

BIOGRAPHICAL SKETCH

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NAME: Miriam Spering

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Konstanz, Konstanz, Germany	Pre-Diploma (B.Sc.)	08/1997	Psychology
Exeter University, Exeter, England	Testamur (B.Sc.)	07/1998	Psychology
Ruprecht-Karls University, Heidelberg, Germany	Diploma (M.Sc.)	03/2002	Psychology
Justus-Liebig University, Giessen, Germany	Dr. rer. nat. (Ph.D.)	08/2006	Psychology / Visual Neuroscience
Justus-Liebig University, Giessen, Germany	Postdoctoral	12/2007	Psychology / Visual Neuroscience
New York University, New York, NY, USA	Postdoctoral	12/2010	Psychology / Cognitive Neuroscience

A. Personal Statement

My research addresses the question how we process visual information and interact with our environment through motor actions. I have studied eye movements as a model system for understanding principles of sensorimotor control for 15 years. I have trained with leaders in the visual neurosciences (PhD with Karl Gegenfurtner at the University of Giessen and postdoc with Marisa Carrasco at NYU). At UBC, I direct the Visual Performance & Oculomotor Mobility lab where we use state-of-the-art eye tracking and motion capture to assess vision and movement in healthy observers and patients with sensorimotor deficits. My laboratory consists of undergraduates (n=21, 4 current), Masters students (n=3, 1 current) and PhD students (n=1 current). My research program is funded by the Natural Sciences and Engineering Research Council (NSERC) and the Canada Foundation for Innovation (CFI). My teaching includes courses at the undergraduate, graduate and postgraduate level (medical students and residents). I have served the profession in many capacities at the provincial level (full-time member of the UBC Clinical Research Ethics Board; reviewer of numerous local/provincial grants), nationally (member of the Board of Directors of the Canadian Physiological Society, British Columbia lead of the Canadian Action and Perception Network, ad-hoc reviewer for numerous NSERC and CFI grants) and internationally (reviewer for Dutch, German, French and Israeli grants; frequent manuscript reviewer). I have demonstrated ability to organize scientific meetings, e.g., symposia at the Vision Sciences Society conference, the Canadian Association for Neuroscience meeting, and the conference of the German Society of Experimental Psychology (TeaP). Since 2014 I have coordinated and co-chaired the annual Gained in Translation meeting of the Ophthalmology departments at UBC, UW (Seattle) and OHSU (Portland). I will serve as the Co-Vice Chair of the 2017 Gordon Research Conference on Eye Movements, and as Co-Chair for the 2019 meeting.

B. Positions and Honors

Positions and Employment

2006 - 2007	Postdoctoral Research Fellow, Justus-Liebig University, Giessen, Germany
2008 - 2010	Postdoctoral Research Fellow, New York University, New York, NY, USA
2011 -	Assistant Professor of Ophthalmology & Visual Sciences, University of British Columbia (UBC), Vancouver, BC, Canada
2011 -	Faculty, Graduate Program in Neuroscience, UBC
2011 -	Faculty Member, Center for Brain Health, UBC
2012 -	Faculty Associate, Peter Wall Institute for Advanced Studies, UBC
2013 -	Principal Investigator, International Collaboration on Repair Discoveries, UBC
2014 -	Faculty Member, Institute for Computing, Information and Cognitive Systems, UBC

Other Experience and Professional Memberships

2002 - 2015	Member, German Psychological Society (DGPS)
2003 -	Member, Society for Neuroscience (SfN)
2003 -	Member, Vision Sciences Society (VSS)
2012 -	Member, Canadian Association for Neuroscience (CAN)
2013 -	Member, Association for Psychological Science (APS)
2014 -	Member, Canadian Physiological Society (CPS)
2015 - 2018	Board of Directors, Councilor, Canadian Physiological Society

Honors

1997 - 1998	Scholarship, Erasmus / Sokrates Program of the European Union
1998 - 2002	Scholarship, German National Merit Foundation (Studienstiftung des deutschen Volkes)
1998 - 2002	Scholarship, Konrad-Adenauer Foundation
2007	1 st place in Ph.D. thesis award competition, German Psychological Society
2007	Klaus Tschira Award for Achievements in the Public Understanding of Science, Germany
2008 - 2009	Postdoctoral Fellowship, German Academic Exchange Service (declined)
2008 - 2010	Postdoctoral Fellowship, German Research Foundation
2012	Early Career Scholar Award, Peter Wall Institute for Advanced Studies, UBC
2015	Elected as Co-Vice Chair, Gordon Research Conference on Eye Movements for 2017
2017 - 2019	Co-Vice Chair and Co-Chair, Gordon Research Conference on Eye Movements

C. Contribution to Science

1. Visual signals for smooth pursuit eye movements

Much of our success in moving through a dynamic visual world relies on the accuracy with which we move our eyes. My research has significantly advanced the understanding of how motion signals from a visual target and its context are used to guide visual perception and smooth pursuit eye movements. For example, early in my research career, I developed paradigms to assess the effect of context information on pursuit, unraveling processes by which the brain actively inhibits a distracting context during pursuit. As a PI, I extended this line of research to examine eye-hand coordination in dynamic, naturalistic environments.

- a. Spering M, Kerzel D, Braun DI, Hawken MJ, Gegenfurtner KR. Effects of contrast on smooth pursuit eye movements. *J Vision* 2005;5:455-465. PMID: [16097876](#)
- b. Spering M, Gegenfurtner KR, Kerzel D. Distractor interference during smooth pursuit eye movements. *J Exp Psychol Human Percept* 2006;32:1136-1154. PMID: [17002527](#)
- c. Spering M, Gegenfurtner KR. Contextual effects on smooth pursuit eye movements. *J Neurophysiol* 2007;97:1353-1367. PMID: [17135467](#)
- d. Spering M, Gegenfurtner KR. Contextual effects on motion perception and smooth pursuit eye movements. *Brain Res* 2008;1225:76-85. PMID: [18538748](#)

- e. Kreyenmeier P, Fooker J, Spering M. Contextual effects on eye and hand in a predictive interception task. *J Neurophysiol* 2016; submitted.
2. Tracking the unseen: when perception and eye movements are dissociated
 Visual perception and eye movements are considered to be tightly linked. Diverse fields, ranging from developmental psychology to computer science, utilize eye tracking to measure visual perception. As a graduate student and then as a postdoc I discovered striking dissociations in which the eye movement system acts on unseen visual information. Our research in this area provides evidence supporting the role of subcortical pathways for unaware visual processing.
- Spering M, Gegenfurtner KR. Contrast and assimilation in motion perception and smooth pursuit eye movements. *J Neurophysiol* 2007;98:1355-1363. PMID: [17634337](#)
 - Spering M, Pomplun M, Carrasco M. Tracking without perceiving: A dissociation between motion perception and eye movements. *Psychol Sci* 2011;22:216-225. PMID: [21189353](#)
 - Spering M, Montagnini A. Do we track what we see? Evidence for common and independent processing of motion information for perception and smooth pursuit eye movements. *Vision Res* 2011;51:836-852. PMID: [20965208](#)
 - Spering M, Carrasco M. Similar effects of feature-based attention on motion perception and pursuit eye movements at different levels of awareness. *J Neurosci* 2012;32:7594-7601. PMID: [22649238](#)
 - Spering M, Carrasco M. Acting without seeing: eye movements reveal visual processing without awareness. *Trends Neurosci* 2015;38:247-258. PMID: [25765322](#)
3. Efference copy function and failure in the oculomotor system
 To investigate the functional importance of smooth tracking eye movements for visual motion prediction, I developed a paradigm in which observers estimated a target's trajectory either while actively tracking it with their eyes or while fixating elsewhere. We demonstrate performance enhancement during smooth tracking, evidence that feedback (efference-copy) information can boost visual performance. During my postdoc, we provided first evidence for an efference-copy deficit in the visual system in schizophrenia, revealing links between this deficit and clinical symptom severity. My current research program as a PI extends these findings by linking specific eye movement patterns to manual interception strategies. This research has also impacted the development of vision and eye movement testing tools for athletic development (in collaboration with the UBC varsity baseball team).
- Spering M, Schütz AC, Braun DI, Gegenfurtner KR. Keep your eyes on the ball: Smooth pursuit eye movements enhance the prediction of visual motion. *J Neurophysiol*. 2011;105:1756-1767. PubMed PMID: [21289135](#).
 - Spering M, Dias EC, Sanchez J, Schütz AC, Javitt DA. Efference copy failure during smooth pursuit eye movements in schizophrenia. *J Neurosci* 2013;33:11779-11787. PubMed PMID: [23864667](#).
 - Fooker J, Yeo S-H, Pai DK, Spering M. Eye movement accuracy determines natural interception strategy. *J Vision* 2016; in press.

Complete List of Published Peer-Reviewed Journal Articles in My Bibliography:

<http://www.ncbi.nlm.nih.gov/sites/myncbi/1pWmwav8eyck5/bibliography/50574383/public/?sort=date&direction=ascending>.

D. Research Support

Ongoing Research Support

04/01/2012-03/31/2018

Discovery Grant, RGPIN 418493, Natural Sciences and Engineering Research Council (NSERC)

SPERING, MIRIAM (PI)

Visual motion processing for perception and smooth pursuit eye movements

The goal is to understand the interaction between vision and eye movements in human behavior.

Role: PI

02/01/2014-12/31/2017

John R. Evans Leaders Fund (JELF), Canada Foundation for Innovation (CFI)

SPERING, MIRIAM (PI)

Dynamics of vision and eye movements

This is an infrastructure and equipment grant to purchase state-of-the-art eye trackers and motion capture technology for my laboratory.

Role: PI

06/01/2016-12/31/2018

Infrastructure Operating Funds (IOF), Canada Foundation for Innovation

SPERING, MIRIAM (PI)

Funds to cover the salary of a highly-qualified technician to operate the infrastructure purchased under the CFI-JELF.

Role: PI