David C. Somers, Ph.D.

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Research Overview

My laboratory's research investigates the neural substrates and behavioral mechanisms of the cognitive factors – attention, memory, perceptual knowledge, and executive control – that influence the remarkable perceptual abilities of the human mind. In the realm of perception, the average child outperforms the world's top computers. Yet, the human mind is profoundly limited in attentional and short-term memory capacity. Our "mental RAM" capacity is roughly four items – items, not gigabytes or terabytes – and yet we easily outperform supercomputers. The human mind's perceptual strengths largely derive from long-term memory, much of it stored as perceptual knowledge, which we rapidly access with little or no conscious awareness. Human perceptual limitations emerge from a network of frontal lobe and parietal lobe regions that serve as the backbone of the brain's attentional network.

Our investigations employ functional MRI studies and behavioral psychophysical experiments, along with computational analysis. NIH- and NSF-supported projects in the lab are currently examining the interactions between visual attention and visual memory systems; multisensory (visual and auditory) attentional networks; functional distinctions between subregions of the parietal lobe and frontal lobes; and the effects of training and experience on perceptual-attentional networks. Much of our work focuses on revealing these mechanisms in healthy young adults, but we are collaborating on research regarding healthy aging individuals and patients with Parkinson's Disease.

Post-tenure research has demonstrated that multiple regions of the human parietal lobe contain maps of the visual world. My lab was the first to identify two of these cortical areas, naming them IPS3 and IPS4. We also renamed one previously defined region (V7) to IPS0, a convention that has been broadly accepted in the field. We have observed functional distinctions in these cortical areas between visual attention and visual short-term memory mechanisms. Significantly, the spatial representations held in these regions change dynamically with task demands – the right hemisphere aids the weaker left hemisphere. This finding has important implications for understanding the mechanisms of the syndrome known as *hemispatial neglect*, a marked inattention to the left side of space that is associated with right hemisphere parietal lobe damage. My lab has made a series of surprising findings regarding the cortical coding of multisensory information. We have demonstrated that primary visual cortex – long presumed to be unisensory - is driven by touch in subjects who have been blindfolded for only a few hours; this has important implications for understanding neuroplasticity effects in the blind and in low-vision populations. We have further demonstrated that the regions of the posterior parietal lobe, long thought to be a key site of multisensory integration, largely encode spatial information with unimodal cortical regions. This reveals that multisensory integration is largely performed at the network level rather than by multisensory brain regions. Finally, we have conducted both behavioral and fMRI studies demonstrating the flexible nature of the limitations of our attentional system.

Academic Employment History

Research Scientist, Perceptual Science Laboratory (E.H. Adelson), Department of Brain & Cognitive Sciences, Massachusetts Institute of Technology, Cambridge, MA, March 1996-September 2000.

Research Scientist, Nuclear Magnetic Resonance Center (R.B.H. Tootell), Department of Radiology, Massachusetts General Hospital, Charlestown, MA, March 1997-June 2000.

Assistant Professor, Department of Psychology, Rutgers University, Newark, NJ, January 2000-June 2000.

Adjunct Assistant Professor, Department of Radiology, University of Medicine & Dentistry of New Jersey, Newark, NJ, January 2000-June 2000.

Assistant Professor, Department of Psychology, Boston University, Boston MA, July 2000 – Aug 2006.

Visiting Scientist, Nuclear Magnetic Resonance Center, Department of Radiology, Massachusetts General Hospital, Charlestown, MA, July 2000 – present.

Assistant Professor, Program in Neuroscience, Boston University, Boston MA, Jan 2001-Aug 2006.

Assistant Professor, Program in Mathematical and Computational Neuroscience, Boston University, Boston MA, Jan 2001- Aug 2006.

Research Fellow, Department of Cognitive & Neural Systems, Boston University, Boston MA May 2001 - 2011

Associate Professor, Department of Psychology, Boston University, Boston MA, Sept. 2006 – present.

Associate Professor, Graduate Program in Neuroscience, Boston University, Boston MA, 2006-present.

Associate Professor, Center for Neuroscience, Boston University, Boston MA, 2007-present.

Associate Professor, Undergraduate Program in Neuroscience, Boston University, Boston MA, 2008-present.

Associate Professor, Center for Computational Neuroscience and Neural Technology (CompNet), Boston University, Boston, MA 2011-present.

Education & Training

B.S., Mathematics and Computer Science, Harvey Mudd College, Claremont, CA. 1987. Psychology Minor.

Ph.D., Cognitive and Neural Systems, Boston University, Boston, MA. 1993. [Program now called Graduate Program in Neuroscience: Computational]

Research and training in cognitive science, neural networks, visual perception, and dynamical systems. Thesis research on coupled neural oscillators and perceptual feature binding. Thesis Advisors: Stephen Grossberg, founding president, International Neural Network Society, and Nancy Kopell, member, National Academy of Sciences and MacArthur Fellow.

Post-Doctoral Fellow, Computational & Cognitive Neuroscience, Department of Brain & Cognitive Sciences, Massachusetts Institute of Technology, Cambridge, MA, 1992-1997. Neuroscience research and training in the laboratory of Mriganka Sur. Computational research focused on circuit--level models of visual cortex: orientation selectivity, non-classical receptive field properties.

Grants, Honors, & Awards
Prior to Tenure (Awards only):

- Student Body President, Harvey Mudd College, 1985-86.
- College Fellow, Harvey Mudd College, 1986-87.
- Who's Who Among Students in American Colleges and Universities, 1987.
- Durfee Foundation Award, Study of Science & Engineering Education, China, 1987.
- Thomas J. Watson Fellowship, England, India, & Nepal, 1987-88.
- Presidential University Graduate Fellowship, Boston University, 1988--89.
- NASA Graduate Student Research Fellowship, 1989--1992.
- McDonnell--Pew Post-doctoral Fellowship in Cognitive Neuroscience, 1992-1994.
- NIH grant F32-MH010671, "Local Excitation and Visual Cortical Circuitry," Principal Investigator, 1994-1997.
- NSF, Co-investigator, "Statistical and Configural Aspects of Lightness Perception", Proposal Funded, but declined due to concurrent NIH funding (PI: E.H. Adelson), 1/1999-12/2001, **$420,435 Awarded**.
- NIH/NEI, Investigator, "Configural Mechanisms of Lightness Perception", National Eye Institute, R01 Proposal Funded (PI:E.H. Adelson), 1999-2004.
- NSF grant BCS-0236737, "Mechanisms of Attentional Selection in Human Visual Cortex," Principal Investigator, Cognitive Neuroscience Program, 2003-2006, **$775,000 Awarded**.

Post-Tenure (Funded Grants only)

- NSF grant BCS-0236737, "Mechanisms of Attentional Selection in Human Visual Cortex," Principal Investigator, Cognitive Neuroscience Program, 2006-2007, **$775,000 Awarded**.
- NSF grant BCS-0726061, "Perceptual and Attentional Topography of Human Posterior Parietal Cortex," Principal Investigator, Cognitive Neuroscience Program, 2007-2011, **$570,000 Awarded**.
- NSF grant SBE-0354378, SMA-0835976, Center of Excellence for Learning in Education, Science, and Technology (CELEST) grant, Investigator, "Interactions between auditory and visual spatial attention 10/1/09-3/31/11, **$142,272 Awarded** (specific to our lab) (PI: Grossberg).
- NSF grant SMA-0835976, Center of Excellence for Learning in Education, Science, and Technology (CELEST) grant, Investigator, Governing Board Member (2012-2015), 3/1/10-2/28/15. (PI: Mingolla; Shinn-Cunningham) **$19.3 Million Total Awarded.**
- NSF grant SMA-0835976, "Network interactions between auditory and visual spatial attention and working memory", 4/1/11-2/28/12, **$197,484 Awarded** (specific to our lab). (PI: Mingolla)
- NSF grant SMA-0835976, Co-investigator, "Network interactions between auditory and visual spatial attention and working memory", 3/1/12-2/28/13, **$126,059 Awarded** (specific to our lab). (PI: Mingolla; Shinn-Cunningham)
- NIH grant R01EY022229, Principal Investigator, "Human Fronto-Parietal Networks for Visual Attention and Memory," 4/2012-3/2017. **$2,040,397 Awarded**.
- NIH grant 5R01AG031941-03, Site-PI, "Aging and Perceptual Learning: Behavioral and fMRI Studies." 7/2012-8/2013. (PI: J. Andersen) **Total Grant: $3,796,049 Awarded, BU: Portion $1,665,625 Awarded.**
- NIH grant T90DA032484, Key Personnel, "Training in Computational Neuroscience: Integrating Experiment, Theory, and Technology". 9/2011-8/2016. (PI: D. Mountain) **$322,053 Awarded.**

- NIH grant R01NS067128, Investigator, "Effects of Parkinson's Disease on Perception, Cognition and Gait." 9/2009-9/2014. **$3,296,436 Awarded** (PI: A. Cronin-Golomb)
- HHMI Undergraduate Science Education Core Curriculum Development, Key Personnel, 2010-2014. (PI: Lipton/Eichenbaum) **$1,500,000 Awarded.**

Students' Awards & Grants

Prior to Tenure:

- BU, Presidential University Graduate Fellowship to Stephanie McMains, **Stipend & Tuition Awarded.** 2000-2001. Role: Thesis Advisor.
- NIH/NEI, post-doctoral grant to Dr. Lotfi Merabet. "The Role of Visual Cortex in Tactile Object Processing," 2004-2006. **$103,040 Awarded**. Role: Sponsor
- BU, Presidential University Graduate Fellowship to Katherine Crum. **Stipend & Tuition Awarded.** 2004-2005. Role: Thesis Advisor.
- NSF, Graduate Research Fellowship Program. Honorable Mention to Susan Mosher, 2006. Role: Mentor/Sponsor.
- BU, Kavita Jain Award for Best Ph.D. dissertation in Psychology, Stephanie McMains, 2006. Role: Thesis Advisor/First Reader.

Post-Tenure:

- NIH/NEI grant K23EY016131 to Dr. Lotfi Merabet, "The Occipital Cortex in Cross-Modal Sensory Processing," 2006-2011. **$782,794 Awarded.** Role: Co-mentor.
- NIH/NEI grant F32EY017502, post-doctoral training grant to Dr. Stephanie McMains (Princeton U.), "fMRI Studies of Visual Attention in Humans and Macaques." **$140,000 Awarded.** 2006-2010**.** Role: PhD Thesis advisor.
- NIH/NEI grant F32EY019448. Post-doctoral training grant to Dr. Jascha Swisher (Vanderbilt U.) "Spatial scales of functional organization in human visual cortex." **$150,000 Awarded.** 2009-2012. Role: PhD Thesis advisor.
- BU, Dean's Fellowship for Graduate Study to Samantha Michalka. **Stipend & Tuition Awarded.** 2009-2010. Role: Thesis Advisor.

- BU UROP Travel Award, Georgina Fleming, 2009. Role: Mentor/Sponsor. **$250 Awarded.**
- BU UROP Summer Research Fellowship, Christine Gamble, 2011. Role: Mentor/Sponsor. **$2000 Awarded.**
- BU UROP Summer Research Fellowship, Stephanie Bachewski, 2011. Role: Mentor/Sponsor. **$2000 Awarded.**
- BU, Dean's Fellowship for Graduate Study to Kathryn Devaney. **Stipend & Tuition Awarded.** 2011-2012. Role: Thesis Advisor.
- BU CAS Summer Research Scholar, Stephanie Bachewski, Summer 2011, Role: Mentor/Sponsor. **$2000 Awarded.**
- NSF, Graduate Research Fellowship Program, Honorable Mention to Kathryn Devaney, 2012. Role: Mentor/Sponsor. No Funds Awarded.
- BU UROP Summer Research Fellowship, Christine Gamble, 2012. Role: Mentor/Sponsor. **$2000 Awarded.**
- BU UROP Summer Research Fellowship, Devin Buckley, 2012. Role: Mentor/Sponsor. **$2000 Awarded.**
- BU UROP Summer Research Fellowship, J. Daniel Bireley, 2012. Role: Mentor/Sponsor. **$2000 Awarded.**
- BU/NIH Computational Neuroscience Undergraduate Research Fellowship, Rachel Franklin, 2012-2014, Role: Mentor/Co-sponsor. **$14,000 Total Award.**
- BU UROP Travel Award, Christine Gamble, 2012. Role: Mentor/Sponsor. **$300 Awarded.**
- NIH/NEI grant F32NS077824. Post-doctoral training grant to Dr. Katherine C. Bettencourt (Harvard U.) "Revealing IPS organization through its role in location and feature processing." **$162,000 Awarded.** 2012-2015. Role: PhD Thesis advisor.

Service

Faculty Committee Service

Prior to Tenure:

Social Sciences Curriculum Committee, College of Arts & Sciences, Boston University, 2005-2006.

Merit Committee, Psychology Department, Boston University, 2007, 2011.

Graduate Admissions Committee, Brain, Behavior & Cognition Program, Department of Psychology, Boston University, 2001-2006.

Faculty Member, Program in Neuroscience, 2001-2006.

Post-Tenure:

Governing Board, Center of Excellence for Learning, Education, Science & Technology (CELEST), a NSF Science of Learning Center, Boston University, 2012-present.

Social Sciences Curriculum Committee, College of Arts & Sciences, Boston University, 2006-2007.

Undergraduate Neuroscience Curriculum Committee, Boston University, 2007-present.

Ad-hoc Computational Neuroscience Curriculum Committee, Boston University, 2007.

Natural Sciences Curriculum Committee, College of Arts & Sciences, Boston University, 2011-2012.

Chair Search Committee, Psychology Department, Boston University, 2007.

Faculty Search Committee, Brain, Behavior & Cognition Program, Boston University 2009-2010, 2011-2012.

Merit Committee, Psychology Department, Boston University, 2007, 2011.

Faculty Reviewer, The Nerve, student-run neuroscience journal, 2009.

Graduate Admissions Committee, Brain, Behavior & Cognition Program, Department of Psychology, Boston University, 2006-present.

Faculty Member, Program in Neuroscience, 2001-2008.

Faculty Member, Graduate Program in Neuroscience, 2008-present.

Faculty Member, Undergraduate Program in Neuroscience, 2008-present.

Judge, Boston University Science and Engineering Research Symposium, March 2012.

National & International Service & Reviewing

Prior to Tenure:

Society for Neuroscience, Education Committee, Board Member 2002-2005.

Study section reviewer, ad hoc reviewer, NIH/CSR (Center for Scientific Review), National Eye Institute (NEI) Central Visual Processes (CVP) panel, Oct 2004

Study section reviewer, NIH/CSR, Sensorimotor Integration NRSA panel (F02B), 2005-2006.

Ad hoc grant reviewer, NSF, Program in Computational Neuroscience, 1994--95, 1999

Additional Ad hoc grant reviewer, NIH, NEI, Visual Section B (VISB), 1999

Grant Reviewer, Biomedical Research Council of Singapore, 2001, 2004, 2005

Grant Reviewer, Binational Science Foundation (US-Israel), 1999, 2004

Grant Reviewer, NSF, Cognitive Neuroscience, 2002

Conference Referee, Neural Information Processing Seminars (NIPS), 1996

Conference Referee, International Conference on Neural Networks (ICNN), 1997

Journal Referee, Neural Networks, 1993, 1995, 1997, 1998

Journal Referee, Neuron, 2001, 2002, 2003, 2004.

Journal Referee, Journal of Neuroscience, 1995, 1997, 1998, 1999, 2001, 2002, 2005, 2006

Journal Referee, Journal of Neurophysiology, 2001, 2003, 2005, 2006.

Journal Referee, Current Biology 2003

Journal Referee, Journal of Vision, 2006

Journal Referee, NeuroImage, 2002, 2003

Journal Referee, Cerebral Cortex, 2004

Journal Referee, Visual Neuroscience, 1996

Journal Referee, Neural Computation, 1996, 1998, 1999, 2000

Journal Referee, Journal of Computational Neuroscience, 1996, 1998

Journal Referee, Physica D, 1996

Journal Referee, Proceedings of the National Academy of Sciences, (USA), 1996, 1998, 2002

Journal Referee, Nature, 1999, 2000, 2001

Journal Referee, Nature Neuroscience, 2000, 2002

Journal Referee, Network, 2000

Journal Referee, Vision Research, 2000, 2003

Journal Referee, Journal of the Optical Society of America, 2001

Post Tenure:

Reviewing Editor, Frontiers in Systems Neuroscience, 2008-present.

Served on 14 NIH Study Section Review Panels (Career Total: 18):

7-time NIH Study Section Chairperson, (F02B) NIH/CSR, Sensory, Motor & Cognitive Neuroscience Fellowship Study Section, 2009-2011.

Study section reviewer, NIH/CSR, Chartered Member of Cognition & Perception (CP) panel, July 2012 – June 2016.

Study section reviewer, ad hoc reviewer, NIH/CSR, Mechanisms of Sensory, Perceptual, and Cognitive Processes (SPC) Study Section, February 2012.

Study section reviewer, ad hoc reviewer, NIH/CSR, Cognition & Perception (CP) panel, June 2011, October 2011.

Study section reviewer, NIH/CSR, Sensorimotor Integration NRSA panel (F02B), 2006-2008.

Reviewer, Howard Hughes Medical Institute, International Student Dissertation Research Fellowship Program, 2011, 2012.

Grant Reviewer, NSF, Cognitive Neuroscience, 2012

Selection Panelist & Grant Reviewer, Thomas J. Watson Fellowship, New York, 2009-10.

External Advisory Board, Harvard/MGH/MIT Advanced Multimodal Neuroimaging Training Program, 2008-2010.

Journal Referee, Neuron, 2007, 2008, 2009, 2010, 2011, 2012.

Journal Referee, Journal of Neuroscience, 2006, 2007, 2008, 2009, 2010. 2011, 2012

Journal Referee, Journal of Neurophysiology, 2006, 2007, 2008, 2009, 2010.

Journal Referee, Current Biology 2009, 2011

Journal Referee, Attention, Perception & Psychophysics, 2010, 2011, 2012

Journal Referee, Trends in Cognitive Science, 2009

Journal Referee, Journal of Vision, 2006

Journal Referee, Cerebral Cortex, 2012

Journal Referee, Vision Research, 2007

Journal Referee, Cortex, 2012

Journal Referee, Journal of Cognitive Neuroscience, 2012

Journal Referee, European Journal of Neuroscience, 2011

Outreach Programs

Post-tenure:

Scientific Advisory Board, Institute for Contemporary Art, Boston. Grand Opening Exhibition: "Super Vision," 2006.

Educational Advisor, Museum of Fine Arts, Boston, Ancient Assyria Exhibition, 2008.

Educational Advisory Board, Treasure's Trove, Inc., 2006-2007.

Golden Terriers Alumni Luncheon Speaker, Boston University, 2009.

Johns Hopkins University / Center for Talented Youth, Neuroscience Day-Boston, 2010.

Workshop Co-organizer & Speaker, Sabermetrics, Scouting and the Science of Baseball, Boston University, August 4-5 2012. Featuring Red Sox Manager, Bobby Valentine. Multi-disciplinary community outreach raised $15,000 for the Jimmy Fund, Dana-Farber Cancer Institute. http://saberseminar.com/

Current Professional Memberships

Association for Psychological Science

Cognitive Neuroscience Society

Society for Neuroscience

Vision Sciences Society

Selected Invited Research Lectures

Convocation Address, Harvey Mudd College, Claremont, CA,, August 2000.

Keynote Address, Japanese Winter Workshop on Mind & Brain, Rusutsu, Japan, 2001.

NASA – Johnson Space Center, Houston, TX, 1991.

National Institute of Health, Bethesda, MD, 1992.

McMaster University, Hamilton, Ontario, Canada, 1992.

Boston University, Boston, MA, 1994, 1999, 2000.

Harvard University, Cambridge, MA, 1995, 1999.

Johns Hopkins University, Baltimore, MD, 1995.

Neurosciences Institute, La Jolla, CA, 1995.

Brandeis University, Waltham, MA, 1995.

New York University, New York, NY, 1995.

MIT Artificial Intelligence Laboratory, Cambridge, MA, 1995.

Freie Universität, Berlin, Germany, 1996.

Georgetown Medical School, Washington, D.C., 1997.

Duke University, Durham, NC, 1997.

Brown University, Providence, RI, 1997.

Universidad Autonoma de Madrid, Madrid, Spain, 1998.

Maryland Psychiatric Research Institute, Baltimore, MD, 1998.

Courant Institute of Applied Mathematics, New York, NY, 1998

Institute for Mathematics and its Applications, Minneapolis, MN, 1998.

Instituto Juan March, Madrid Spain, 1998.

West Virginia School of Medicine, Morgantown, WV, 1999.

Boston University Medical School, Boston MA, 1999.

Harvard Medical School, Boston, MA, 1999.

Dartmouth University, Hanover, NH, 2000.

NEC Research Labs, Princeton, MA, 2000.

Japanese Winter Workshop on Mind & Brain, Rusutsu, Hokkaido, Japan, 2001.

NTT Research Laboratory, Atsugi, Japan, 2001.

Brigham & Women's Hospital, Boston, MA 2001, 2005.

Massachusetts General Hospital, Charlestown, MA, 2005.
Harvard University, Vision Sciences, Department of Psychology, Cambridge, MA 2005.
7th Gathering for Gardner (G4G7) in celebration of Martin Gardner, Atlanta, GA, 2006.

Post-Tenure:
Shanghai Biophysics Society, Vision & Audition Conference, Invited Speaker, Shanghai, China, 2006.
Harvard University, Cognition, Brain & Behavior Seminar Series, Department of Psychology, Cambridge, MA 2007.
Massachusetts General Hospital, Martinos Center, Charlestown, MA, 2007.
Massachusetts Institute of Technology, Vision Seminar, Cambridge, MA, 2008.
Golden Terriers Alumni Luncheon, Boston University, 2009.
Johns Hopkins University / Center for Talented Youth, Neuroscience Day-Boston, 2010.
Massachusetts General Hospital, Martinos Center for Biomedical Imaging, Brain & Cognition Seminar Series, Charlestown, MA, 2011.
Schepens Eye Research Institute, Harvard Medical School, Distinguished Lecturer Series, Boston, MA 2011.
Boston University, ThinkArt Interdisciplinary Conference, Boston, MA, 2011.
Harvard University, Cognition, Brain & Behavior Seminar Series, Department of Psychology, Cambridge, MA 2011.
Brigham & Women's Hospital, Attention Lab Seminar Series, Boston, MA, 2011.
Boston University, Convocation Address, Undergraduate Program in Neuroscience [selected by vote of senior class], 2012.
Sabermetrics, Scouting and the Science of Baseball Workshop, Boston, MA, Aug 2012.
Harvard University, Radcliffe Institute for Advanced Study, "Reading: Clinical Rehabilitation, Research and Neuro-plasticity" Symposium, Cambridge, MA, Sept 2012.

Veteran's Administration Hospital, Neuroimaging & Neuropsychology Seminar Series, Boston, MA, Dec. 2012.

Guest Teaching Lectures, Workshops, Seminars, Symposia

Seminar Organizer, MIT Cognitive Neuroscience Colloquium Series, 1993-1994.

Lecturer, Summer Workshop in Methods in Computational Neuroscience, Marine Biological Laboratories, Woods Hole, MA, 1996.

Symposium Organizer, Computational Neuroscience *94 -- ``Recurrent Models of Cortical Circuitry"

Symposium Organizer, Computational Neuroscience *96 -- ``Visual Cortical Orientation Selectivity (w/ M. Carandini).

Guest Lecturer, Models of Visual Perception, (graduate-level), Boston University, 1996, 2001.

Guest Lecturer, Computational Neuroscience, (graduate-level), Boston University, 1997.

Invited Lecturer, International Mathematical Association Workshop on Computational Neuroscience, 1998.

Faculty Lecturer, Graduate Proseminar in Psychology, Fall '01, Fall '02, Fall '03, Fall '04

Faculty Lecturer, Systems & Cognitive Neuroscience, Boston University, Spring '01, Spring '02, Spring '03, Spring '04, Spring '05, Spring '06.

Post-Tenure:

Massachusetts Institute of Technology/Health Sciences & Technology, Guest Lecturer in HST583, Graduate Course in Neuroimaging, Cambridge, MA 2008.

Faculty Lecturer, Frontiers in Neuroscience, graduate seminar, Boston University, Spring '11.

Faculty Lecturer, Systems & Cognitive Neuroscience, Boston University, Spring '07, Colloquium Series Organizer, Brain, Behavior & Cognition Program, Department of Psychology, Boston University, Oct 2006-2009.

Colloquia Co-Organizer, Vision Sciences, Boston University, Spring 2012.

Workshop Co-organizer & Speaker, Sabermetrics, Scouting and the Science of Baseball, Boston University, August 4-5 2012. Featuring Red Sox Manager, Bobby Valentine. Multi-disciplinary community outreach raised over $14,000 for the Jimmy Fund, Dana-Farber Cancer Institute. http://saberseminar.com/the-participants-the-program/

Courses Taught at Boston University

Prior to Tenure: (24 semester courses taught solo)

Introduction to Cognitive Psychology (undergraduate-level), Boston University, Professor, Spring ’01, Fall ’01, Spring ’02, Fall ’02, Spring ’03, Summer I ’03, Fall ’03 , Spring ’04, Summer I ’04, Fall ’04 , Spring ’05, Summer I ’05, Fall ’05, Spring ’06, Summer I ’06.

Human Brain Mapping (mixed graduate & undergraduate), Boston University, Professor, Fall ’01, Fall ’02, Fall ’03, Spring ’05, Spring ’06.

Research Methods in Perception & Cognition (mixed graduate & undergraduate), Boston University, Professor, Spring ’02, Spring ’03, Spring ’04, Fall ’05.

Post-Tenure: (20 semester courses: 19 solo taught, 1 co-taught; 1 course for Fall 2012)

Introduction to Cognitive Psychology (undergraduate-level), Boston University, Professor,

Fall ’06, Spring ’07,

Summer I ’08, Spring ’09,

Summer I ’09, Spring ’10,

Summer I ’10, Spring ’11,

Summer I ’11, Fall ’11,

Fall ‘12

Cognitive Neuroscience (Core class for Undergraduate Neuroscience Major)

Fall ’08, (co-taught, with Prof. Chantal Stern)

Fall ’09,

Fall ’10,

Spring ‘12

Human Brain Mapping (mixed graduate & undergraduate), Boston University, Professor,

Fall ’06,

Spring ’09,

Spring ’10,

Fall ‘11

Attention, Graduate Seminar,

Spring ’07,

Spring ‘11

Past Trainees

Prior to BU:

Emanuel (Emo) Todorov PhD, role: mentored grad student (as post-doc), MIT. Position: Associate Professor of Applied Mathematics and Computer Science and Engineering, University of Washington, Seattle, WA.

Athanassios (Thanos) G.Siapas PhD, role: mentored grad student (as post-doc), MIT. Position: Professor of Computation and Neural Systems; in Biology and Engineering and Applied Science, California Institute of Technology, Pasadena, CA.

Adriane Seiffert PhD, role: mentored grad student (as post-doc), MGH. Position: Asst. Professor of Psychology; Vanderbilt Univesity, Nashville, TN.

Valentin Dragoi PhD, role: mentored grad student (as post-doc), MIT. Position: Associate Prof., Neurobiology & Anatomy, University of Texas, Medical School, Houston, TX.

BU, Prior to tenure:

Stephanie McMains PhD, role: PhD Thesis advisor. Positions: Post-doctoral Fellow, Princeton University; Senior Staff Scientist, Harvard University, Center for Brain Science, Neuroimaging Center, Cambridge, MA.

Jennine Amato, role: Master's Research Mentor, Positions: Research Assistant, Martinos Center for Neuroimaging, Mass. General Hosp., Harvard Medical School, Charlestown, MA.

Michael Arcaro, role: Undergraduate Research Mentor, Position: PhD Student in Psychology, Princeton University, Princeton, NJ.

Mark Halko, role: Undergraduate Research Mentor, Positions, Research Assistant, Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Charlestown, MA. Returned later to BU to earn his PhD in my laboratory (see below).

Devin Brady, role: Undergraduate Research Mentor, Positions: Research Assistant, Psychology Dept., Vanderbilt University.

Caitlin Brooking, role: Undergraduate Research Mentor. Position: Director of Program Development at Mississippi Commission for Volunteer Service, Jackson, MS.

Caren M. Walker, role: Undergraduate Research Mentor, Position: PhD. Student in Psychology, University of California, Berkeley, Berkeley, CA.

Rebecca McNally-Keehn, PhD, role: Undergraduate Research Mentor, Position: Post-doctoral Fellow, Children's Hospital/Harvard Medical School, Neurodevelopmental Disorders Phenotyping Program, Boston, MA.

BU, Post-Tenure:

Lotfi Merabet PhD, OD, role: Post-doctoral advisor. Position: Assistant Professor, Massachusetts Eye and Ear Infirmary, Boston, MA.

Jascha Swisher, PhD, role: PhD Thesis advisor. Positions: Post-doctoral Fellow, Vanderbilt University; Research Faculty, Vanderbilt University, Psychology Dept., Nashville, TN.

Mark Halko PhD, role: PhD Thesis advisor. Position: Post-doctoral Fellow, Harvard Medical School & Beth Israel Hospital, Center for Non-invasive Brain Stimulation, Boston, MA.

Summer Sheremata, PhD, role: PhD Thesis advisor, Position: Post-doctoral Fellow, University of California, Berkeley, School of Optometry, Berkeley, CA.

Katherine Crum Bettencourt, PhD., role: PhD Thesis advisor, Position: Post-doctoral Fellow, Harvard University, Psychology Dept, Cambridge, MA.

Brittany Cassidy, role: Undergraduate Mentor, Position: Research Assistant, Martinos Center for Neuroimaging, Mass. General Hosp., Harvard Medical School; PhD. Student in Psychology, Brandeis University, Waltham, MA

John Lymberis, role: Undergraduate Mentor, Position: Research Assistant, Gabrieli Lab, Brain & Cognitive Sciences, MIT, Cambridge, MA

Haneen Haddad, MA, role: Undergraduate Mentor, Position: Counselor, Family Service, Inc., Lawrence, MA.

Angela Fenoglio, role: Undergraduate Mentor, Positions: Research Assistant, Fetal-Neonatal Neuroimaging & Developmental Science Center, Children's Hospital/Harvard Medical School, Boston, MA; pursuing a master's degree in Mind, Brain, and Education at the Harvard Graduate School of Education.

Georgina Fleming, role: Undergraduate Mentor, Position: Co-founder & CEO, Zimbabwe Orphans Fund's

Peter Ireland, role: Undergraduate Mentor, Position: Research Assistant, Children's Hospital/Harvard Medical School, Boston, MA.

Julia Ladna, role: Undergraduate Mentor, Position: Research Assistant, Brigham & Women's Hospital/Harvard Medical School, Boston, MA.

Katherine Mott, role: Summer research mentor. Position: Research Assistant, Laboratory of Higher Cortical Function, Brigham & Women's Hospital/Harvard Medical School, Boston, MA.

Stephanie Bachewski, role: Undergraduate Mentor. 2012 BU Neuroscience Graduate.

Eli Fredman, role: Undergraduate Mentor, Position: Research Assistant, Psychiatry Neuroimaging Lab, Brigham & Women's Hospital/Harvard Medical School, Boston, MA.

Current Trainees – 4 PhD, 7 Undergraduate

Lingqiang Kong, PhD Student, Cognitive & Neural Systems

Maya Rosen, PhD Student, Brain, Behavior & Cognition Program, Psychology

Samantha Michalka, PhD Student, Graduate Program in Neuroscience

Kathryn Devaney, PhD Student, Brain, Behavior & Cognition Program, Psychology

Christie Gamble, undergraduate, Neuroscience

Kyle Starkweather, undergraduate, Neuroscience

Greta Gadbois, undergraduate (non-BU), Computer Science

Milo Toor, undergraduate (non-BU), Computer Science

Rachel Franklin, undergraduate, Neuroscience

J. Daniel Bireley, undergraduate, Neuroscience

Devin Buckley, undergraduate, Neuroscience

PhD Dissertation Committees

Prior to tenure:

Brenda Kirchoff, "A fMRI investigation of the interactions between memory and material sensitivity." Brain & Behavior & Cognition Program, Psychology. Role: 4th Committee Member. 2002.

Seungwoo Hwang, "Neural network model of thalamocortical dynamics, adaptive boundary-surface alignment, and the McCollough effect." Cognitive & Neural Systems. Role: 2nd Reviewer. 2002.

Shinichi Koyama, "Attentional modulation of excitatory and inhibitory signals revealed in perceptual learning." Brain & Behavior & Cognition Program, Psychology. Role: 3rd Reader. 2002.

Daniel Palomo, "Categorizing forms: Learning to see things differently." Brain & Behavior & Cognition Program, Psychology. Role: 3rd Reader. 2002.

Bonnie Wong, "Patterns of Visual Scanning as Predictors of Emotional Recognition in Normal Aging." Clinical Program, Psychology. Role: 4th Committee Member. 2004.

Seth Sherman, "Magnitude and activation in the medial temporal lobe during encoding affects recollection and familiarity." Brain & Behavior & Cognition Program, Psychology. Role: 4th Committee Member. 2004.

Brian Ostafin, "Affective learning and alcohol consumption: Correlations of risk and causes of change." Clinical Program, Psychology. Role: 4th Committee Member. 2004.

Simon Hong, “A neural model of surface perception, lightness, anchoring, and filling-in.” Cognitive & Neural Systems. Role: 2nd Reviewer. 2004.

Alexander Harner, "A self-organizing neural network model of receptive field, columnar organization, and feature map development in visual cortical areas.” Neuroscience. Role: 3rd Reader. 2005.

Karin Schon,”Functional MRI studies of working memory maintenance and long-term encoding.” Brain & Behavior & Cognition Program, Psychology. Role: 3rd Reader. 2005.

Stephanie McMains, “Mechanisms for attending to multiple spatial locations: fMRI of divided visual attention.” Brain & Behavior & Cognition Program, Psychology. **Role: 1st Reader/Thesis Advisor**. 2006.

Post-Tenure:

Jascha Swisher, “Visual maps in human parietal cortex.” Neuroscience. **Role: 1st Reader/Thesis Advisor.** 2007.

Antje Ihlefeld, “Strategies of spatial listening for speech comprehension.” Cognitive and Neural Systems. Role: 4th Committee Member. 2007.

Sule Tinaz, “Functional and structural MRI studies of cognitive change in Parkinson’s disease.” Clinical Program, Psychology. Role: 2nd Reader. 2007.

Mark Halko, “Illusory contour and surface completion mechanisms in human visual cortex.” Brain & Behavior & Cognition Program, Psychology. **Role: 1st Reader/Thesis Advisor.** 2008.

Janet McGraw-Fisher, “Brain activity in Dyslexia: The role of task difficulty.” Brain & Behavior & Cognition Program, Psychology. Role: 2nd Reader. 2009.

Summer Sheremata, “Behavioral and physiological studies of the perceptual mechanisms underlying visual working memory.” Brain & Behavior & Cognition Program, Psychology. **Role: 1st Reader/Thesis Advisor**. 2009.

Veronica Gross, “Memory, visual perception, and health in synesthesia.” Neuroscience. Role: 4th Committee Member, 2009.

Birgit Werner, “A functional analysis of the excitatory synaptic inputs to on-off ganglion cells in the aquatic tiger salamander retina.” Neuroscience. Role: 4th Committee Member. 2009.

Yoshiaki Tsushima, “The role of attention in perceptual learning.” Brain & Behavior & Cognition Program, Psychology. Role: 4th Committee Member. 2009.

Katherine Bettencourt, “Functional MRI and behavioral investigations of capacity limits in human visual attention.” Brain & Behavior & Cognition Program, Psychology. **Role: 1st Reader/Thesis Advisor**, 2010.

Melissa Batson, “Task-irrelevant perceptual learning of crossmodal links: specificity and mechanisms.” Neuroscience. 3rd Reader, 2010.

Maureen Glessner Courtney, "HIV-associated structural brain changes in cognitively asymptomatic patients." Clinical Program, Psychology. Role: 3rd Reader.

Matthew LoPresti, "Working memory for social cues: Mechanisms underlying the perception and maintenance of facial expressions." Neuroscience. Role: 2nd Reader. 2010.

Kim Celone, "Characterizing the brain-behavior basis of habit learning in women with eating disorders." Clinical Program, Psychology. Role: Chair of the Examining Committee. 2011.

Nicholas Foley, "Neural dynamics of object-based multifocal visual spatial attention and priming: object cueing, useful field of view, and crowding." Cognitive and Neural Systems. Role: 3rd Reader. 2011.

Jonathan Dobres, "The effects of performance feedback and their implications for the time course and stabilization of perceptual learning." Role: 4th Committee Member. 2012.

Thackery Brown, "Functional MRI investigations of overlapping spatial memories and flexible decision-making in humans." Neuroscience. Role: Chair of the Examining Committee. 2013.

Lingqiang Kong, "Functional MRI investigations of cortical mechanisms in auditory spatial attention." Cognitive and Neural Systems. Role: 2nd Reader. 2013.

Bo Cloud Cao, "A psychophysical study of the achromatic watercolor effect and computational modeling of brightness-related responses in visual cortex." Cognitive and Neural Systems. Role: 3rd Reader. 2013.

Randall Newmark, "High-resolution functional magnetic resonance imaging of working memory functions in medial temporal lobe." Neuroscience. Role: 3rd Reader. 2013/TBD.

Lenny Verghese, "Behavioral and neural correlates of working memory and attentional specificity for abstract auditory stimuli." Biomedical Engineering. Role: 3rd Reader. TBD.

Samantha Michalka, "Dynamic recruitment of the lateral frontal cortex in vision and audition." Neuroscience. **Role: 1st Reader/Thesis Advisor.** TBD.

Senior Work for Distinction Projects (Undergraduates)

Prior to Tenure:

Julie Howard, "Performance of colored-hearing synesthetes on Stroop-type and visual search tasks." Role: Committee Member. 2000-2001.

Katrin Meidell, "Motor imagery in musicians: an fMRI study." Role: **Advisor.** 2001-2002.

Maureen McCarthy, “Effects of attention demands on tuning characteristics in perceptual learning.” Role: Committee Member. 2001-2002.

Alicia Chang, “A comparison of autonomic reactivity to words and phrases in a first and second language.” Role: Committee Member. 2001-2002.

Caren Walker, “The Neuropsychological underpinnings to the phenomena of God.” Role: **Advisor**. 2002-2003.

Alexis Coty, “Sex differences in speech perception: Evidence from the phonemic restoration illusion.” Role: Committee Member. 2002-2003.

Caitlin Brooking, “Critical Band Spatial Frequency Processing of Emotional Expressions.” Role: **Advisor**. 2003-2004.

Nicole Rimar, “Earwitness Identification: The effects of emotional content of crime-related speech on voice recognition.” Role: Committee Member. 2003-2004.

Leah Sciaba, “Mood and Memory: Individual differences and inference in the reconstruction of memory.” Role: Committee Member. 2003-2004.

Lucy Harrison, “Autism: The etiology and treatments of the disorder.” Role: Committee Member. 2003-2004.

Verena Krause, “How Pavlovian Conditioning Pertains to Task-Irrelevant Subliminal Learning.” Role: Committee Member. 2004-2005.

Andrew Camp, “Modulation of the startle reaction in subjects with social anxiety.” Role: Committee Member. 2004-2005.

Marisa Tricarico, “The role of the superior temporal sulcus and the parahippocampal gyrus in the active maintenance of emotion versus identity.” Role: Committee Member, 2004-2005.

Devin Brady, “Modulation of the visual crowding effect by attention and training.” Role: **Advisor**. 2006-2007.

Post-Tenure:

Brittany Cassidy, “Location specificity in higher level perceptual learning.” Role: **Advisor**. 2006-2007.

Ben Curtis, “Visual presentations of base-rates and base-rate neglect.” Role: Committee Member. 2006-2007.

Gina Riccio, “Personality traits and advertising preferences.” Role: Committee Member. 2006-2007.

John Lymberis, “Interactions between visual attention and visual short-term memory.**”** Role: **Advisor**. 2006-2007.

Georgina Fleming, “Visual short-term memory and visual attention may share common resources.” Role: **Advisor**. 2008-2009.

Eli Fredman, “An analysis of cross-modal N-2 inhibition of return.” Role: **Advisor**. 2011-2012.

Lauren Herrera, “Investigation of overlapping memories in rat hippocampus.” Role: Committee Member. 2011-2012.

Christine Gamble, “An emergent hemifield asymmetry for visual short-term memory capacity.” Role: **Advisor**. 2012-2013.

Devin Buckley, TBD, Role: **Advisor**. 2012-2013.

High School Student Mentoring / Research Internship Program in Science and Engineering at BU

Post-tenure:

Sooin Lee, “Effects of delay on object representations in visual short-term memory.” Role: Advisor/mentor. Summer 2008. [Later admitted to UPenn with honors fellowship].

Visual Arts

Exhibitions of Neuroscience-Related Artwork

"In the Mind's Sky: Intersections of Art and Science." Ruth Chandler Williamson Gallery, Scripps College, Claremont, California. Aug.-Oct. 2000.

"Intrinsic Profiles" Grand Opening Ceremonies, Center for Mind and Brain, University of California, Davis, California, April 2004.

"Self-Portrait," ThinkArt: Memory Conference, Boston University, October 2011.

Scientific Artwork Credits

Cover, Journal of Neuroscience, Vol. 15, No. 8, August 1995.

Cover, Cerebral Cortex, Vol. 8, No. 3, April/May 1998.

Cover, Journal of Cognitive Neuroscience, Vol. 12, No. 3, May 2000.

Cover, Cognitive Neuroscience of Memory: An Introduction (by H. Eichenbaum), Oxford Univ. Press, 2002.

Program in Neuroscience, Boston University, contributed art to website and advertising posters.

Undergraduate Neuroscience Program, Boston University, contributed art to T-shirt design.

Scientific Advisory Board

Institute of Contemporary Art, "Super Vision," The Grand Opening Exhibition at the waterfront museum. Provided feedback and commentary. Contributed content to the Mediatheque collection, Fall 2006.

Research Papers (Cited 2500+ times; First-author & Senior-author papers cited 2200+ times; 1000+ citations since 2007. Source: Google Scholar, see attached documentation).

1. *Grossberg, S., and **Somers, D.C**. (1991) Synchronized oscillations during cooperative feature linking in a cortical model of visual perception. Neural Networks, 4, 453--466.

2. *Grossberg, S., and **Somers, D.C**. (1992) Synchronized oscillations for binding spatially distributed features into pre-attentive brain representations. Structure: From Physics to General Systems. E. R. Caianello, M. Marinaro, and G. Scarpetta, (Eds.) World Scientific Press.

3. *Grossberg, S., and **Somers, D.C.** (1992) Synchronized oscillations for binding spatially distributed feature codes into coherent spatial patterns. Neural Networks for Vision and Image Processing. G.A. Carpenter and S. Grossberg (Eds.) pp 385--405. Cambridge, MA: MIT Press.

(*)-- Ph.D.~Thesis research papers written with S. Grossberg were published in accordance with departmental policy of listing authors alphabetically.

4. **Somers, D.C.,** and Kopell, N. (1993) Rapid synchronization through fast threshold modulation. Biological Cybernetics 68, 393-407.

5. **Somers, D.C.** (1993) Synchronization in networks of neural relaxation oscillators: visual cortical processing and intrinsic oscillator properties. Ph.D. Thesis.

6. Kopell, N., and **Somers, D.C.** (1995) Anti-phase solutions in relaxation oscillators coupled through excitatory interactions. Journal of Mathematical Biology 33, 261--280.

7. **Somers, D.C.,** Nelson, S.B., and Sur, M. (1995) An emergent model of orientation selectivity in cat visual cortical simple cells. Journal of Neuroscience, 15, 5448-5465, August cover feature.

8. **Somers, D.C.,** Todorov, E.V., Siapas, A.G., and Sur, M. (1995) Vector-based integration of local and long-range information in visual cortex. MIT Artificial Intelligence Laboratory Memo No. 1556. & Center for Biological and Computational Learning Memo No. 127.

9. **Somers, D.C**., Todorov, E.V., Toth, L.J., Rao, S.C., Kim,D.-S., Nelson, S.B., Siapas, A.G., and Sur, M. (1995). Variable gain properties of local cortical circuitry support context-dependent modulation by fixed strength long-range horizontal connections. Computational Roles of Lateral Connections in the

Cortex. J. Sirosh, R. Miikkulainen (Eds.) Univ. of Texas, Electronic Book. URL: http://www.cs.utexas.edu/users/nn/web-pubs/htmlbook96/somers/

10. **Somers, D.C.,** and Kopell, N. (1995) Waves and synchrony in networks of oscillators of relaxation and non-relaxation type. Physica D: Nonlinear Phenomena, 89, 169-183.

11. **Somers, D.C.,** Nelson, S.B., and Sur, M. (1995) An emergent model of visual cortical orientation selectivity. The Neurobiology of Computation. J.M. Bower (Ed.) pp 311--316. Norwell, MA: Kluwer Academic Press.

12. Toth, L.J., Rao, S.C., Kim, D.S., **Somers, D.C.**, and Sur, M. (1996) Subthreshold facilitation and suppression in primary visual cortex revealed by intrinsic signal imaging. Proceedings of the National Academy of Sciences, 93, 9869-9874.

13. Todorov, E.V., Siapas, A.G., **Somers, D.C.**, and Nelson, S.B. (1997) Modeling visual cortical contrast adaptation effects. Computational Neuroscience, Trends in Research. J.M. Bower (Ed.), pp 525--531. New York: Plenum Press.

14. Dragoi, V. and **Somers, D.C.** (1997) Short and long-term plastic effects induced by the multiple time scales of events at the cellular and synaptic level in a model of spiking neurons in primary visual cortex. Invest. Opthalmol. Vis. Sci., 38 (4), 1791

15. Todorov, E.V., Siapas, A.G., and **Somers, D.C.** (1997) A model of recurrent interactions in primary visual cortex. Advances in Neural Information Processing Systems, 9, 118-124.

16. **Somers, D.C**. and Adelson, E.H. (1997) Junctions, transparency, and brightness. Invest. Opthalmol. Vis. Sci., 38 (4), 2126

17. **Somers, D.C.**, Todorov, E.V., Siapas, A.G., and Sur, M. (1997) A local circuit integration approach to understanding visual cortical receptive fields. Computational Neuroscience, Trends in Research, pp 505--510.

18. Adelson, E.H., **Somers, D.C.** (1997) Atmospheric boundaries in lightness perception. Perception, 26: 234.

19. **Somers, D.C.,** Todorov, E.V., Siapas, A.G., Toth, L.J., Kim, D.S., and Sur, M. (1998) A local circuit integration approach to understanding visual cortical receptive fields, Cerebral Cortex, 8, 204-217. Cover Feature.

20. **Somers, D.C.**, Dale, A.M., Seiffert, A.E., and Tootell, R.B.H. (1998) fMRI Analysis of 2nd-Order Visual Motion Perception and Attentive-Tracking. NeuroImage, 7: 134.

21. **Somers, D.C.**, Dale, A.M., Seiffert, A.E., and Tootell, R.B.H. (1999) Functional MRI reveals spatially specific attentional modulation in human primary visual cortex, Proc. Natl. Acad. Sci. USA., 96, 1663-1668.
See also Commentary on Somers et al. 1999 by M.I. Posner & C.D. Gilbert, Proc. Natl. Acad. Sci. USA., 96,. 2585-2587.

22. Kwong, K.K., **Somers, D.C.**, Wu, O. and Chesler, D. A. (1999) High temporal resolution event-related fMRI. Ultrafast Magnetic Resonance Imaging in Medicine. S. Naruse and H. Watari (Ed.) pp 149-152. Amsterdam: Elsevier Science.

23. Adelson, E.H, **Somers, D.C.** (2000) Shadows are fuzzy and straight; paint is sharp and crooked. Perception. 29, 46.

24. **Somers, D.C.**, Dragoi V., and Sur, M. (2001) Orientation selectivity and its modulation by local and long-range connections in visual cortex. Cerebral Cortex, Volume 15, Cat Primary Visual Cortex. B. Payne and A. Peters (Eds.) pp 471—520. New York: Academic Press.

25. Adelson, E.H., **Somers, D.C.** (2001) Straightness, structure, and shadows. Journal of Vision. 1(3): 204-204.

26. McMains, S. and **Somers, D.C.** (2002) Functional MRI investigation of multiple foci of visual spatial attention: More than one spotlight? Cognitive Neuroscience, 5, 5.

27. Seiffert, A.E., **Somers, D.C.**, Dale, A.M., and Tootell, R.B.H. (2003) Functional MRI studies of human motion perception: Texture, luminance, attention, and after-effects. Cerebral Cortex 13, 340-349.

28. **Somers, D.C.**, McNally, R. (2003) Kinesthetic visual capture induced by apparent motion. Journal of Vision 3 (9): 35-35.

29. McMains, S. and **Somers, D.C.** (2004) Multiple Spotlights of Attentional Selection in Human Visual Cortex. Neuron, 42, 677-686.
See also Commentary on McMains & Somers 2004 by F. Tong, Neuron, 42. 524-526. *"the present study provides a rare example of how neuroimaging data can be gathered to test the predictions of a cognitive theory"*

30. Swisher, J.D., Brooking, C., **Somers, D.C.** (2004) Spatial frequency and facial expressions of emotion. Journal of Vision 4 (8): 905-905.

31. Merabet, L.B., Rizzo, J.F., **Somers, D.C.**, Pascual-Leone, A.(2005) What blindness can tell us about seeing again. Nature Reviews Neuroscience, 6, 71-77.

32. **Somers, D.C.** and McMains, S. (2005) Spatially-Specific Attentional Modulation Revealed by fMRI. Neurobiology of Attention. L. Itti, G. Rees, J. Tsotsos (Eds.) pp 377—382. New York: Academic Press.

33. Logvinenko, A.D., Adelson, E.H., Ross, D.A. & **Somers, D.C.** (2005). Straightness as a cue for luminance edge classification. Perception & Psychophysics, 67, 120-128.

34. McMains, S.A., and **Somers, D.C.** (2005). Processing efficiency of divided spatial attention mechanisms in human visual cortex. Journal of Neuroscience, 25, 9444-8.

35. Brady, D.K., Swisher, J.D., **Somers, D.C.** (2006) Effects of attention on the spatial extent of crowding. Journal of Vision, 6(6) 590-590.

Post-Tenure:

36. Merabet, L, Swisher, JD, McMains, SA, Halko, MA, Amedi, A, Pascual-Leone, A, **Somers, D.C.** (2007) Combined activation and deactivation of visual cortex during tactile sensory processing. J Neurophysiol 97, 1633-41.

37. Swisher, JD, Halko, MA, Merabet, L, McMains, SA, **Somers, D.C.** (2007) Visual Topography of Human Intraparietal Sulcus. Journal of Neuroscience, 27, 5326-37.

38. Cassidy, B.S., Sheremata, S., **Somers, D.C.** (2007) Spatially specific training effects in multiple spotlight attention. Journal of Vision, 7(9): 700-700.

39. Schon, K., Tinaz, S., **Somers, D.C.**, Stern, C.E. (2008) Delayed match to object or place: An event-related fMRI study of short-term stimulus maintenance and the role of stimulus pre-exposure. Neuroimage, 39, 857-872.

40. Halko, M.A., Lymberis, J., **Somers, D.C.** (2008) Interactions between visual short term memory and visuospatial attention. Journal of Vision, 8 (6): 197-197.

41. Halko, M., Mingolla, E., **Somers, D.C.** (2008) Multiple mechanisms of illusory contour perception. (2008) Journal of Vision, 8(11): 17, 1-17.

42. Bettencourt, K.C. and **Somers, D.C.** (2009) Effects of target enhancement and distractor suppression on multiple object tracking capacity. Journal of Vision, 9(7): 9, 1-11.

43. Fleming, G., Sheremata, S.L., **Somers, D.C.** (2009) Cross-hemifield attention benefits for visual short-term memory. Journal of Vision, 9(8):178-178.

44. Sheremata, S.L, Bettencourt, K.C., **Somers, D.C**. (2010) Hemispheric asymmetry in visuotopic posterior parietal cortex emerges with visual short-term memory load. Journal of Neuroscience, 30, 12581-8.

45. Bettencourt, K.C., Michalka, S.M., and **Somers, D.C.** (2011) Shared filtering processes link attentional and visual short-term memory capacity limits. Journal of Vision, Vol. 11, No. 10, Article 22.

46. **Somers, D.C.** (2013) Attentional "spotlight" in early visual cortex. The New Visual Neurosciences, Eds. J. Werner, L. Chalupa. Cambridge, MA: MIT Press, in press.

47. Kong, L., Michalka, S.W., Rosen, M.L., Sheremata, S.L., Swisher, J.D., Shinn-Cunningham, B.S., **Somers, D.C.** (2012) Auditory spatial attention representations in the human cerebral cortex, submitted.

48. Bettencourt, K.C., Sheremata, S.L., and **Somers, D.C.** (2012) Distractor influences on attention capacity in visuotopic human posterior parietal cortex, in revision.

49. **Somers, D.C.** and Sheremata, S.L. (2012) Attention maps in the brain. Wiley Interdisciplinary Reviews: Cognitive Science. Peer-reviewed review article, Submitted.

50. **Somers, D.C**. & McMains, S.A. (2012) Functional MRI evidence for dual process limitations on the capacity of visual spatial attention. Submitted.

51. Rosen, M.L., Stern, C.E., and **Somers, D.C.** (2012) Long-term memory guidance of visuospatial attention in a change detection paradigm. In prep.

ABSTRACTS

- Grossberg, S., and **Somers, D.C.** (1991) Synchronized oscillations during cooperative feature linking in visual cortex. Proceedings of the International Joint Conference on Neural Networks, 1991 SEATTLE, Vol. 2, 249--254.

- **Somers, D.C.**, and Grossberg, S. (1991) Synchronized oscillations during cooperative feature linking in a model of visual cortex. Society for Neuroscience Abstracts, 17, 479.2.

- **Somers, D.C.**, and Kopell, N. (1992) Threshold properties of individual model neural oscillators contribute to rapid network synchronization and may potentially play a role in perceptual feature binding. Society for Neuroscience Abstracts, 18, 131.6.

- **Somers, D.C.**, Nelson, S.B., and Sur, M. (1993) A computational investigation of the role of short—range intracortical excitation in orientation selectivity in visual cortex. Society for Neuroscience Abstracts, 19, 263.5.

- **Somers, D.C.** (1993) Dynamic feature binding properties of neural relaxation oscillators. Invest. Opthalmol. Vis. Sci. Suppl., 34 (4), 457.

- **Somers, D.C.**, Nelson, S.B., and Sur, M (1994) Effects of long-range connections on gain control in an emergent model of visual cortical orientation selectivity. Society for Neuroscience Abstracts, 20, 646.7.

- **Somers, D.C.**, Nelson, S.B., and Sur, M (1995) Analysis of temporal dynamics of orientation selectivity in feedback and feedforward models of visual cortex. Society for Neuroscience Abstracts, 21, 162.1.

- Siapas, A.G., Todorov, E., and **Somers, D.C.** (1995) Computing mean firing rates of ensembles of realistic neurons. Society for Neuroscience Abstracts, 21, 649.4

- **Somers, D.C.**, Todorov, E.V., Siapas, A.G., and Nelson, S.B. (1996) Contrast adaptation effects modeled as thalamocortical and intracortical synaptic transmission changes. Society for Neuroscience Abstracts, 22, 254.19

- E.H. Adelson and **Somers, D.C.** (1997) Statistics and configuration in lightness perception. European Conference on Visual Perception, oral presentation.

- Mazer, J.A., **Somers, D.C**, and Adelson, E.H. (1997) Sensitivity of area V1 neurons to apparent brightness in awake behaving macaque monkeys. Society for Neuroscience Abstracts, 23, 178.3.

- **Somers, D.C.**, Dale, A.M., Mendola, J.D., Adelson, E.H., and Tootell, R.B.H. (1997) A functional magnetic resonance imaging investigation of apparent brightness perception. Society for Neuroscience Abstracts, 23, 178.22.

- **Somers, D.C.**, Seiffert, A.E., Dale, A.M., and Tootell, R.B.H. (1998) Second-order motion stimulus-induced activation and attentional modulation of human visual cortical areas MT and V3A. Invest. Opthalmol. Vis. Sci. Suppl., 39, S1129.

- **Somers, D.C.**, Seiffert, A.E., Dale, A.M., and Tootell, R.B.H. (1998) fMRI analysis of 2nd-order visual motion perception and attentive tracking. NeuroImage, 7, S323.

- **Somers, D.C.**, Seiffert, A.E., Dale, A.M., and Tootell, R.B.H. (1998) An fMRI investigation of second-order visual motion processing with attentional modulation. Society for Neuroscience Abstracts, 24, 213.4.

- **Somers, D.C.**, Seiffert, A.E., Dale, A.M., and Tootell, R.B.H. (1999) fMRI investigations of motion aftereffects with 1st and 2nd-order stimuli. Invest. Opthalmol. Vis. Sci. Suppl., 40, S1049.

- Tootell, R.B.H., Hadjikhani, N., and **Somers, D.C.**, (1999) fMRI reveals subthreshold activation in human visual cortex: implications for consciousness. Society for Neuroscience Abstracts, 25, 6.12

- **Somers, D.C.**, Seiffert, A.E., Dale, A.M., and Tootell, R.B.H. (1999) Effects of task difficulty and stimulus contrast on attentional modulation in human striate and extrastriate cortex revealed by fMRI. Society for Neuroscience Abstracts, 25, 6.10

- **Somers, D.C.**, Nichols, K.R., and Adelson, E.H. (2000) Temporal dynamics reveal multiple mechanisms of brightness perception. Invest. Opthalmol. Vis. Sci. Suppl., 41, S956.

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

- 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.

- Halko, M.A. and **Somers, D.C.** (2004) Robust, moving illusory contours induced by ‘munching’ pacman Kanizsa display. Society for Neuroscience Meeting.

- Swisher, J.D. and **Somers, D.C.** (2004) Multitaper analysis of phase-encoded functional imaging data. Society for Neuroscience Meeting.

- **Somers, D.C.** and Adelson, E.H. (2005) Turning a brightness illusion on and off via selective attention. Society for Neuroscience Meeting.

- Schon, K., Tinaz, S., **Somers, D.C.**, Stern C.E. (2005) Frontal eye field activity is not specific to active maintenance of spatial locations: an fMRI study. Society for Neuroscience 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.

- Halko, M.A., Mingolla, E., **Somers, D.C.** (2005). Dynamic cues override contradictory occlusion cues to support robust illusory contour formation and neon color spreading. Society for Neuroscience Meeting.

- Merabet, L.B., Swisher, J.D., McMains, S.A., Halko, M.A., Amedi, A., Pascual-Leone, A., **Somers, D.C.** (2005) Tactile cross-modal processing in visual cortex. Society for Neuroscience Meeting.

- 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.

Post-Tenure:

- Sheremata S.L., **Somers, D.C.**, Attention to features affects visual short-term memory representations. Program 118.1. 2006 Neuroscience Meeting Planner. Atlanta, GA: Society for Neuroscience, 2006. Online.

- Swisher J.D., Merabet L, Pascual-Leone A, **Somers, D.C.**, Distinct regions of tactile and visual activation in human parietal cortex. Program 437.1/F11. 2006 Neuroscience Meeting Planner. Atlanta, GA: Society for Neuroscience, 2006. Online.

- Halko M.A., **Somers, D.C.**, Functional MRI evidence for multiple mechanisms of illusory contour perception. Program 604.6. 2006 Neuroscience Meeting Planner. Atlanta, GA: Society for Neuroscience, 2006. Online.

- Merabet L.B., Swisher J.D., McMains S.A., Halko M.A., Rizzo J.F., Pascual-Leone A., **Somers, D.C.** (2006) Activation and Deactivation of Visual Cortical Areas During Tactile Processing. Invest Ophthalmol Vis Sci 2006;47: E-Abstract 5877.

- Bettencourt, K.C. and **Somers, D.C.** (2007) Effects of Task Difficulty on Multiple Object Tracking Performance. Journal of Vision, vol. 7, no. 9, 898.

- Bettencourt, K.C. and **Somers, D.C.** (2008) Correlations between visual short-term memory and attentional capacity limits. Journal of Vision, vol. 8, no. 6, 862.

- **Somers, D.C.** and Sheremata, S.L. (2008) Cross-hemifield attention benefits for visual enumeration. Journal of Vision, vol. 8, no. 6, 983.

- Sheremata, S.L. and **Somers, D.C.** (2008) Role of encoding duration on visual short-term memory capacity. Journal of Vision, vol. 8, no. 6, 1173.

- Bettencourt, K.C., Sheremata, S.L., and **Somers, D.C.** (2008) Attentional modulations of BOLD activity in human posterior parietal cortex produced by multiple target selection and distractor suppression. 2008 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2008. Online.

- Sheremata, S.L., Bettencourt, K.C. and **Somers, D.C.** (2008) Retinotopic localization of activation in intraparietal sulcus during a visual short-term memory task. 2008 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2008. Online.

- Kong, L.Q., Sheremata, S.L., Shinn-Cunningham, B., **Somers, D.C.**,(2010) fMRI investigation of visual and auditory spatial attention reveals content-dependent and process-dependent regions in human parietal and frontal cortex. 2010 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2010. Online.

- Sheremata, S.L., Michalka, S.W., Rosen, M.L., Bettencourt, K.C., **Somers, D.C.** (2010) Functional Dissociation of Visual Short-Term Memory and Multi-Object Tracking Visual Attention in Human Intraparietal Sulcus. 2010 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2010. Online.

- Kong, L., Swisher J.D., **Somers, D.C**., Shinn-Cunningham, B. (2011) fMRI and multi-voxel pattern analysis of direction of spatial auditory attention in human auditory cortex. Baltimore, MD: 34th Annual Meeting of Association for Research in Otolaryngology. Online.

- Putcha, D., Ross, R.S., Rosen, M.L., Cronin-Golomb, A., **Somers, D.C.**, Stern, C.E. (2011) Diminished V6 activation in response to optic flow in Parkinson's disease. 2011 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2011. Online.

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