

Helen C. Lai
Curriculum Vitae

University of Texas Southwestern Medical Center, Department of Neuroscience
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EDUCATION

- 1999-2005** Ph.D. in Biophysics, University of California, San Francisco, San Francisco, CA
- 1992-1996** B.A. in Chemistry, Cornell University, College of Arts and Sciences, Ithaca, NY

RESEARCH EXPERIENCE

- 2012-present** Sara and Frank McKnight Fellow, UT Southwestern Medical Center
- Uncovering the functional organization of spinal cord circuitry generating somatosensory behavior using genetic, molecular, and electrophysiological techniques.
- 2006-2012** Postdoctoral Fellow, University of Texas Southwestern Medical Center
Advisor: Jane E. Johnson, Ph.D.
- Determined transcriptional mechanisms of differentiation and cell type specification in spinal cord and cerebellar neurons.
- 2002-2005** Graduate Student, University of California, San Francisco
Advisor: Lily Y. Jan, Ph.D.
- Revealed structural mechanisms of voltage-gated potassium channels.
 - Used yeast complementation systems to study ion channel function.
- 1996-1999** Development Associate, Chiron/Bayer Corporation, Emeryville, CA
Manager: John Teare, Ph.D.
- Developed DNA analytical methods to determine properties of nucleosides.
 - Used DE-MALDI TOF mass spectrometry for DNA sequencing.

HONORS AND AWARDS

- 2012-present** Sara and Frank McKnight Fellow
- 2007-2010** Ruth L. Kirschstein NRSA F32 Postdoctoral Fellowship (NINDS/NIH)
- 2003-2005** American Heart Association Pre-doctoral Fellowship
- 2004** Science & Health Education Partnership Ace Award for Science Education
- 2000** National Science Foundation Graduate Research Fellowship: Honorable Mention
- 1999** Bayer Corporation, Special Recognition Award for Outstanding Performance
- 1992-1996** Procter and Gamble Undergraduate Scholarship
- 1994-1996** Dean's List, Cornell University
- 1992-1994** John McMullen Scholar in Engineering, Cornell University

PUBLICATIONS (peer reviewed)

Yuengert R., Hori K., McClellan J.X., Huang T.P., Neul J.L., and **Lai H.C.** Atoh1-lineage neurons relay proprioceptive information through atypical routes critical for coordinated motor tasks. Under review.

Lai H.C., Meredith D.M., and Johnson J.E. bHLH Factors in neurogenesis and neuronal subtype specification. (2013). *Developmental Neuroscience: A Comprehensive Reference, Volume 1*, Elsevier Limited, Oxford, England.

Chang J.C., Meredith D.M., Mayer P.R., Borromeo M.D., **Lai H.C.**, Ou Y.H. and Johnson J.E. Prdm13 mediates the balance of inhibitory and excitatory neurons in somatosensory circuits. (2013). *Dev Cell*. 25(2): 182-195.

Wang Y., Lin L., **Lai H.**, Parada L.F., and Lei L. Transcription factor Sox11 is essential for both embryonic and adult neurogenesis. (2013). *Dev Dyn*. Published online April 28, 2013.

Lai H. C., Klisch T.J., Roberts R., Zoghbi H. Y., and Johnson J. E. In vivo neuronal subtype-specific targets of Atoh1 (Math1) in dorsal spinal cord. (2011). *J. Neurosci*. 31(30):10859-10871.

Panteleeva I., Boutillier S., See V., Spiller D.G., Rouaux C., Almouzni G., Bailly D., Maison C., **Lai H.C.**, Loeffler J.P., Boutillier A.L. HP1alpha guides neuronal fate by timing E2F-targeted genes silencing during terminal differentiation. (2007). *EMBO J*. 26(15): 3616-28.

Grabe M.*, **Lai H.C.***, Jain M., Jan Y.N., Jan L.Y. Structure prediction for the down state of a potassium channel voltage sensor. (2007). *Nature*. 445(7127): 550-553. * Equal contribution.

Lai H.C., Jan L.Y. The distribution and targeting of neuronal voltage-gated ion channels. (2006). *Nature Reviews Neuroscience*. 7(7): 548-562.

Lai H.C., Grabe M., Jan Y.N., Jan L.Y. The S4 voltage sensor packs against the pore domain in the KAT1 voltage-gated potassium channel. (2005). *Neuron*. 47(3):395-406.

Serber Z., **Lai H.C.**, Yang A., Ou H.D., Sigal M.S., Kelly A.E., Darimont B.D., Duijf P.H., Van Bokhoven H., McKeon F., Dötsch V. A C-terminal inhibitory domain controls the activity of p63 by an intramolecular mechanism. (2002). *Mol. Cell Biol*. 22(24):8601-11.

Ou H.D., **Lai H.C.**, Serber Z., Dötsch V. Efficient identification of amino acid types for fast protein backbone assignments. (2001). *J. Biomol. NMR*. 21(3):269-73.

PREVIEWS

Lai H.C., Johnson J.E. Neurogenesis or neuronal specification: Phosphorylation strikes again! 2008. *Neuron*. 58(1):3-5.

Lai H.C., Johnson J.E. Faculty of 1000 Biology evaluation of Betley JN et al. Stringent specificity in the construction of a GABAergic presynaptic inhibitory circuit. 2009. *Cell*. 139(1):161-74. <http://www.f1000biology.com/article/id/1165571/evaluation>.

REVIEWER

Journal of Neuroscience

RESEARCH PRESENTATIONS

Lai H.C., Yuengert R., Hori K., Gibson J.R., Huber K.M., Johnson J.E. (2013). Poster: “Atoh1-lineage cells in the spinal cord define spatially and morphologically distinct neurons with common firing properties.” Society for Neuroscience Meeting (San Diego, CA).

Lai H.C., Hori K., McClellan J.X., Gibson J.R., Huber K.M., Johnson J.E. (2012). Poster: “Elucidating somatosensory circuits of spinal cord neurons.” Gordon Research Conference, Neural Development (Newport, RI).

Lai H.C., Johnson J.E. (2012). **Invited Talk:** “Understanding the logic of somatosensory circuits.” UT Arlington Bioengineering Department (Arlington, TX).

Lai H.C., Klisch T.J., Roberts R., Zoghbi H.Y., Johnson J.E. (2010). **Invited Talk:** “Targeted determination of Atoh1 regulated genes involved in neuronal specification.” UT Southwestern Neuroscience Retreat (UT Southwestern, Dallas, TX).

Lai H.C., Klisch T.J., Roberts R., Zoghbi H.Y., Johnson J.E. (2010). Poster: “Molecular Determinants of Dorsal Spinal Cord Interneurons Specified by Atoh1 (Math1).” Gordon Research Conference, Neural Development (Newport, RI).

Lai H.C., Johnson J.E. (2009). Poster: “Downstream targets of Atoh1 (Math1).” Society for Developmental Biology Annual Meeting (San Francisco, CA).

Lai H.C., Johnson J.E. (2008). Poster: “Molecular determinants of proprioceptive pathway neurons specified by Atoh1 (Math1).” Gordon Research Conference, Neural Development (Newport, RI).

Lai H.C., Grabe M., Jain M., Jan Y.N., Jan L.Y. (2006). Poster: “Structural model of the KAT1 voltage-gated potassium channel in the down state of S4.” Cold Spring Harbor Lab, Channels, Receptors, and Synapses Meeting (Cold Spring Harbor, NY).

Lai H.C., Grabe M., Jan Y.N., Jan L.Y. (2004). Poster: “Packing the S4 voltage sensor against S5 of the pore domain of voltage-gated potassium (Kv) channels.” Gordon Research Conference, Ion Channels (Tilton, NH).

Lai H.C., Grabe M., Jan Y.N., Jan L.Y. (2004). **Invited Talk:** “The S4 voltage sensor packs against the pore domain in the KAT1 voltage-gated potassium channel.” UCSF Biophysics Retreat (UCSF, San Francisco, CA).

TEACHING EXPERIENCE

- 2010 Teaching Assistant, UT Southwestern Core Course in Bioelectricity
- Led discussions and aided student presentations on an open neuroscience topic.
- 2004-present Supervisor, UT Southwestern and UCSF
- Trained technicians, graduate, and summer students in laboratory techniques.

- 2001-2004 Teacher's Aide Volunteer, Science and Health Education Partnership, UCSF
- Planned and taught classes in DNA, genetics, and inheritance to seventh graders.
- Planned and taught classes on sound to second grade students.
- 2000 Teaching Assistant, Macromolecules Graduate Course, UCSF
- Wrote problem sets and tests for a course in macromolecular interactions.
- Conducted review sessions and individual tutoring.
- 1994-1996 Chemistry Tutor, Introductory chemistry, Cornell University
- Tutored undergraduates taking the freshman introductory chemistry course.

PROFESSIONAL SOCIETIES

- 2007-present Society for Neuroscience
2009 Society for Developmental Biology
2002-2005 Biophysical Society
2001-2003 Women in Life Sciences