

Stephanie A. McMains

Curriculum Vitae

Department of Psychology
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RESEARCH OVERVIEW

My research focuses on the neural mechanisms of human visual perception and attention using both psychophysics and functional magnetic resonance imaging. In particular, I am interested in how bottom-up stimulus driven processes interact with top-down goal directed processes in order to select relevant information from our cluttered environment.

EDUCATION

- 2000-2006 *Degree:* Doctor of Philosophy
Field: Psychology: Brain Behavior and Cognition Program
Institution: Boston University, Boston MA
- 1995-1999 *Degree:* Bachelor of Science
Field: Cognitive Science
Institution: Carnegie Mellon University, Pittsburgh PA

RESEARCH EXPERIENCE

- 2006 to Present *Position Title:* **Postdoctoral Fellow**
Advisor: Sabine Kastner, Ph.D., M.D.
Location: Neuroscience of Attention & Perception Laboratory, Princeton University, Princeton NJ
- 2000 to 2006 *Position Title:* **Graduate Student**
Advisor: David Somers, Ph.D.
Location: Perceptual Neuroimaging Laboratory, Boston University, Boston MA
- 1999 to 2000 *Position Title:* **Research Assistant**
Advisor(s): Marcel Just, Ph.D. and Patricia Carpenter, Ph.D.
Location: Center for Cognitive Brain Imaging, Carnegie Mellon University, Pittsburgh PA
- 1998 to 1999 *Position Title:* **Undergraduate Research Assistant**
Advisor(s): Marcel Just, Ph.D. and Patricia Carpenter, Ph.D.
Location: Center for Cognitive Brain Imaging, Carnegie Mellon University, Pittsburgh PA

TEACHING EXPERIENCE

During Graduate Studies

- Fall 2001 to **Discussion Section Instructor**
Spring 2003 PSY 101- Introduction to Psychology

During Undergraduate Studies

- Spring 1999 **Laboratory Instructor**
85-429 - Cognitive Brain Imaging (Prof. Marcel Just)

GRANTS, HONORS & AWARDS

- Individual NRSA Post-Doctoral Fellowship, FMRI studies of visual attention, Sponsor Sabine Kastner (2006 – 2009)
- Kavita Jain Dissertation Award, Boston University (2006)
- Dean's Fellowship, Boston University (2000 - 2005)
- Student Travel Award, Cognitive Neuroscience Society Meeting (2002)
- Clara Mayo Memorial Graduate Fellowship Award (2001)
- Psi Chi, The National Honors Society in Psychology (1999)
- Presidential Scholarship, Carnegie Mellon University (1995-1999)

LABORATORY & COMPUTER SKILLS

- Siemens Allegra 3T system console operation
- Human cortical surface reconstruction using FreeSurfer
- FMRI data analysis (AFNI, FS-FAST)
- Experimental design using Matlab, Vision Shell, C++
- Pupil tracking systems (ASL)

PROFESSIONAL MEMBERSHIPS

- Vision Science Society (VSS)
- Society for Neuroscience (SFN)
- The Organization for Human Brain Mapping (OHBM)

ORGANIZATION COMMITTEE

2008 to present Vision and Attention Club, Princeton University, Princeton NJ

2008 to present Postdoc Social Club, Princeton University, Princeton NJ

AD-HOC REVIEWER

- Journal of Neuroscience
- Journal of Cognitive Neuroscience
- NeuroImage
- Cerebral Cortex

PUBLICATIONS

McMains, S.A. and Kastner, S. (2009). Competitive Interactions as an Interface for Selective Attention in Human Visual Cortex. *In preparation.*

McMains, S.A., Crum, K.E., Swisher, J.D., Somers, D.C. (2009). Limitations of the human fronto-parietal circuitry for split spotlight and zoom lens visual spatial attention. *Submitted.*

Magen, H., **McMains, S.A.**, Emmanouil, T.A., Treisman, A.M., Kastner, S. (2009). Spatial working memory delay activity in visual cortex. *In preparation.*

PUBLICATIONS (continued)

McMains, S.A. and Kastner, S., (2009). Defining the units of competition: Gestalt principles modulate competitive interactions in human visual cortex. *J Cogn Neurosci, In press.*

McMains, S.A. and Kastner S (2009): Visual Attention. In: Encyclopedia of Neuroscience; eds. Binder, Hirokawa, Windhorst; Springer, *in press*

Kastner S, **McMains, S.A.**, Beck DM (2009): Attention mechanisms in the human visual system: Evidence from neuroimaging. In: Cognitive Neurosciences. *In press.*

Magen, H., Emmanouil, T.A., **McMains, S.A.**, Kastner, S., Treisman, A.M. (2009). Attentional demands predict short-term memory load response in posterior parietal cortex. *Neuropsychologia, 47, 1790-8*

*Arcaro, M.J., * **McMains, S.A.**, Singer, B.D., Kastner, S. (2009). Retinotopic organization of the human ventral visual cortex. *J Neurosci, 29, 10638-52.* * both authors contributed equally to this study.

McMains, S.A., Fehd, H.M., Emmanouil, T.A., Kastner, S., (2007). Mechanisms of Feature and Space-based Attention: Response Modulation and Baseline Increases. *J. Neurophys, 98, 2110-21.*

Kastner S and **McMains, S.A.**, (2007). News & Views: Out of the spotlight: face to face with attention. *Nat Neurosci, 10, 1344-5.*

Swisher, J.D., Halko, M.A., Merabet, L.B., **McMains, S.A.**, Somers, D.C. (2007). Visual topography of human intraparietal sulcus. *J Neurosci, 27:20, 5326-37.*

Merabet, L.B., Swisher, J.D., **McMains, S.A.**, Halko, M.A., Amedi, A., Pascual-Leone, A., Somers, D.C. (2007). Combined activation and deactivation of visual cortex during tactile sensory processing. *J Neurophysiol, 97:2, 1633-41.*

McMains, S.A. and Somers, D.C. (2005). Processing Efficiency of Divided Spatial Attention Mechanisms in Human visual Cortex. *J Neurosci, 25:41, 9444-8.*

Somers, D.C. and **McMains, S.A.** (2004) Spatially-Specific Attentional Modulation Revealed by fMRI. In: *Neurobiology of Attention.* L. Itti, G. Rees, J. Tsotsos (Eds.) New York: Academic Press, Elsevier, 377-382.

McMains, S.A. and Somers, D.C.(2004). Multiple Spotlights of Attentional Selection in Human Visual Cortex. *Neuron, 42:4, 677-86.*

Just, M.A., Carpenter, P.A., Maguire, M., Diwadkar, V., **McMains, S.** (2001). Mental rotation of objects retrieved from memory: a functional MRI study of spatial processing. *Journal of Experimental Psychology: General, 130:3, 493-504.*

TALKS PRESENTED

McMains, S.A. and Kastner, S. (2008). Competitive Interactions as an Interface for Selective Attention in Human Visual Cortex, Society for Neuroscience Conference, *To be presented*

McMains, S.A. (2008). Competitive Interactions are biased by illusory contour formation in human extrastriate cortex. Princeton Imaging Meeting Seminar Series, Princeton University, Princeton, NJ.

McMains, S.A. and Kastner, S. (2007). Competitive Interactions in Human Extrastriate Cortex are Biased by Illusory Contour Formation, Society for Neuroscience Conference

McMains, S.A. and Kastner, S. (2007). Illusory Contour Formation Modulates Competitive Interactions in Human Extrastriate Cortex, Visual Sciences Society Meeting

TALKS PRESENTED (continued)

McMains, S.A. (2005). Human fronto-parietal circuitry for ‘split spotlight’ and ‘zoom lens’ visual spatial attention. Brain Behavior and Cognition Program Colloquium Series, Boston University, Boston, MA.

McMains, S.A. and Somers, D.C. (2004). fMRI cost-benefit analysis of split spotlight and zoom lens spatial attention mechanisms in human visual cortex. Society for Neuroscience Meeting

McMains, S.A. (2004). Are there advantages to splitting our attentional spotlight? Brain Behavior and Cognition Program Colloquium Series, Boston University, Boston, MA.

McMains, S.A. and Somers, D.C. (2002). Functional MRI investigation of multiple foci of visual spatial attention: More than one spotlight? Cognitive Neuroscience Society Meeting

McMains, S.A. and Somers, D.C. (2002). Multiple Spotlights of Attentional Selection in Human Visual Cortex. Society for Neuroscience Meeting.

POSTERS PRESENTED

McMains, S.A. and Kastner, S., (2008). Competitive Interactions in Human Extrastriate Cortex are Modulated by Collinear Alignment, Organization for Human Brain Mapping Meeting

McMains, S.A. and Kastner, S., (2007). Collinear Alignment Modulates Competitive Interactions in Human Extrastriate Cortex, Vision Sciences Society Meeting

McMains, S.A., Crum, K.E., Swisher, J.D., Somers, D.C. (2005) Human Fronto-Parietal Circuitry for ‘Split Spotlight’ and ‘Zoom Lens’ Visual Spatial Attention. Society for Neuroscience Meeting

ADDITIONAL ABSTRACTS

Arcaro, M.J., **McMains, S.A.**, Kastner, S., (2007). Attention tasks reveal topographic maps in posterior parahippocampal cortex, Vision Sciences Society Meeting

Arcaro, M.J., **McMains, S.A.**, Kastner, S., (2007). Phase-encoded Attentive Tracking Reveals Topographic Maps in Human Ventral Occipital Cortex, Society for Neuroscience Conference

Swisher, J.D., Crum, K.E., **McMains, S.A.**, Halko, M.A., Sheremata, S.L., Somers D.C. (2005). Stimulus-driven retinotopic maps in human parietal cortex observed via fMRI. Society for Neuroscience Meeting