

Cecilia S. Lu, Ph.D.

EDUCATION & TRAINING

Ph.D. Neuroscience Brandeis University, Waltham, MA	2004
Short Course: Neurobiology of <i>Drosophila</i> , scholarship student Cold Spring Harbor Laboratory, NY	2004
B.S. Life Science with distinction National Tsing Hua University, Taiwan	1997

RESEARCH EXPERIENCE

Post-doctoral Fellow, Department of Cell Biology 2004-present
Harvard Medical School, Boston, MA

Advisor: David L. Van Vactor, Ph.D., Professor of Cell Biology

"MicroRNA Functions in Synapse Development"

- Discovered miR-8 functions in neuromuscular junctions. Identified multiple regulatory targets controlling the cellular processes of synaptic formation, growth and stability.
- Analyzed regulatory relationships between miR-8 and targets by molecular genetics and bioinformatics. Imaged live and immunohistochemical *Drosophila* NMJ preparations across developmental stages by DIC and confocal microscopy.
- Developed transgenic reagents for silencing specific miRNA expression in a spatio-temporally specific fashion *in vivo*.
- Devised a metabolic labeling method to profile quantitative changes of target genes regulated by miR-8 *in vivo*. Surveyed up to 70% catalogued *Drosophila* proteome.
- Launched pilot genetic screens for enhancers and suppressors of a microtubule plus-tip protein Orbit/CLASP participating in repulsive guidance pathway to steer motor axons.

Graduate Researcher, Department of Biology, Program in Neuroscience 1997-2004
Brandeis University, Waltham, MA

Advisor: Leslie C. Griffith, M.D., Ph.D., Professor of Biology

"Scaffold-Dependent Regulation of Ca²⁺/CaM-dependent Kinase II in Synapse Function"

- Elucidated and validated *in vivo* a biochemical mechanism for a MAGUK scaffolding protein dCASK to regulate CaMKII, a brain enzyme important for synaptic plasticity and learning & memory in animals.

- Developed *in vitro* binding assays to test intra- and inter-molecular protein interactions that modify CaMKII activity. Expressed and purified recombinant proteins from bacteria, mammalian cell culture, and insect cells for kinase assays.
- Trained and advised users of BIACORE 2000 to measure real-time molecular interaction by Surface Plasmon Resonance (SPR) technology and analyze data using proprietary software.

Undergraduate Researcher, Institute of Biomedical Sciences 1996-1997
Academia Sinica, Taiwan

Advisor: Tai-huang Huang, Ph.D., Research Fellow, Structural Biology

- Designed and produced 8 recombinant inward-rectifying potassium ion channel subunits for structure-function analysis by nuclear magnetic resonance.

Summer Research Intern, Department of Pharmacology 1995
Yale University School of Medicine, New Haven, CT

Advisor: Yung-Chi Cheng, Ph.D., Henry Bronson Professor of Pharmacology

- Optimized purification of Uridine/Cytidine Kinase for use in screens for biologically active nucleoside analogs as chemotherapeutics agent against human cancers.

TEACHING EXPERIENCE

Post-doctoral Fellow, Van Vactor Lab 2004-present
Harvard Medical School, Boston, MA

- Supervised and counseled graduate and undergraduate thesis research.

Teaching Assistant 1998-1999
Brandeis University, Waltham, MA

- Led discussion and review sessions in Human Physiology.
- Conducted Biology Lab with recognition for excellence in mentoring.
- Supervised and counseled undergraduate thesis research.

Teaching Intern, **National Experimental High School at Hsinchu Science Park** 1997
National Tsing Hua University, Taiwan

LEADERSHIP EXPERIENCE

Post-doc Representative, Department of Cell Biology 2007-2008
Harvard Medical School, Boston, MA

- Served as postdoc liaison with faculty and department administrators to plan social events, Department retreats, and careers roundtable discussions.
- Led a team of 5 postdocs in launching seminar series, "Cutting Edge of Cell Biology Research".
- Initiated online surveys. Collected and analyzed feedback from surveys about past events and prioritized new agendas. Presented key findings at meetings with faculty.
- Maintained Listserv: facilitated resource-sharing in the community of postdocs.

Deputy Artistic Director, NTHU Symphony Orchestra 1994-1996
Executive Secretary, Student Association 1994-1995
National Tsing Hua University, Taiwan

FELLOWSHIPS & AWARDS

Harvard Medical School Post-doctoral Research Fellowship	2004-2008
Cold Spring Harbor Laboratory Scholarship, Neurobiology of <i>Drosophila</i>	2004
Brandeis University Graduate Fellowship	1998-2002
Gordon Research Conference on Molecular and Cellular Neurobiology Travel Award	2002
Society for Neuroscience Travel Scholarship	2001
Ministry of Education College Fellowship, Taiwan	1993-1997
National Science Foundation Undergraduate Scholar, Taiwan	1995-1997

INVITED PRESENTATION:

Cecilia S. Lu, Alex Mauss, Bo Zhai, Matthias Landgraf, Steven Gygi, and David Van Vactor (2010). "Trans-synaptic Coordination of Neuromuscular Junction Formation by the Conserved MicroRNA MiR-8", Gordon Research Conference: Cell Biology of the Neuron, Waterville Valley, New Hampshire, USA.

Cecilia S. Lu, Carlos M. Loya, Tudor Fulga, Jannette Rusch, Janet Wang and David Van Vactor (2009). "MicroRNA MiR-8 Regulates Synaptic Morphogenesis", Cold Spring Harbor Laboratory Symposium on Synapses: From Molecules to Circuits & Behavior, Cold Spring Harbor, NY, USA.

Leslie C. Griffith, **Cecilia S. Lu**, Xiu Xia Sun and Maidung Nguyen (2002). "Regulation of CaMKII Activity by Scaffold-dependent Autophosphorylation", FASEB Summer Research Conference: Ca²⁺ Signaling, Salt Lake City, UT, USA.

Cecilia S. Lu, Maidung Nguyen, Xiu Xia Sun and Leslie C. Griffith (2002). "Camguk (Cmg), the *Drosophila* Homologue of the CASK/Lin-2 MAGUK Protein Interacts with Ca²⁺/Calmodulin-Dependent Kinase II (CaMKII)", Gordon Research Conference: Molecular and Cellular Neurobiology, Hong Kong, China.

MANUSCRIPTS IN PREPARATION:

Cecilia S. Lu, Alex Mauss, Bo Zhai, Matthias Landgraf, Steve Gygi and David Van Vactor. "microRNA-8 Promotes Synaptogenesis By Coordinate Regulation of Cell Adhesion Molecules During Motor Axon Targeting."

Cecilia S. Lu, Jannette Rusch, Janet Wang and David Van Vactor. "Gain-of-Function Abl Screen Identifies Interaction with RNA Regulatory Mechanisms Downstream of Fragile-X Mental Retardation Protein in the Receptor Protein Tyrosine Phosphatase DLAR Pathway."

PUBLICATIONS:

Cecilia S. Lu and David Van Vactor (2010) Chapter 104: Genetic analysis of synaptogenesis. *Comprehensive Developmental Neuroscience* edited by Pasko Rakic and John Rubenstein, Elsevier, Oxford, UK (Submitted).

Laura Anne Lowery, Haeryun Lee*, **Cecilia S. Lu***, Rebecca Murphy, Robert A. Obar, Jacqueline Rho, Bo Zhai, Steve Gygi, Yougen Zhan and David Van Vactor (2010). "Parallel Genetic and Proteomic Screens Identify Msps as a CLASP-Abl Pathway Interactor in *Drosophila*". *Genetics*, August, 185 (4): 1311-1325. * Co-second authors with equal contribution.

Carlos M. Loya*, **Cecilia S. Lu***, David Van Vactor and Tudor A. Fulga (2009) *Nature Methods*, volume 6, issue 12, December 5, 2009, pages 897-903. Transgenic microRNA inhibition with spatiotemporal specificity in intact organisms. * Co-first authors with equal contribution.

- Comment in: *Nature Methods*, December 2009, 6 (12): 873-874.

Cecilia S. Lu and David Van Vactor (2007) *Current Biology*, volume 17, issue 20, October 23, 2007, pages R895-898. Synapse specificity: Wnts keep motor axons on target.

Cecilia S. Lu, James J. L. Hodge, Jennifer Mehren, Xiu Xia Sun and Leslie C. Griffith (2003) *Neuron*, volume 40, issue 6, December 18, 2003, pages 1185-1197. Regulation of the Ca²⁺/CaM-Responsive Pool of CaMKII by Scaffold-Dependent Autophosphorylation.

Leslie C. Griffith, **Cecilia S. Lu** and Xiu Xia Sun (2003) *Molecular Interventions*, volume 3, issue 7, October, 2003, pages 386-403. CaMKII, an enzyme on the move: regulation of temporo-spatial localization.

REFERENCES:

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