and choices in five reward areas. *Journal of Neurophysiology*.
- Heilbronner, S. R. and **Hayden, B. Y.** (2016) The description-experience gap in risky choice in non-human primates. *Psychonomic Bulletin and Review*. **Psychonomic Society Award for Best Paper of 2016**.
- Blanchard, T. C., Strait, C. E., and **Hayden, B. Y.** (2015) Ramping ensemble activity in dorsal anterior cingulate cortex neurons during persistent commitment to a decision. *Journal of Neurophysiology*.
- Piantadosi, S. T. and **Hayden, B. Y.** (2015). Utility-free heuristic models of two-option choice can mimic predictions of utility-stage models under many conditions. *Frontiers in Decision Neuroscience*.
- Strait, C. E., Sleezer, B. J., and **Hayden, B. Y.** (2015). Signatures of value comparison in ventral striatum neurons. *PLoS Biology* (2015).
- Blanchard, T. C. and **Hayden, B. Y.** (2015). Monkeys are more patient in a foraging task than in a standard intertemporal choice task. *PLoS One*.
- Blanchard, T. C., **Hayden***, **B. Y.**, and Bromberg-Martin*, E. S. (*=co-senior authors). (2015). Orbitofrontal cortex uses distinct codes for different choice attributes in decisions motivated by curiosity. *Neuron*.
- Hughes, K. D., Higham, J. P., Allen, W., Elliot, A. J., and **Hayden, B. Y.** (2015). Extraneous color affects female macaques' gaze preference for photographs of male conspecifics. *Evolution and Human Behavior*.
- Blanchard, T. C., Wilke, A., and **Hayden, B. Y.** (2014) Hot hand bias in rhesus monkeys. *Journal of Experimental Psychology: Animal Learning and Cognition*.
- Strait, C. E., Blanchard, T. C., and **Hayden, B. Y.** (2014) Reward value comparison via mutual inhibition in ventromedial prefrontal cortex. *Neuron*.
- Blanchard, T. C. and **Hayden, B. Y.** (2014) Neurons in dorsal anterior cingulate cortex signal post-decisional variables in a foraging task. *Journal of Neuroscience*.
- Blanchard, T. C., Wolfe, L. S., Vlaev, I., Winston, J. S., and **Hayden, B. Y.** (2014) Biases in preferences for sequences of outcomes in monkeys. *Cognition*.
- Strait, C. E. and **Hayden, B. Y.** (2013) Preferences for skewed gambles in rhesus monkeys. *Biology Letters*.
- Blanchard, T. C., Pearson, J. M., and **Hayden, B. Y.** (2013) Postreward delays and systematic biases in measures of animal temporal discounting. *Proceedings of the National Academy of Sciences*.
- Hayden, B. Y.** and Gallant, J. L. (2013) Working memory and decision processes in visual area V4. *Frontiers in Decision Neuroscience*.

- David, S. V. and **Hayden, B. Y.** (2012) Neurotree: A collaborative, graphical database of the academic genealogy of neuroscience. *PLoS ONE*.
- Heilbronner, S. R. **Hayden, B. Y.**, and Platt, M. L. (2011) Decision salience signals in posterior cingulate cortex. *Frontiers in Decision Neuroscience*.
- Hayden, B. Y.**, Pearson, J.M., and Platt, M.L. (2011) Neuronal basis of sequential foraging in a patchy environment. *Nature Neuroscience*.
- Hayden, B. Y.**, Heilbronner, S. R., Pearson, J. M., and Platt, M.L. (2011) Surprise signals in anterior cingulate cortex: neuronal encoding of unsigned reward prediction errors driving adjustments in behavior. *Journal of Neuroscience*.
- Pearson, J. M., **Hayden, B. Y.**, and Platt, M. L. (2010) Explicit information reduces discounting behavior in monkeys. *Frontiers in Comparative Psychology*.
- Hayden, B. Y.**, Smith, D. V., and Platt, M. L. (2010) Cognitive control signals in posterior cingulate cortex. *Frontiers in Human Neuroscience*.
- Hayden, B. Y.**, Heilbronner, S. R., and Platt, M. L. (2010) Ambiguity aversion in rhesus macaques. *Frontiers in Decision Neuroscience*.
- Smith, D. V., **Hayden, B. Y.**, Truong, T., Song, A., Platt, M. L., and Huettel, S. A. (2010) Distinct value signals in anterior and posterior ventromedial prefrontal cortex. *Journal of Neuroscience*.
- Hayden, B. Y.** and Platt, M. L. (2010) Neurons in anterior cingulate cortex multiplex information about reward and action. *Journal of Neuroscience*.
- Pearson, J. M., **Hayden, B. Y.**, Raghavachari, S., and Platt, M. L. (2009) Neurons in posterior cingulate cortex signal exploratory decisions in a dynamic multi-option choice task. *Current Biology*.
- Hayden, B. Y.** and Platt, M. L. (2009) The mean, the median, and the St. Petersburg Paradox. *Judgment and Decision Making*.
- Hayden, B. Y.**, Pearson, J. M., and Platt, M. L. (2009) Fictive reward signals in anterior cingulate cortex. *Science*.
- Hayden, B. Y.**, Smith, D. V., and Platt, M. L. (2009) Electrophysiological correlates of default-mode processing in macaque posterior cingulate cortex. *Proceedings of the National Academy of Sciences*.
- Hayden, B. Y.** and Platt, M. L. (2009) Gambling for Gatorade: risk-sensitive decision making for fluid rewards in humans. *Animal Cognition*.
- Hayden, B. Y.** and Gallant, J. L. (2009) Combined effects of spatial and feature-based attention on responses of V4 neurons. *Vision Research*.
- Hayden, B. Y.**, Nair, A. C., McCoy, A. N., and Platt, M. L. (2008) Posterior cingulate cortex mediates outcome-contingent allocation of behavior. *Neuron*.
- David, S. V., **Hayden, B. Y.**, Mazer, J. A., and Gallant, J. L. (2008) Attention to stimulus features shifts spectral tuning of V4 neurons during natural vision. *Neuron*.
- Hayden, B. Y.**, Heilbronner, S. R., Nair, A. C., and Platt, M. L. (2008) Cognitive influences on risk-seeking by rhesus macaques. *Judgment and Decision Making*.
- Hayden, B. Y.**, Parikh, P. C., Deaner, R. O., and Platt, M. L. (2007) Economic principles motivating social attention in humans. *Proceedings of the Royal Society B*.
- Hayden, B. Y.** and Platt, M. L. (2007) Temporal discounting predicts risk sensitivity in rhesus macaques. *Current Biology*.
- David, S. V., **Hayden, B. Y.**, and Gallant, J. L. (2006) Spectral receptive field properties explain shape selectivity in area V4. *Journal of Neurophysiology*.
- Hayden, B. Y.** and Gallant, J. L. (2005) Timecourse of attentional modulation reveals differences in mechanisms of spatial and feature attention. *Neuron*.
- Fu, Y., Djupsund, K., Gao, H., **Hayden, B. Y.**, Shen, K., and Dan, Y. (2002) Temporal specificity in the cortical plasticity of visual space representation. *Science*.

REVIEWS, CHAPTERS, AND PREVIEWS

- Sleezer, B. J., and **Hayden, B. Y.** (2019). Neuroscience: Reevaluating the Role of Orbitofrontal Cortex. *Current Biology*.
- Widge, A. S., Heilbronner, S. R., and **Hayden, B. Y.** (2019). Prefrontal cortex and cognitive control: insights from human electrophysiology. Faculty of 1000 Reviews.
- Wang, M. Z. and **Hayden, B. Y.** (2019). Beyond incentive hope: information sampling and learning under reward uncertainty. Commentary in Behavioral and Brain Sciences.
- Wang, M. Z., Sweis, B., and **Hayden, B. Y.** (2019). A testable definition of curiosity. IEEE CDS Newsletter. In press.
- Hayden, B. Y.** (2018). Why has evolution not selected for perfect self-control? Philosophical Transactions of the Royal Society B.

- Yoo, S. B. M. and **Hayden, B. Y.** (2018) Economic choice as an untangling of options into actions. *Neuron*.
- Wang, M. Z. and **Hayden, B. Y.** (2018). Beyond incentive hope: information sampling and learning under reward uncertainty. *Behavioral and Brain Sciences*.
- Balasubramani, P. P. Moreno-Bote, R., **Hayden, B. Y.** (2018) Using a simple neural network to delineate some principles of distributed economic choice. *Frontiers in Computational Neuroscience*.
- Hayden, B. Y.** and Moreno-Bote, R. (2018) A neuronal theory of sequential economic choice. *Brain and Neuroscience Advances*.
- Eisenreich, B. and **Hayden, B. Y.** (2018) Persistent apes are intelligent apes. *Current Biology*.
- Hayden, B. Y.** Economic choice: the foraging perspective. (2018) *Current Opinion in Behavioral Science*.
- Hayden, B. Y.** and Cantlon, J. (2017) Comparative Cognition. *Current Opinion in Behavioral Science*.
- Hayden, B. Y.** and Haggard, P. (2017) Neuroscience: decision, insight, and intention. *Current Biology*.
- Eisenreich, B., Akaishi, R., and **Hayden, B. Y.** (2016) Control without controllers: towards a distributed neuroscience of executive control. *Journal of Cognitive Neuroscience*.
- Eisenreich, B. and **Hayden, B. Y.** Choice-induced preference: a challenge for contrast (2017) *Animal Sentience*.
- Hunt, L. and **Hayden, B. Y.** (2017) A distributed, hierarchical, and recurrent framework for reward-based choice. *Nature Reviews Neuroscience*.
- Alexander, W. H., Brown, J. W., Collins, A. G. E., **Hayden, B. Y.**, and Vassena, E. (2017). Prefrontal cortex in control: broadening the scope to identify mechanisms. *Journal of Cognitive Neuroscience*.
- Ebitz, R. B. and **Hayden, B. Y.** (2016) Dorsal anterior cingulate: a Rorschach test for cognitive neuroscience. *Nature Neuroscience*.
- Akaishi, R. and **Hayden, B. Y.** (2016) A spotlight on reward. *Neuron*.
- Heilbronner, S. R. and **Hayden, B. Y.** (2016) Dorsal anterior cingulate cortex: a bottom-up view. *Annual Review of Neuroscience*.
- Kidd, C. and **Hayden, B. Y.** Neuroscience and psychology of curiosity (2015) *Neuron*.
- Calhoun, A. J. and **Hayden, B. Y.** (2015) The Foraging Brain. *Current Opinion in Behavioral Sciences*.
- Hayden, B. Y.** (2015) Time discounting and time preferences in animals: a critical review. *Psychonomic Bulletin and Review*.
- Hayden, B. Y.** and Heilbronner, S. R. (2014) All that glitters is not reward signal. *Nature Neuroscience*.
- Hayden, B. Y.** and Walton, M. E. (2014) Neuroscience of foraging. *Frontiers in Decision Neuroscience*.
- Hayden, B. Y.** and Pasternak, T. (2013) Linking neural activity to complex decisions. *Visual Neuroscience*.
- Heilbronner, S. R. and **Hayden, B. Y.** (2013) Contextual factors explain risk preferences in rhesus macaques. *Frontiers in Decision Neuroscience*.
- McGinty, V. B., **Hayden, B. Y.**, Heilbronner, S. R., Dumont, E. C., Graves, S. M., Mirrione, M. M., du Hoffman, J., Sartor, G. C. España, R. A., Millan, E. Z. Di Feliceantonio, A. G., Marchant, N. J., Napier, T. C., Root, D. H., Borgland, S. L., Treadway, M. T., Floresco, S. B., McGinty, J. F., and Haber, S. N. Emerging, reemerging, and forgotten brain areas of the reward circuit: notes from the 2010 Motivational and Neural Networks Conference (2011) *Behavioral Brain Research*.
- Platt, M. L. and **Hayden, B. Y.** Learning: not just the facts, ma'am, but the counterfactuals as well. (2011) *PLoS Biology*.
- Pearson, J. M., Heilbronner, S. R., Barack, D. L., **Hayden, B. Y.**, and Platt, M. L. (2011) Posterior cingulate cortex: adapting behavior to a changing world. *Trends in Cognitive Sciences*.
- Pearson, J. M., **Hayden, B. Y.**, and Platt, M. L. (2011) A role for posterior cingulate cortex in policy switching and cognitive control. In *Neural Basis of Motivation and Cognitive Control* Mars, Sallet Rushworth, and Yeung, editors.
- Platt, M. L., Watson, K. K., **Hayden, B. Y.**, Shepherd, S. V., and Klein, J. T. (2010) Neuroeconomics: implications for understanding the neurobiology of addiction. In *Advances in the Neuroscience of Addiction*, Kuhn and Koob, editors.
- Hayden, B. Y.**, and Platt, M. L. (2010) Risky decisions and fictive learning: case studies on the difficulties of integrating evidence from fMRI and electrophysiology in cognitive neuroscience. In *Attention and Performance*, Robbins and Delgado, editors.
- Hayden, B. Y.** (2009) Neuroethology of Vision. In *Primate Neuroethology*, Platt and Ghazanfar, editors.
- Heilbronner, S. R., **Hayden, B. Y.**, and Platt, M. L. (2009) Neuroeconomics of risk sensitive decision making. In *Impulsivity: The Behavioral and Neurological Science of Discounting*, Madden, Bickel, and Critchfield, editors.
- Hayden, B. Y.** and Platt, M. L. (2008) Animal cognition: great apes wait for grapes. *Current Biology*.
- Hayden, B. Y.** and Platt, M. L. (2008) Cingulate cortex. *New Encyclopedia of Neuroscience*, Elsevier.
- Hayden, B. Y.** and Platt, M. L. (2006) Fool me once, shame on me; fool me twice, blame ACC. *Nature Neuroscience*.

ACTIVE GRANTS

- Addiction Connectome Core of the Minnesota Discovery Team on Addiction. Role: Core director. NIH P30. (2020-2025).
- *Prefrontal-striatal circuit manipulation during self-control in nonhuman primates*. MDT Addiction Seed Grant Program. (Co-PIs: Sarah Heilbronner and Benjamin Yost Hayden).
- *Neural basis of reward-based choice*. Role: PI. NIH R01 DA037229 (2015-2020)
- *Neuronal basis of persistence*. Role: PI. NIH R01 DA038615 (2015-2025)

COMPLETED GRANTS

- *Coordinated 3D markerless pose estimation and neural measurements from freely moving rhesus monkeys*. MN Futures Program. (Co-PIs: Hyun Soo Park and Benjamin Yost Hayden).
- *Repeated cocaine exposure and striatal contributions to cognitive control*. Role: PI. R01 DA038106 (2014-2019)
- *Flexible control of reward-based decisions*. Role: PI. NSF CAREER award BCS 1253576 (2013-2018)
- *Applying a neuroeconomics paradigm for the assessment of central fatigability in an aging population*. Role: Co-I (PI: Feng Vankee Lin). NIH R21 AG053193 (2016-2018)
- *Do reward-based choices depend on neuronal simulation of possible rewards?* Role: PI. Klingenstein-Simons Fellowship (2014-2016)
- *Center for the Origins of Cognition*. Role: PI (with Jessica Cantlon, Co-PI). University of Rochester Pump Primer.
- *Future-oriented decisions in macaques*. Role: PI. Templeton Science of Prospecion Award (2015-2016)
- *The Future of Visual Attention*. Role: PI. NSF conference grant (2016)
- *The Future of Visual Attention*. Role: PI. NIH R13 conference grant EY026284 (2016)
- *Dissociable roles of caudate and ventral striatum in set-shifting in monkeys*. Role: PI. NARSAD Young Investigator Award, Brain and Behavior Research Foundation (2013-2015)
- *Advanced electrodes for recording activity in striatum and prefrontal cortex*. Role: PI; Co-PI: Tatiana Pasternak (2013-2015). Schmitt Equipment Award.
- *Neural basis of choice*. Role: PI. Sloan Foundation Fellowship (2013-2015)
- *Dopamine and the role of anterior cingulate cortex in executive processes*. Role: PI. NIDA K99/R00 027718-01 (2010-2014)
- *Neural mechanisms of self-control*. Role: PI. Tourette Syndrome Association Fellowship (2010-2011)
- *The role of the posterior cingulate cortex in reward-guided decision-making*. Role: PI. NIDA Kirschstein NRSA 023338-01 (2008-2010)
- *Neural mechanisms of reward-based decision-making*. Role: Awardee. Duke Translational Neuroscience Fellowship (2005-2006)

HONORS

- 2016 Best Paper Award in Psychonomic Bulletin and Review for “The description-experience gap in risky choice in non-human primates” from the Psychonomic Society
- Templeton Foundation Fellow in Prospecion (August 2014). John Templeton Foundation
- Klingenstein-Simons Fellowship Award in the Neurosciences (May 2014). Klingenstein-Simons Foundation
- Elected as *Associate Member* of the American College of Neuropsychopharmacology (Dec 2013)
- NARSAD Young Investigator Award (Aug 2013) Brain and Behavior Research Foundation
- Poster selected for Data Blitz (Dec 2012). Meeting of the American College of Neuropsychopharmacology (ACNP)
- Sloan Research Fellow (Feb 2012). Sloan Foundation
- Travel Award, American College of Neuropsychopharmacology (Dec 2011). 50th Annual ACNP Conference, Waikoloa Village, Hawaii
- Outstanding poster (April, 2010). Motivational Neuronal Networks Conference, Shell Island, NC COSYNE
- Spotlight poster (March 2010). COSYNE meeting
- Young Investigator Award (Sept, 2009). Society for Neuroeconomics
- Best post-doc talk (March, 2009). Department of Neurobiology Retreat, Duke University Medical School
- Valedictorian (May, 2005). Department of Molecular and Cell Biology, University of California Berkeley

INVITED TALKS

- Natural decision-making*. MIT. Boston, MA. Sept, 2019.
- Curiosity and Neuroscience*. RLDM Conference. Montreal, QC. July, 2019.
- Curiosity and the Brain*. Templeton Meeting on Curiosity. Washington, D. C. May, 2019.
- Natural decision-making*. OHSU. Portland, OR. May, 2019.
- Neural basis of choice and action*. Massachusetts General Hospital. Boston, MA. April, 2019.
- Neural basis of executive control*. Brown University. Providence, RI. Jan, 2019.
- Neural basis of choice and control*. Workshop on Computational Properties of Prefrontal Cortex. Nashville, TN. Oct, 2018.
- Neuroengineering & neuroeconomics*. Neuroengineering Seminar, University of Minnesota. Minneapolis, MN. Sept, 2018.
- Embodied Neuroeconomics*. Gordon Conference on Neurobiology of Cognition, Newry, Maine, July 2018
- Posterior Cingulate Cortex and Reward*. Baylor College of Medicine. Houston, TX. Apr 2018.
- Choice and choice processes*. Indiana University. Bloomington, IN. Mar 2018.
- Towards wireless recording in freely moving macaques*. TBSI Webinar. Jan, 2018.
- Neural basis of reward-based choice*. University of Minnesota. Minneapolis, MN. Jan, 2018.
- Distributed executive control*. Control Processes. Amsterdam, Netherlands. Oct 2017.
- Neuroscience of foraging choices*. NYU CNS department seminar. New York City, NY. Oct 2017.
- Neural basis of choice*. Colloquium talk. University of Minnesota. Minneapolis, MN. Sept 2017.
- The past and future of neuroeconomics*. Klingenstein Fellows meeting. New York City, NY. May 2017
- Circuitry for curiosity based decisions*. Origins of Cognition Symposium, RIT, Rochester, NY. May 2017
- The neuronal foundations of value*. Cognition and Decision Seminar. Columbia University, New York City, NY. Apr 2017
- Neuroscience of reward-based decisions*. Albert Einstein University. New York City, NY. Mar 2017.
- Neuroscience of foraging decisions*. University of Rochester, department of Ecology. Rochester, NY. Feb 2017.
- Neuroscience of foraging decisions*. University of Chicago. Chicago, IL. Feb 2017.
- Distributed mechanisms of evaluation and comparison*. SFN Mini-Symposium (Chair/Speaker). San Diego, CA. Nov 2016
- Distributed approaches to economic choice and executive control*. Carnegie Mellon University. Pittsburgh, PA. Oct 2016
- Positive and negative in cingulate cortex*. Persistent Maladaptive Behaviors Meeting. UR. Rochester, NY, Oct 2016
- Micro and macro: bridging across levels in neuroeconomics*. University of Minnesota. St. Paul, MN. Sept 2016
- Imagination is the cure for poor self-control*. Templeton Meeting on Prospecion. Philadelphia, PA. Aug 2016
- Attention as a solution to the selection problem in economic choice*. CVS Symposium. Rochester, NY. June 2016
- Demand for control reduces coding sparseness in dorsal anterior cingulate cortex*. CNS Meeting. NYC, NY. Apr 2016
- Distributed computation, economic choice, and control*. Cognitive Science Dinner, UR, Rochester, NY. Mar 2016
- Circuitry for economic choice*. Department of Neurobiology, Duke University, Durham, NC. Feb 2016
- Neural basis of economic choice*. Department of Psychology, Vanderbilt University, Nashville, TN. Jan 2016
- Distributed mechanisms of economic choice*. Affective Brain Lab, UCL (on-line talk series), London, UK, Oct 2015
- Representation of reward on the orbital surface*. Quadrennial Meeting on OFC, INSERM, Paris, France, Sept 2015
- Does economic choice involve simulation of possible rewards?* Templeton Meeting on Prospecion. Phila., PA, Aug 2015
- Neuroscience of foraging*. Duke-Kunshan University Summer School in Neuroeconomics. Shanghai, China, July 2015
- Neuroscience of foraging*. NYU-Shanghai Summer School in Neuroeconomics. Shanghai, China, July 2015
- Neuroscience of economic choice*. Neurobiology and Behavior Colloquium Series, Cornell University, Mar 2015
- Representation and reward*. Department of Psychological and Brain Sciences, Johns Hopkins University, Feb 2015
- Representation and the reward system*. Behavior, Genetics, and Neuroscience Series, Yale University, Jan 2015
- Spatial selectivity in reward regions*. Workshop on Computational Properties of Prefrontal Cortex, Whistler, BC, Oct 2014
- Economics for monkeys*. Laboratory for Laser Energetics Science and Technology Series, Rochester NY, Oct 2014
- Reward representation in orbitofrontal cortex*. NIA / NIDA Intramural Program, Baltimore, MD, Sept 2014
- Future-oriented decisions in macaques*. Templeton Conference on Prospecion, Philadelphia, PA, Aug 2014
- Information-seeking, curiosity, and reward*. Gordon Conference on Neurobiology of Cognition, Newry, Maine, July 2014
- Information-seeking, curiosity, and reward*. Symposium on Biology of Decision Making, Paris, France, May 2014
- Orbitofrontal cortex, Representation and Reward*. Mount Sinai Medical School, New York, NY, April 2014
- Neural basis of persistence*. SFN Minisymposium (presenter and chair), SFN meeting, San Diego, CA, Nov 2013
- Neural basis of self-control*. EBBS meeting, Munich, Germany, Sept 2013
- Eat prey, leave: the neuroscience of foraging*. Symposium on Decision Neuroscience, Düsseldorf, Germany, June 2013
- Economics vs. Neuroeconomics*. University of Illinois, Urbana-Champaign, April, 2013
- Neuroscience of foraging*. COSYNE Workshop (organizer), Salt Lake City, UT, Mar 2013
- Reward and decisions*. COSYNE Workshop, Salt Lake City, UT, Mar 2013
- Decision-making and control*. Princeton University, Princeton, NJ, Mar 2013

Why do monkeys like to gamble? TEDxRochester, Rochester, NY, Nov 2012
We don't know what we want. Interactive Strategies 2012, Houston, TX, Oct 2012
Eat, Prey, Leave: Self-control and foraging. Clarkson University, Potsdam, NY, Sept 2012
Elements of reward-based choice. Oxford University, Oxford, UK, Sept 2012
Neural basis of reward-guided decisions. University College London, London, UK, Sept 2012
Process models of decisions involving risk (and time). University of Warwick, Warwick, UK, Sept 2012
Anterior cingulate cortex and oculomotor control. UR Center for Visual Science Symposium, Rochester, NY, Jun 2012
Anterior cingulate cortex and oculomotor control. UR CVS Research Talk Series, Rochester, NY, Apr, 2012
Why do monkeys like to gamble? University of Rochester Phelps Colloquium Series, Rochester, NY, Feb 2012
Algorithms for value-based choice. University of Zurich, Switzerland, Oct 2011
Neural basis of foraging decisions Brain, Mind, and Society Series, Caltech, Pasadena, CA, Oct 2010
Cingulate cortex, outcomes, and behavioral adjustments. Workshop on Prefrontal Cortex, Whistler, BC, Sept 2010
Cingulate cortex, outcomes, and behavioral adjustments. Neuro2010, Kobe, Japan, September 2010
What do ACC neurons signal? RIKEN seminar, Tokyo, Japan, August 2010
Neural basis of foraging decisions. Yale University, New Haven, CT, June 2010
What information is carried by ACC neurons? Motivation and Cognitive Control, University of Oxford, UK, June 2010
Neural representation of fictive outcomes. COSYNE Workshops, Snowbird, UT, March 2010
Monitoring an uncertain world: cingulate cortex. University of Rochester, Rochester, NY, February 2009
Cingulate cortex: learning about rewards. Carnegie Mellon University, Pittsburgh, PA, February 2009
Cingulate cortex: learning about rewards. University of Texas, Austin, TX, February 2009
Cingulate cortex: choice and monitoring. Dartmouth College, Hanover, NH, January 2009
Monitoring an uncertain world: the cingulate cortex. University of Pennsylvania, Philadelphia, PA, August 2009
Uncertainty, monitoring, and the cingulate cortex . Yale University Medical School, New Haven, CT, May 2009
Cingulate cortex monitors outcomes of risky decisions. NIMH, Bethesda, MD, October 2008
What causes risk sensitivity among primates? Economics for Apes Conference, MPI, Leipzig, Germany, July 2007
Attention, working memory, and decision in V4. Oxyopia Seminar, UC Berkeley, Berkeley, CA, January 2005

MENTORSHIP

Post-docs supervised:

- Benjamin Voloh, Neuroscience, University of Minnesota, 2020-present
- Ruyuan Zhang, Neuroscience, University of Minnesota, 2018-2019
- Becket Ebitz, Brain and Cognitive Sciences, University of Rochester and University of Minnesota, 2017-2020.
- Benjamin Eisenreich, Brain and Cognitive Sciences, University of Rochester and University of Minnesota, 2016-2020.
- Brianna Sleezer, Brain and Cognitive Sciences, University of Rochester, 2016-2017
- Rei Akaishi, Brain and Cognitive Sciences, University of Rochester, 2016-2017
- Pragathi Priyadharsini Balasubramani, Brain and Cognitive Sciences, University of Rochester, 2015-2017
- Alex Thomé, Brain and Cognitive Sciences, University of Rochester, 2013-2015

Graduate students supervised:

- David Maisson, Neuroscience, University of Minnesota, 2020-present
- Tyler Cash-Padgett, Neuroscience, University of Minnesota, 2016-present
- Priyanka Mehta (Sproull Fellow), Neuroscience, University of Minnesota, 2016-present
- Seng-Bum (Michael) Yoo, Brain and Cognitive Sciences, University of Rochester, 2015-2020
- Habiba Azab, Brain and Cognitive Sciences, University of Rochester, 2014-2020
- Shraddha Shah, Brain and Cognitive Sciences, University of Rochester, 2014-2016
- Zhe (Maya) Wang, Brain and Cognitive Sciences, University of Rochester, 2014-2020
- Brianna Sleezer, Neuroscience Graduate Program, University of Rochester, 2012-2016
- Caleb Strait, Brain and Cognitive Sciences, University of Rochester, 2011-2016
- Tommy Blanchard, Brain and Cognitive Sciences, University of Rochester, 2011-2015

SERVICE

Intramural service

Director, MDTA Speaker Series (2018-present)

Member, T32 Computational Neuroscience Training Grant (2018-present)

Chair, MDT Addiction Speaker Series. University of Minnesota. (2018-present)

Co-Organizer, University of Rochester Neuromedicine Symposium on Persistent Maladaptive Behaviors (with Suzanne Haber), 2016-2017

Co-Organizer, CVS symposium 2016, with Jude Mitchell. Topic: The Future of Visual Attention.

Major Advisor, Neuroscience Major: 2016-2017.

Faculty advisor for BCS 206 (Undergraduate research in cognitive science).

Society for Neuroscience, Rochester Chapter, Council Member (2014-2016)

University of Rochester, University Committee for Interdisciplinary Studies (2013-2017)

BCS Faculty Search Committee (2012-2014) Systems Neuroscience and Computation/Theory searches

CVS Website Committee (2012-2013)

Neuroscience Graduate Program Admissions Committee (2011-present)

Graduate student thesis committees:

- Roger Feltman (CSP), Jordan Silberman (CSP), Celeste Kidd (BCS), Berkeley Fahrenthold (NGP), Kevin Dieter (BCS), Adam Pallus (Neuroscience)

University of Rochester undergraduate senior project committees (n=7)

Courses taught:

- NSC 203 (Neuroscience Lab) team taught with Kathy Nordeen and Dave Kornack, 2012-present
- NSC 301 (Senior seminar) 2013-present
- BCS 248/548 (Seminar in Neuroeconomics) 2014-present

Coordinator, Duke Center for Neuroeconomic Studies Major Speaker Series (2007-2009)

Coordinator, Duke Center for Neuroeconomic Studies Summer Journal Club (2007-2008)

Co-coordinator, Duke Neuroeconomics Journal Club (2006-2007) with Bethany Weber

Extramural service

Ad-hoc study section member, K99 BRAINS, NIH (May, 2020)

Ad-hoc study section member, CP, NIH (Feb, 2020)

Ad-hoc study section member, SPC, NIH (June, 2019)

Ad-hoc study section member, NIDA CEBRA, NIH (2018 and 2019)

Ad-hoc study section member, BRLE, NIH (May, 2018)

Ad-hoc study section member, SPC, NIH (March, 2017)

Co-director, Neuroeconomics Summer Course (NYU-Shanghai) with Nathaniel Daw (NYU), Hilke Plassman (INSEAD), and Agnieszka Tymula (U Sydney)

Abstract reviewer, COSYNE (2014 and 2015 meeting)

Co-creator, Neurotree website (<http://www.neurotree.org>) with Stephen V. David

Ad-hoc study section member, NIDA CEBRA, NIH (2015)

NSF Review Panel for Brain and Cognitive Sciences (2013) and ad hoc reviewer, 2011-present

Editor, Invited special issue on neuroscience of foraging, *Frontiers in Decision Neuroscience* (2012-2013)

Ad-hoc grant reviewer for Wellcome Trust, EU Grant foundation, Leakey Foundation, and others