Ethan S. Bromberg-Martin

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Education and training

Associate Research Scientist in the Solomon H. Snyder Department of Neuroscience at Johns Hopkins University
(2025 – present)

Senior Scientist in the Department of Neuroscience at Washington University School of Medicine in St. Louis
(2017 – 2025)

Assistant Professor in the Department of Neuroscience at Columbia University.
(2014 – 2017)

Postdoctoral fellow in the laboratory of Okihide Hikosaka at the National Eye Institute.
(2009 – 2013)

Ph.D. in Neuroscience at Brown University and the National Eye Institute
Thesis: The Role of Dopamine in Information-Seeking (Advisor: Okihide Hikosaka)
(2005 – 2009)

Bachelor of Science in Computational Biology at Brown University, magna cum laude
Thesis: Partial-Order Alignment of RNA Structures (Advisor: Franco Preparata)
(2001 – 2005)

Publications

On the origins of subjective value without instrumental value
Bromberg-Martin ES, Merel J, Monosov IE.
In preparation.

Representations of information value in mouse orbitofrontal cortex during information seeking
Bussell JJ, Badman RP, Márton CD, Bromberg-Martin ES, Abbott LF, Rajan K, Axel R.
Accepted, coming soon!

Dorsal raphe neurons signal integrated value during multi-attribute decision-making
Feng YY, Bromberg-Martin ES, Monosov IE.
Cell Reports (2024), Vol 43, no. 6, 114341.

A neural mechanism for conserved value computations integrating information and rewards
Bromberg-Martin ES*, Feng YY*, Ogasawara T, White JK, Zhang K, Monosov IE. *(*equal contribution)*
Nature Neuroscience (2024), Vol 27, no. 1, pp. 159-175.

Laser stimulation of the skin for quantitative study of decision-making and motivation
Pai J, Ogasawara T, Bromberg-Martin ES, Ogasawara K, Gereau RW, Monosov IE.
Cell Reports Methods (2022), Vol 2, no. 9, 100296.

Surprise and recency in novelty detection in the primate brain

Zhang K, Bromberg-Martin ES, Sogukpinar F, Kocher K, Monosov IE.
Current Biology (2022), Vol 32, no. 10, pp. 2160-2173.

How the value of the environment controls persistence in visual search
Traner MR, Bromberg-Martin ES, Monosov IE.
PLoS Computational Biology (2021), Vol 17, no. 12, e1009662.

A prefrontal network integrates preferences for advance information about uncertain rewards and punishments
Jezzini A, Bromberg-Martin ES*, Trambaiolli LR*, Haber SN, Monosov IE. *(*equal contribution)*
Neuron (2021), Vol. 109, no. 14, pp. 2339-2352.

Neural circuitry of information seeking
Bromberg-Martin ES, Monosov IE.
Current Opinion in Behavioral Sciences (2020), Vol. 35, pp. 62-70.

The value of beliefs
Bromberg-Martin ES, Sharot T.
Neuron (2020), Vol. 106, no. 4, pp. 561-565.

A neural network for information seeking
White JK*, Bromberg-Martin ES*, Heilbronner SR, Zhang K, Pai J, Haber SN, Monosov IE. *(* co-first authors)*
Nature Communications (2019), Vol. 10, no. 1, pp. 5168.

Valuation of knowledge and ignorance in mesolimbic reward circuitry
Charpentier CJ, Bromberg-Martin ES, Sharot T.
PNAS (2018), Vol. 115, no. 31, pp. E7255-E7264.

Orbitofrontal cortex uses distinct codes for different choice attributes in decisions motivated by curiosity
Blanchard TC, Hayden BY*, Bromberg-Martin ES*. *(* co-senior authors)*
Neuron (2015) Vol. 85, no. 3, pp. 602-614.

Lateral habenula neurons signal errors in the prediction of reward information
Bromberg-Martin ES, Hikosaka O.
Nature Neuroscience (2011) Vol. 14, no. 9, pp. 1209-1216.

Dopamine in motivational control: rewarding, aversive, and alerting
Bromberg-Martin ES, Matsumoto M, Hikosaka O.
Neuron (2010) Vol. 68, no. 5, pp. 815-834.

Multiple timescales of memory in lateral habenula and dopamine neurons
Bromberg-Martin ES, Matsumoto M, Nakahara H, Hikosaka O.
Neuron (2010) Vol. 67, no. 3, pp. 499-510.

Distinct tonic and phasic anticipatory activity in lateral habenula and dopamine neurons
Bromberg-Martin ES, Matsumoto M, Hikosaka O.
Neuron (2010) Vol. 67, no. 1, pp. 144-155.

A pallidus-habenula-dopamine pathway signals inferred stimulus values
Bromberg-Martin ES, Matsumoto M, Hong S, Hikosaka O.
Journal of Neurophysiology (2010), Vol. 104, no. 2, pp. 1068-1076.

Coding of task reward value in the dorsal raphe nucleus
Bromberg-Martin ES, Hikosaka O, Nakamura K.
Journal of Neuroscience (2010), Vol. 30, no. 18, pp. 6262-6272.

Midbrain dopamine neurons signal preference for advance information about upcoming rewards
Bromberg-Martin ES, Hikosaka O.
Neuron (2009) Vol. 63, no. 1, pp. 119-126.

New insights on the subcortical representation of reward
Hikosaka O, Bromberg-Martin E, Hong S, Matsumoto M.
Current Opinion in Neurobiology (2008) Vol. 18, pp. 203-208.

Invited and conference talks

Why did we evolve to seek information? Theory of subjective value without instrumental value
2025-09-30 Curiosity, information seeking, and exploration conference, Brown University
2025-10-03 Neuroeconomics meeting, Boston, MA

Neural circuits and theory of information seeking
2025-05-01 Society for Philosophy and Neuroscience conference, Washington University in St. Louis
2024-12-11 Foraging, information seeking and exploration conference, INSERM, Lyon, France
2024-09-03 Georg-August-Universität Göttingen, Germany

Integrating information and reward into subjective value: humans, monkeys, and the lateral habenula
2023-10-14 Symposium talk at Society for Neuroeconomics 2023, Vancouver, Canada
2023-08-16 Gordon Conference on Catecholamines, Castelldefels, Spain
2022-11-13 Nanosymposium talk at Society for Neuroscience 2022, San Diego, CA
2022-03-20 Selected conference talk at Cosyne 2022, Lisbon, Portugal

A neural network for information seeking
2024-02-27 Bridging Diverse Perspectives on the Mechanistic Basis of Foraging, Janelia Research Campus
2023-03-14 Cosyne Workshop on Decision Uncertainty and Confidence, Mont Tremblant, Canada
2022-10-10 University of Texas at Austin
2022-09-21 University of Geneva, Geneva, Switzerland
2022-09-19 INSERM, Lyon, France
2022-05-06 University of Alabama
2021-04-01 University of Ghent
2020-05-03 Symposium talk at the Cognitive Neuroscience Society Annual Meeting
2019-10-20 Nanosymposium talk at Society for Neuroscience 2019, Chicago, IL

Neural circuits for information seeking
2017-09-22 University of Western Ontario
2017-05-25 Association for Psychological Science Annual Meeting
2017-04-06 Washington University in St. Louis
2017-03-20 Harvard University
2015-01-15 University College London (Affective Brain Lab online talk series)
2014-09-26 Yale University
2014-09-25 Massachusetts Institute of Technology
2014-09-20 Champalimaud Neuroscience Programme
2014-06-02 National Institutes of Aging and Drug Abuse, NIH Bayview Campus
2014-03-25 Princeton University
2014-03-10 University of Rochester
2013-11-07 University of California San Diego
2013-06-27 National Institute of AIST, Tsukuba, Japan
2013-06-26 National Institute for Physiological Sciences, Okazaki, Japan
2013-06-25 Kansai Medical University, Moriguchi City, Japan
2013-06-18 RIKEN Brain Science Institute, Wako, Japan

2013-02-14, Department of Neuroscience, Columbia University

Motivational computations in the habenula-dopamine pathway
2016-06-06 Lateral Habenula Under the Spotlight Symposium, IFM, Paris, France.

Multiple forms of reward memory in the habenula-dopamine pathway
2013-11-10 Minisymposium talk at the Society for Neuroscience 2013, San Diego, CA

Lateral habenula signals for information seeking and other rewards
2013-06-20 Symposium at the Japan Neuroscience Society Meeting, Kyoto, Japan

Motivational and visuospatial signals in midbrain dopamine neurons
2011-08-09, Gordon Research Conference on Catecholamines

Dopamine neuron signals related to reward, alerting, and stimulus selection
2011-02-28, Cosyne Workshop "Attention, reinforcement learning, and reward"

Multiple motivational signals in lateral habenula and dopamine neurons
2011-02-15, Center for Neuroeconomics, New York University
2010-03-02, Cosyne Workshop "Decision making and learning: beyond the basics"

A neural pathway for information-seeking
2009-10-30, Cold Spring Harbor Laboratory
2009-09-09, Gatsby Computational Neuroscience Unit, University College London.

The role of dopamine in information-seeking
2010-05-24, "Infomax approaches in learning and control" workshop, UCSD
2009-03-25, Department of Neurobiology, Yale University

Poster presentations

Why did we evolve to seek information? Testing two computational theories
Bromberg-Martin ES, Merel J, Monosov IE.
(2024) Society for Neuroscience Abstract

Integrating information and reward into subjective value: humans, monkeys, and the lateral habenula
Bromberg-Martin ES, Feng YY, Ogasawara T, White JK, Zhang K, Monosov IE.
(2022) Bernstein Conference for Computational Neuroscience, Berlin, Germany

Integrating information and reward into subjective value: common computations in humans, monkeys, and basal ganglia-lateral habenula circuitry
Bromberg-Martin ES, Feng YY, Ogasawara T, White JK, Zhang K, Monosov IE.
(2021) Society for Neuroscience Abstract

Integrating information and reward into subjective value: lateral habenula both predicts and causally influences decision-making online
Feng YY, Bromberg-Martin ES, Ogasawara T, White JK, Zhang K, Monosov IE.
(2021) Society for Neuroscience Abstract

High channel-count neural recordings in monkeys reveal the diverse underpinnings of novelty detection across brain circuits
Zhang K, Bromberg-Martin ES, Sogukpinar F, Kocher K, Monosov IE.
(2021) Society for Neuroscience Abstract

How do time and uncertainty motivate information seeking?

Bromberg-Martin ES, Ogasawara T, Feng YY, White JK, Zhang K, Monosov IE.
(2020) Cosyne Abstracts 2020, Denver CO.

A neural pathway for information seeking: a cingulate-striatum-pallidum network predicts gaze shifts to objects associated with uncertain rewards
Bromberg-Martin ES, White JK, Zhang K, Pai J, Monosov IE.
(2018) Society for Neuroscience Abstract, *44*: 416.19.

A neural pathway for information seeking: causal manipulations of regions in the cingulo-striatum-pallidum network and their effects on the motivation to resolve uncertainty
Monosov IE, White JK, Bromberg-Martin ES, Zhang K, Pai J.
(2018) Society for Neuroscience Abstract, *44*: 416.20.

Deciding to know: information prediction errors and value in the human brain
Charpentier CJ, Bromberg-Martin ES, Sharot T.
(2016) Society for Neuroscience Abstract, *42*: 648.21.

Distinct neural processes for appetitive and informational rewards
Bromberg-Martin ES, Merel J, Blanchard TC, Hayden BY.
(2016) Society for Neuroscience Abstract, *42*: 542.01.

Information seeking is driven by two types of uncertainty
Bromberg-Martin ES, Barack DL, Platt ML.
(2016) Cosyne Abstracts 2016, Salt Lake City USA.

Distinct neural processes for appetitive and informational rewards
Bromberg-Martin ES, Merel J, Blanchard TC, Hayden BY.
(2015) Cosyne Abstracts 2015, Salt Lake City USA.

Ventral pallidum neurons signal an information-induced bias in handling reward uncertainty
Bromberg-Martin ES, Hikosaka O.

(2014) Cosyne Abstracts 2014, Salt Lake City USA.

Lateral habenula neurons encode risky rewards with distinct tonic and phasic motivational signals
Bromberg-Martin ES, Matsumoto M, Hikosaka O.
(2012) Society for Neuroscience Abstract, *38*: 295.07.

What does information seeking tell us about reinforcement learning?
Bromberg-Martin ES, Hikosaka O.
(2012) Cosyne Abstracts 2012, Salt Lake City USA.

A pallidus-habenula-dopamine pathway transmits both motivational and visuospatial signals
Bromberg-Martin ES, Matsumoto M, Hong S, Hikosaka O.
(2011) Society for Neuroscience Abstract, *37*: 732.11.

Distinct tonic and phasic anticipation of rewards and punishments in lateral habenula and dopamine neurons
Bromberg-Martin ES, Matsumoto M, Hikosaka O.
(2010) Frontiers in Addiction Research (NIDA mini-convention at SFN), poster 37.

Distinct tonic and phasic anticipation of rewards and punishments in lateral habenula and dopamine neurons
Bromberg-Martin ES, Matsumoto M, Hikosaka O.
(2010) Society for Neuroscience Abstract, *36*: 916.24.

Lateral habenula neuron encoding of information prediction errors
Bromberg-Martin ES, Hikosaka O.

(2009) Society for Neuroscience Abstract, *35*: 683.11.

Multiple timescales of reward memory in lateral habenula and midbrain dopamine neurons
Bromberg-Martin E, Matsumoto M, Nakamura K, Nakahara H, Hikosaka O.
(2009) *Frontiers in Systems Neuroscience. Conference Abstract: Computational and systems neuroscience*.

Midbrain dopamine neurons signal preference for advance information about upcoming rewards
Bromberg-Martin ES, Hikosaka O.
(2008) Society for Neuroscience Abstract, *34*: 691.23.

Lateral habenula neurons respond to the negative value of rewards and the positive value of elapsed time
Bromberg-Martin ES, Matsumoto M, Hikosaka O.
(2007) Society for Neuroscience Abstract, *33*: 530.9.

Hybrid Billboard Clouds for Model Simplification
Bromberg-Martin E, Mar Jonsson A, Marai GE, McGuire M.
(2004) SIGGRAPH Poster Abstract.

Other research

Summer 2002, 2003, 2004
Internship at the Laboratory of Experimental and Computational Biology,
National Cancer Institute, at NCI-Frederick in Ft. Detrick, Maryland.

Summer 2001
Internship at the Laboratory of Biochemical Genetics,
National Heart, Lung, and Blood Institute, at the NIH in Bethesda, Maryland.