

# Ethan Meyers, Ph.D.

*Curriculum vitae, updated December 2018*

## Contact Information

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## Current Position

2014-Present Assistant Professor of Statistics, Hampshire College

2014-Present Research Affiliate, Center for Brains, Minds and Machines, MIT

## Education

2010-2014 Postdoctoral Associate, McGovern Institute for Brain Research, MIT

2004-2010 Ph.D. in Computational Neuroscience, Mass. Institute of Technology  
Advisor: Tomaso Poggio

1998-2002 B.A. in Computer Science, Oberlin College

## Research Summary

The field of neuroscience is poised to enter a new era of understanding. Advancements in recording technologies, combined with new programs that emphasize data sharing such as the BRAIN Initiative, and the Allen Institute's Brain Observatory, and the openfMRI project, have given rise to an exponential increase in the amount of data that is available. However, in order to convert these new data sets into meaningful information, new data science tools and methods are urgently needed.

The primary goal of my research is to address this problem by developing statistical and machine learning methods that have the capacity to extract deeper meaning from these complex high dimensional neural signals. By applying the methods I develop to neural recordings, my aim is to understand the neural algorithms that underlie complex behaviors such as visual object recognition, working memory, and other high-level cognitive processes.

## Publications

1. **Meyers E** (2018). Dynamic population coding and its relationship to working memory. *Journal of Neurophysiology*, 120:2260-2268. [\[pdf\]](#)
2. **Meyers E**, Liang A, Katsuki F, Constantinidis C (2017). Differential processing of isolated object and multi-item pop-out displays in LIP and PFC. *Cerebral Cortex*, 28(11):3816-3828. [\[pdf\]](#)
3. Poggio T, **Meyers E** (2016). Turing++ Questions: A Test for the Science of (Human) Intelligence. *AI Magazine*, 37(1):73:77.
4. **Meyers E**, Borzello M, Freiwald W, Tsao D (2015). Intelligent Information Loss: The Coding of Facial Identity, Head Pose, and Non-Face Information in the Macaque Face Patch System. *Journal of Neuroscience*, 35(18):7069-81. [\[pdf\]](#)
5. Isik L, **Meyers E**, Leibo J, Poggio T (2014). Timing of invariant object recognition in the human visual system. *Journal of Neurophysiology*, 111:61-102. [\[pdf\]](#)
6. **Meyers E** (2013). The Neural Decoding Toolbox. *Frontiers in Neuroinformatics*, 7:8. [\[link to paper\]](#)
7. **Meyers E**, Qi XL, Constantinidis C (2012). Incorporation of new information into prefrontal cortical activity after learning working memory tasks. *Proceedings of the National Academy of Sciences*, 109:4651-4656. [\[pdf\]](#) [\[link to supplementary web material\]](#)
8. Isik L, **Meyers E**, Leibo J, Poggio T (2012). Preliminary MEG decoding results. *MIT CSAIL Technical Report*, 2012-010.
9. Zhang Y,\* **Meyers E**,\* Bichot N, Serre T, Poggio T, and Desimone R (2011). Object decoding with attention in inferior temporal cortex. *Proceedings of the National Academy of Sciences*, 108:8850-8855. \*These authors contributed equally. [\[pdf\]](#) [\[link to supplementary web material\]](#)
10. **Meyers E**, and Kreiman G (2011). Tutorial on Pattern Classification in Cell Recording. *Visual population codes*, Kreigeskorte N, and Kreiman G (eds.), MIT Press.
11. **Meyers E**, Embark H, Freiwald W, Serre T, Kreiman G, and Poggio T (2010). Examining high level neural representations of cluttered scenes. *MIT CSAIL Technical Report*, 2010-034.
12. Ostrovsky Y, **Meyers E**, Ganesh S, Mathur U, Sinha P (2009). Visual Parsing After Recovery From Blindness. *Psychological Science*, 20:1467-1491. [\[link to paper\]](#)
13. **Meyers E**, Freedman D, Kreiman G, Miller E, Poggio T (2008). Dynamic Population Coding of Category Information in Inferior Temporal and Prefrontal Cortex. *Journal of Neurophysiology*, 100:1407-1419. [\[pdf\]](#) [\[link to supplementary web material\]](#)

14. **Meyers, E**, Wolf L (2008). Using Biologically Inspired Visual Features for Face Processing. *International Journal of Computer Vision*, 76(1):93-104. [\[link to paper\]](#)
15. Wolf L, Bileschi S, and **Meyers E** (2006). Perception Strategies in Hierarchical Vision Systems. *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*. [\[pdf\]](#)
16. Ezzat T, **Meyers E**, Glass J, and Poggio T (2005). Morphing Spectral Envelopes Using Audio Flow. *Interspeech/Eurospeech*.
17. Cox D, **Meyers E**, and Sinha P (2004). Contextually Evoked Object-specific Responses in Human Visual Cortex. *Science*, 303(5667):115-117. [\[link to paper\]](#)

## Select Conference Abstracts

**Meyers E**, Rithichoo L, Zhang T, Lu P, Fang C. An online platform for reproducible neural data analyses. Society for Neuroscience 2018.

**Meyers E**, Riley M, Qi X-L, Constantinidis C. Differences in dynamic and static coding within different subdivisions of the prefrontal cortex. Society for Neuroscience 2017.

**Meyers E**. A Data Science approach to analyzing neural data. Joint Statistical Meetings (JSM) 2017.

**Meyers E**, Dean M, Hale G. New Data Science tools for analyzing neural data and computational models. Society for Neuroscience 2016.

**Meyers E**, Borzello M, Freiwald W, Tsao D. Decoding what types of information are in the macaque face patch system. Cosyne 2014.

**Meyers E**, Schafer R, Zhang Y, Poggio T, Desimone R. The role of the pulvinar in visual processing and attention. Cosyne 2013.

**Meyers E**, The advantages of using population decoding – and a Matlab decoding toolbox. Society for Neuroscience 2012.

**Meyers E**, Qi XL, Constantinidis C. The incorporation of new information into prefrontal cortical activity after learning new tasks. Cosyne, 2012.

**Meyers E**, Qi XL, Constantinidis C. Comparing the information content of PFC before and after training in a working memory task. Society for Neuroscience 2011.

**Meyers E**, Zhang Y, Bichot N, Chikkerur S, Serre T, Poggio T, Desimone R. Decoding multiple objects from populations of macaque IT neurons with and without spatial attention. Cosyne, 2010.

**Meyers E**, Freedman D, Kreiman G, Miller E, Poggio T. Decoding dynamic patterns of neural activity using a 'biologically plausible' fixed set of weights. Cosyne 2009.

**Meyers E**, Embark H, Freiwald W, Serre T, Kreiman G, Poggio T. Neural representations of cluttered scenes in macaque ventral visual cortex. Society for Neuroscience 2008.

**Meyers E**, Freedman D, Miller E, Kreiman G, Poggio T. Reading Out Visual Information from Populations of Neurons in Inferior Temporal and Prefrontal Cortex. Cosyne 2007.

**Meyers E**, Ostrovsky Y, Sinha P. Visual de-fragmentation via high spatial frequencies. Vision Sciences Society, 2005.

## Invited and Selected Talks

University of Massachusetts Cognitive Science Lunch, Amherst MA (2018) "Decoding the neural algorithms that underlie behavior"

University of Massachusetts Neuroscience & Behavior Colloquium, Amherst MA (2017) "Decoding how information is represented and processed in higher-order cortical areas"

MathWorks Research Summit, Newton MA (2016) "Using machine learning to analyze neural data"

University of Massachusetts Neuroscience Club, Amherst MA (2016) "Using machine learning to understand how the brain processes information"

Society for Neuroscience Conference, Chicago, IL (2015) "How PFC and LIP process single and multiple-object 'pop-out' displays"

Wake Forest University School of Medicine Colloquium, Winston-Salem, NC (2015) "Using population decoding to understand neural content and coding"

Society for Neuroscience Conference, Washington DC (2014) "Decoding what types of information are in the macaque face patch system"

Allen Institute for Brain Science, Seattle, WA (2013) "How new information is added into PFC and implications for analyzing neural activity"

McGovern Institute Retreat, Falmouth, MA (2013) "How information is added into prefrontal cortical activity"

Society for Neuroscience Conference, San Diego, CA (2010) "The representation of objects in inferior temporal cortex with and without attention"

International Conference on Cognitive Science, Beijing, China (2010) "The coding of abstract category information in macaque inferior temporal and prefrontal cortex"

McGovern Institute Retreat, Newport, RI (2010) "Attention's influence on object representations in inferior temporal cortex"

Vision Sciences Society, Sarasota, FL (2007) "Decoding of ITC cell activity matches human visual similarity judgments"

Vision Sciences Society Conference, Sarasota, FL (2005) "Neural responses to contextually defined faces"

## Professional Service

Hampshire College Executive Committee of the Faculty, member (2018-present)

Hampshire College Education Policy Committee, chair (2015-2017)

MIT CBMM Face Identification Workshop, co-organizer (2015)

Hampshire College Cognitive Science Faculty Search Committee (2015)

Five College Statistics Program, webmaster (2015-present)

MIT BCS colloquium committee (2013-2014)

MIT BCS postdoc committee, co-chair (2012-2014)

Ad hoc reviewer for: Nature Communications, Journal of Neuroscience, Journal of Neurophysiology, Journal of Cognitive Neuroscience, Journal of Neuroscience Methods, Cerebral Cortex, Frontiers in Psychology, Vision and Image Understanding, Neural Information Processing Systems Conference (NIPS), Chance, MIT press, CRC press.

## Honors, Awards and Fellowships

2009-2010 Hubert Schoemaker Graduate Student Fellowship

2006-2009 National Defense Science and Engineering Graduate Fellowship

2005 Sigma Xi Scientific Research Society

2002 Phi Beta Kappa Honor Society

2002 High Honors in Computer Science, Oberlin College

## Funding

### Active

NCS-FO: 1835268/1834994

9/15/2018 – 8/31/2022

NSF

\$138,087 annual direct costs

Title: "Collaborative Research: Optoelectronic Tools for Closed-Loop Neuron Ensemble Recording and Control during Complex Behaviors"

Role: Co-Principal Investigator (with Xu, Moorman, Li at UMass Amherst)

## **Pending**

R01 EY016773 4/1/2019 – 3/31/2024  
NIH/NIA \$100,000 annual direct costs for subcontract  
Title: “Cortical circuit basis of visual spatial processing”  
Role: Co-Investigator (with PI Constantinidis at Wake Forest)

## **Past**

MATLAB development fund 6/1/2017 – 12/31/2018  
MathWorks \$50,000 direct costs  
Title: “Developing data analysis tools and computational models for understanding  
neural processing”  
Role: Principal Investigator

## **Courses Taught**

CS-210: *Statistics for Cognitive Science* (spring 2019)  
CS-350: *Analysis of Neural Data* (spring 2015, 2017)  
CS-303: *Electrophysiology Methods and Data Analysis* (co-taught spring 2016)  
CS-149: *Understanding Statistics Using Baseball* (spring 2015-18)  
[\[link to class website\]](#)  
CS-173T/CS-243: *Introduction to Data Science* (fall 2017, spring/fall 2018)  
CS-342: *Machine Learning* (fall 2015, spring 2019).  
CS-206: *Introduction to Statistics* (fall 2014-16, 2018)  
CS-173: *Prediction* (fall 2014)  
MIT 9.S912: *Vision and Learning: Computers and Brains* (co-taught, fall 2013)  
MIT IAP: *Methods for Analyzing Neural Data* (short-course, winter 2013, 2014)  
MIT 9.011: *Systems Neuroscience Core* (TA, fall 2008)  
MIT 9.660: *Computational Cognitive Science* (TA, fall 2007)  
MIT 9.63: *Laboratory in Cognitive Science* (TA, Fall 2007)  
MIT 9.00: *Introduction to Psychology* (TA, spring 2006)