

## CONTACT

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375 Waverley St, Palo Alto, CA, 94301, 626 353 5332, signeb@stanford.edu

## EDUCATION

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California Institute of Technology, Pasadena, CA, USA 2008

PhD in Computation and Neural Systems

Thesis title *'The neural mechanisms underlying the influence of associative learning on valuation and decision-making'*

Areas of specialty: reward learning, decision-making, functional MRI, real-time fMRI

University of Waterloo, Waterloo, ON, Canada 2003

Honors Bachelor of Applied Science in Computer Engineering

Option in International Studies in Engineering, Option in Cognitive Science

## RESEARCH EXPERIENCE

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Postdoctoral Research, Stanford University 2008-present

*Supervised by Dr. Allan Reiss, Center for Interdisciplinary Brain Science Research*

My work applies neuroimaging to understanding both structural and functional differences in the brains of individuals with disorders of the brain such as Fragile X, Turner's syndrome and autism.

Graduate Research, California Institute of Technology 2004 - 2008

*Supervised by Dr. John O'Doherty and Dr. Shinsuke Shimojo*

I studied the neural mechanisms underlying learning reward associations, in classical and instrumental conditioning paradigms, using functional magnetic resonance imaging.

Research Assistant, University of Toronto 2003 - 2004

*Supervised by Dr A Randal McIntosh, Rotman Research Institute*

Developed tools for statistical analysis of neuroimaging data, with an emphasis on functional connectivity.

Research Assistant, McGill University 2003

*Supervised by Dr Tom Shultz, Lab for Natural and Simulated Cognition*

Developed routines for applying functional data analysis techniques to psychological behavioral measures.

Research Assistant, University of Waterloo 2002

*Supervised by Dr Catherine Burns, Advanced Interfaces Design Lab*

Assisted with a behavioral study on the use of a collaborative computer interface.

## PEER-REVIEWED PUBLICATIONS

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Bray S, O'Doherty J (2007) *Neural coding of reward-prediction error signals during classical conditioning with attractive faces*. J Neurophysiol 97:3036-3045.

Bray S, Shimojo S, O'Doherty JP (2007) *Direct instrumental conditioning of neural activity using functional magnetic resonance imaging-derived reward feedback*. J Neurosci 27:7498-7507.

Bray S, Balleine B, Shimojo S, Rangel A, O'Doherty JP (2008) *The neural mechanisms underlying the influence of Pavlovian cues on human decision-making*. J Neurosci 28:5861-5866.

Bray S, Shimojo S, O'Doherty JP (2009) *Human medial orbitofrontal cortex is recruited during experience of imagined as well as real rewards*. (submitted)

Bray S, Chang C, Hoeft F (2009) *Applications of multivariate pattern classification analyses in developmental neuroimaging of healthy and clinical populations*. (accepted in Frontiers in Human Neuroscience)

## ABSTRACTS

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Society for Neuroscience 2008, Washington DC

*Testing the influence of neurofeedback dependent increases in medial orbitofrontal cortex on judgments of stimulus reward value*

Cognitive Neuroscience Society 2008, San Francisco

*The neural mechanisms of specific Pavlovian-to-Instrumental transfer effects in humans*

Society for Neuroscience 2006, Atlanta

*Direct instrumental conditioning of neural activity using real-time fMRI*

Cognitive Neuroscience Society 2006, San Francisco

*Neural coding of reward prediction error signals during classical conditioning with attractive faces*

Society for Neuroscience 2004, San Diego

*Causal influences among regional electrical sources in a cross-modal cueing task*

## INVITED TALKS

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*Direct instrumental conditioning of neural activity*

ERATO project meeting, Shuzenji, Japan, Jul 2008

*Pavlovian cues influence instrumental choices: an fMRI study*

Tamagawa-Caltech Joint Workshop "Neural Mechanisms of the Social Mind", Tamagawa University, Japan, Dec 2007

*Direct instrumental conditioning of neural activity*

Caltech Biology Division annual retreat, Santa Barbara, CA, Oct 2007

## AD HOC REVIEWER

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Neuroimage  
European Journal of Neuroscience

## SCIENCE WRITING

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Bray, Signe (2008) *Marketing gets in your head*, Engineering and Science, Caltech, Volume LXXI, Number 1.

Bray, Signe (2008) *Caltech connects with local classrooms*, Engineering and Science, Caltech, Volume LXXI, Number 1.

Bray, Signe (2009) *Stanford Research Institute International: The mother of many Stanford spin-offs*, Stanford Scientific Magazine, Stanford University, Volume VIII, Issue I, Autumn 2009.

## TEACHING AND OUTREACH

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**Instructor:** Stanford University 2009  
*Biocore Explorations: Is personality hard-wired?*

**Guest lecturer:** Stanford University 2009  
*Methodology of Research – Neuroimaging*

**Volunteer reading tutor:** Reading partners, Selby Lane reading center 2008-2009

**Science outreach volunteer:** Caltech classroom connection 2007  
Assisted a Pasadena high school physics teacher with lab and lecture sessions.

**Teaching Assistant:** California Institute of Technology 2005-2006  
*CNS 187 Neural Computation, Fall 2005*  
*CNS 131 Psychology of Learning and Motivation, Winter 2005 and 2006*

**Teaching Assistant:** University of Waterloo, Waterloo, Ontario 2002  
Full time member of teaching staff for Introduction to Computer Programming in C++.