Exponent®
Engineering & Scientific Consulting

Robert Rauschenberger, Ph.D.

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Professional Profile

Dr. Rauschenberger is a cognitive psychologist with over 25 years of research on the topics of the conspicuity of visually presented information, distraction, human factors in product design, and user experience. He currently oversees a team of experienced Master's and Ph.D.-level user researchers, who operate in Exponent's state-of-the-art six-lab Centers for Scientific User Research (CSUR).

Dr. Rauschenberger routinely develops, and evaluates the adequacy of, warnings, instructions, and other disclosures. Dr. Rauschenberger has performed usability testing, user research, user interface design, workflow studies, contextual inquiries, focus groups, and human factors evaluations, and he has instrumented tracking of eye gaze in a variety of product domains. He applies the findings from his work to reduce the risks in the interaction of humans with products in their environment, most notably, recently, with respect to virtual reality (VR) products.

Prior to joining Exponent, Dr. Rauschenberger was a Principal at Siemens Corporate Research, where he managed the research in user experience across the breadth of the Siemens product portfolio for the North American market (healthcare, consumer, online, automotive, industrial) and supported the product development lifecycle for a variety of products, from ideation to interaction design to validation. Dr. Rauschenberger has served as program chair of the Healthcare Technical Group of the Human Factors and Ergonomics Society for two successive years, after which time he continued to serve as co-chair. 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 his time at Siemens, Dr. Rauschenberger was an Associate at Harvard University, a Visiting Scholar at MIT, and a Research Social Scientist at The University of Arizona; he was the recipient of a National Science Foundation research grant; and he was the co-investigator on a multi-year Department of Homeland Security contract to facilitate the interdiction of person-borne improvised explosive devices. He has served 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, in addition to having reviewed grant applications for the National Science Foundation and the Research Foundation Flanders (FWO), Belgium.

Academic Credentials & Professional Honors

Ph.D., Psychology, Johns Hopkins University, 2002

M.A., Psychology, 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)

U.S. DOT DTRT5714R20001 (as team member), "Operations Research and Analysis (ORA) Services"

Academic Appointments

Lecturer, Drexel University, 2013-Ongoing

Lecturer, Arizona State University, 2020-Ongoing

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

Prior Experience

Principal, 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

Outside Tenure Reviewer, Indiana University South Bend (2006)

Undergraduate Subject Pool Committee, University of Arizona (2002/3)

Teaching Assistant Committee, The Johns Hopkins University (1997-2001; Chair: 1998-2001)

Graduate Representative Organization, The Johns Hopkins University (1997-2001)

Ph.D. Exam Committee, Emily Skow-Grant, University of Arizona (2003/4)

Ph.D. Thesis Co-Supervisor, Roman Vilimek, Universität Regensburg, Germany (2005/6)

Diploma Thesis Supervisor, Philipp Hämmerle, University of Applied Science, Vorarlsberg, Austria (2006)

Diploma Thesis Co-Supervisor, Robert Lischke, Humbolt University Berlin, Germany (2008)

Master's Thesis Co-Supervisor, Billy Cheung, Simon Fraser University, Vancouver, Canada (2008)

Professional Affiliations

Human Factors and Ergonomics Society

Psychonomic Society

Vision Sciences Society

Publications

Lewis RC, Rauschenberger R, Kalmes R. Hand-to-mouth and other hand-to-face touching behavior in a quasi-naturalistic study under controlled conditions. Journal of Toxicology and Environmental Health, Part A: Current Issues. In press.

Rauschenberger R, Barakat B. Health and safety of VR use by children in an educational use case. Proceedings, 2020 IEEE Conference on Virtual Reality and 3D User Interfaces, Atlanta, GA, 2020. (Nominated for Best Paper IEEE VR 2020.)

Lester BD, Larson R, Dosch I, Fowler G, Rauschenberger R. Perception of terrain slope in real and virtual environments. Proceedings, 11th International Conference on Applied Human Factors and Ergonomics, San Diego, CA, 2020.

Lester BD, Hashish R, Kim R, Moorman H, Hildebrand E, Schwark J, Rauschenberger R, Young D. Mobile device usage influences gaze patterns to obstacles during locomotion. Proceedings, Industrial & Systems Engineering Research Conference, Anaheim, CA, 2016.

Barakat B, Crump C, Cades D, Rauschenberger R, Schwark J, Hildebrand E, Young D. Eye tracking evaluation of driver visual behavior with a forward collision warning and mitigation system. Proceedings, Human Factors and Ergonomics Society 59th Annual Meeting, Los Angeles, CA, 2015.

Rauschenberger R, Sala JB, Wood CT. Product warnings and the involuntary capture of attention. Proceedings, Human Factors and Ergonomics Society 59th Annual Meeting, Los Angeles, CA, 2015.

Schwark J, Fowler G, Larson R, Rauschenberger R. An investigation of operator performance in All-Terrain Vehicle (ATV) handling and control. Procedia Manufacturing 2015; 20:1567-1574.

Crump C, Cades D, Rauschenberger R, Hildebrand E. et al. Driver reactions in a vehicle with collision warning and mitigation technology. SAE Technical Paper 2015-01-1411, 2015. doi:10.4271/2015-01-1411.

Crump C, Cades D, Rauschenberger R, Hildebrand EA, Young DE. Dynamic on-road method for evaluation of Advanced Driver Assistance System (ADAS). Proceedings, 3rd Annual World Conference of the Society for Industrial and Systems Engineering, pp. 77-81, San Antonio, TX, October 20-22, 2014. ISBN: 97819384960-2-8.

Rauschenberger R, Wood CT, Sala JB. Human factors and the design of medical devices. In: Bringing your medical device to market. Reiss JB (ed), pp. 215-226, Food and Drug Law Institute, 2013.

Kuzel MJ, Cohen H, Cohen J, Rauschenberger R. Evaluation of mobile eye tracking for forensic analysis of pedestrian falls. Proceedings, Human Factors and Ergonomics Society 57th Annual Meeting, San Diego, CA, 2013.

Heckman GM, Kim RS, Lin S, Rauschenberger R, Young DE, Lange R. Drivers' visual behavior during backing tasks: Factors affecting the use of rearview camera displays. Proceedings, Human Factors and Ergonomics Society 56th Annual Meeting, Boston, MA, 2012.

Kim R, Rauschenberger R, Heckman G, Young D, Lange R. Efficacy and usage patterns for three types of rearview camera displays during backing up. Proceedings, Society of Automobile Engineers World Congress, Detroit, MI, 2012.

Zheng XS, Kiekebosch J, Rauschenberger R. Attention-aware human-machine interface to support video surveillance task. Proceedings, Human Factors and Ergonomics Society 55th Annual Meeting, Las Vegas, NV, 2011.

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 53rd 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 Science 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 52nd Annual Meeting, New York, NY, 2008.

Rauschenberger R, Yantis S. Perceptual encoding efficiency in visual search. Journal of Experimental Psychology: General 2006; 135:116-131.

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

Rauschenberger R, Chu H. The effects of familiarity on encoding efficiency in visual search. Perception & Psychophysics 2006; 68:770-775.

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

Rauschenberger R. When something old becomes something new: Spatiotemporal object continuity and attentional capture. Journal of Experimental Psychology: Human Perception and Performance 2003; 29:600-615.

Rauschenberger R. Attentional capture by auto- and allo-cues. Psychonomic Bulletin & Review 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. Perception & Psychophysics 2001; 63:1250-1261.

Enns JT, Austen EL, DiLollo V, Rauschenberger R, Yantis S. New objects dominate luminance transients in setting attentional priority. Journal of Experimental Psychology: Human Perception and Performance 2001; 27:1287-1302.

Presentations

Rauschenberger R, Fleming D, Sobel K, Hyman E. A science-based approach for health and safety evaluations of virtual reality products. Workshop given at the 2020 ICPHSO Annual Meeting and Training Symposium, Orlando, FL, February 2020.

Rauschenberger R, Hildebrand E. A product liability perspective on medical device development. Paper presented at the Human Factors and Ergonomics Society Healthcare Symposium, Baltimore, MD, April 2015.

Heckman G, Rauschenberger R, Kim R, Young D, Lange R. A comparative evaluation of rearview camera display locations: Collision avoidance outcomes and use patterns. Paper presented at the SAE Government/Industry meeting, Washington, DC, January 2012.

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.

Project Experience

Designed healthcare and consumer products now deployed in the marketplace.

Conducted national and international user studies, focus groups, workflow analyses, and contextual inquiries across a large range of product domains, from healthcare to consumer to industrial to automotive to online.

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

Assisted companies with 510(k) submissions to the FDA for clearance for marketing of medical devices by conducting human factors studies.

Assisted companies with their response to inquiries from government agencies (e.g., FDA) regarding the safety of their products, by conducting human factors evaluations and analyzing data from large databases of accident and adverse event records.

Editorships & Editorial Review Boards

Brain, Behaviour and Cognitive Science Grant Selection Committee, NSERC, Committee member

National Science Foundation, Reviewer

Research Foundation Flanders (FWO), Belgium, Reviewer

Attention, Perception & Psychophysics, Consulting Editor and Reviewer (2005-2010)

Program Chair, Human Performance in Healthcare, Human Factors and Ergonomics Society

Organizer, Conference for Object Perception and Memory (OPAM)

Member, Scientific Committee, European Conference on Visual Perception

Peer Reviews

National Science Foundation

Human Factors and Ergonomics Society

Research Foundation Flanders (FWO), Belgium

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 psychologica

Experimental Psychology

Emotion

CHI

Graphics Interface

Scholarpedia

Consciousness & Cognition

PLoS ONE

Leonardo

Cognitive Science

International Journal of Human-Computer Interaction

ACM Transactions on Computer-Human Interaction

Human Factors

Transactions on the Web

Transaction on Visualization and Computer Graphics

Transactions on Computer-Human Interaction