

Michelle R. Greene

Curriculum Vitae

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May 2019

EDUCATION

- 2009 Ph.D, Cognitive Science, Massachusetts Institute of Technology
- 2004 B.S., Psychobiology, University of Southern California

PROFESSIONAL APPOINTMENTS

- 2017 - Assistant Professor of Neuroscience, Bates College
- 2016 - 2017 Research Scientist, Department of Computer Science, Stanford University
- 2015 - 2016 Assistant Professor of Computational Sciences, Minerva Schools at KGI
- 2013 - 2015 Research Fellow, Department of Computer Science, Stanford University
- 2011 - 2013 Postdoctoral Fellow, Department of Computer Science, Stanford University
- 2009 - 2011 Postdoctoral Fellow, Harvard Medical School, Brigham & Women's Hospital,
Department of Surgery

GRANT SUPPORT

- 2017-2020 National Science Foundation (BCS 1736394) "Uncovering the Neural
Dynamics of Scene Categorization through Electroencephalography,
Machine Learning, and Neuromodulation"
Role: Co-PI
- 2017 Digital Course Design/Redesign Initiative (Bates College)
- 2015 Center for Cognitive and Neurobiological Imaging Seed Grant (Stanford)
- 2009-2012 Ruth L. Kirschstein National Research Service Award (NEI-NRSA)
- 2005-2009 National Science Foundation Graduate Research Fellowship (NSF)

PUBLICATIONS

Articles in Revision, Under Review, and In Preparation

Hansen, B.C., Field, D.J., **Greene, M.R.**, Olson, C., & Miskovic, V. (in revision) Towards a neural state-space geometry of natural scene responses: A steady-state approach.

Tadros, T., Cullen, N., **Greene, M.R.**, & Cooper, E.A. (in revision) Assessing Neural Network Scene Classification from Degraded Images.

Greene, M.R. Hansen, B.C. Independent Contributions from Visual and Conceptual Features to Early Scene Representations.

Jordan, M.C., **Greene, M.R.**, L. Fei-Fei., & Beck, D.M. Sequential Warping of Cortical Representational Geometries According to Cognitive Principles Contributes to the Emergence of Separable Categories.

Greene, M.R. & Wolfe, J.M., Estimating Human Observers' Contextual Knowledge with Shannon's Guessing Game.

Greene, M.R., Botros, A., Beck, D., & L Fei-Fei. Revealing Internal Category Representations.

Refereed Articles

Citations

- | | | |
|------|---|----|
| 2018 | Greene, M.R. Hansen, B.C. Shared Spatiotemporal Category Representations in Biological and Artificial Neural Networks. <i>PLoS Computational Biology</i> 14(7), e1006327. | 9 |
| 2018 | Groen, I.I.A., Greene, M.R. , Baldassano, C., Beck, D.M., L. Fei-Fei & Baker, C.I. Distinct Contributions of Functional and Deep Neural Network Features to Representational Similarity of Scenes in Human Brain and Behavior. <i>eLife</i> 7, e32962. | 27 |
| 2016 | Vessel, E.A., Biederman, I., Subramaniam, S., & Greene, M.R. Effective Signaling of Surface Boundaries by L-Vertices Reflect the Consistency of their Contrast in Natural Images. <i>Journal of Vision</i> . | 0 |
| 2016 | Jordan, M.C., Greene, M.R. , Beck, D.B., & L. Fei-Fei. Typicality Sharpens Category Representations in Object-Selective Cortex. <i>NeuroImage</i> , 134, 170-179. | 15 |
| 2016 | Greene, M.R. Estimates of Object Frequency are Frequently Overestimated. <i>Cognition</i> , 149, 6-10. | 11 |
| 2016 | Greene, M.R. , Baldassano, C., Esteva, A., Beck, D.M., & L. Fei-Fei. Visual Scenes are Categorized by Function. <i>Journal of Experimental Psychology: General</i> , 145(1), 82-94. | 37 |
| 2015 | Jordan, M.C., Greene, M.R. , Beck, D. & Li Fei-Fei. (2015) Basic level category structure emerges gradually across human ventral visual cortex. <i>Journal of Cognitive Neuroscience</i> 27(7), 1427-1446. | 20 |

- 2015 **Greene, M.R.**, Botros, A., Beck, D.M. & L. Fei-Fei. What you see 28
is what you expect: rapid scene understanding benefits from
prior experience. *Attention, Perception, & Psychophysics*, 77(4),
1239-1251.
- 2014 **Greene, M.R.** & L. Fei-Fei. Visual Categorization is Automatic 38
and Obligatory: Evidence from a Stroop-like Paradigm.
Journal of Vision, 14(1).
- 2013 **Greene, M.R.**, Statistics of High-level Scene Context. 46
Frontiers in Perception Science. 4, 777.
- 2013 Boucart, M., Moroni, C., Thiabaut, M., Szaffarczyk, M., & 41
Greene, M.R., Scene categorization at large visual eccentricities.
Vision Research, 86, 35-42.
- 2012 **Greene, M.R.** Liu, T. & Wolfe, J.M., Reconsidering Yarbus: 112
Pattern Classification Cannot Predict Observers' Task From
Scan Paths. *Vision Research*, 62, 1-8.
- 2011 **Greene, M.R.**, & Wolfe, J.M., Global Image Properties Do 21
Not Guide Visual Search. *Journal of Vision*, 11(6).
- 2011 Wolfe, J.M., Vo, M.L-H., Evans, K.K., & **Greene, M.R.** 337
Visual search in scenes involves selective and non-selective
pathways. *Trends in Cognitive Sciences*. 15(2), 77-84.
- 2011 Park, S., Brady, T.F., **Greene, M.R.** & Oliva, A. 158
Disentangling scene content from spatial boundary:
Complementary roles for the PPA and LOC in representing
real-world scenes *Journal of Neuroscience*. 31(4), 1333-1340.
- 2010 **Greene, M.R.**, & Oliva, A. Adapting to Scene Space: High-Level 55
Aftereffects to Global Scene Properties. *Journal of Experimental
Psychology: Human Perception and Performance*. 36(6), 1430-1432.
- 2009 **Greene, M.R.** & Oliva, A. The Briefest of Glances: the Time 364
Course of Natural Scene Understanding. *Psychological Science*,
20(4), 464-472.
- 2009 **Greene, M.R.** & Oliva, A. Recognition of Natural Scenes from 348
Global Properties: Seeing the Forest Without Representing the
Trees. *Cognitive Psychology*, 58(2), 137-176.

Refereed Book chapters

- 2019 **Greene, M.R.** The Information Content of Visual Categories. In Federmeier & Beck (eds) *Psychology of Learning and Motivation: Volume 70*.

Refereed Conference Proceedings

- 2018 Greene, M.R. & Hansen, B.C. From Pixels to Categories: Unique and Early Contributions of Functional and Visual Features. *Proceedings of Computational Cognitive Neuroscience*.
* Winner, Best Paper Award.
- 2012 **Greene, M.R.,** & Li Fei-Fei. Automatic basic-level object and scene categorization. *Visual Cognition*, 20(9), 1028-1031.
- 2006 **Greene, M.R.** & Oliva, A. Natural Scene Categorization from Conjunctions of Ecological Global Properties. *Proceedings of the 28th Annual Conference of the Cognitive Science Society*, Vancouver, July, 291-296.

Book Reviews

- 2015 Kveraga & Bar, *Scene Vision*. Published in *Perception*.

CONFERENCE ACTIVITY

Denotes Bates College Student

Talks

- 2019 “The Role of Recurrent Processing in Visual Scene Categorization” (w/ J. Siegart#, W. Zhou#, E. Lam#, M. Machoko#). Meeting of the Vision Sciences Society, May 17-22, St. Pete Beach, Florida.
- 2018 “From Pixels to Scene Categories: Unique and Early Contributions of Functional and Visual Features” (w/ B.C. Hansen). Computational Cognitive Neuroscience, September 5-8, Philadelphia, PA.
- 2017 “Scene Category Structure Reflects Lived Experience” Meeting of the Psychonomics Society, November 9-12, Vancouver, BC. (Invited talk at Beyond the Lab: Using Big Data to Discover Principles of Cognition).
- 2017 “Measuring the Efficiency of Contextual Knowledge” Meeting of the Vision Sciences Society, May 19-24, St. Pete Beach, Florida.
- 2017 “Convolutional neural networks best predict representational dissimilarity in scene-

- selective cortex: comparing computational, object, and functional models” w/ I. Groen, C. Baldassano, D. Beck, L. Fei-Fei & C. Baker. Meeting of the Vision Sciences Society, May 19-24, St. Pete Beach, Florida.
- 2016 “Comparing computational, object, and functional models of scene representation in the human brain”. ” w/ I. Groen, C. Baldassano, D. Beck, L. Fei-Fei & C. Baker. Meeting of the Society for Neuroscience, November 12-16, San Diego, California.
- 2016 “What do convolutional neural networks know about object categories” . Meeting of the Psychonomics Society, November 17-20, Boston, Massachusetts.
- 2015 “How Many Objects Does it Take to Understand a Scene?” Meeting of the Psychonomics Society, November 19-22, Chicago IL.
- 2015 “Functions Provide a Fundamental Categorization Principle for Scenes” w/ Baldassano, C., Esteva, A., Beck, D.M, & L. Fei-Fei. Meeting of the Vision Sciences Society, May 15-20, St. Pete Beach, Florida.
- 2015 “Category Boundaries and Typicality Warp the Neural Representation Space of Real-World Object Categories” w/ Jordan, M.C., Beck, D.M., & L. Fei-Fei. Meeting of the Vision Sciences Society, May 15-20, St. Pete Beach, Florida.
- 2014 “Scene Categories Reflect Affordances” w/ Baldassano, C., Esteva, A., Beck, D.M, & L. Fei-Fei. Meeting of the Psychonomics Society, November 20-23, Long Beach, California.
- 2014 “Cohesion and Distinctiveness in Human Visual Cortex Favor Basic Level Representations. w/ Jordan, M.C., Beck, D.M., & L. Fei-Fei. Meeting of the Society for Neuroscience, November 15-19, Washington D.C.
- 2014 “Human estimates of object frequency are frequently over-estimated” Vision Sciences Society, May 16-21, St. Pete Beach, Florida.
- 2013 “Discovering mental representations of complex natural scenes.” Vision Sciences Society, w/ Botros, A., Beck, D.M., & L Fei-Fei, May 10-15, Naples, Florida.
- 2013 “Typicality sharpens object representations in object-selective cortex.” Vision Sciences Society, w/ Jordan, M.C., Beck, D.M., & L Fei-Fei. May 10-15, Naples, Florida.
- 2012 “Automatic basic-level object and scene categorization.” Object Perception Attention and Memory (OPAM), w/ L. Fei-Fei. November 15, Minneapolis, MN.
- 2012 “Neural Representations of Object Categories at Multiple Taxonomic Levels.” Vision Sciences Society, w/ Jordan, M.C., Beck, D.M. & L. Fei-Fei. May 11-16, Naples Florida.

- 2011 “Reconsidering Yarbus: Pattern Classification Cannot Predict Observer’s Task from Scan Paths.” Vision Sciences Society, w/ Liu, T., & Wolfe, J.M. May 6-11, Naples Florida.
- 2009 “Natural scene categorization by global scene properties: Evidence from patterns of fMRI activity”. Vision Sciences Society, w/ Park, S., Brady, T., & Oliva, A. May 8-13, Naples Florida.
- 2008 “High-level Aftereffects to Natural Scenes.” Vision Sciences Society, w/ A. Oliva, May 9-14, Naples Florida.
- 2006 “Natural Scene Categorization from Conjunctions of Ecological Global Properties.” Cognitive Science Society, w/ A. Oliva, July 26-29, Vancouver, B.C.
- 2006 “From zero to gist in 200msec: the time course of scene recognition.” Scene Understanding Symposium (SUNS), w/ A. Oliva, February 17, Cambridge Massachusetts.

Posters

- 2019 “Measuring the Information Content of Visually-Evoked Neuroelectric Activity” (w/ D. Field & B.C. Hansen). Vision Sciences Society, May 17-22, St. Pete Beach, Florida.
- 2019 “Task demands flexibly change the dynamics of feature use during scene processing (w/ B.C. Hansen) Vision Sciences Society, May 17-22, St. Pete Beach, Florida.
- 2019 “Diagnostic Objects Contribute to Late—But Not Early—Visual Scene Processing” (w/ J. Self#, J. Siegart#, M. Machoko#, & E. Lam#) Vision Sciences Society, May 17-22, St. Pete Beach, Florida.
- 2018 “What Steady-State Visual Evoked Potentials (SSVEP) Tell Us About Early Visual Representation of Natural Scenes” (w/ D. Field & B. Hansen). Meeting of the Optical Society of America Fall Vision Meeting, Reno NV, September 21-23.
- 2018 “Mapping the Neuroelectric State Space Geometry of Natural Scenes” w/ B. Hansen, D. Field, C. Olson, V. Miskovic, & L.J. Rhodes. Vision Sciences Society, May 16-23, St. Pete Beach, Florida.
- 2017 “Visual, Functional, and Semantic Contributions to Scene Categorization” w/ B. Hansen. Vision Sciences Society, May 17-24, St. Pete Beach, Florida.
- 2017 “The rapid perception of functional scene features” Concepts, Actions, and Categories (CAOS), Rovereto, Italy.
- 2016 “Decoding the informative value of early and late visual evoked potentials in scene categorization” w/ B. Hansen, C. Walsh, R. Goldberg & Y. Zhang. Vision Sciences

- Society, May 13-18, St. Pete Beach, Florida.
- 2015 “Typicality Sharpens Object Representations in Object Selective Cortex” Cognitive Neuroscience Society w/ M.C. Iordan, D.M. Beck & L. Fei-Fei. March 28-31, San Francisco, California.
- 2014 “Scene Category Prototypes: Reconstruction of Internal Templates and Prediction of Rapid Classification”. Association for Psychological Science, w/ A. Botros, D.M. Beck & L. Fei-Fei, May 22-26, San Francisco, California.
- 2013 “Oddness at a glance: unraveling the time course of typical and atypical scene perception,” Vision Sciences Society, w/ Botros, A., & L. Fei-Fei, May 10-15, Naples, Florida.
- 2013 “Internal representations of real-world scene categories.” Cognitive Neuroscience Society, w/ Botros, A., Beck, D.M., & L. Fei-Fei. April 5-8, San Francisco, California.
- 2013 “Real-world objects acquire basic-level advantage in occipito-temporal cortex.” Cognitive Neuroscience Society, w/ Iordan, M.C., Beck, D.M., & L. Fei-Fei. April 5-8, San Francisco, California.
- 2012 “Scene categorization at large visual eccentricities.” European Conference of Visual Perception, w/ Boucart, M., Thibaut, M., & Szaffarczyk, S. September 2-6, Sardinia Italy.
- 2012 “A large-scale taxonomy of real-world scenes.” Vision Sciences Society, w/ L. Fei-Fei, May 11-16, Naples Florida.
- 2012 “The Relative Effectiveness of Different vs. Shared Mask Features on the Processing of Scene Gist.” Vision Sciences Society, w/ Witherspoon, R., & Castelhana, M., May 11-16, Naples Florida.
- 2011 “Depth and Size Information Reduce Effective Set Size for Visual Search in Real-World Scenes.” Vision Sciences Society, w/ Sherman, A., & Wolfe, J.M., May 6-11, Naples Florida.
- 2010 “What’s behind the box? Playing Shannon’s guessing game with scenes.” Vision Sciences Society, w/ Wolfe, J.M., Oliva, A., & Torralba, A., May 7-12, Naples Florida.
- 2009 “Rapid Scene Understanding: Evidence of Global Property Processing before Basic-level Categorization.” Vision Sciences Society, w/ Park, S., & Oliva., May 8-13, Naples Florida.
- 2008 “Calculating Scene Context: What 47,928 Objects can tell us about scene categories.” Scene Understanding Symposium (SUNS), w/ Oliva, A., & Torralba, T., February 1,

Cambridge Massachusetts.

- 2007 “High-level aftereffects to natural scenes: adapting to the building blocks of gist.” Scene Understanding Symposium (SUNS), w/ A. Oliva., February 1-2, 2007, Cambridge Massachusetts.
- 2006 “Seeing the {Camouflage+Closed+Natural=Forest} for the trees: Rapid scene categorization can be mediated by Conjunctions of Global Scene Properties.” Vision Sciences Society, w/ A. Oliva, May 5-10, Sarasota Florida.
- 2006 “Constructing Depth Information in Briefly Presented Scenes.” Vision Sciences Society, w/ Konkle, T., McDaniel, E., & Oliva, A., May 5-10, Sarasota Florida.
- 2006 “Not all scene categories are created equal: the role of object and layout diagnosticity in scene gist understanding.” Vision Sciences Society, w/ Oliva, A., Konkle, T., & Torralba, A., May 5-10, Sarasota Florida.
- 2005 “Better to run than hide – time course of naturalistic scene decisions.” Sciences Society, w/ A. Oliva, May 6-11, Sarasota Florida.
- 2004 “Perceiving visual complexity...Objects do not matter.” Object Perception Attention and Memory (OPAM), w/ A. Oliva, November 18, Minneapolis, MN.

INVITED TALKS

- 2019-02 Bowdoin College, Biology Department Seminar
- 2017-12 University of Amsterdam, Neuroscience Department Colloquium
- 2017-08 Cornell University, Psychology Department Colloquium
- 2014-10 University of Illinois, Urbana-Champaign, Psychology Department
- 2014-04 University of Pennsylvania, Department of Psychology
- 2014-04 University of Delaware, Department of Psychology
- 2014-04 George Washington University, Department of Psychology
- 2014-04 Johns Hopkins University, Department of Cognitive Science
- 2014-04 National Institute of Mental Health
- 2014-03 University of Southern California, Department of Neuroscience
- 2014-03 University of California at Riverside, Department of Psychology
- 2013-08 University of California Berkeley, Bay Area Vision Research Meeting
- 2012-02 University of California Santa Cruz, Department of Psychology
- 2011-02 Stanford University, Department of Computer Science
- 2010-10 Smith-Kettlewell Eye Institute
- 2009-09 Harvard Medical School / Brigham & Women’s Hospital
- 2006-03 Harvard University (w/ A. Torralba)
- 2005-12 Harvard Medical School / Brigham & Women’s Hospital

TEACHING

Bates College, Instruction

Computational Neuroscience with Lab (2017, 2018)
Introduction to Neuroscience (2018, 2019)
Capstone Seminar in Human Cognitive Neuroscience (2018)
Neuroethics and Society (2018)
Neural Codes: The Language of Thought (2019)

Minerva Schools at KGI, Instructor

Formal Analysis (2015-2016)

Minerva Schools at KGI, Design

CS110: Computation: Solving Problems with Algorithms
SS110: Perception, Cognition, & Reality

Tufts University, Experimental College, Sole Instructor/Course Design

Introduction to Neuroscience, Neuroethics, and the Future (Fall, 2009)

Massachusetts Institute of Technology, Teaching Assistant

Cognitive Science (Spring, 2009)
Laboratory in Cognitive Science (Fall, 2006)
Introduction to Psychology (Spring, 2006)

Outreach

2011	“Understanding Science in the Media,” HSSP: 8-week course for high school students
2009	“Big Blunders of Scientific Ethics in Cog-Neuroscience,” Spark! One-day seminar for high school students
2008	“Neuroscience for Future Presidents,” Splash! One-day seminar for high school students

THESIS MENTORSHIP

Thesis projects mentored (* denotes Honors)

- 2018-2019 * Wanyi Lu. “Depth of Processing of Visual Scenes Not Reported During Attentional Blink”.
- 2018-2019 Priyanka Takle. “The Role of Functional- and Object- Based Processing of Early Scene Representations”
- 2018 Emily Lufburrow. “The Efficacy of Acupuncture Treatment on Life Quality Outcomes of Cancer Patients”
- 2017-2018 * Julie S. Self. “The Role of Diagnostic Objects in the Temporal Dynamics of Visual Scene Categorization”
- 2017-2018 Katherine Hartnett. “Wait....Did You See That? Exploring the Effects of Predictability on Scene Perception”
- 2017-2018 Hanna DeBruyn. “Does Scene Category Information Persist After Backwards Masking?”

Honors Program Panelist

- 2018-2019 Alexa Harrison “Temporal Negative Priming: Visual and Auditory”
- 2018-2019 Xinyuan Zhang “Learning Induces Methylation to Encode, Consolidate, and Recall Memory in the Hippocampus: Are Tet and Tcf4 Candidates for Intellect?”
- 2017-2018 Katrina Muñoz. “ECT and DBS: Depression Treatments and their Perceived Threat to Personal Identity”
- 2017-2018 Gwen Savino. “Depth of Processing in Object Substitution Masking”

OTHER MENTORSHIP

- 2018 Jamie Siegart, Enton Lam, Munashe Machoko, Wuyue Zhou. Work in progress: “Similarities and Differences Between Humans and Deep Convolutional Neural Networks”
- 2016 Khang Duong, Raymundo Gonzalez Leal, Huy Nguyen: Undergraduate volunteers. Project: “Revealing Internal Scene Category Representations”.
- 2012 – 2013 Abraham Botros: Full-time research assistant. Co-authoring projects: “Obtaining Scene Category Prototypes from Random Image Features”; “Oddness at a glance....”
- 2010 Tommy Liu: Research Science Institute Student. Co-authored project:

“Reconsidering Yarbus: Pattern Classification Cannot Predict Observer’s Task from Scan Paths”

2010 Kimberly Lamarre: Project Success Student. Aided with project: “Global Image Properties Do Not Guide Visual Search.”

AD-HOC REVIEWING (JOURNALS)

Nature Human Behaviour; Nature Communications; Proceedings of the National Academy of Sciences; Scientific Reports; Psychological Science; Journal of Neuroscience; Cerebral Cortex; NeuroImage; Attention, Perception & Psychophysics; Cognitive Research: Principles and Implications; Journal of Experimental Psychology: General; Journal of Experimental Psychology: Human Perception and Performance; Journal of Experimental Psychology: Learning, Memory & Cognition; PLoS One; PLoS Computational Biology; Behavioral Research Methods; Canadian Journal of Experimental Psychology; Frontiers of Perception Science; Gestalt Theory Journal; Journal of Neurophysiology; Journal of Vision; Perception; Psychonomic Bulletin and Review; Psychophysiology; Quarterly Journal of Experimental Psychology; Visual Cognition; Vision Research; Proceedings of the Cognitive Science Society; European Cognitive Science

AD-HOC REVIEWING (GRANTING AGENCIES)

National Science Foundation (NSF); UK SBS

EDITORIAL BOARD

Attention, Perception & Psychophysics (2015 -)

DEPARTMENT AND UNIVERSITY SERVICE

2018 - Student Affairs Committee
2017-2018 STEM Inclusive Faculty Search
2015-2016 Faculty Research Liaison, Minerva Schools at KGI
2010-2011 Coordinator, Visual Attention Lab Seminar Series, Harvard Medical School
2007-2008 Coordinator, MIT Cog Lunch

PROFESSIONAL MEMBERSHIPS

2003-present Vision Sciences Society
2009-present Association for Psychological Science
2006-present Cognitive Sciences Society
2009 Neuroethics Society
2013-present Cognitive Neuroscience Society