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## BIOGRAPHICAL SKETCH

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NAME: Shoemaker, Lorelei Dawn

eRA COMMONS USER NAME: SHOEMAKER.LORELEI

POSITION TITLE: Research Associate

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### EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
University of Winnipeg, Winnipeg, Manitoba, Canada	B.Sc. (4 y)	1985-1990	Chemistry
University of California, Los Angeles, California	Ph.D.	2001-2006	Neuroscience
University of California, Los Angeles, California	Postdoctoral Fellow	2006-2007	Neuroscience
Center for Regenerative Medicine, MGH, Harvard Medical School, Boston, MA	Postdoctoral Fellow	2007-2009	Neuroscience
Department of Neurosurgery, Stanford University, CA	Postdoctoral Fellow	2009-2011	Neuroscience

### A. Personal Statement

My diverse background has given me a unique perspective and has prepared me particularly well for the challenges of undertaking human AVM research. The success of this project also lays in the strong collaboration with Dr. Steve Chang, a neurosurgeon and clinical expert in arteriovenous malformations. I have a strong research background in neural stem/progenitor cell biology, neural development, and cerebrovasculature at both the Graduate and Postdoctoral levels. In addition, my training has involved a broad and extensive array of approaches, including *in vitro* and *in vivo* models in rodents, zebrafish and human, stem/progenitor cell analysis, protein biochemistry, and molecular biology. Since joining the Department of Neurosurgery, my focus has been on establishing a basic cerebrovascular patient-based research program. I am strongly motivated by this work, as our research has great potential to be highly translatable.

### B. Positions and Honors

#### Positions and Employment

1990 Assistant Researcher, University of Manitoba, Winnipeg, Manitoba, Canada  
1991-1993 Chemist, Health Protection Branch, Winnipeg, Manitoba, Canada  
1994-1998 Technical Officer, National Research Council, Winnipeg, Manitoba, Canada  
1998 Special Projects Chemist, Biovail Pharmaceutical Corporation International, Manitoba, Canada  
1998-1999 Independent Consultant. Winnipeg, Manitoba, Canada  
1999-2001 Research Associate, Allan Tobin Laboratory, University of California, Los Angeles, CA  
2001-2006 Graduate Student Researcher, University of California, Los Angeles, CA  
2006-2007 Post-doctoral Fellow, University of California, Los Angeles, CA  
2007-2009 Post-doctoral Fellow, Center for Regenerative Medicine, MGH, Harvard Medical School, Boston, MA  
2009-2011 Post-doctoral Fellow, Department of Neurosurgery, Stanford University, Stanford, CA  
2011- Research Associate, Department of Neurosurgery, Stanford University, Stanford, CA

## **Other Experience and Professional Memberships**

- 1990-1996 University of Winnipeg Alumni Association (Executive Member 1990-95, President 1995-96). Member of the Dean of Arts and Sciences and the Vice-President Academic Search Committees, and various undergraduate and faculty award and scholarship committees.
- 2001-2005 International Association of Analytical Chemists (2001-05), Southern California Section (2000-01), Mid-Canada Section (Member, 1989-99; President 1996-97).
- 2006-2007 International Society for Stem Cell Research, Member.
- 2003-2008 Sigma Delta Epsilon/Graduate Women in Science, Member.
- 2001-2008 Society for Neuroscience, Member.
- 2001-2012 American Association for the Advancement of Science, Member.
- 2002-2012 American Society for Mass Spectrometry, Member.

## **Editorial Service**

Reviewer for: Neurosurgery, Molecular and Cellular Proteomics, UCSD-Nature Molecule Pages, Journal of Cell Biology, Phytochemistry

## **University Service**

- 1987-1996 Member of the Vice-President Academic and the Dean of Arts and Sciences Search Committees; member of various undergraduate and faculty award and scholarship committees, University of Winnipeg
- 1990-1995 University of Winnipeg Alumni Association, Executive Member, President (1995-1996)
- 2002-2004 UCLA Neuroscience IDP Retreat Student Organizer
- 2003-2006 Neuroscience Interdepartmental Ph.D. Program First Year Mentor, UCLA
- 2012-2013 Stanford Innovation Farm Team member, Office of Technology and Licensing, Stanford University

## **Honors**

- 1985-1986 Alumni Entrance (full tuition) Scholarship, University of Winnipeg, Manitoba, Canada
- 1988 Undergraduate Research Award. National Science and Engineering Research Council, Canada
- 1989-1990 Mid-Canada Association Scholarship, International Association of Analytical Chemists, Canada
- 1995 Science Education Award, Institute for Biodiagnostics. Winnipeg, Manitoba, Canada
- 2002-2004 Dr. Ursula Mandel Scholarships, Graduate Division UCLA, Los Angeles, CA
- 2004 Team Proposal Award of Excellence, Route28 Summits in Neurobiology, Germany
- 2004-2005 International Scholarship, Phi Beta Kappa (Alpha Association), CA
- 2004-2005 Hortense Fishbaugh Memorial Scholarship, UCLA Affiliates, Los Angeles, CA
- 2004-2006 Student Travel Awards, American Society for Mass Spectrometry, US
- 2005-2006 Dissertation Year Fellowship, Graduate Division UCLA, Los Angeles, CA
- 2006 Institute for Stem Cell Biology and Medicine Travel Award, UCLA, Los Angeles, CA
- 2006 RIKEN Summer Internship Program, Laboratory of Dr. Hitoshi Okamoto, RIKEN Institute, Japan
- 2008 William Randolph Hearst Fund Postdoctoral Award, Harvard Medical School, Boston, MA
- 2012 Outstanding Poster Award, North American Vascular Biology Organization, Monterey, CA

## **Inventions**

- 2001 Co-Inventor of Huntingtin-expressing PC12 cells, laboratory of Dr. Allan Tobin (University of California Invention Case No. 2001-430), UCLA, 2001.

## **C. Contribution to Science**

My PhD thesis was an important shift for me, as I combined my analytical chemistry and mass spectrometry (MS) background, with a newly-acquired deep knowledge of neural stem and progenitor cells, realizing the potential of interdisciplinary research. In my postdoctoral research, I was presented with the challenge of recapitulating *in vivo* development of corticospinal motor neurons in rodents in an *in vitro* model to ultimately interrogate using MS; a more considerable challenge was understanding gene function via transgenic knockout rodent models. This experience ultimately led me to join Stanford to establish a patient-based cerebrovascular research program. Our basic research has direct relevance to our patients, in possible clinical translation or to inform better models with which to test hypotheses.

1. Nakano, I.; Masterman-Smith, M.; Saigusa, K.; Paucar, A.A.; Horvath, S.; **Shoemaker, L.**; Watanabe, M.; Negro, A.; Bajpai, R.; Howes, A.; Lelievre, V.; Waschek, J.A.; Lazareff, J.A.; Freije, W.A.; Liao, L.M.; Gilbertson, R.J.; Cloughesy, T.F.; Geschwind, D.H.; Nelson, S.F.; Mischel, P.S.; Terskikh, A.V.; Kornblum, H.I.

Maternal Embryonic Leucine Zipper Kinase (MELK) is a critical regulator of malignant brain tumor cell proliferation, including brain tumor stem cells. *J Neurosci Res.* 86(1):48-60, 2008.

2. **Shoemaker, L.D.**; Orozco, N.M.; Geschwind, D.H.; Whitelegge, J.P.; Faull, K.F.; Kornblum, H.I. Identification of differentially expressed proteins in murine embryonic and postnatal cortical neural progenitors. *PLoS One.* 2010; 5(2):e9121.

3. **Shoemaker, L.D.** and Arlotta, P. Untangling the cortex: advances in understanding specification and differentiation of corticospinal motor neurons. *Bioessays.* 2010; 32(3):197-206.

4. Sigdel, T.K.; **Shoemaker, L.D.**; Chen, R.; Li, L.; Butte, A.J.; Sarwal, M.M.; Steinberg, G.K. Immune response profiling identifies autoantibodies specific to Moyamoya patients. *Orphanet J Rare Dis.* 2013 Mar 21;8:45.

5. **Shoemaker, L.D.**; Fuentes, L.F.; Santiago, S.M.; Allen, B.M.; Cook, D.J.; Steinberg, G.K.; Chang, S.D. Expression of lymphatic-associated genes in human brain arteriovenous malformations. *Ann Clin Transl Neurol.* 1(12): 982–995, 2014.

6. **Shoemaker LD**, Clark MJ, Patwardhan A, Chandratillake G, Garcia S, Chen R, Morgan AA, Leng N, Kirk S, Chen R, Cook DJ, Snyder M, Steinberg GK. Disease variant landscape of a large multiethnic population of Moyamoya patients by exome sequencing. *G3 (Bethesda).* 2015 Nov 3;6(1):41-9.

#### **Complete List of Published Work:**

<http://www.ncbi.nlm.nih.gov/sites/myncbi/1H1fbsvOm5gQz/bibliography/49109014/public/?sort=date&direction=ascending>

#### **D. Research Support**

##### **Ongoing Research Support**

1. Department of Neurosurgery at Stanford Unrestricted Funds, current

##### **Completed Research Support**

1. NIH R21: “A Proteomic Analysis of Neural Progenitors”. PI: Harley Kornblum, Depart.of Molecular and Medical Pharmacology, UCLA. Duration: 2003-2005.
2. Fidelity Foundation: “Molecular Pathways Controlling Birth and Early Differentiation of Corticospinal Neurons”. PI: Paola Arlotta, Harvard University Depart.of Stem Cell and Regenerative Biology Co-PI: Lori Shoemaker. Duration: 2007-2009.
3. Leslie Munzer Neurological Institute: “Pathogenesis and Radiobiology of Brain Arteriovenous Malformations”. PI: Lorelei Shoemaker and Steven Chang, Dept. of Neurosurgery, Stanford. Duration: 2009-2010.
4. Brain Aneurysm Foundation: “Identification of Genetic Indicators to Predict Cerebral Vasospasm Following Subarachnoid Hemorrhage”. PI: Lorelei Shoemaker and Steven Chang, Dept. of Neurosurgery, Stanford. Duration: 2010-2011.
5. Stanford Cardiovascular Institute Seed Grant: “Endothelial cell fate specification in response to fluid flow”. PI: Alex Dunn, Dept. of Chemical Engineering, Stanford Co-PI: Gerald Fuller, Dept. of Chemical Engineering, Lorelei Shoemaker and Steven Chang, Dept. of Neurosurgery, Stanford. Duration: 2013 – 2014.