

**Robert Rauschenberger, Ph.D.**  
**Managing Scientist**

**Professional Profile**

Dr. Rauschenberger specializes in visual attention, visual perception, and human cognition, with 15 years of research on the topics of involuntary distraction, the conspicuity of visually presented information, and cognitive engineering in product design. Dr. Rauschenberger's specific expertise in product design includes healthcare products, consumer products, and automotive products. Dr. Rauschenberger has performed usability testing, human factors evaluations, workflow studies, and measured reaction times and error rates in a variety of domains to minimize the risks in the interaction of humans and their environment, such as during medical or safety-related procedures, and in the use of consumer products. He specializes in applying these methodologies to the design of products and the evaluation of their safety risk, as well as to the design and study of the effectiveness of warnings and safety information.

Dr. Rauschenberger is presently program chair of the Healthcare Technical Group of the Human Factors and Ergonomics Society. He held the position of Adjunct Professor at the School of Interactive Arts and Technology at Simon Fraser University from 2008 through 2011. Prior to joining Exponent, Dr. Rauschenberger was a Principal Research Scientist at Siemens Corporate Research, an Associate at Harvard University, a Visiting Scholar at MIT, and a Research Social Scientist at The University of Arizona; was the recipient of a National Science Foundation research grant; and was the co-investigator on a multi-year Department of Homeland Security contract to facilitate the interdiction of person-borne improvised explosive devices. He serves on the editorial board of *Attention, Perception & Psychophysics*, and has formerly served on the Grant Selection Committee of the Natural Sciences and Engineering Research Council of Canada. Furthermore, Dr. Rauschenberger has completed the core curriculum for the German law degree ("Grundstudium") at the University of Bonn (six semesters).

**Academic Credentials and Professional Honors**

Ph.D., Psychology, The Johns Hopkins University, 2001  
M.A., Psychology, The Johns Hopkins University, 1998  
B.A., Liberal Arts, Sarah Lawrence College, 1996

National Science Foundation Research Grant (2004–2007, as Principal Investigator)  
DHS Research Grant (as Co-PI), "Wide Area Surveillance and Suicide Bomber Detection"  
DHS Research Grant (as Co-PI), Center of Excellence for the Awareness and Localization of Explosives-Related Threats (ALERT)

## Languages

German – *Native Speaker*

## Publications

Zheng XS, Kiekebosch J, Rauschenberger R. Attention-aware human-machine interface to support video surveillance task. Proceedings, Human Factors and Ergonomics Society 2011, 1818–1822.

Sala JB, Nichols EA, Muhammad R, Lakhiani SD, Rauschenberger R, Wood CT. Government, warnings, and safety information: A comparison of inter-agency regulations and guidance. In: Advances in Human Factors, Ergonomics, and Safety in Manufacturing and Service Industries. Karwowski W, Salvendi G (eds), pp. 1047–1056, CRC Press, 2010.

Rauschenberger R. Reentrant processing in attentional guidance—Time to abandon old dichotomies. Invited editorial. *Acta Psychologica* 2010; 135:109–111.

Rauschenberger R, Lin JJW, Zheng XS, Lafleur C. Subset search for icons of different spatial frequencies. Proceedings, Human Factors and Ergonomics Society 53<sup>rd</sup> Annual Meeting, San Antonio, TX, 2009.

Zheng XS, Chakraborty I, Lin JJW, Rauschenberger R. Correlating low-level image statistics with users' rapid aesthetic and affective judgments of web pages. Long Paper presented at the 2009 CHI conference, Boston, MA, 2009. (Nominated for Best Paper CHI 2009.)

Carlson TA, Rauschenberger R, Verstraten FAJ. No representation without awareness in the Lateral Occipital complex. *Psychological Sci* 2007; 18:298–302.

Zheng XS, Sapundshiev I, Rauschenberger R. WikiTable: A new tool for collaborative authoring and data management. *HCI* 2007; 15:501–508.

Zheng XS, Chakraborty I, Lin JJW, Rauschenberger R. Developing metrics to predict users' perceptions of interface design. Proceedings, Human Factors and Ergonomics Society 2008; 2023–2027.

Rauschenberger R, Yantis S. Perceptual encoding efficiency in visual search. *J Exper Psychology: General* 2006; 135:116–131.

Rauschenberger R, Liu T, Slotnick SD, Yantis S. Temporally unfolding neural representation of pictorial occlusion. *Psychological Sci* 2006; 17:358–364.

Rauschenberger R, Chu H. The effects of familiarity on encoding efficiency in visual search. *Percept Psychophysics* 2006; 68:770–775.

Rauschenberger R, Mosca F, Peterson MA, Bruno N. Amodal completion in visual search: Preemption or context effects? *Psychological Sci* 2004; 15:351–355.

Rauschenberger R. When something old becomes something new: Spatiotemporal object continuity and attentional capture. *J Exp Psychology: Human Percept Perform* 2003; 29:600–615.

Rauschenberger R. Attentional capture by auto- and allo-cues. *Psychonomic Bull Rev* 2003; 10:814–842.

Rauschenberger R, Yantis S. Masking unveils pre-amodal completion representation in visual search. *Nature* 2001; 410:369–372.

Rauschenberger R, Yantis S. Attentional capture by globally-defined objects. *Percept Psychophysics* 2001; 63:1250–1261.

Enns JT, Austen EL, DiLollo V, Rauschenberger R, Yantis S. New objects dominate luminance transients in setting attentional priority. *J Exp Psychology: Human Percept Perform* 2001; 27:1287–1302.

## **Presentations**

Rauschenberger R. Human factors in product design and liability: The role of attention. Paper presented at The West Coast Product Safety & Liability Conference: Presentations for Manufacturers by Leading Experts & Attorneys, Los Angeles, CA, March 2010.

Rauschenberger R, Yantis S. Attentional capture through levels of representation. Poster presented at the Annual Meeting of the Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 1998.

Rauschenberger R, Yantis S. Search asymmetries revisited: A new theory of visual attention. Poster presented at the Annual Meeting of the Psychonomic Society, Los Angeles, CA, November 1999.

Rauschenberger R, Yantis S. What can search asymmetries really tell us? Paper presented at the Annual EPA Vision and Attention Meeting, Baltimore, MD, March 2000.

Rauschenberger R, Yantis S. Completing the picture: Representations of amodally completed objects in visual search. Poster presented at the Annual Meeting of the Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 2000.

Rauschenberger R, Yantis S. What counts as a new object in the new-object hypothesis of attentional capture? Poster presented at the Meeting of the Vision Sciences Society, Sarasota, FL, May 2001.

Rauschenberger R, Peterson MA, Mosca F, Bruno N. A modified search task investigates an alternative to the two-stage model of amodal completion. Poster presented at the Annual Meeting of the Vision Sciences Society, Sarasota, FL, May 2002.

Schulz MF, Rauschenberger R, Peterson MA. Amodal completion in passively viewed displays: A priming study. Poster presented at the Annual Meeting of the Vision Sciences Society, Sarasota, FL, May 2002.

Liu T, Rauschenberger R, Slotnick SD, Yantis S. Neural signatures of amodal completion. Poster presented at the Annual Meeting of the Cognitive Neuroscience Society, New York, NY, March 2003.

Peterson MA, Rauschenberger R. Context effects on border assignment in the target stimulus in visual search. Poster presented at the Annual Meeting of the Vision Sciences Society, Sarasota, FL, May 2003.

Rauschenberger R, Liu T, Slotnick SD, Yantis S. Cortical representation of pictorial occlusions in early visual areas and LOC. Poster presented at the Annual Meeting of the Vision Sciences Society, Sarasota, FL, May 2003.

Skow-Grant E, Rauschenberger R, Peterson MA. Attention, not inhibition of return, tracks objects. Paper presented at the 11th Annual Workshop on Object Perception, Attention, and Memory, Vancouver, Canada, November 2003.

Rauschenberger R, Peterson MA. When unambiguous stimuli become ambiguous: Spatiotemporal context effects with nominally unambiguous stimuli. Paper presented at the Annual Meeting of the Vision Sciences Society, Sarasota, FL, May 2004.

Rauschenberger R, Chu H. The effects of familiarity on encoding efficiency in visual search. Poster presented at the Annual Meeting of the Vision Sciences Society, Sarasota, FL, May 2005.

Carlson TA, Rauschenberger R, Verstraten FAJ. Cortical adaptation of unconscious perceptual representations. Paper presented at the Annual Meeting of the European Conference on Visual Perception, A Coruña, Spain, August 2005.

Rauschenberger R, Lin JW. Workflow analysis for patients' visits in VAMC audiology departments. Paper presented at the Annual Meeting of the Association of VA Audiologists, Denver, CO, April 2007.

Chakraborty, I, Zheng XS, Lin J, Rauschenberger R. Computational eye movement model based on adaptive saliency map. Paper presented at the Annual Fall Vision Meeting, Berkeley, CA, September 2007.

## **Invited Presentations**

Rauschenberger R. Taking a “Q” from human factors: Visual search in HMI design. Keynote address for the HFES Regional Conference, California State University Long Beach, Long Beach, CA, February 2011.

Rauschenberger R. Taking a “Q” from human factors: Visual search in HMI design. Cognitive Science and Engineering Department, Arizona State University College of Technology & Innovation, January 2011.

Cognitive engineering for airport security screening. Simon Fraser University, Vancouver, BC, 2009.

When what you design is not what you get. Microsoft Research Lab, Redmond, WA, 2009.

An idiosyncratic perspective on visual search and perception. University of British Columbia, Vancouver, Canada, 2008.

An idiosyncratic perspective on visual search and perception. Notre Dame University, South Bend, IN, 2008.

When what you design is not what you get. Universität Bielefeld, Bielefeld, Germany, 2006.

When what you design is not what you get. Deutsche Luft- und Raumfahrtgesellschaft, Braunschweig, Germany, 2006.

When what you design is not what you get. SIAT, Simon Fraser University, Vancouver, Canada, 2006.

Dynamic interactions in visual search displays: When less is more. Yale University, New Haven, CT, 2005.

Dynamic representations of the visual world. University of Arizona, Tucson, AZ, 2004.

Dynamic representations of the visual world. Royal Holloway University, London, UK, 2004.

Dynamic representations of the visual world. University of Delaware, Newark, DE, 2004.

Dynamic representations of the visual world. University of St. Andrews, St. Andrews, Scotland, 2004.

Dynamic interactions in visual search displays. Michigan State University, East Lansing, MI, 2004.

When more is less: Visual search difficulty and exposure time. Siemens Corporate Research, Princeton, NJ, 2004.

An idiosyncratic perspective on visual search and perception. Vision Sciences Laboratory, Harvard University, Cambridge, MA, 2004.

Attentional capture by auto- and allo-cues. Visual Attention Lab., Harvard Medical School, Cambridge, MA, 2004.

Dynamic representations of the visual world. University of North Carolina, Chapel Hill, NC, 2003.

Masking unveils visual representations in the brain. University of Arizona, Tucson, AZ, 2001.

Masking unveils visual representations in the brain Sarah Lawrence College, Bronxville, NY, 2000.

### **Prior Experience**

Principal Research Scientist, Siemens Corporate Research, 2005–2009

Visiting Scholar, MIT, 2004–2005

Associate, Harvard University, 2004–2005

Research Social Scientist, The University of Arizona, 2004–2005

Postdoctoral Fellow, The University of Arizona, 2001–2004

### **Project Examples**

Assisted companies with development and evaluation of safety communication ( warnings on products, user manuals) for consumer and healthcare products.

Investigated the heterogeneity of alleged classes of plaintiffs in class action lawsuits.

Evaluated the effectiveness of an automotive video backup camera display under realistic driving conditions.

Designed medical software applications now deployed in the market space and evaluated their safety in a product litigation context.

Conducted human factors evaluations of hardware and software deployed in several domains, from healthcare to automotive to power transportation to industrial automation.

Used scientific methods to study the factors that lead to distraction and inattention; govern visual search under conditions of duress; and the factors determining the efficiency of visual search, more generally (e.g., for warnings).

### **Academic Appointments**

- Adjunct Professor, School of Interactive Arts and Technology, Simon Fraser University, 2008–2011

## **Editorships and Editorial Review Boards**

- Program Chair, Healthcare Technical Group, Human Factors and Ergonomics Society
- *Editorial Board Member, Attention, Perception & Psychophysics*
- Committee Member, Brain, Behaviour and Cognitive Science Grant Selection Committee, Natural Sciences and Engineering Research Council of Canada
- Organizing Committee, Conference for Object Perception and Memory
- Scientific Committee, European Conference on Visual Perception

## **Peer Reviewer**

- National Science Foundation
- Workshop on Object Perception, Attention and Memory (Co-Organizer)
- *Psychological Science*
- *Cognitive Psychology*
- *Journal of Experimental Psychology: Human Perception and Performance*
- *Vision Research*
- *Journal of Vision*
- *Visual Cognition*
- *Attention, Perception & Psychophysics*
- *Psychonomic Bulletin & Review*
- *acta psychological*
- *Experimental Psychology*
- *Emotion*
- *CHI*
- *Graphics Interface*
- *Scholarpedia*
- Human Factors and Ergonomics Society
- *Consciousness & Cognition*

## **Professional Affiliations**

- Human Factors and Ergonomics Society
- Psychonomic Society

## **Past Affiliations**

- Association for Computing Machinery Special Interest Group on Computer-Human Interaction
- Association for Psychological Science
- Vision Sciences Society