benhayden@gmail.com
(425) 749-2341
http://www.haydenlab.com

Baylor College of Medicine
Department of Neurosurgery
S101 BCM Main Campus

Benjamin Y. Hayden

Professor and McNair Scholar (Neurosurgery) — **March 2023 - present**
Baylor College of Medicine, Houston, TX

Professor (Neuroscience) — **July 2021 – Feb 2023**
Associate Professor (Neuroscience) — **Sept 2017 – June 2021**
University of Minnesota, Minneapolis, MN

Associate Professor (Brain and Cognitive Sciences) — **July 2016-August 2017**
Assistant Professor (Brain and Cognitive Sciences) — **July 2011-June 2016**
University of Rochester, Rochester, NY

Post-doctoral fellow (laboratory of Michael Platt) — **Nov 2005 – June 2011**
Duke University, Durham, NC

Ph.D. (Molecular and Cell Biology, advisor: Jack Gallant) — **August 2000 –Oct 2005**
Thesis title: *Mechanisms of working memory, attention, and decision in visual area V4*
University of California Berkeley, Berkeley, CA

B.A. (Chemistry and Linguistics) — **August 1996 – May 2000**
Rice University, Houston, TX

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

Yao, Y., Bala, P., Mohan, A. Bliss-Moreau, E., Coleman, K., Freeman, S., Machado, C., Raper, J., Zimmermann, J., **Hayden, B. Y.** and Park, H-S. (2022). OpenMonkeyChallenge: dataset and benchmark challenges for pose estimation of non-human primates. *International Journal of Computer Vision*

Aponik-Gremillion, L., Chen, Y. Y., Bartoli, E., Koslov, S. R., Rey, H. G., Weiner, K. S., Yoshor, D., **Hayden, B. Y.,** Sheth, S. A., Foster, B. L. (2002). Distinct population and single-neuron selectivity for executive and episodic processing in human dorsal posterior cingulate. *eLife*

Wu, S., Blanchard, T. Meschke, E., Aslin, R., **Hayden, B.Y.** and Kidd, C. (2022). Macaques preferentially attend to intermediately surprising information. *Biology Letters*

Wang, M., **Hayden, B. Y.,** and Heilbronner, S. (2022). A structural and functional subdivision in central orbitofrontal cortex. *Nature Communications*

Woo, J. H., Azab, H., Jahn, A., **Hayden, B. Y.** and Brown, J. (2022). The PRO model accounts for the anterior cingulate cortex role in risky decision-making and monitoring. *Cognitive, Affective, and Behavioral Neuroscience*

Maisson, D. Cash-Padgett, T., Wang, M., **Hayden, B. Y.,** Heilbronner, S. and Zimmermann, J. (2021). Choice-relevant information transformation along a ventrodorsal axis in the medial prefrontal cortex. *Nature Communications*

Yoo, S. B. M., Tu, J C., and **Hayden, B. Y.** (2021). Multicentric tracking of multiple agents by anterior cingulate cortex during pursuit and evasion. *Nature Communications*

Chen, C.*, Ebitz, R. B.*, Bindas, S., Redish, A. D., **Hayden, B. Y.**, and Grissom, N. M. (2021). Divergent strategies for learning in males and females. *Current Biology* (* = equal contribution)

Ebitz, R. B, Tu, J. C., and Hayden, B. Y. (2020). Rules warp feature encoding in decision-making regions. *PLoS Biology.*

Bala, P. C., Eisenreich, B. R., Yoo, S. B. M., **Hayden, B. Y.***, Park, H. S.*, & Zimmermann, J.* (2020). OpenMonkeyStudio: automated markerless pose estimation in freely moving macaques. *Nature Communications* (* = equal contribution)

Moreno-Bote, R., Ramirez-Ruiz, J., Drugowistch, J., and **Hayden, B. Y.** (2020). Heuristics and optimal solutions to the breadth-depth dilemma. *Proceedings of the National Academy of Sciences*

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*

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*

Yacoub, E., Grier, M. D., Auerbach, E. J., Lagore, R. L., Harel, N., Zilverstand, A., **Hayden, B. Y.**, Heilbronner, S. R., Ugurbil, K. & Zimmermann, J. (2020). Ultra-high field (10.5 T) resting state fMRI in the macaque. *Neuroimage*

Ebitz, R. B., Sleezer, B. J., Jedema, H., Bradberry, C., and **Hayden, B. Y.** (2019). 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

Hayden, B. Y. (2022). The dangers of cortical brain maps. *Journal of Cognitive Neuroscience*

Foster, B. L., Koslov, S., Aponik-Gremillion, L., Monko, M., **Hayden, B. Y.**, and Heilbronner, S. R. (2022). A tripartite view of posterior cingulate cortex. *Nature Reviews Neuroscience*

Knaebe, B., Weiss, C., Zimmermann, J., and **Hayden, B. Y.** (2022). The promise of behavioral tracking systems for advancing primate animal welfare. *Animals*

Cisek, P. and **Hayden, B. Y.** (2022). Neuroscience needs evolution. *Philosophical Transactions of the Royal Society B*

Hayden, B. Y., Park, H. S. and Zimmermann, J. (2021). Automated pose estimation in primates. *American Journal of Primatology*

Fine, J. and **Hayden, B. Y.** (2021). The whole prefrontal cortex is premotor cortex. *Philosophical Transactions of the Royal Society B*

Ebitz, R. B. and **Hayden, B. Y.** (2021). The population doctrine in cognitive neuroscience. *Neuron*

Hayden, B. Y. and Niv, Y. (2021). The case against economic values in the orbitofrontal cortex (or elsewhere in the brain). *Behavioral Neuroscience*

Wang, M. Z. and **Hayden, B. Y.** (2021). Latent learning, cognitive maps, and curiosity. *Current Opinion in Behavioral Sciences*

Voloh, B., Knoebl, R., Zimmermann, J., and **Hayden, B. Y.** (2020). Oscillations as a window into neuronal mechanisms underlying dorsal anterior cingulate function. *International Review of Neurobiology*

Yoo, S. B. Y., **Hayden, B. Y.**, and Pearson, J. M. Continuous decisions. (2020). *Philosophical Transactions of the Royal Society B*

Cervera, R. L., Wang, M. Z., and **Hayden, B. Y.** (2020). Systems neuroscience of curiosity. *Current Opinion in Behavioral Sciences*

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*

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. 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*

Eisenreich, B., Akaishi, R., and **Hayden, B. Y.** (2017) Control without controllers: towards a distributed neuroscience of executive control. *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

- *Posterior cingulate cortex and executive control of memory.*
  Role: Co-PI (With Brett Foster, University of Pennsylvania). NIH R01 MH129439 (2022-2027)
- *Neural basis of behavior in freely moving macaques*
  Role: PI. NIH R01 MH125377 (2021-2026)
- *Neuronal basis of persistence*
  Role: PI. NIH R01 DA038615 (2015-2025, renewed in 2020)
- *Modeling circuit-specific psychiatric deep-brain stimulation and its cognitive effects in macaques*
  Role: Lead PI (with co-PI Alik Widge, Psychiatry). NIH R01 MH124687 (2020-2025)

COMPLETED GRANTS

- *Neural correlates of social states in macaques*
  Role: PI (with Co-PIs Hyun Soo Park and Jan Zimmermann) NSF (2020-2025).
- *Traveling wave transcranial alternating current stimulation for control of large-scale brain networks*
  NINDS R01. Role: Co-I (PI: Alexander Opitz, 2020-2025)
- *Technology to realize the full potential of ultra-high field fMRI*
  NIH P40. Role: Co-I (PI: Kamil Ugurbil, 2019-2024)
- *Linking neuronal, metabolic, and hemodynamic responses across scales*
  NIH R01. Role: Co-I (PI: Geoffrey Ghose, 2018-2022)
- *3D markerless pose estimation and neural measurements from freely moving rhesus monkeys*
  MN Futures Program. Role: Co-PI (with Hyun Soo Park, Computer Science, 2018-2022)
- *Sex-biased impacts of 16p11.2 variants on reward-based choice*
  NIMH R01. Role: Co-I (PI: Nicola Grissom, 2020-2023)
- *Center for Neural Circuits in Addiction*
  NIDA P30. Role: Core director, Addiction Connectome Core. (2020-2023)
- *Using Computation to Achieve Breakthroughs in Neuroscience*
  Role: PI. NIH T32 MH115886 (2019-2023)
- *Prefrontal-striatal circuit manipulation during self-control in nonhuman primates*
  MDT Addiction Seed Grant Program. (with Sarah Heilbronner)
- *Neural basis of reward-based choice*
  Role: PI. NIH R01 DA037229 (2015-2020)
- *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 fatiguability 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 (2016)
- *Future-oriented decisions in macaques*
  Role: PI. Templeton Science of Prospection 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

- Best Paper Award in Psychonomic Bulletin and Review (2016). For "The description-experience gap in risky choice in non-human primates" from the Psychonomic Society
- Templeton Foundation Fellow in Prospection (2014). John Templeton Foundation
- Klingenstein-Simons Fellowship Award in the Neurosciences (May 2014). Klingenstein-Simons Foundation
- *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

TALKS

12/22 *Naturalistic Decision-making.* Northwestern University.
10/22 *Neuroscience in freely moving monkeys and humans.* Harvard University.
03/22 *Orbitofrontal cortex in the natural world.* Oxford University.
03/22 *New frontiers in orbitofrontal cortex research.* Imperial College London.
03/22 *A navigational role for prefrontal regions.* University College London.
03/22 *Big questions in animal tracking.* Brain Behavior Quantification Symposium. NIH BRAIN Initiative panel.
02/22 *Pose tracking in primates.* Public talk at the Minnesota Zoo.
10/21 *Monkey tracking.* SymPOSEium, University of Minnesota.
10/21 *ACC, addiction, control.* Harvard University.
10/21 *Posterior cingulate cortex and navigation.* Society for Neuroscience Conference. Chicago, IL.
04/21 *The population doctrine and cognitive neuroscience.* Imperial College London.
10/20 *Neural basis of naturalistic decisions*. Yerkes Primate Center, Emory University, Atlanta, GA.
10/20 *Augmentation of automated image tracking algorithms*. Neuromatch 3.0.
09/20 *Neural basis of naturalistic decisions*. Université de Montréal.
08/20 *OpenMonkeyStudio Showcase*. Primate tracking mini-conference. University of Minnesota, MN.
01/20 *Intracranial recordings in neurosurgical patients with free movement*. UMN Udall Center. University of Minnesota, MN.
01/20 *Systems neuroscience*. Medtronic Short Course on Neuroscience.
9/19 *Natural decision-making.* MIT. Cambridge, MA.
7/19 *Curiosity and Neuroscience.* Reinforcement Learning and Decision Making Conference. Montreal, QC.
5/19 *Curiosity and the Brain.* Templeton Meeting on Curiosity. Washington, D. C.
4/19 *Natural decision*-making. OHSU. Portland, OR.
4/19 *Neural basis of choice and action.* Harvard/Massachusetts General Hospital. Boston, MA.
1/19 *Neural basis of executive control.* Brown University. Providence, RI.
10/18 *Neural basis of choice and control.* Workshop on Computational Properties of Prefrontal Cortex. Vanderbilt University. Nashville, TN.
9/18 *Neuroengineering and neuroeconomics.* Neuroengineering Seminar, University of Minnesota. Minneapolis, MN.
7/18 *Embodied Neuroeconomics.* Gordon Conference on Neurobiology of Cognition, Newry, Maine
4/18 *Posterior Cingulate Cortex and Reward.* Baylor College of Medicine. Houston, TX.
3/18 *Choice and choice processes.* Indiana University. Bloomington, IN.
1/18 *Towards wireless recording in freely moving macaques.* TBSI Webinar.
1/18 *Neural basis of reward-based choice.* University of Minnesota. Minneapolis, MN.
10/17 *Distributed executive control.* Control Processes. Amsterdam, Netherlands.
10/17 *Neuroscience of foraging choices.* NYU CNS department seminar. New York City, NY
9/17 *Neural basis of choice.* Colloquium talk. University of Minnesota. Minneapolis, MN.
5/17 *The past and future of neuroeconomics.* Klingenstein Fellows meeting. New York City, NY.
5/17 *Circuitry for curiosity based decisions.* Origins of Cognition Symposium, RIT, Rochester, NY.
4/17 *Neuronal foundations of value.* Cognition and Decision Seminar. Columbia University, New York, NY.
3/17 *Neuroscience of reward-based decisions.* Albert Einstein University. New York City, NY.
2/17 *Neuroscience of foraging decisions.* University of Rochester, department of Ecology. Rochester, NY.
2/17 *Neuroscience of foraging decisions.* University of Chicago. Chicago, IL.
11/16 *Distributed mechanisms of choice.* SFN Mini-Symposium (Chair/Speaker). San Diego, CA.
10/16 *Distributed approaches to choice and executive control.* Carnegie Mellon University. Pittsburgh, PA.
10/16 *Positive and negative in cingulate cortex.* Persistent Maladaptive Behaviors. UR. Rochester, NY
09/16 *Micro and macro: bridging across levels in neuroeconomics.* University of Minnesota. St. Paul, MN
08/16 *Imagination is the cure for poor self-control*. Templeton Meeting on Prospection. Philadelphia, PA.
06/16 *Attention as a solution to the selection problem in economic choice.* CVS Symposium. Rochester, NY.
04/16 *Demand for control reduces coding sparseness in dorsal ACC.* CNS Meeting. NYC, NY.
03/16 *Distributed computation, economic choice, and control.* Cognitive Science Dinner, UR, Rochester, NY.
02/16 *Circuitry for economic choice.* Department of Neurobiology, Duke University, Durham, NC. Feb 2016
01/16 *Neural basis of economic choice.* Department of Psychology, Vanderbilt University, Nashville, TN.

10/15 *Distributed mechanisms of economic choice.* Affective Brain Lab, UCL, London, UK
09/15 *Representation of reward on the orbital surface*. Quadrennial Meeting on OFC, INSERM, Paris, France
08/15 *Does economic choice involve simulation of possible rewards?* Templeton Meeting on Prospection. Philadelphia, PA
07/15 *Neuroscience of foraging*. Duke-Kunshan Summer School in Neuroeconomics. Shanghai, China
07/15 *Neuroscience of foraging*. NYU-Shanghai Summer School in Neuroeconomics. Shanghai, China
03/15 *Neuroscience of economic choice.* Neurobiology and Behavior Colloquium Series, Cornell University,
02/15 *Representation and reward*. Dept. Psychological and Brain Sciences, Johns Hopkins University
01/15 *Representation and the reward system.* Behavior, Genetics, and Neuroscience Series, Yale University
10/14 *Spatial selectivity in reward regions.* Workshop on Computational Properties of Prefrontal Cortex, Whistler, BC
10/14 *Economics for monkeys.* Laboratory for Laser Energetics Science and Technology Series, Rochester N
09/14 *Reward representation in orbitofrontal cortex.* NIA / NIDA Intramural Program, Baltimore, MD
08/14 *Future-oriented decisions in macaques.* Templeton Conference on Prospection, Philadelphia, PA
07/14 *Information-seeking, curiosity, and reward.* Gordon Conference on the Neurobiology of Cognition, Newry, Maine
05/14 *Information-seeking, curiosity, and reward.* Symposium on Biology of Decision Making, Paris, France
04/14 *Orbitofrontal cortex, Representation and Reward.* Mount Sinai Medical School, New York, NY
11/13 *Neural basis of persistence.* SFN Minisymposium (presenter and chair), SFN meeting, San Diego, CA
09/13 *Neural basis of self-control*. EBBS meeting, Munich, Germany
06/13 *Eat prey, leave: neuroscience of foraging.* Decision Neuroscience Symposium, Düsseldorf, Germany
04/13 *Economics vs. Neuroeconomics.* University of Illinois, Urbana-Champaign
03/13 *Neuroscience of foraging*. COSYNE Workshop (organizer), Salt Lake City, UT
03/13 *Reward and decisions*. COSYNE Workshop, Salt Lake City, UT
03/13 *Decision-making and control.* Princeton University, Princeton, NJ
11/12 *Why do monkeys like to gamble?* TEDxRochester, Rochester, NY
10/12 *We don't know what we want.* Interactive Strategies 2012, Houston, TX
09/12 *Eat, Prey, Leave: Self-control and foraging.* Clarkson University, Potsdam, NY
09/12 *Elements of reward-based choice.* Oxford University, Oxford, UK
09/12 *Neural basis of reward-guided decisions.* University College London, London, UK
09/12 *Process models of decisions involving risk (and time).* University of Warwick, Warwick, UK
06/12 *Anterior cingulate cortex and oculomotor control.* Center Visual Science Symposium, Rochester, NY
04/12 *Anterior cingulate cortex and oculomotor control.* UR CVS Research Talk Series, Rochester, NY
02/12 *Why do monkeys like to gamble?* University of Rochester Phelps Colloquium Series, Rochester, NY,
10/11 *Algorithms for value-based choice.* University of Zurich, Switzerland
10/10 *Neural basis of foraging decisions* Brain, Mind, and Society Series, Caltech, Pasadena, CA
09/10 *Cingulate cortex, outcomes, and behavioral adjustments.* Workshop on Prefrontal Cortex, Whistler, BC
09/10 *Cingulate cortex, outcomes, and behavioral adjustments*. Neuro2010, Kobe, Japan
08/10 *What do ACC neurons signal?* RIKEN seminar, Tokyo, Japan
06/10 *Neural basis of foraging decisions.* Yale University, New Haven, CT
06/10 *What information is carried by ACC neurons?* Motivation & Cognitive Control, Oxford University, UK
03/10 *Neural representation of fictive outcomes*. COSYNE Workshops, Snowbird, UT
02/09 *Monitoring an uncertain world: cingulate cortex.* University of Rochester, Rochester, NY
02/09 *Cingulate cortex: learning about rewards.* Carnegie Mellon University, Pittsburgh, PA
02/09 *Cingulate cortex: learning about rewards.* University of Texas, Austin, TX
01/09 *Cingulate cortex: choice and monitoring.* Dartmouth College, Hanover, NH
07/09 *Monitoring an uncertain world: cingulate cortex*. University of Pennsylvania, Philadelphia, PA
05/09 *Uncertainty, monitoring, and the cingulate cortex* . Yale University Medical School, New Haven, CT
10/08 *Cingulate cortex monitors outcomes of risky decisions*. NIMH, Bethesda, MD
07/07 *What causes risk sensitivity among primates?* Economics for Apes Conference, MPI, Leipzig, Germany
01/05 *Attention, working memory, and decision in V4.* Oxyopia Seminar, UC Berkeley, Berkeley, CA

MENTORSHIP

Former trainees with tenure-track faculty positions:
• Becket Ebitz (Université de Montréal, Quebec, Canada), 2020
• Ruyuan Zhang (Jiao Tong University, Shanghai, China), 2020
• Seng Bum Yoo (Institute for Basic Science, Sung Kwon Kang University, Seoul, South Korea), 2021
• Rei Akaishi (RIKEN, Tokyo, Japan), 2020

Junior faculty mentorship:
• David Darrow (Neurosurgery, UMN, 2020-2023)
• Jocelyn Richard (Neuroscience, UMN, 2019-2023)
• Jan Zimmermann (Neuroscience, UMN, 2019-2023)
• Alexander Herman (Psychiatry, UMN, 2018-2023)

Post-docs supervised:
• Justin Fine, University of Minnesota and BCM, 2020-present
• Jeremiah Morrow, University of Minnesota, 2021-present
• Benjamin Voloh, University of Minnesota, 2020-present
• Ruyuan Zhang, University of Minnesota, 2018-2019
• R. Becket Ebitz, University of Rochester and University of Minnesota, 2017-2020
• Benjamin Eisenreich, University of Rochester and University of Minnesota, 2016-2020
• Brianna Sleezer, University of Rochester, 2016-2017
• Rei Akaishi, University of Rochester, 2016-2017
• Pragathi Priyadharsini Balasubramani, University of Rochester, 2015-2017
• Alexander Thomé, University of Rochester, 2013-2015

Graduate students supervised:
• Yuan Yao, Computer Science, University of Minnesota, 2020-2022
• David Maisson, Neuroscience, University of Minnesota, 2020-2022
• Roberto Lopez Cervera, Neuroscience, University of Minnesota, 2019-2023
• Praneet Bala, Computer Science, University of Minnesota, 2019-2022
• Tyler Cash-Padgett, Neuroscience, University of Minnesota, 2016-2022
• Priyanka Mehta (*Sproull Fellow*), Neuroscience, University of Minnesota, 2016-2021
• Seng-Bum Yoo, Brain and Cognitive Sciences, University of Rochester, 2015-2020
• Habiba Azab, Brain and Cognitive Sciences, University of Rochester, 2014-2020
• Zhe Wang, Brain and Cognitive Sciences, University of Rochester, 2014-2020
• Shraddha Shah, Brain and Cognitive Sciences, University of Rochester, 2014-2016
• 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

Undergraduate students supervised (2017-present):
• Over 50, including: Afra Suri, Kyle Edmonston, Sydney Walsh, Hannah Lee, Efemona Femati, Alex Rich, Jude Goossens, Rachel Knoebel, Emily Kasprick, Salma Muftah, Preeta Pavagadhi, Collin Meyer, Emily Orr, Julia White, Kelsey Brantley, Sydney Redepenning, Elaina Seeman, Emma Rochlin, Mrunal Zambre, Eliezer Mishulovin

SERVICE

Intramural service

Committee to select new director of graduate studies for the Center for Cognitive Science (2020-2023)
Director, MDTA Speaker Series (2018-2020)
MNFutures Grant Review Committee (2020)

Member, T32 Computational Neuroscience Training Grant (2018-2023)
Chair, MDT Addiction Speaker Series. University of Minnesota. (2018-2023)
CMRR Computational Neuroscience faculty search committee (2017-2018)
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:

- UMN: Natalie Lopresti (Neuroscience), Scott Stanslaski (Biomedical Engineering)
- UR: 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:

- NSCI 5551 (Advanced statistics for Neuroscience) with Jan Zimmermann, 2020
- 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)
Society for Neuroeconomics Awards Committee (2019)
Ad-hoc study section member, SPC, NIH (June, 2019)
Ad-hoc study section member, NIDA CEBRA, NIH (2018 and 2019)
Society for Neuroeconomics Awards Committee (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 Plassmann (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