Tor Wager

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Professional experience

2004 – present	Assistant Professor of Psychology, Columbia University
2003	Visiting Research Fellow, University of Michigan
1997-1998	Postgraduate Research Assistant, University of Colorado, Boulder

Education

1992-1996	Principia College, Elsah, IL
	B. A. with Highest Honors, Music
1998-2003	University of Michigan, Ann Arbor Ph.D. Program in Psychology, Cognition and Perception Area
2003	Ph. D., Psychology, University of Michigan Certificate program in Cognitive Science & Cognitive Neuroscience

Awards and Fellowships

1992	AP Scholar with Honors
1992 – 1996	Principia College Trustee Scholarship (full tuition)
1992 – 1996	National Merit Scholarship
1996	Marion L. Ackley Music Award (music theory and research)
1998 – 2000	Regents' Fellowship, University of Michigan

1999	Nat'l Defense Science and Engineering Graduate Fellowship, Honorable Mention
1999 – 2002	National Science Foundation Graduate Research Fellowship
2001	Patricia Gurin Distinguished Lecture Award, U of Michigan
2002	Trainee Travel Award, Human Brain Mapping
2003	Graduate Students' Present lecture, Annual Meeting of the Cognitive Neuroscience Society

Grants and funding

Current support

NIMH R01MH076136. The neural bases of placebo effects and their relation to regulatory processes, 2007-2011. Principal Investigator ($225,000 direct costs, year 1).

NSF 0631637. *Multilevel mediation techniques for fMRI, 2006-2008.* Principal Investigator ($400,000 direct costs).

NIMH R01MH076137 (K. Ochsner P.I.) *The neural basis of the cognitive control of emotion***,** 2006-2010**.** Co-Investigator ($102,110 direct costs, year 1)

R24 MH075999-01 (I. Liberzon, P. I.) *Cognition-Emotion-HPA Interaction: Translational Network, 2006-2008.* Co-Investigator ($832,819 direct costs).

Gatsby Initiative in Brain Circuitry Pilot Project Grant. *Neuroinformatics of expectancy in pain, 2006-2007.* Principal Investigator ($47,500 direct costs).

MITRE Corporation (E.E. Smith, P.I.) *Automaticity, cognitive control, and the detection of deception*. Co-Investigator ($400,000 direct costs).

P20 RR020645-01 (Rose, P.I.) *Integrative biology of the brain, inflammation, and asthma***.** Consulting collaborator ($1,228,703 direct costs).

Completed support

Mind, Brain, Body, Brain and Health Research Group, *Comparing placebo and opiate effects on pain processing with fMRI*, 2005-2006. Principal Investigator ($31,000 direct costs).

Mind, Brain, Body, Brain and Health Research Group, *Human Mu-opiate Activity in Thermal Pain and Placebo as Measured by [11-C]carfentinil PET*, 2003-2004. Edward E. Smith, P.I., Co-Investigator ($54,000 direct costs).

Mind, Brain, Body, Brain and Health Research Group, *Neural Correlates of Expectancy and Pain in the Placebo Response*, 2002. Edward E. Smith, P.I., Co-Investigator ($28,000 direct costs).

University of Michigan Internal Research Grant, *The Neural Bases of Reward and Working Memory*, 2000 – 2002. Stephan F. Taylor, P.I., Co-Investigator ($9,000 direct costs).

Peer-reviewed Research Publications

1. Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T.D. (2000). Fractionating the Central Executive: Evidence for Separability of Executive Functions. *Cognitive Psychology*, 41, 49-100.

2. Phan, K. L., Wager, T. D., Taylor, S. F., & Liberzon, I. (2002). Functional Neuroanatomy of Emotion: A Meta-Analysis of Emotion Activation Studies in PET and fMRI. *Neuroimage*, 16, 331-348.

3. Sylvester, C.-Y. C., Wager, T. D., Lacey, S. C., Jonides, J., Smith, E. E., Hernandez, L., & Nichols, T. E. (2003). Switching attention and resolving interference: fMRI measures of executive functions. *Neuropsychologia*, 41, 357-370.

4. Wager, T. D. & Nichols, T. E. (2003) Optimization of Experimental Design in fMRI: A General Framework Using a Genetic Algorithm. *Neuroimage*, 18, 293-309.

5. Wager, T. D., Phan, K. L., Liberzon, I., & Taylor, S. F. (2003). Valence, gender, and lateralization of functional brain anatomy in emotion: A meta-analysis of findings from neuroimaging. *Neuroimage*, 19, 513-531.

6. Wager, T. D. & Smith, E. E. (2003). Neuroimaging and working memory: A meta-analysis. Cognitive, Affective, and Behavioral Neuroscience, 3, 255-274.

7. Wager, T. D., Rilling, J., Smith, E. E., Sokolik, A., Casey, K., Kosslyn, S. M., Davidson, R.J., Rose, R. M., Cohen, J. D. (2004). Placebo-induced changes in fMRI in the anticipation and experience of pain. *Science*, 303, 1162-1167.

8. Taylor, S. F., Welsh, R. C., Wager, T. D., Phan, K. L., Fitzgerald, K. D., & Gehring, W. J. (2004). A functional neuroimaging study of motivation and executive function. *Neuroimage*, 21(3), 1045-1054.

9. Phan, K. L., Wager, T. D., Taylor, S. F., & Liberzon, I. (2004). Functional neuroimaging studies of human emotions. *CNS Spectrums*, 9(4), 258-266.

10. Wager, T. D., Reading, S., & Jonides, J. (2004). Neuroimaging studies of shifting attention: a meta-analysis. *Neuroimage*, 22(4), 1679-1693.

11. Keller, M. C., Fredrickson, B. L., Ybarra, O., Cote, S., Johnson, K., Mikels, J., and Wager, T. (2005). A warm heart and a clear head: The contingent effects of weather on human mood and cognition. *Psychological Science,* 16(9): 724-731.

12. Nichols, T., Brett, M., Andersson, J., Wager, T., & Poline, J. B. (2005). Valid conjunction inference with the minimum statistic. *Neuroimage, 25*(3), 653-660.

13. Wager, T. D., Keller, M. C., Lacey, S. C., & Jonides, J. (2005). Increased sensitivity in neuroimaging analyses using robust regression. *Neuroimage, 26*(1), 99-113.

14. Wager, T. D., Vazquez, A., Hernandez, L., & Noll, D. C. (2005). Accounting for nonlinear BOLD effects in fMRI: parameter estimates and a model for prediction in rapid event-related studies. *Neuroimage, 25*(1), 206-218.

15. Wager, T. D., Sylvester, C. Y., Lacey, S. C., Nee, D. E., Franklin, M., & Jonides, J. (2005). Common and unique components of response inhibition revealed by fMRI. *Neuroimage, 27*(2), 323-340.

16. Wager, T. D. (2005). The neural bases of placebo effects in anticipation and pain. *Seminars in Pain Medicine, 3*(1), 22-30.

17. Wager, T. D., Jonides, J., Smith, E. E., & Nichols, T. E. (2005). Towards a taxonomy of attention-shifting: Individual differences in fMRI during multiple shift types. *Cogn Affect Behav Neurosci, 5*(2), 127-143.

18. Wager, T. D. (2005). The neural bases of placebo effects. *Current Directions in Psychological Science,* 14(4), 175-179.

19. Benedetti, F., Mayberg, H. S., Wager, T. D., Stohler, C. S., Zubieta, J. K. (2005). Neurobiological Mechanisms of the Placebo Effect. *Journal of Neuroscience,* 25(45), 10390-10402.

20. Wager, T. D., Jonides, J., Smith, E. E. (2006). Individual differences in multiple types of shifting attention. *Memory & Cognition*, 34(8), 1730-1743.

21. Feldmann-Barrett, L. & Wager, T. D. (2006). The structure of emotion: Evidence from neuroimaging studies. *Current Directions in Psychological Science*, 15(2), 79-83.

22. Wager, T. D., Matre, D., Casey, K. L. (2006). Placebo effects in laser-evoked pain potentials. *Brain, Behavior, and Immunology*, 20(3), 219-230.

23. Summerfield, C., Greene, M., Wager, T., Egner, T., Hirsch, J., & Mangels, J. (2006). Neocortical connectivity during episodic memory formation. *PLoS Biol*, 4(5), e128.

24. Lindquist, M. A., Waugh, C., & Wager, T. D. (2007). Modeling state-related fMRI activity using change-point theory. *NeuroImage, 35*(3), 1125-1141.

25. Wager, T. D., Lindquist, M., & Kaplan, L. (2007). Meta-analysis of functional neuroimaging data: Current and future directions. *Social, Cognitive, and Affective Neuroscience, 2*(2), 150-158.

26. Wager, T. D., Scott, D. J., & Zubieta, J. K. (2007). Placebo effects on human mu-opioid activity during pain. *Proceedings of the National Academy of Sciences, 104*, 11056-11061.

27. Nee, D. E., Wager, T. D., & Jonides, J. (2007). Interference resolution: Insights from a meta-analysis of neuroimaging tasks. *Cogn Affect* Behav *Neurosci, 7*(1), 1-17.

28. Lindquist, M. and Wager, T. D. (2007). Validity and Power in Hemodynamic Response Modeling: A comparison study and a new approach. *Human Brain Mapping,* 28, 764-784.

29. Zaki, J., Ochsner, K. N., Hanelin, J., Wager, T. D., & Mackey, S. C. (in press). Different circuits for different pain: Patterns of functional connectivity reveal distinct networks for processing pain in self and others. *Social Neuroscience*.

30. Lindquist, M., & Wager, T. D. (in press). Spatial Smoothing in fMRI using Prolate Spheroidal Wave Functions. *Human Brain Mapping*.

31. Stern, E. R., Wager, T. D., Egner, T., Hirsch, J., & Mangels, J. (in press). Preparatory neural activity predicts performance on a conflict task. *Brain Research*.

32. Etkin, A., & Wager, T. D. (in press). Functional neuroimaging of anxiety: a meta-analysis of emotional processing in PTSD, social anxiety disorder and specific phobia. *American Journal of Psychiatry*.

Book Chapters and Commentaries

33. Hernandez, L., Wager, T.D., & Jonides, J. (2002). Introduction to Functional Brain Imaging. In John Wixted and Hal Pashler (Eds.), *Stevens Handbook of Experimental Psychology, Third Edition, Volume 4: Methodology in Experimental Psychology*. New York: John Wiley and Sons, Inc. pp. 175-221.

34. Jonides, J., Wager, T.D., & Badre, D.T. (2002). Neuroimaging Studies of Memory. In *Encyclopedia of the Human Brain*. San Diego: Academic Press.

35. Jonides, J., Sylvester, C.-Y. C., Lacey, S .C., Wager, T. D., Nichols, T.E. and Awh, E. (2003). Modules of Working Memory. In R. H. Kluwe, G. Luer, and F. Rosler

(Eds.) *Principles of Working Memory*. Cambridge, MA: Birkhauser Publishing Ltd. pp. 113-134.

36. Wager, T. (2004). Painful deception - Response. Science, 304, 1110-1111.

37. Wager, T. D., & Feldman Barrett, L. (2004). From affect to control: Functional specialization of the insula in motivation and regulation. Published online at PsycExtra: http://www.columbia.edu/cu/psychology/tor/.

38. Wager, T. D., & Ochsner, K. N. (2005). Sex differences in the emotional brain. Neuroreport. 16(2), 85-87.

39. Wager, T.D. & Nitschke, J. B. (2005). Placebo effects in the brain: Linking mental and physiological processes. *Brain, Behavior, and Immunity*, 19, 281-282.

40. Wager, T. D. (2005). Expectations and anxiety as mediators of placebo effects in pain. Pain, 115(3), 225-226.

41. Wager, T.D. (2006). Do We Need to Study the Brain to Understand the Mind? *APS Observer*, 19(9), 25-27.

42. Wager, T. D., Hernandez, L., Jonides, J., & Lindquist, M. (2007). Elements of functional neuroimaging. In J. T. Cacioppo, L. G. Tassinary & G. G. Berntson (Eds.), *Handbook of Psychophysiology* (4th ed., pp. 19-55). Cambridge: Cambridge University Press.

43. Lindquist, M. and Wager, T. D., (in press). Application of change-point theory to modeling state-related activity in fMRI. In *Applied Data Analytic Techniques for "Turning Points Research".*

44. Wager, T. D., Barrett, L. F., Bliss-Moreau, E., Lindquist, K., Duncan, S., Kober, H., et al. (in press). The Neuroimaging of Emotion. In M. Lewis (Ed.), *Handbook of Emotion.*

Selected Conference Presentations

(poster presentations omitted)

1. Wager, T. D. and Nichols, T. Optimization of Experimental Design in fMRI: A General Framework Using a Genetic Algorithm. Paper presented at the Annual Meeting of the International Society for Magnetic Resonance in Medicine, May 2002.

2. Wager, T. D. and Nichols, T. Optimization of Experimental Design in fMRI: A General Framework Using a Genetic Algorithm. Paper presented at the Annual Meeting of the Organization for Human Brain Mapping, May 2002.

3. Wager, T. D. and Nichols, T. Optimization of Experimental Design in fMRI: A General Framework Using a Genetic Algorithm. Paper presented at the Annual Meeting of the International Society for Magnetic Resonance in Medicine, May 2002.

4. T. D. Wager, E. E. Smith, J. Jonides. Tracking relevant information in the brain: An fMRI study of multiple subtypes of attention switching. Paper presented at the Annual Meeting of the Cognitive Neuroscience Society, March 2003.

5. T. D. Wager, E. E. Smith, J. Jonides. Towards a taxonomy of attention switching: Individual differences in attention switching in fMRI. Paper presented at the Annual Meeting of the Society for Neuroscience, 2003.

6. T. D. Wager & Summerfield, C. Functional connectivity and latency in cortical pain processing: fMRI evidence for separable networks. Paper presented at the Annual Meeting of the Society for Neuroscience, 2004.

7. Wager, T. D. Medial prefrontal activations in social and emotional phenomena: Interpretation and prediction. Paper presented at the Annual Meeting of the Society for Personality and Social Psychology, 2005.

8. Wager, T. D. The neural basis of the placebo analgesic response. Symposium presentation at the 11th World Congress on Pain, International Association for the Study Symposium presentation

9. Wager, T. D. The neural bases of the placebo response in fMRI. Symposium presentation at the Annual Meeting of the American Association of Pharmaceutical Scientists, 2005.

10. Wager, T. D. The neural bases of the placebo response in fMRI. Paper presented at the Annual Meeting of the American Psychological Society, 2005.

11. Wager, T. D. The neural bases of the placebo response in fMRI. Symposium presentation at the Annual Meeting of the Society for Neuroscience, 2005.

12. Wager, T. D. Expectation and the cognitive regulation of affect. (Symposium chair), Annual Meeting of the American Psychological Society, 2006.

13. Wager, T. D. The neural bases of the placebo response in fMRI. (Workshop co-chair), Annual Meeting of the Organization for Human Brain Mapping, 2006.

14. Wager, T. D. Basic fMRI Design. Educational workshop presentation. Annual Meeting of the Organization for Human Brain Mapping, 2006.

15. Barrett, L. F. and Wager, T. (2007, May). The neural reference space for emotion: New meta-analytic insights. Invited paper to be delivered at Conference on the Neural Systems of Social Behavior, Austin TX.

16. Wager. T.D. Expectancy modulation of pain affect: Electrophysiological evidence and opioid mechanisms. (Symposium chair). Symposium presentation at the Annual Meeting of the Cognitive Neuroscience Society, 2006.

17. Wager, T. D. Basic fMRI Design. (Acting symposium chair). Educational workshop presentation. Annual Meeting of the Organization for Human Brain Mapping, 2007.

Selected Other Invited Presentations

"Meta-analysis of neuroimaging data." University of Michigan functional MRI symposium. September, 2003.

"Neural measures of relationships among executive functions." Sackler Institute, Cornell Medical Center. February, 2004.

"The neural bases of the placebo response in fMRI." Harvard University. April, 2004.

"From feelings to control: Functional specialization of the insula." University of Michigan. June, 2004.

"Design and analysis in fMRI: Optimization, power, and robust estimation." Columbia University Medical Center. July, 2004.

"Shifting attention and resolving interference: Components of thought?" University of Pennsylvania. September, 2004.

"The neural bases of the placebo response in fMRI." National Institutes of Health/National Center for Complementary and Alternative Medicine symposium on placebo effects. October, 2004.

"Parsing the brain: The neural basis of the placebo response." Columbia University Lifelong Learners seminar series. November, 2004.

"Statistics in functional brain imaging." Columbia University Statistics Conference. December, 2004.

"The neural bases of placebo effects: results and implications for human self-regulation." Yale University. March, 2005.

"Design and analysis in fMRI: Optimization, power, and robust estimation." Stanford University, Gabrieli lab group. January, 2005.

"What can neuroimaging tell us about emotion? The search for simple structure." Boston College, April 2005.

"The neural bases of the placebo response in fMRI." New York State Psychiatric Institute. June, 2005.

"Individual differences in the control of attention." Betty Behrens Symposium, Cambridge University. August, 2005.

"Expectations and individual differences in cognitive and affective control." New York Psychoanalytic Institute. October, 2005.

"Brain pathways in the cognitive generation and regulation of affect." Hunter College, New York, October 2006.

"The neural bases of placebo effects in pain." Pacifica Institute conference on Healing in an Age of Neuroscience. May, 2007

"The neural bases of placebo effects in pain." Cold Spring Harbor Symposium on Mechanisms of Alertness, Arousal, and Attention. June, 2007

"Finding emotion in the brain." Yale University, September, 2007.

Memberships in Professional Societies

Cognitive Neuroscience Society
International Society for Magnetic Resonance in Medicine
Organization for Human Brain Mapping
Society for Neuroscience
American Psychological Society

Professional Service

Editorial service

Consulting Editor, Cognitive Affective, and Behavioral Neuroscience
Consulting Editor, Social Cognitive and Affective Neuroscience (SCAN journal)
Guest editor of Named Series on placebo effects in Brain, Behavior, and Immunity

Reviewing of scientific publications

Allyn & Bacon
Archives of General Psychiatry
Behavioral and Brain Sciences
Brain Research

Cerebral Cortex
Emotion
Journal of Cognitive, Affective, & Behavioral Neuroscience
Journal of Cognitive Neuroscience
Journal of Neuroscience
Nature Neuroscience
Nature Reviews Neuroscience
Neuroimage
Neuroreport
Pain
Proceedings of the National Academy of Sciences
Psychiatry Research: Neuroimaging
Psychological Science
Science
Sage Books
Wellcome Trust

Committees:

2002	Admissions committee, Cognition and Perception, University of Michigan
2001-2004	fMRI Center operations committee, University of Michigan
2004-present	Institutional review board (IRB), Columbia University

Teaching Activities

Fall 2001	Advanced Cognitive Lab. Taught experimental design and statistics. *Graduate Student Instructor*.
Winter 2001	Human Neuroanatomy. Core requirement for University of Michigan Neuroscience Ph.D. students. Lecturer and lab instructor. *Graduate Student Instructor*.
Winter 2001	Mind and Brain. Introductory course for undergraduates. *Consultant*.
July 2001	Neuroanatomy for Cognitive Scientists. A two-week workshop for students and faculty co-instructed with Dr. Jeffrey Hutsler. *Co-instructor.*
2001 - 2002	Functional Neuroimaging Methods. *Lecturer*: experimental design for fMRI; *Lab instructor*: experimental design and programming lab.
Winter 2002	Human Neuroanatomy. *Guest lecturer*: Higher Cognitive Functions.

Winter 2003	Multivariate Statistics. Core requirement for University of Michigan Psychology Ph. D. students. *Graduate Student Instructor*.
2004-present	The Neuroscience of Cognitive and Emotional Control. Columbia University seminar (undergraduate/graduate). *Instructor.*
	Methods and Issues in Cognitive Neuroscience: fMRI Methods. Columbia University seminar (undergraduate/graduate). *Co-instructor with Dr. Kevin Ochsner*
	Statistics for Behavioral Scientists. Columbia University lecture course (undergraduate). *Instructor.*