Benjamin Y. Hayden

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University of Rochester
Department of Brain and Cognitive Sciences
Meliora Hall 360, Box 270268
Rochester, NY, 14627

CAREER HISTORY

Assistant professor — **July 2011-present**
Department of Brain and Cognitive Sciences and
Center for Visual Science
University of Rochester
Rochester, NY

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

Post-doctoral fellow (laboratory of Jack Gallant) — **June 2005 – Oct 2005**
University of California, Berkeley
Berkeley, CA

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

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

PEER-REVIEWED ORIGINAL RESEARCH

(for reprints, please visit haydenlab.com/papers)

Postreward delays and systematic biases in measures of animal temporal discounting
Tommy C. Blanchard, John M. Pearson, and Benjamin Y. Hayden
Proceedings of the National Academy of Sciences (2013). *In press.*

Working memory and decision processes in visual area V4
Benjamin Y. Hayden and Jack L. Gallant
Frontiers in Decision Neuroscience (2013) 7:18. PMCID 3582211.

Neurotree: A collaborative, graphical database of the academic genealogy of neuroscience
Stephen V. David and Benjamin Y. Hayden
PLoS ONE (2012). *In press.* PMCID: 3465338.

Decision salience signals in posterior cingulate cortex
Sarah R. Heilbronner , Benjamin Y. Hayden, and Michael L. Platt
Frontiers in Decision Neuroscience (2011). Volume 5, article 55. PMCID: 3082769.

Neuronal basis of sequential foraging in a patchy environment
Benjamin Y. Hayden, John M. Pearson, and Michael L. Platt
Nature Neuroscience (2011). Vol 14 (7) 933-941. NIHMSID: 422967

Surprise signals in anterior cingulate cortex: neuronal encoding of unsigned reward prediction errors driving adjustments in behavior
Benjamin Y. Hayden, Sarah R. Heilbronner, John M. Pearson, and Michael L. Platt
Journal of Neuroscience (2011). Vol 31(11) 4178-87. PMCID3070460.

Explicit information reduces discounting behavior in monkeys
John M. Pearson, Benjamin Y. Hayden, and Michael L. Platt
Frontiers in Comparative Psychology (2010) Vol. 1, article 237. PMCID3153841.

Cognitive control signals in posterior cingulate cortex
Benjamin Y. Hayden, David V. Smith, and Michael L. Platt
Frontiers in Human Neuroscience (2010) Vol. 4, article 223. PMCID: 3001991.

Ambiguity aversion in rhesus macaques
Benjamin Y. Hayden, Sarah R. Heilbronner, and Michael L. Platt
Frontiers in Decision Neuroscience (2010) vol 4 art 166. PMCID: 2948461.

Distinct value signals in anterior and posterior ventromedial prefrontal cortex
David V. Smith, Benjamin Y. Hayden, Trong-Kha Truong, Allen Song, Michael Platt and Scott A. Huettel
Journal of Neuroscience (2010) vol 30 p. 2490-2495. PMCID: 2856318.

Neurons in anterior cingulate cortex multiplex information about reward and action
Benjamin Y. Hayden and Michael L. Platt
Journal of Neuroscience (2010) vol. 30 p. 3339-3346. PMCID: 2847481.

Neurons in posterior cingulate cortex signal exploratory decisions in a dynamic multi-option choice task
John M. Pearson, Benjamin Y. Hayden, Sridhar Raghavachari, and Michael L. Platt
Current Biology (2009) vol. 19 (18), p 1-6. NIHMSID: 422335.

The mean, the median, and the St. Petersburg Paradox
Benjamin Y. Hayden and Michael L. Platt
Judgment and Decision Making (2009) vol. 4 (4), p. 256-273. NIHMSID: 422969.

Fictive learning signals in anterior cingulate cortex
Benjamin Y. Hayden, John M. Pearson, and Michael L. Platt
Science (2009) vol. 324 (5929) p. 948-950. PMCID: 3096846.
New York Times: "In that tucked tail, real pangs of regret?" http://www.benhayden.com/pub/nytimes.pdf

Electrophysiological correlates of default-mode processing in macaque posterior cingulate cortex
Benjamin Y. Hayden, David V. Smith, and Michael L. Platt
Proceedings of the National Academy of Sciences (2009) vol. 106 (14) p. 5948-5953. PMCID: 2667004.
Faculty of 1000 Biology evaluation: http://www.f1000biology.com/article/id/1161820/evaluation

Gambling for Gatorade: risk-sensitive decision making for fluid rewards in humans
Benjamin Y. Hayden and Michael L. Platt
Animal Cognition (2009) vol. 12(1) p. 201-207. PMCID: 2683409.

Combined effects of spatial and feature-based attention on responses of V4 neurons
Benjamin Y. Hayden and Jack L. Gallant
Vision Research (2009) vol. 49(10) p. 1182-1187 PMID 18619996.

Posterior cingulate cortex mediates outcome-contingent allocation of behavior
Benjamin Y. Hayden, Amrita C. Nair, Allison N. McCoy, and Michael L. Platt
Neuron (2008) vol 60(1) p. 19-25. PMCID: 2575690.

Attention to stimulus features shifts spectral tuning of V4 neurons during natural vision
Stephen V. David, Benjamin Y. Hayden, James A. Mazer, and Jack L. Gallant
Neuron (2008) vol 59(3) p. 509-521. PMCID: 2948549
.

Cognitive influences on risk-seeking by rhesus macaques
Benjamin Y. Hayden, Sarah R. Heilbronner, Amrita C. Nair, and Michael L. Platt
Judgment and Decision Making (2008) vol. 3(5) p. 389-395. PMCID: 2763334.

Economic principles motivating social attention in humans

Benjamin Y. Hayden, Purak C. Parikh, Robert O. Deaner, and Michael L. Platt
Proceedings of the Royal Society B (2007) vol. 274(1619) p. 1751-1756. PMCID: 2493582.

Temporal discounting predicts risk sensitivity in rhesus macaques
Benjamin Y. Hayden and Michael L. Platt
Current Biology (2007) vol. 17(1) p. 49-53. PMCID: 1868415.

Spectral receptive field properties explain shape selectivity in area V4
Stephen V. David, Benjamin Y. Hayden, and Jack L. Gallant
Journal of Neurophysiology (2006) vol. 96(6) p. 3492:3505. PMID 16987926.

Timecourse of attentional modulation reveals differences in mechanisms of spatial and feature attention
Benjamin Y. Hayden and Jack L. Gallant
Neuron (2005) vol. 47(5) p. 637-643. PMID 16129394.

Temporal specificity in the cortical plasticity of visual space representation
Yuxi Fu, Kaj Djupsund, Hongfeng Gao, Benjamin Y. Hayden, Kai Shen and Yang Dan.
Science (2002) vol. 296 p. 1999-2003. PMID 12065829.

CHAPTERS AND PREVIEWS

Linking neural activity to complex decisions
Benjamin Y. Hayden and Tatiana Pasternak
Visual Neuroscience (2013). *In press.*

Contextual factors explain risk preferences in rhesus macaques
Sarah R. Heilbronner and Benjamin Y. Hayden
Frontiers in Decision Neuroscience (2013) 7:7 PMCID: 356 1601

Emerging, reemerging, and forgotten brain areas of the reward circuit: notes from the 2010 Motivational and Neural Networks Conference
Vincent B McGinty, Benjamin Y Hayden, Sarah R Heilbronner, Eric C Dumont, Steven M Graves, Martine M Mirrione, Johann du Hoffman, Gregory C Sartor, Rodrigo A España, E. Zayra Millan, Alexandra G DiFeliceantonio, Nathan J Marchant, T. Celeste Napier, David H Root, Stephanie L Borgland, Michael T Treadway, Stan B Floresco, Jacqueline F McGinty, Suzanne Haber, PhD
Behavioral Brain Research (2011) vol. 225 (1), p 348-357. PMCID: 3445023.

Learning: not just the facts, ma'am, but the counterfactuals as well
Michael L. Platt and Benjamin Y. Hayden
PLoS Biology (2011) vol 9 (6) e1001092. PMCID: 3125155.

Posterior cingulate cortex: adapting behavior to a changing world
John M. Pearson, Sarah R. Heilbronner, David L. Barack, Benjamin Y. Hayden, and Michael L. Platt,
Trends in Cognitive Sciences (2011) vol. 15 (4) p. 143-151. PMCID: 3070780.

A role for posterior cingulate cortex in policy switching and cognitive control
John M. Pearson, Benjamin Y. Hayden, and Michael L. Platt
Neural Basis of Motivation and Cognitive (2011) Mars, Sallet Rushworth, and Yeung, editors

Neuroeconomics: implications for understanding the neurobiology of addiction
Michael L. Platt, Karli K Watson, Benjamin Y. Hayden, Stephen V. Shepherd, and Jeffrey T. Klein.
In Advances in the Neuroscience of Addiction (2010), Kuhn and Koob, editors

Risky decisions and fictive learning: case studies on the difficulties of integrating evidence from fMRI and electrophysiology in cognitive neuroscience
Benjamin Y. Hayden and Michael L. Platt
In Attention and Performance (2010), Robbins and Delgado, editors

Neuroethology of Vision
Benjamin Y. Hayden
In Primate Neuroethology (2009), Platt and Ghazanfar, editors

Neuroeconomics of risk sensitive decision making
Sarah R. Heilbronner, Benjamin Y. Hayden, and Michael L. Platt
In Impulsivity: The Behavioral and Neurological Science of Discounting (August, 2009)
Madden, Bickel, and Critchfield, editors

Animal cognition: great apes wait for grapes
Benjamin Y. Hayden and Michael L. Platt
Current Biology (2008) 17:21: PMID: 17383569.

Cingulate cortex
Benjamin Y. Hayden and Michael L. Platt
New Encyclopedia of Neuroscience, Elsevier (2008)

Fool me once, shame on me; fool me twice, blame ACC
Benjamin Y. Hayden and Michael L. Platt
Nature Neuroscience 2006 9:7 857-859. PMID: 16801914.

RECENT ABSTRACTS

Striatal contributions to cognitive set-shifting
Brianna J. Sleezer, Tommy C. Blanchard, and Benjamin Y. Hayden
Society for Neuroscience Meeting, San Diego, CA (Nov 2013)

The orbital frontal cortex and the value of information
Tommy C. Blanchard and Benjamin Y. Hayden
Society for Neuroscience Meeting, San Diego, CA (Nov 2013)

Neuronal representations underlying value computations in ventromedial prefrontal cortex
Caleb E. Strait, Tommy C. Blanchard, and Benjamin Y. Hayden
Society for Neuroscience Meeting, San Diego, CA (Nov 2013)

Anterior cingulate cortex and self-control
Tommy C. Blanchard and Benjamin Y. Hayden
American College of Neuropsychopharmacology Conference, Hollywood, FL (December 2012)

Role of dorsal anterior cingulate cortex in self-control decisions
Tommy C. Blanchard, Caleb E. Strait, and Benjamin Y. Hayden.
Society for Neuroscience Meeting, New Orleans, LA (Oct 2012)

Spatial tuning in ventral medial prefrontal cortex neurons
Caleb E. Strait, Tommy C. Blanchard, and Benjamin Y. Hayden.
Society for Neuroscience Meeting, New Orleans, LA (Oct 2012)

Outcome expectancy signals in macaque OFC in a curiosity task
Marc Mancarella, Tommy C. Blanchard, and Benjamin Y. Hayden
Society for Neuroscience Meeting, New Orleans, LA (Oct 2012)

Contributions of the ventral striatum to reward-based decision making
Brianna J. Sleezer, Caleb E. Strait, and Benjamin Y. Hayden
Society for Neuroscience Meeting, New Orleans, LA (Oct 2012)

GRANTS

Benjamin Y. Hayden (2013-2015)
Dissociabile roles of caudate and ventral striatum in set-shifting in monkeys
NARSAD Young Investigator Award, Brain and Behavior Research Foundation

Benjamin Y. Hayden (2013-2014)
Voltammetric electrodes for recording dopamine levels in striatum and prefrontal cortex
Schmitt Equipment Award

Benjamin Y. Hayden (2013-2018)
Flexible control of reward-based decisions
NSF CAREER award BCS 1253576

Benjamin Y. Hayden (2010-2015)
Dopamine and the role of anterior cingulate cortex in executive processes
NIDA K99/R00 027718-01

Benjamin Y. Hayden (2010-2011)
Neural mechanisms of self-control
Tourette Syndrome Association Fellowship

Benjamin Y. Hayden (2008-2010)
The role of the posterior cingulate cortex in reward-guided decision-making
NIDA Kirschstein NRSA 023338-01

Benjamin Y. Hayden (2005-2006)
Neural mechanisms of reward-based decision-making
Duke Translational Neuroscience Fellowship

HONORS

NARSAD Young Investigator Award (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

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
University of Rochester Center for Visual Science Symposium, Rochester, NY, June 2012

Anterior cingulate cortex and oculomotor control
University of Rochester CVS Research Talk Series, Rochester, NY, April, 2012

Why do monkeys like to gamble?
University of Rochester Phelps Colloquium Series, Rochester, NY, February 2012

Algorithms for value-based choice
University of Zurich, Switzerland, October 2011

Neural basis of foraging decisions
Brain, Mind, and Society Series, Caltech, Pasadena, CA, October 2010

Cingulate cortex, outcomes, and behavioral adjustments
Workshop on Computational Properties of Prefrontal Cortex, Whistler, BC, September 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 Conference, University of Oxford, Oxford, UK, June 2010

Neural representation of fictive outcomes
COSYNE Workshops, Snowbird, UT, March 2010

Monitoring an uncertain world: 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, Max Planck Institute, Leipzig, Germany, July 2007

Attention, working memory, and decision in V4
Oxyopia Seminar, Dept Vision Sciences, UC Berkeley, Berkeley, CA, January 2005

MENTORSHIP

Graduate students supervised:
• Tommy Blanchard, Brain and Cognitive Sciences, University of Rochester, 2011-present
• Caleb Strait, Brain and Cognitive Sciences, University of Rochester, 2011-present
• Brianna Sleezer, Neuroscience Graduate Program, University of Rochester, 2012-present
CVS Training Fellowship 2013
• Dave Mallpress, University of Bristol, Worldwide University Network Scholars Program, summer 2013

Post-docs:
• Alex Thome, Brain and Cognitive Sciences, University of Rochester, 2013-present

OTHER ACTIVITY

BCS Faculty Search Committee (2012-2013)
CVS Website Committee (2012-2013)
Reviewing Editor, Frontiers in Decision Neuroscience (2010-present)
Co-creator, Neurotree website (http://www.neurotree.org) with Stephen V. David
Co-coordinator, Duke Neuroeconomics Journal Club (2006-2007) with Bethany Weber
Coordinator, Duke Center for Neuroeconomic Studies Summer Journal Club (2007-2008)
Coordinator, Duke Center for Neuroeconomic Studies Major Speaker Series (2007-2009)