

Marc N. Coutanche

pronunciation: *kʊtəʊnʃ*
(*ku-tawn-sh*)

Assistant Professor
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EMPLOYMENT AND EDUCATION

- 2015 – present University of Pittsburgh
Assistant Professor, Psychology and Center for the Neural Basis of Cognition
Research Scientist, Learning Research & Development Center
- 2014 – 2015 Yale University
Postdoctoral Fellow
Advisor: Marvin Chun
- 2013 – 2014 University of Pennsylvania
Postdoctoral Fellow
Advisor: Sharon Thompson-Schill
- 2008 – 2013 University of Pennsylvania
Ph.D., Psychology (2013) with M.A., Psychology (2009)
Advisor: Sharon Thompson-Schill (committee: Russell Epstein; Joseph Kable)
- 2007 – 2008 Oxford University
Research Psychologist
Advisor: Anthony Bailey
- 2005 – 2007 iMPower Consulting Ltd.
Public-Sector Management Consultant
Role: Project management of large government projects
- 2002 – 2005 Oxford University
B.A. (Hons), Experimental Psychology
Thesis Advisor: Edmund Rolls

RESEARCH INTERESTS

- Broad: Cognitive neuroscience, memory, learning, perception, brain imaging
- Specific: Neural basis of semantic memory, learning, memory consolidation, sleep,
perception, fMRI methods, multivariate pattern analysis, informational connectivity

FELLOWSHIPS

- National Institutes of Health Postdoctoral National Research Service Award 2014 - 2015
 - o Score in top 1%
- Howard Hughes Medical Institute International Student Research Fellowship 2011 - 2013
- Benjamin Franklin Fellowship, University of Pennsylvania 2008 - 2011

GRANTS

- Co-PI, NSF NCS - “*Neurobehavioral integration of visual and semantic number knowledge and its role for individual variation in the math ability of children and adults*” (\$963,164) 2017
- Learning Research and Development Center Internal Awards Program (\$49,515) 2017
- Central Research Development Fund Award, University Research Council (\$15,042) 2016
- Key personnel (20%) on National Institutes of Health R21 grant 2014
- American Psychological Foundation F.J. McGuigan Dissertation Award (one awardee / year) 2012

HONORS AND AWARDS

- Nominated and admitted to Pitt Graduate Faculty 2017
- 2016 Faculty Honoree, 40th Annual Honors Convocation, University of Pittsburgh 2016
- Krieg Cortical Scholar, Cajal Club (awarded at SfN Annual Meeting) 2015
for *conducting exemplary research on the structure and/or connections of the cerebral cortex*
- Elected Fellow of the Psychonomic Society 2013
- Anne Anastasi General Psychology Graduate Student Research Recognition Award, APA 2013
- Concepts, Actions, and Objects Workshop Abstract Award (Rovereto, Italy) 2013
- Routledge Cognitive Neuropsychology Student Travel Prize 2013
- Research Student Travel Prize, University of Pennsylvania 2013
- Research Travel Subvention, University of Pennsylvania 2013
- Ruth Roemer Award for *outstanding contributions to the UPenn psychology community* 2011

MANUSCRIPTS UNDER REVIEW

Coutanche, M.N. and Thompson-Schill, S.L. (submitted). Learning about real world size transforms neural activity in the human visual system.

Anzellotti, S.* and **Coutanche, M.N.*** (invited *TiCS* submission). Beyond functional connectivity: Investigating networks of multivariate representations [*equal contributions].

Coutanche, M.N. and Chun, M.M. (submitted). How information is learned influences how memory traces respond to attentional modulation and the testing effect.

Martin, L., Durisko, C., Moore, M.W., **Coutanche, M.N.**, Chen, D., and Fiez, J.A. (submitted). The VWFA is the home of orthographic learning when house images are used as letters.

PUBLICATIONS

Coutanche, M.N. and Koch, G.E. (In press). Variation across individuals and items determine learning outcomes from fast mapping. *Neuropsychologia*.

Coutanche, M.N., Solomon, S.H., and Thompson-Schill, S.L. (2016). A meta-analysis of fMRI decoding: Quantifying influences on human visual population codes. *Neuropsychologia*, 82, 134–141.

Coutanche, M.N. and Thompson-Schill, S.L. (2015). Rapid consolidation of new knowledge in adulthood via fast mapping. *Trends in Cognitive Sciences*, 19(9), 486–488.

- Coutanche, M.N.** and Thompson-Schill, S.L. (2015). Creating concepts from converging features in human cortex. *Cerebral Cortex*, 25(9), 2584–2593.
- Coutanche, M.N.** and Thompson-Schill, S.L. (2014). Fast mapping rapidly integrates information into existing memory networks. *Journal of Experimental Psychology: General*, 143(6), 2296–2303.
- Coutanche, M.N.** and Thompson-Schill, S.L. (2014). Using informational connectivity to measure the synchronous emergence of fMRI multi-voxel information across time. *Journal of Visualized Experiments* (89), e51226.
- Coutanche, M.N.** (2013). Distinguishing multi-voxel patterns and mean activation: Why, how, and what does it tell us? *Cognitive, Affective and Behavioral Neuroscience (CABN)*, 13(3), 667–673.
- Coutanche, M.N.** Gianessi, C.A., Chanales, A.J.H., Willison, K.W., and Thompson-Schill, S.L. (2013). The role of sleep in forming a memory representation of a two-dimensional space. *Hippocampus*, 23(12), 1189–1197.
- Coutanche, M.N.** and Thompson-Schill, S.L. (2013). Informational Connectivity: Identifying synchronized discriminability of multi-voxel patterns across the brain. *Frontiers in Human Neuroscience*, 7:15, 1–14.
- Coutanche, M.N.** and Thompson-Schill, S.L. (2012). The advantage of brief fMRI acquisition runs for multi-voxel pattern detection across runs. *NeuroImage*, 61(4), 1113–1119.
- Coutanche, M.N.** and Thompson-Schill, S.L. (2012). Reversal without remapping: What we can (and cannot) conclude about learned associations from training-induced behavior changes. *Perspectives on Psychological Science*, 7(2), 118–134.
- Kylliäinen, A., Wallace, S., **Coutanche, M.N.**, Leppänen, J.M., Cusack, J., Bailey, A.J., and Hietanen, J. (2012). Affective-motivational brain responses to direct gaze in children with autism spectrum disorder. *Journal of child psychology and psychiatry, and allied disciplines*, 53(7), 790-797.
- Coutanche, M.N.** Thompson-Schill, S.L., and Schultz, R.T. (2011). Multi-voxel pattern analysis of fMRI data predicts clinical symptom severity. *NeuroImage*, 57(1), 113–123.
- Casey, J.P., Magalhaes, T., Conroy, J.M., Regan, R., Shah, N., Anney, R., Shields, D.C., et al. (2012). A novel approach of homozygous haplotype sharing identifies candidate genes in autism spectrum disorder. *Human Genetics*, 131(4), 565–579.

CONFERENCE PRESENTATIONS

- Coutanche, M.N.** (accepted). Incorporating new knowledge into existing perceptual and conceptual dimensions through interacting regions of the human brain. Submitted for the International Conference on Learning and Memory, Huntington Beach, CA.
- Coutanche, M.N.** (accepted). Incorporating new knowledge into perceptual and conceptual dimensions through interacting regions of the human brain. Submitted for the Annual Meeting of the Psychonomic Society, Vancouver, Canada.

Bruett, H. and **Coutanche, M.N.** (accepted). The role of inter-region information synchrony in processing visual stimuli. Submitted for the Annual Meeting of the Psychonomic Society, Vancouver, Canada.

Carlos, B.J., Hirshorn, E.A., Durisko, C., Fiez, J.A., and **Coutanche, M.N.** (accepted). Multivariate laterality as a novel measure of laterality and marker for word inversion sensitivity in the visual word form area. Submitted for the Annual Meeting of the Psychonomic Society, Vancouver, Canada.

Carlos, B.J. and **Coutanche, M.N.** (June 2017). Testing a new method for assessing lateralization using multi-voxel pattern analysis. Poster to be presented at Eighth International Workshop on the Statistical Analysis of Neuronal Data (SAND), Pittsburgh, PA.

Bruett, H. and **Coutanche, M.N.** (June 2017). Informational connectivity as a method for measuring synchrony in the processing of visual information. Poster to be presented at Eighth International Workshop on the Statistical Analysis of Neuronal Data (SAND), Pittsburgh, PA.

Coutanche, M.N. and Koch, G.E. (May 2017). The interaction of conceptual dimensions for animate items in the human ventral stream. Workshop on Concepts, Actions and Objects: Functional and Neural Perspectives, Rovereto, Italy.

Coutanche, M.N. and Koch, G.E. (March 2017). Neural correlates for trait memory differences. Poster presented at Cognitive Neuroscience Society Annual Meeting, San Francisco, CA.

Coutanche, M.N. and Thompson-Schill, S.L. (November 2016). The influence of recent semantic learning on human visual cortex. Poster presented at Society for Neuroscience Annual Meeting, San Diego, CA.

Coutanche, M.N. and Koch, G.E. (November 2016). The neural basis for trait memory differences. Poster presented at University of Pittsburgh Brain Day 2016, Pittsburgh, PA.

Coutanche, M.N. and Thompson-Schill, S.L. (November 2016). The influence of recent semantic learning on human visual cortex. Poster presented at University of Pittsburgh Brain Day 2016, Pittsburgh, PA.

Coutanche, M.N. and Chun, M.M. (July 2016). Exploring the nature of fast mapped knowledge through divided attention. Symposium presentation at International Conference on Memory, Budapest, Hungary.

Herholz, P., Schuster, V., **Coutanche, M.N.**, & Jansen, A. (June, 2016). fMRI as a new fertility monitor? Influences of sex hormones on brain organization revealed by MVPA. Annual Meeting of the Organization for Human Brain Mapping, Geneva, Switzerland.

Coutanche, M.N. (May 2016). The rapid consolidation of new knowledge into cortical networks through fast mapping. Talk at Context and Episodic Memory Symposium, Philadelphia, PA.

Ruscio, A.M., Hallion, L.S., **Coutanche, M.N.**, Wu, H., Thompson-Schill, S.L., & Rauch, S.L. (April 2016). Neural substrates of worry and rumination in generalized anxiety disorder and major depressive disorder. Anxiety and Depression Association of America Annual Meeting, Philadelphia, PA.

Tamez, E.R., Trueswell, J.C., **Coutanche, M.N.**, and Thompson-Schill, S.L. (October 2015). fMRI activity during a spontaneous dialogue task. Society for the Neurobiology of Language Annual Meeting, Chicago, IL.

Parma, V.*, **Coutanche, M.N.*** (*equal contributions), Seubert, J., Fondberg, R., Hackl, L., Åhs, F., and Lundström, J.N. (April 2015). Anxiety-dependent modulation of olfactory fear conditioning: A multidimensional approach. Association for Chemoreception Sciences Annual Meeting, FL.

Coutanche, M.N. and Thompson-Schill, S.L. (November 2014). Fast mapping rapidly integrates information into existing memory networks. Symposium speaker (“Memory, Sleep and Dreams”), Psychonomic Society Annual Meeting, Long Beach, CA.

Parma, V.*, **Coutanche, M.N.*** (*equal contributions), Seubert, J., Fondberg, R., Hackl, L., Åhs, F., and Lundström, J.N. (November 2014). Multidimensional approach to the study of olfactory fear conditioning in individuals with low and high trait anxiety vulnerability. Clinical Chemosensation Annual Meeting, Dresden, Germany.

Coutanche, M.N., Solomon, S.H., and Thompson-Schill, S.L. (May 2014). A meta-analysis of multi-voxel patterns in the ventral stream. Poster presented at Vision Sciences Society Annual Meeting, St. Pete Beach, FL.

Coutanche, M.N. and Thompson-Schill, S.L. (May 2014). Fast mapping rapidly integrates information into existing memory networks. Talk at Context and Episodic Memory Symposium, Philadelphia, PA.

Coutanche, M.N. and Thompson-Schill, S.L. (April 2014). Fast mapping rapidly integrates information into existing memory networks. Poster presented at Cognitive Neuroscience Society Annual Meeting, Boston, MA.

Coutanche, M.N. and Thompson-Schill, S.L. (May 2013). Converging on a convergence zone: concurrent feature decoding predicts identity decoding for anticipated objects. Talk at Workshop on Concepts, Actions, and Objects: Functional and Neural Perspectives, Rovereto, Italy.

Coutanche, M.N. and Thompson-Schill, S.L. (May 2013). Functional activity patterns encoding the identity of anticipated objects are marked by converging shape and color decoding in early visual areas during preparatory visual attention. Talk at Vision Sciences Society, Naples, FL.

Coutanche, M.N., Gianessi, C.A., Chanales, A.J.H., Willison, K.W., and Thompson-Schill, S.L. (November 2012). Sleep aids the consolidation of spatial relational memories. Poster presented at Psychonomic Society Annual Meeting, Minneapolis, MN.

Coutanche, M.N. and Thompson-Schill, S.L. (April 2012). The advantage of brief functional magnetic resonance imaging acquisition runs for multi-voxel pattern detection. Poster presented at Cognitive Neuroscience Society Annual Meeting, Chicago, IL.

Coutanche, M.N. and Thompson-Schill, S.L. (April 2011). Informational Connectivity: A novel fMRI analysis method for identifying brain areas that share distributed encoding principles. Poster presented at Cognitive Neuroscience Society Annual Meeting, San Francisco, CA.

Coutanche, M.N., Thompson-Schill, S.L., and Schultz, R.T. (October 2009). An application of multi-voxel pattern analysis to investigating patient groups: face classification in the autism fusiform face area. Poster presented at Society for Neuroscience Annual Meeting, Chicago, IL.

Coutanche, M.N., Wallace, S., White, K.B., Foley, S., Bailey, A., and I.M.G.S.A.C. (May 2008). Face and gaze processing in the broader autism phenotype: Independent differences in ASD relatives. Poster presented at International Meeting for Autism Research, London, UK.

White, K.B., Wallace, S., Parr, J., **Coutanche, M.N.**, Foley, S., Bailey, A., and I.M.G.S.A.C. (May 2008). Social cognition in the broader autism phenotype. Poster presented at International Meeting for Autism Research, London, UK.

INVITED TALKS

November, 2016. Adding meaning to perception: Forming integrated knowledge in human cortex. Carnegie Mellon University Cognitive Psychology Symposium, Pittsburgh, PA.

October 2016. The employment of neural systems in human learning: Determinants and implications for memory. Center for the Neural Basis of Cognition Annual Retreat, Seven Springs, PA.

January 2016. Sleep and memories. Panther Psychology Club, University of Pittsburgh, Pittsburgh, PA.
September 2015. Adding meaning to perception: The impact of learning in distributed activity patterns in human sensory cortex. Cognitive Psychology Brown Bag, University of Pittsburgh, Pittsburgh, PA.

December 2014. Decoding conceptual and perceptual representations across networks of the human brain. fMRI Brown Bag Symposium Series, Dartmouth College, Hanover, NH.

September 2014. The integration of knowledge into cortical memory networks. Current Works in Cognitive Psychology Series, Yale University, New Haven, CT.

May 2014. Talk discussant at Context and Episodic Memory Symposium, Philadelphia, PA.

May 2013. The role of sleep in forming a memory representation of a two-dimensional space. Cognitive Science Guest Lecture, ETH Zürich, Switzerland.

January 2013. Synchronous decoding of multi-voxel patterns in visual object processing. Center for Cognitive Neuroscience Talk Series, University of Pennsylvania, Philadelphia, PA.

May 2011. Decoding patterns in the active human brain. Art of Research Graduate Symposium, University of Pennsylvania, Philadelphia, PA.

April 2008. The broader autism phenotype. International Molecular Genetics Study of Autism Consortium Annual Conference, Oxford, UK.

CURRENT COLLABORATORS

- Stefano Anzellotti (MIT)
- Marvin Chun (Yale University)
- Michael Dickey (University of Pittsburgh)

- Julie Fiez (University of Pittsburgh)
- Lauren Hallion (University of Pittsburgh)
- Elizabeth Hirshorn (SUNY New Paltz)
- Melissa Libertus (University of Pittsburgh)
- Valentina Parma (SISSA, International School for Advanced Studies)
- Ayelet Ruscio (University of Pennsylvania)
- Michael Sayette (University of Pittsburgh)
- Sharon Thompson-Schill (University of Pennsylvania)
- Natasha Tokowicz (University of Pittsburgh)
- Tessa Warren (University of Pittsburgh)

TEACHING EXPERIENCE

Instructor of Graduate Courses

- Cognitive Neuroscience of Learning and Memory (University of Pittsburgh) Spring 2017
 Delivered to graduate students in Psychology, Bioengineering, Communication Science & Disorders, English, Neuroscience, Rehabilitation Science, Machine Learning, Neural Computation

Instructor of Undergraduate Courses

- Introduction to Psychology (University of Pittsburgh) Fall 2017
- Introduction to Cognitive Neuroscience (University of Pittsburgh) Spring 2016, Fall 2016
- Pre-Freshman Program - Memory (University of Pennsylvania) 2011, 2012, 2013
- Cognitive Neuroscience (University of Pennsylvania) 2010

3-day Workshop Instructor

- Theory and Application of MVPA (University of Pennsylvania) 2013, 2014
- Theory and Application of MVPA (University of Oregon) 2013

Teaching Assistant Trainer (University of Pennsylvania)

2014

College-level Teaching Certificate (University of Pennsylvania)

2012

Teaching Assistant

- Cognitive Neuroscience (Instructor: Sharon Thompson-Schill) 2010
- Learning (Instructor: Robert Rescorla) 2009

English-language Teacher (Shenzhen, China)

2004

MENTORING

Graduate Student Advisees

- Griffin Koch (Psychology, University of Pittsburgh) 2017 - present
- Heather Bruett (Psychology, University of Pittsburgh) 2016 - present

Fellowships to increase representation of underrepresented groups

- Brandon Carlos, Post-Bac Fellow (University of Pittsburgh) 2016 - 2017
- Ariel Rosario, Summer Undergraduate Research Fellow (Yale University) 2015

Lab Staff

- William Rybaltowski, Lab Coordinator 2017 - present
- Griffin Koch, Lab Coordinator 2016 - 2017

Senior Thesis Undergraduate Students

- Avi Chanales (University of Pennsylvania), Cognitive Science Major 2011 - 2012
 - o Awarded the *Alumni Society Prize for Excellence in Research*
 - o Co-author: Coutanche, Gianessi, Chanales, Willison & Thompson-Schill (2012)
 - o Subsequent position: PhD student at New York University

- Carol Gianessi (University of Pennsylvania), Psychology Major 2010 - 2011
 - o Awarded the *Morris Viteles Award for Excellence in Undergraduate Psychology Research*
 - o Co-author: Coutanche, Gianessi, Chanales, Willison & Thompson-Schill (2012)
 - o Subsequent position: PhD student at Yale University

Graduate Student Milestone Committees (Masters, Qualifying Exams, Dissertation)

- Robert J. Vargas (Psychology, Carnegie Mellon University)
- Ven Popov (Psychology, Carnegie Mellon University)
- Xiaoping Fang (Psychology, University of Pittsburgh)
- Ruizhe Liu (Psychology, University of Pittsburgh)
- Brian Knox (Accounting and Neuroscience, University of Pittsburgh)
- Gabriela Terrazas (Psychology, University of Pittsburgh)
- Joshua J. Tremel (Psychology, University of Pittsburgh)

Graduate Student Mentoring Committees

- Joshua J. Tremel (Psychology, University of Pittsburgh)
- Zachary Caddick (Psychology, University of Pittsburgh)
- Kole Norberg (Psychology, University of Pittsburgh)

REVIEWING

Journals: Neuron, Nature Neuroscience, Journal of Neuroscience, Cerebral Cortex, NeuroImage, Journal of Cognitive Neuroscience, Cortex, Neuropsychologia (“*Outstanding Reviewer*”), Memory and Cognition, Human Brain Mapping, NeuroImage: Clinical, Brain Connectivity, PLOS ONE, IEEE Transactions on Medical Imaging, Autism Research, Neuroscience, Nature Scientific Reports, Neurobiology of Learning and Memory

Grants: Fund for Scientific Research (FNRS), Autistica, Alzheimer’s Society

SCIENCE OUTREACH

- Judge, Linden Elementary School Science Fair 2017
- Featured Scientist, Cerebella Design’s ‘Celebrating Brains’ Initiative 2016 - present
- Yale “Pathways to Science” summer program for high school students (lecturer) 2015
- Yale “Science Diplomats” public library talk series 2015
- Howard Hughes Medical Institute ‘Ask a Scientist’ online service 2012

DEPARTMENTAL AND PROFESSIONAL SERVICE

- Symposium Chair for Psychonomic Society 2017 Annual Meeting 2017

- Reviewer of manuscripts for Tim Post Award for Research Excellence 2017
- Psychology colloquium committee 2016 - 2017
- Symposium co-organizer, International Conference of Memory 2016 2016
- Faculty search committee 2015 - 2016
- Cognitive psychology graduate student recruitment committee 2015 - 2016
- Organizer, University of Pennsylvania Psychology graduate student interview weekends 2012
- Organizer, Series of Psychology faculty panels, University of Pennsylvania 2010 - 2011

OTHER INTELLECTUAL CONTRIBUTIONS

Contributor to textbooks

- Author of test-bank practice questions, *Psychological Science* 6th ed. (W.W. Norton) 2017
- Author of lecture slides and practice questions, *Cognition* 6th ed. (W.W. Norton) 2015
- Author of test-bank practice questions, *Psychological Science* 5th ed. (W.W. Norton) 2014
- Author of test-bank practice questions, *Cognitive Neuroscience* 4th ed. (W.W. Norton) 2013

SOFTWARE

- Creator, Informational Connectivity MATLAB Toolbox (www.informationalconnectivity.org)
- Contributor, Princeton Multi-Voxel Pattern Analysis (MVPA) MATLAB Toolkit

MEDIA CONTRIBUTIONS

Templeton, D. (2017, July 11). Using brain patterns may be first step to reading the mind, CMU study shows. *Pittsburgh Post-Gazette*. <http://www.post-gazette.com/news/health/2017/07/11/Computer-program-can-interpret-brain-patterns-Carnegie-Mellon-University-study/stories/201706270128>

Dague, T. (2016, July 6). We go inside the escape-room phenomenon. *Pittsburgh City Paper*. <http://www.pghcitypaper.com/pittsburgh/we-go-inside-the-escape-room-phenomenon/Content?oid=1934005>

Carroll, L. (2016, March 26). How did I get here!? What to do when your brain goes on autopilot. *Today*. <http://www.today.com/health/how-unconscious-memory-trips-us-t66431>

Carroll, L. (2015, December 30). What’s your memory style? Why we recall every detail or just the facts. *Today*. <http://www.today.com/health/what-your-memory-style-brain-wiring-may-control-how-we-t62226>

Coutanche, M.N. (2014, September 4). Using Fruits and Veggies to Break Down How We Remember and Identify Objects. *Cognitive Neuroscience Society Blog*. https://www.cogneurosociety.org/decoding_fruit_coutanche/

The Perils of Trying to Unlearn. (2012, May). *Observer*, 25(5). <http://www.psychologicalscience.org/index.php/publications/observer/2012/may-june-12/the-perils-of-trying-to-unlearn-2.html>

PROFESSIONAL AFFILIATIONS

Fellow of the Psychonomic Society

Cognitive Neuroscience Society
Society for Neuroscience