

A. FIELD OF SPECIALIZATION

The goal of my research is to understand the neural mechanisms that underlie the control of attention and its relation with decision making. Attention and decision making have been studied in countless studies in many species and experimental paradigms, but we have a limited understanding of how they are related. What role does attention play in decision making? What motivates us to attend to different sensory inputs in different contexts, and what do our brains aim to accomplish when they focus attention? Our laboratory investigates these questions using behavioral, computational and neurophysiological tools. My working hypothesis is that attention plays a key role in information seeking, and as such, is specialized for detecting sensory inputs that promote learning and/or reduce uncertainty about relevant items. Using behavioral and computational approaches, I have developed and continue to develop new paradigms for measuring information seeking in humans and non-human primates. Using neurophysiological techniques in humans and monkeys, I investigate the basis of attentional recruitment in relation to task contingencies in areas implicated in cognitive control. These studies probe the intricate relationships between cognition – our ability to make sense of the world - and decisions – our ability to act in the world. These interactions are at the root of all complex behavior and deciphering them has broad relevance for many psychiatric disorders, most notably autism, attention deficit/hyperactivity disorder, drug addiction, schizophrenia and depression.

B. EDUCATION

Massachusetts Institute of Technology B.Sc. Cognitive Neuroscience 1986

Yale University PhD Neurobiology 1993
Dissertation: Contributions of the frontal eye field to smooth pursuit eye movements
 Mentor: Prof. Charles Bruce

C. POSITIONS HELD AFTER PHD

1993-1995 **Uniformed Services University of the Health Sciences, Bethesda, MD**
 Postdoctoral Fellow, Neuroscience (Supervisor: Prof. Asaf Keller)

1995-2001 **Laboratory of Sensorimotor Research, National Institutes of Health, Bethesda, MD**
 Postdoctoral Fellow (Supervisor: Dr. Michael Goldberg)

2001-2010 **Columbia University, Departments of Neuroscience and Psychiatry,**
 Assistant Professor

2010-2017 **Columbia University, Department of Neuroscience**
 Associate Professor with tenure

2017- **Columbia University, Department of Neuroscience**
 Full Professor with tenure

D. TEACHING EXPERIENCE**TEACHING**

The body in health and disease, Columbia University Medical School (instructor, 2005-present)
 Continuing medical education lecture, Columbia University (instructor, 2008-2009)

Ignorance, Columbia University undergraduate course (instructor, 2011)
Graduate student seminar on Cognitive Neuroscience (co-director, 2010, 2016)
Cold Spring Harbor *Visual Neuroscience* (instructor, 2015, 2017)
Woods Hole *Minds, Brains and Machines* (lecturer, 2016)
The neuroscience of curiosity (Lecturer, Architecture Department Graduate Program)

MENTORSHIP

Postdoctoral researchers

Jeff Oristaglio (2002-2005)
Edgar Emilio Galindo-Leon (2003-2004)
Puiu Balan (2003-2010; Presently researcher at Luvain University, Belgium)
Timothy Gersch (2009-2014)
Mototaka Suzuki (2008-2013; Presently postdoctoral fellow with Markus Larkum, Berlin)
Simon Kelley (2008-2010; Presently Professor, Trinity College Institute for Neuroscience, Ireland)
Nicholas Foley (2010-present)
Nabil Daddaoua (2013-2019)
Daniel Vatterott (2015-present)
Avanti Dey (2016-present)
Kenji Kobayashi (2017-2019)
Gaurav Patel (2015-present; K99 mentor and collaborator)

PhD students

Nick Singletary (2017 -) (co-supervised with Guillermo Horga, Psychiatry)
Michael Cohanpour (2017 -) (co-supervised with Mariam Aly, Psychology)
Erfan Zabeh (2019-) (Co-supervised with Josh Jacobs, Biomedical Engineering)

PhD Dissertation Committees

Andrew Teich (2003-2005)
Raquel Bibi (2011-2013)
Sara Steenrod (2008-2010)
Arthur Prat-Carrabin, Ecole Normale Supérieure (ENS), Paris, France

E. PUBLICATIONS

PEER-REVIEWED RESEARCH ARTICLES

* denotes candidate as senior author

Forthcoming and in preparation

Foley, N.C., Cohanpour, M., Semework, M. S., Sheth, S.A. and Gottlieb, J* (2019) Frontal and parietal neurons encode reward predictions in distinct reference frames. *bioRxiv*

Bahareh, S., Karimimehr, S., Foley, N.C. and Gottlieb, J* Microscopic and mesoscopic effects of reward uncertainty in monkey dorsolateral prefrontal and parietal lobes *bioRxiv*

Ten, A., Kaushik, P., Oudeyer, P.Y and Gottlieb, J. (in preparation) Endogenously organized study behavior

Daddaoua, N., Horan, M. and Gottlieb, J* (in preparation) Specific involvement of the monkey lateral intraparietal area to information sampling based on reward and uncertainty

Horan, M., Daddaoua, N. and Gottlieb, J* (in preparation) Encoding of cognitive effort and expected information gains by monkey parietal cells

Nejatbakhsh, A., Foley, N.C. and Gottlieb, J* (in preparation) Comparison of neuronal and local field potential encoding of reward expectancy in monkey dorsolateral prefrontal and parietal lobes

Published (reverse chronological order)

Horan, M.H. Daddaoua, N. and Gottlieb, J* (2019): Parietal neurons encode information sampling based on decision uncertainty. ***Nature Neuroscience***, 22(8):1327-1335.

Kobayashi, K., Ravaioli, S., Baranes, A., Woodford, M. and Gottlieb, J* (2019): Diverse motives of human curiosity, ***Nature Human Behavior***, Apr 15. doi: 10.1038/s41562-019-0589-3

Gottlieb J* and Oudeyer, P.Y (2018) Neural mechanisms of active sampling and curiosity: toward a novel paradigm of motivated cognition; ***Nature Reviews Neuroscience***, 19(12):758-770

Dey, A. and Gottlieb, J.* (2018): Attention, information seeking and active sampling: Empirical evidence and implications for learning. *The Cambridge Handbook of Motivation and Learning*

Foley, N.C., Kelly, S. K., Mhatre, H., Lopes, M. and Gottlieb, J* (2017) Parietal neurons encode expected gains in instrumental information. ***PNAS***, Apr 18;114(16):E3315-E3323. doi: 10.1073/pnas.1613844114. Epub 2017 Apr 3.

Daddaoua, N., Lopes, M. and Gottlieb, J* (2016): Intrinsically motivated exploration guided by uncertainty reduction and conditioned reinforcement in non-human primates. ***Nature Scientific Reports***, Feb 3;6:20202. doi: 10.1038/srep20202.

Gottlieb J.*Lopes, M. and Oudeyer, P.Y (2016): Motivated cognition: Neural and computational mechanisms of curiosity, attention and intrinsic motivation, in '***Recent Developments in Neuroscience Research on Human Motivation***', Sung-il Kim, Johnmarshall Reeve, and Mimi Bong, editors.

Oudeyer, P.Y, Lopes, M., and Gottlieb J* (2016): Intrinsic motivation, curiosity and learning: theory and applications in educational technologies, ***Progress in Brain Research***, 229: 257-284

Shomstein, S. and Gottlieb, J* (2016): Spatial and non-spatial aspects of visual attention: interactive cognitive mechanisms and neural underpinnings, ***Neuropsychologia Special Issue: Facets of Human Attention***, (16)30172-5. doi: 10.1016/j.neuropsychologia.2016.05.021.

Oudeyer, P.Y, Lopes, M., Kidd, C. and Gottlieb J* (2016) Curiosity and Intrinsic Motivation for autonomous Machine Learning, ***ERCIM News*** 107: 34-35 <http://ercim-news.ercim.eu/en107/special/curiosity-and-intrinsic-motivation-for-autonomous-machine-learning>

Baranes, A., Oudeyer, P.Y and Gottlieb, J* (2015): Eye movements encode semantic curiosity in human observers. ***Vision Research***. 117:81-90. doi: 10.1016/j.visres.2015.10.009. Epub 2015 Nov 12.

Schwemmer, M.A., Feng, S., Cohen, J.D., Gottlieb, J* and Holmes, P. (2015): A multi-area stochastic model for a covert visual search task; ***PLoS ONE***, 9(2), e88725.

Baranes AF, Oudeyer PY, Gottlieb, J* (2014) The effects of task difficulty, novelty and the size of the search space on intrinsically motivated exploration. ***Front Neurosci***. 8:317. doi: 10.3389/fnins.2014.00317. eCollection 2014.

Foley N.C., Jangraw D.C., Peck C.J., Gottlieb, J* (2014) Novelty enhances salience independently of

reward in the parietal lobe. *J. Neuroscience* 34(23):7947-7957

Timothy M. Gersch, Nicholas C. Foley, Ian Eisenberg, and Gottlieb, J* (2014): Neural correlates of temporal credit assignment in the parietal lobe; *PLOS One*, 9(2):e88725. doi: 10.1371.

Krishna BS, Ipata AE, Bisley JW, Gottlieb, J*, Goldberg ME (2014): Extrafoveal preview benefit during free-viewing visual search in the monkey *J Vis.* 8;14(1). pii: 6. doi:10.1167/14.1.6.

Gottlieb, J*, Hayhoe, M., Hikosaka, O. and Rangel, A. (2014): Attention, information seeking and reward, *J. Neuroscience*, 34(46):15497-504. doi: 10.1523/JNEUROSCI.3270.14.2014.

Suzuki M and Gottlieb J* (2013): Distinct mechanisms of distractor suppression in the frontal and parietal lobes. *Nature Neuroscience*, 16(1):98-104

Gottlieb, J*, Oudeyer PY, Lopes M, Baranes A. (2013): Information-seeking, curiosity, and attention: computational and neural mechanisms. *Trends Cogn Sci.* 17(11):585-93. doi: 10.1016/j.tics.2013.09.001.

Gottlieb J* (2013): Slicing a pie is no piece of cake. *Nature Neuroscience*, 16(10):1364-6. doi: 10.1038/nn.3520.

Gottlieb, J* (2012) Attention, learning and the value of information. *Neuron* 76(2):281-295

Gottlieb, J*, Balan P (2010) Attention as a decision in information space. *Trends Cogn Sci.* 14(6):240-8. doi: 10.1016/j.tics.2010.03.001.

Gottlieb, J* and Snyder, LH.(2010) Spatial and non-spatial functions of the parietal cortex. *Current Opinion in Neurobiology* 20(6):731-40

Peck CJ, Jangraw D, Suzuki, M., Efem R and Gottlieb, J* (2009) Reward modulates attention independently of action value in posterior parietal cortex. *The Journal of Neuroscience* 29(36):11182–11191

Balan PF and Gottlieb, J* (2009) Functional significance of non-spatial information in monkey lateral intraparietal area. *The Journal of Neuroscience* 29(25):8166-8176

Gottlieb J*, Balan P, Oristaglio J, Suzuki M. (2009): Parietal control of attentional guidance: the significance of sensory, motivational and motor factors. *Neurobiology of Learning and Memory* 91(2):121-128

Gee AL, Ipata AE, Gottlieb, J*, Bisley JW, Goldberg ME (2008) Neural enhancement and pre-emptive perception: the genesis of attention and the attentional maintenance of the cortical salience map. *Perception* 37(3):389-400.

Balan PF, Oristaglio J., Schneider D and Gottlieb, J* (2008) Neuronal correlates of the set size effect in monkey lateral intraparietal area. *PLoS Biol.* 6(7):e158

Gottlieb, J* (2008): Saliency. In: *The Senses: a comprehensive reference*, H Masland and T Albright, eds., Academic Press, San Diego.

Reynolds, J.H., Gottlieb, J* and Kastner, S. (2008): Attention. In: *Fundamental Neuroscience, 2nd edition*, Squire et al. (eds), Academic Press, San Diego p. 1113-1132.

Balan P, Gottlieb J* (2008): Comment on Cohen et al: Neural basis of the set-size effect in frontal eye field: timing of attention during visual search *J Neurophysiol.* 102(2):1340-1341

Gottlieb, J*, Balan P.F., Oristaglio, J and Schneider D (2008) Task specific computations in attentional maps. *Vision Research* 49(10):1216-1226

Gottlieb, J* (2007) From a different point of view: human extrastriate cortex integrates information across saccades, ***Journal of Neurophysiology*** 97(2): 961-962

Gottlieb, J* (2007): From thought to action: the parietal cortex as a bridge between perception, action and cognition. ***Neuron***, 53(1): 9-16.

Goldberg ME, Bisley JW, Powell KD, Gottlieb, J* (2006) Saccades, salience and attention: the role of the lateral intraparietal area in visual behavior. ***Prog Brain Res***. 155:157-75.

Oristaglio J., Schneider D. M., Balan P. F. and Gottlieb, J* (2006) Integration of visuospatial and effector information during symbolically cued movements in monkey lateral intraparietal area. ***Journal of Neuroscience*** 26(32):8310-9 *Accompanied by Journal Club article; mentioned as MustRead on Faculty of 1000.*

Balan PF and Gottlieb, J* (2006) Integration of exogenous input into a dynamic salience map revealed by perturbing attention, ***Journal of Neuroscience*** 26(36): 9239-9249

Ipata AE, Gee AL, Bisley, JW, Gottlieb J.* and Goldberg, ME. (2006): LIP responses to a popout stimulus are reduced if it is overtly ignored. ***Nature Neuroscience***, 9(8):1071-1076 *Accompanied by a news and views article.*

Gottlieb J.*, Kusunoki, M. and Goldberg M.E. (2005): Simultaneous representation of saccade targets and abrupt onsets in monkey lateral intraparietal area. ***Cerebral Cortex***, 15(8):1198-1206

Gottlieb, J* and Mazzoni, P (2004) Action, Illusion and Perception (perspective article) ***Science*** 303(5656) 317-318.

Reynolds, J.H., Gottlieb, J* and Kastner, S. (2003): Attention. In: ***Fundamental Neuroscience, first edition***, Squire et al. (eds), Academic Press, San Diego p. 1249-1274.

Goldberg, M.E., Bisley, J., Powell, K.D., Gottlieb, J. and Kusunoki, M. (2002): The role of the lateral intraparietal area of the monkey in the generation of saccades and visuospatial attention. ***Ann NY Acad. Sci.*** 956:205-215.

Gottlieb, J* (2002) Parietal mechanisms of target representation. ***Curr Opin Neurobiol.***,12(2):134-140.

Powell, K. D., Colby, C. L., Gottlieb, J., Kusunoki, M. and Goldberg, M.E (1999).: Space and salience in parietal cortex. In: ***Current Oculomotor Research***, Becker et al. (eds), Plenum Press, New York, p. 25-35.

Gottlieb J. and Goldberg, M.E. (1999): Activity of neurons in the lateral intraparietal area of the monkey during an antisaccade task. ***Nature Neuroscience*** (1999) 2(10): 906-912.

Gottlieb, J., Kusunoki, M. and Goldberg, M. E (1998).: The representation of visual salience in monkey posterior parietal cortex. ***Nature*** 391(6666): 481-484.

Gottlieb, J. and Keller, A. (1997): Intrinsic circuitry and physiological properties of pyramidal neurons in rat barrel cortex. ***Experimental Brain Research*** (1997) 115: 47-60.

Gottlieb, J., MacAvoy, M. G. and Bruce, C. J. (1994): Neural responses related to smooth pursuit eye movements and their correspondence with electrically-elicited smooth eye movements in the monkey frontal eye field. ***Journal of Neurophysiology*** (1994) 72(4): 1634-1653.

Selemon, L. D., Gottlieb, J. and Goldman-Rakic, P. S. (1994): Islands and striosomes in the neostriatum of the rhesus monkey: non-equivalent compartments. ***Neuroscience*** 58(1): 183-192.

Gottlieb, J., Bruce, C. J. and MacAvoy, M. G. (1993): Smooth eye movements elicited by microstimulation in the primate frontal eye fields. ***Journal of Neurophysiology*** 69(3): 786-799.

MacAvoy, M. G., Gottlieb, J. and Bruce, C. J. (1991): Smooth pursuit eye movement representation in the primate frontal eye field. **Cerebral Cortex** 1: 95-102.

Sabel, B. S., Gottlieb, J. and Schneider, G. L. (1988): Exogenous GM1 gangliosides protect against retrograde degeneration following posterior neocortex lesions in developing hamsters. **Brain Research** 459: 373-380.

F. FUNDING SOURCES

CURRENT

Neural mechanisms of saccadic information sampling

National Institute of Mental Health R03 MH-098039-01
2016-2018 Total direct costs: \$100,000 (role: PI)

Understanding curiosity: biological, behavioral and computational mechanisms

Human Frontiers Science Program
2016-2019 Total direct costs: \$900,000 (role: co-PI, with Oudeyer, Kidd)

Attentional control by uncertainty and reward: parietal and frontal mechanisms

National Institute of Mental Health R01 MH-098039-01
2012-2017 Total direct costs: \$1,250,000 (role: PI)

Top-down selection of task-relevant cues: neural mechanisms in the frontal and parietal lobes

National Eye Institute R01 1R01EY0251581
2015-2020 Total direct costs: \$1,250,000 (role: PI)

Determinants of attention and information seeking in human economic choice

Presidential Scholars in Society and Neuroscience Faculty Seed Grants for Interdisciplinary Projects in Society and Neuroscience
2015-2016 Total direct costs: \$30,000 (role: co-PI, with Michael Woodford)

Population dynamics of reward and uncertainty

McKnight Memory and Cognitive Disorders Award
2015-2017 Total direct costs: \$300,000 (role: PI)

Neural mechanisms of curiosity and attention

INRIA, Bordeaux, France
2016-2019 Total direct costs: EUROS 30,000 (role: co-PI, with Oudeyer and Lopes)

Integrating information sampling and decision making through large scale testing of human information seeking behavior

Columbia University Seed grant (RISE)
2017-2019 Total direct costs: \$160,000 (role: co-PI, with Woodford and Oudeyer)

COMPLETED

Parietal mechanisms of vision and attention

Sloan Foundation Scholar award
2001-2003 Total direct costs: \$50,000 (role: PI)

Neurophysiological mechanisms of spatial attention in monkey parietal cortex

The Esther A. and Joseph Klingenstein Fund
2002-20053 Total direct costs: \$150,000 (role: PI)

Parietal mechanisms of vision and attention

McKnight Foundation Scholar award

2002-2005 Total direct costs: \$225,000 (role: PI)

Parietal mechanisms of vision and attention

National Eye Institute

2003-2010 Total direct costs: \$1,250,000 (role: PI)

From thought to action: neural correlates of context-dependent actions in prefrontal and parietal cortex

The Gatsby Initiative in Brain Circuitry

2007-2010 Total direct costs: \$100,000 (role: PI)

From thought to action: interactions between prefrontal and parietal cortex for context dependent actions

National Alliance for Research on Schizophrenia & Depression

2008-2010 Total direct costs: \$60,000 (role: PI)

Neural mechanisms of attention, reward and plasticity

Professional Schools Diversity Fellowship, Columbia University

2008-2009 Total direct costs: \$25,000 (role: PI)

Interactions between prefrontal and parietal cortex for flexible actions

Human Frontiers Cross-Disciplinary Fellowship to M. Suzuki

2009-2011 Total direct costs: \$125,000 (role: mentor)

Neural mechanisms of long-term planning

National Institute of Mental Health 1 RO3 MH091590-01

2010-2012 Total direct costs: \$105,000 (role: PI)

Pavlovian learning, attention and decisions

National Institute of Drug Abuse 1 R21 DA030095-01

2010-2012 Total direct costs: \$250,000 (role: PI)

Neural mechanisms of attention and intrinsic curiosity

Human Frontiers Cross-Disciplinary Fellowship to A. Baranes

2012-2015 Total direct costs: \$205,000 (role: mentor)

Neural mechanisms of curiosity and attention

INRIA, Bordeaux, France

2012-2015 Total direct costs: EUROS 36,000 (role: co-PI, with Oudeyer and Lopes)

G. HONORS AND AWARDS

HONORS

1995 Fellows' Award for Research Excellence, National Institutes of Health

2005 Elected member, *International Neuropsychological Society*

2008 Associate Editor, *Journal of Neuroscience*

2008 Appointed member of *Faculty of 1000*.

2009 Chair, Society for Neuroscience Minisymposium, “Cognitive functions of the parietal lobe”
2011 Member, Kavli Institute for Brain Science, Columbia University
2013 Permanent member, Sensory, Perceptual and Cognitive Processes Study Section, NIH
2014 Chair, Society for Neuroscience Symposium, “Attention, reward and information seeking”
2014 Chair and organizer (with Oudeyer and Lopes), *First Interdisciplinary Symposium on Information Seeking, Curiosity and Attention*, INRIA, Bordeaux
2015 Member, Mind Brain Behavior Institute, Columbia University
2016 Chair and organizer (with Oudeyer and Gliga), *Second Interdisciplinary Symposium on Information Seeking, Curiosity and Attention*, British Medical Association, London
2017 Chair, “*Systems, Cognitive and Computational Neuroscience*” seminar series, Department of Neuroscience and Zuckerman Mind Brain Behavior Institute
2019 Elected Co-Chair and Organizer, Gordon Conference on Oculomotor Control
2019 Director, Research Cluster on Curiosity, Center for Science and Society, Columbia University

AWARDS

1997 Fellows’ Award for Research Excellence, National Institutes of Health.
2001 Sloan Foundation Fellow
2002 Klingenstein Fellow
2003 McKnight Scholar Award
2008 Young Investigator Award (National Alliance for Research on Schizophrenia and Depression)
2008 Professional Schools Diversity Fellowship (Columbia University)
2014 McKnight Memory and Cognitive Disorders Award

PRESS

<http://ercim-news.ercim.eu/en107/special/curiosity-and-intrinsic-motivation-for-autonomous-machine-learning>

<https://medium.com/neodotlife/curious-robots-9c468a6c9161>

[https://lynnborton.com/2019/02/20/neuroscience-eyes-curiosity-with-jacqueline-gottlieb-phd/;](https://lynnborton.com/2019/02/20/neuroscience-eyes-curiosity-with-jacqueline-gottlieb-phd/)
<https://www.mixcloud.com/lynnborton/choose-to-be-curious-74-neuroscience-eyes-curiosity-with-jacqueline-gottlieb-phd/>
<https://soundcloud.com/choosetobecurious/ep-74-neuroscience-eyes-curiosity-with-jacqueline-gottlieb-phd>

<https://youtu.be/OF7hDERyHcM>

<https://www.wsj.com/video/how-smartphones-sabotage-your-brains-ability-to-focus/72E56EB0-0B92-44BF-9897-08461040E3E8.html>

INVITED SEMINARS

2003
Annual interdisciplinary conference, Jackson Hole, Wyoming
2005
Annual interdisciplinary conference, Jackson Hole, Wyoming
Department of Biology, City College
2006
McKnight Conference, Aspen, Colorado
Department of Biology, Columbia University
Program in integrative neuroscience, Columbia University

2007
International conference on visual attention, Buenos Aires, Argentina
Gordon conference on the oculomotor system, Maine
Department of Psychology, Rutgers University
Center for Perceptual Science, New York University
Department of Psychology, Columbia University
Sergievsky Center, Columbia University

2008
2nd Munich Visual Search Symposium, Fribourg, Switzerland
Banbury conference visual and auditory attention, Cold Spring Harbor
Center for the Neural Basis of Cognition, University of Pittsburgh
Department of Physiology, University of Wisconsin – Madison Medical School
Continuing medical education lecture, Columbia University
Seminar on Behavioral Neuroscience, Columbia University

2009
COSYNE meeting, workshop on attention and decision making, Salt Lake City, Utah
Department of Psychology, Princeton University, Princeton, NJ
Department of Neuroscience, University of Chicago, Chicago, IL

2010
Department of Economics, New York University, New York, NY
Laboratory of Sensorimotor Research, NIH, Bethesda, MD 2011

2011
COSYNE meeting workshop organizer, Salt Lake City, Utah
Neuroeconomics lecture series, New York University, NY
Department of Neuroscience, Stanford University, Stanford, CA
Gordon Conference on Oculomotor Control, Biddeford, ME
Bretesche Workshop on Visual Saliency, Bretesche, France

2012
Gordon Conference on the Oculomotor System, Biddeford, ME
Bretesche Workshop on Visual Saliency, Bretesche, France

2013
Yale University Department of Neurobiology, New Haven, CT
Workshop on attention and decision making, University of Rovereto, Italy
Pisa University Department of Psychology, Pisa, Italy
Mount Sinai School of Medicine, New York, NY

2014
Workshop on top-down control of attention, INS meeting, Versilia, Italy
First Interdisciplinary Symposium on curiosity and attention, Bordeaux, France (co-chair)

2015
Institute for Neuroscience, Georgetown University, Washington, DC
Affective Brain Lab, UCL, London, England
Invited faculty, Cold Spring Harbor Summer course, Cold Spring Harbor, NY
Center on perception, Giessen, Germany
Kyoto Symposium of the Japan Neuroscience Society, Kyoto, Japan
Annual lecture for the interdisciplinary neuroscience program, Washington, University, St Louis

2016
Salk Institute, Sand Diego, CA
COSYNE Workshop, Innovative aspects of visual attention, Snowbird, Utah
VSS Workshop, The functions of the parietal lobe, St. Pete Beach, FL
Cognition and Decisions Seminar Series, Columbia University
Invited Faculty, “Minds, Brains and Machines”, Woods Hole, MA

2nd Interdisciplinary Symposium on Information Seeking, Curiosity and Attention, London, UK
(co-chair)

New York University, Institute for the Interdisciplinary Study of Decision Making

2017

Alpine Brain Imaging Meeting, Champéry, Switzerland

Cornell University, Ithaca, NY

Harvard University, Cambridge, MA

Society for Biological Psychiatry, San Diego, CA

Invited faculty, Cold Spring Harbor Summer course, Cold Spring Harbor, NY

Gordon Conference on Oculomotor Control

Attentional and perceptual foundations of economic theory, Retreat, Westchester, NY

University of Zurich, Economics Department

Winter School on the Neuroscience of Consciousness, Montebello, Canada

The Network Neuroscience of Curiosity, University of Pennsylvania

2018

SUNY Downstate, Brooklyn, NY

Brain Conference on Computational Neuroscience of Prediction, Rungstedgaard, Denmark

Annual Conference, The McKnight Foundation, Aspen, Colorado

Visual Search and Selective Attention IV (Jeff Schall, co-organizer), Munchen, Germany

European Behavioural Pharmacology Society (EBPS) Cambridge, UK

Computational Properties of the Prefrontal Cortex, Nashville, TN

Donders Lecture, Donders Institute, Amsterdam, Netherlands

Co-Organizer, "The Emerging Sciences of Curiosity", University of Pennsylvania

2019

Co-Chair, Gordon Conference on Oculomotor Control

Oxford University, Department of Physiology and Anatomy

University of Arizona at Tucson, Psychology Department

Brown University Psychology Colloquium

American Educational Research Association, Toronto, CA

Center for Vision Science, Toronto, CA

Curiosity, Exploration and Explanation, Princeton, US

H. SERVICE

UNIVERSITY/DEPARTMENT

Institutional Animal Care and Use Committee, New York State Psychiatric Institute (2002-2011)

Departmental Retreat Committee (2005-2007)

Faculty search committee (2007-2010)

Admissions committee, Graduate Program in Neurobiology and Behavior (2010-present)

Seminars Committee, Department of Neuroscience (2010-present)

Founder, "*Systems, Cognitive and Computational Neuroscience*" seminar series, Department of Neuroscience and Zuckerman Mind Brain Behavior Institute (2017)

Organizer, Music and Meaning – Seminars in Society and Neuroscience, Columbia University

Director, Research Cluster on Curiosity, Center for Science and Society, Columbia University

SCIENTIFIC COMMUNITY

Journal Reviewer

Nature, Neuron, Nature Neuroscience, Journal of Neuroscience, PLOS Biology, Journal of Neurophysiology, Vision Research, Journal of Vision, Cerebral Cortex, Neurobiology of Learning and Memory, Experimental Brain Research, Journal of Neuroscience Methods

Grant Reviewer

National Institutes of Health (permanent member on the SPC study section), National Science Foundation, Netherlands Science Association, Italian Institute for Advancement of Science, MacArthur Foundation