MICHAEL LIN, M.D. PH.D.

Curriculum Vitae

CONTACT INFORMATION

Address	Stanford University School of Medicine 269 Campus Drive CCSR 2105, Mail Code 5164 Stanford, CA 94305
Phone	650-721-1681
Fax	650-498-6540
Email	mzlin@stanford.edu, lin@post.harvard.edu

EDUCATION

1994-2004 *M.D.*, **University of California Los Angeles School of Medicine, Los Angeles, CA**

1996-2002 *Ph.D.,* **Harvard Medical School, Boston, MA,** Biological and Biomedical Sciences

1990-1994 *B.A., summa cum laude,* **Harvard University, Cambridge, MA,** Biochemistry

1989-1990 *Early Action Honors Program,* **University of California San Diego, San Diego, CA,** concurrent with high school

POSITIONS HELD

6/2010-current *Assistant Professor,* **Stanford University, Departments of Pediatrics and Bioengineering**
Member of the Bio-X Program, the Stanford Institute for Neuro-Innovation and Translational Neurosciences, and by courtesy the Department of Chemical and Systems Biology

5/2009-5/2010 *Acting Assistant Professor,* **Stanford University, Departments of Pediatrics and Bioengineering**

6/2004-4/2009 *Postdoctoral Fellow,* **Laboratory of Prof. Roger Y. Tsien, HHMI and UCSD School of Medicine, Department of Pharmacology**
Developed tools for imaging and controlling signaling in living neurons. Developed a drug-controllable tag for sensitive and selective visualization and purification of newly synthesized proteins of interest. Developed a method for rapidly controlling translation of proteins of interest with drugs. Engineered new green and red fluorescent proteins for in vivo imaging and biosensing, and improved channelrhodopsins for controlling neuronal excitability using structure-based design and screening.

7/1996-6/2002 *Doctoral Student,* **Laboratory of Prof. Michael E. Greenberg, Harvard Medical School, Departments of Microbiology and Neurobiology**
Investigated mechanisms of signaling from extracellular stimuli to local morphological responses in neurons. Discovered ephexin, a novel activator of Rho-family GTPases mediating neurite repulsion by ephrin molecules, and elucidated a complete signal transduction pathway involving Eph receptor-activated Src phosphorylation of ephexin. Developed novel knock-in and knock-out strategies for engineering mutant ephexin and BAD alleles in transgenic mice. In collaboration with Prof. Rosalind Segal, designed and constructed improved adenovirus systems for gene delivery.

7/1994-6/1996 *MD-PhD student,* **Laboratory of Prof. S. Larry Zipursky, UCLA School of Medicine, Department of Biological Chemistry and HHMI**
Mapped and identified the *rca* and *ebi* cell cycle control genes in the fly.

9/1991-6/1994 *Undergraduate thesis student,* **Laboratory of Prof. Fotis C. Kafatos, Harvard University, Department of Biology**
Identified P-element mutations in a screen for embryogenesis genes.

6/1990-9/1990 *Undergraduate research assistant*, **Protein engineering group of Dr. Margaret Moore, Hybritech Inc.**
Designed system for reporting protein interactions using beta-galactosidase fragment complementation.

TEACHING EXPERIENCE

2011-2013 **Stanford Depts. of Bioengineering, Chemical and Systems Biology, and Molecular and Cellular Physiology**
Head instructor for graduate molecular bioengineering laboratory course. Lecturer for courses in graduate protein engineering, graduate molecular imaging, graduate cell signaling, graduate quantitative cell biology, and undergraduate introduction to bioengineering.

1999 **Harvard Medical School Dept. of Neurobiology**
Teaching assistant in graduate developmental neurobiology with Profs. Christopher A. Walsh, David van Vactor, and Rosalind Segal.

1995, 1996 **UCLA Depts. of Biological Chemistry and Chemistry**
Teaching assistant in advanced undergraduate nucleic acid chemistry with Prof. Al Courey and in advanced undergraduate cell biology with Prof. Michael Grunstein.

1993, 1994 **Harvard University Depts. of Biology and Biochemistry**
Teaching fellow in genetics with Profs. William Gelbart and Matthew Meselson.

1991-1994 **Harvard University Bureau of Study Counsel**
Individual tutor to undergraduates in biology, chemistry, and physics.

AWARDS AND HONORS

Rising Star Award, Biomedical Engineering Society, Cellular and Molecular Bioengineering Special Interest Group, 1/2013.
Damon Runyon-Rachleff Innovation Award, 11/2012.
Rita Allen Foundation Scholar, 5/2011.
Burroughs Wellcome Career Award for Medical Scientists, 2007.
Jane Coffin Childs Memorial Research Fellowship, 2005.
Western Student Medical Research Forum Prize, 2004.
U.S. Department of Defense Graduate Fellowship, 1997.
NIH Medical Scientist Training Program Fellowship, 1994.
Harvard University Phi Beta Kappa Honors Society, 1994.
Harvard Public Service Abroad Fellowship, 1993.
Ford Undergraduate Research Fellowship, 1992, 1993.
John Harvard Scholarship for academic achievement, 1992, 1993, 1994.

INVITED TALKS

Johns Hopkins University Breast Cancer Research Program, Baltimore, MD, 5/2013.
University of Southern California Department of Chemistry Stauffer Sympoisum, Los Angeles, CA, 4/2013.
Protein Engineering: New Approaches and Applications, University of Chester, UK, 4/2013.
Biophysical Society Annual Meeting, New and Notable Symposium, Philadelphia, PA, 2/2013.
Janelia Fluorescent Proteins and Biological Sensors III Conference, Ashburn, VA, 11/2012.
Basic Biological Sciences seminar series, University of Bergen, Bergen, Norway, 9/2012.

EITA Young Investigator Conference, Palo Alto, CA, 7/2012.
Molecular and Cellular Cognition Society Meeting, Washington, DC, 11/2011.
Society for Neuroscience Annual Meeting, Minisymposium on Second Generation Optogenetic Tools, San Diego, CA, 11/2010.
UCSF Department of Radiology and Biomedical Imaging, San Francisco, CA, 10/2010.
Janelia Fluorescent Proteins and Biological Sensors II Conference, Ashburn, VA, 10/2009.
SPIE Photonics West, San Jose, CA, 1/2009.
Vollum Institute, Oregon Health Sciences University, Portland, OR, 1/2009.
European Genes at Work on Time Conference, Turin, Italy, 10/2008.
Neuroscience Institute at Stanford, Stanford, CA, 8/2008.
Stanford Department of Chemical and Systems Biology, Stanford, CA, 3/2008.
UCLA Center for Neurobehavioral Genetics, Los Angeles, CA, 2/2008.
HHMI Janelia Farm Research Campus, Ashburn, VA, 3/2007.
UCI Department of Biomedical Engineering, Irvine, CA, 3/2007.
American Society for Cell Biology Annual Meeting, Symposium on Synapse Assembly, San Diego, CA, 12/2006.
University of Rome and Centro Europeo Ricerca sul Cervello (CERC), Rome, Italy, 3/2006.
Univ. of Illinois at Urbana Champagne, Young Excellence in Bioengineering Seminar, Urbana, IL, 2/2006.

OTHER PROFESSIONAL ACTIVITIES

Guest Editor, Journal of Biomedical Optics, 2013.
Member, American Chemical Society, 2013-present.
Member, Protein Society, 2013-present.
Member, Biomedical Engineering Society, 2012-present.
Member, American Society for Biochemistry and Molecular Biology, 2011-present.
Member, American Society of Gene and Cell Therapy, 2010-present.
Member, Biophysical Society, 2008-present.
Member, American Society for Cell Biology, 2006-present.
Member, Society for Neuroscience, 2005-present.
Ad hoc reviewer for PLoS One, Chemistry and Biology, Journal of Neurophysiology, Brain Cell Biology, Cellular and Molecular Bioengineering, Trends in Biotechnology, PNAS, Science Signaling, Nature Biotechnology, Nature Methods, and Nature.

PATENTS

Chu J, **Lin MZ.** 2012**.** Far-red Fluorescent Proteins with Improved Detectability by Red Excitation Light. Provisional Application for Patent.

Zhou X, **Lin MZ**. 2012. Optical Control Of Protein Activity And Localization by Fusion to Photochromic Fluorescent Protein Domains. Provisional Application for Patent.

Lin MZ, Tsien RY. 2008. Drug Controlled Molecular Tags. International Application Serial Number PCT/US2007/021077.

Shaner N, **Lin MZ**, McKeown MR, Tsien RY. 2008. Fluorescent Proteins with Increased Photostability. US Application Serial number 12/259,089.

PUBLICATIONS

Chu J, Haynes RD, Corbel SY, González-González E, Cranfill PJ, Baird M, Davidson MW, Contag CH, Blau HM, **Lin MZ**. Non-invasive high-resolution imaging of muscle regeneration with a new red-absorbing fluorescent protein. *In review at Nature Biotechnology*.

Chu J, Xing Y, **Lin MZ**. Far-red fluorescent proteins: mechanisms and applications. *The Fluorescent Protein Revolution*. Day R and Davidson M, Eds. (CRC Press, Boca Raton). *In press*.

Miranda JG, Weaver AL, Qin Y, Park JG, Stoddard CI, **Lin MZ**, Palmer AE. New Alternately Colored FRET Sensors for Simultaneous Monitoring of Zn2+ in Multiple Cellular Locations. *PLoS One*, 2012 7:e49371.

Timmers M, Yang J, Geng Y, Kim HJ, Jeon NL, Shu X, Mackey MR, Ellisman MH, Tsien RY, **Lin MZ**. 2012. Fluorescent and photo-oxidizing TimeSTAMP tags track protein fates in light and electron microscopy. *Nature Neuroscience* 15:1742-1751.

Zhou XX, Chung HK, Lam AJ, **Lin MZ**. 2012. Optical control of protein activity by fluorescent protein domains. *Science* 9:810-814.

Lam A, St-Pierre F, Gong Y, Marshall JD, Cranfill PJ, Baird MA, McKeown MR, Wiedenmann Jörg, Davidson MW, Schnitzer MJ, Tsien RY, **Lin MZ.** 2012. Improving FRET dynamic range with bright green and red fluorescent proteins. *Nature Methods* 9: 1005-1012. (Most downloaded *Nature Methods* article in October 2012.)

Lin MZ. 2011. Beyond the rainbow: New fluorescent proteins brighten the infrared scene. *Nature Methods* 8:726-728.

Knopfel T, **Lin MZ**, Levskaya A, Tian L, Lin JY, Boyden ES. 2010. Towards the second generation of optogenetic tools. *Journal of Neuroscience* 30:14998-15004.

Lin MZ, Miyawaki A, Tsien RY. 2010. Fluorescent proteins illuminate cell biology (poster). *Nature Reviews Molecular Cell Biology*. 2010 Oct.

De Jaco A, **Lin MZ**, Dubi N, Comoletti D, Miller M, Camp S, Ellisman M, Bukto MT, Tsien RY, Taylor P. 2010. Neuroligin trafficking deficiencies arising from mutations in the alpha/beta-hydrolase fold family. *Journal of Biological Chemistry* 285:28674-28682.

Lin MZ, Tsien RY. TimeSTAMP tagging of newly synthesized proteins. 2010. *Current Protocols in Protein Science* 2010 Feb.; Chapter 26: Unit 26.5.

Lin MZ, McKeown MR, Aguilera T, Shaner NC, Campbell RE, Adams SR, Tsien RY. 2009. Autofluorescent proteins with excitation in the optical window for intravital imaging in mammals. *Chemistry and Biology* 16:1169-1179.

Shu X, Royant A, **Lin MZ**, Aguilera T, Levram-Ellisman V, Steinbach PA, Tsien RY. 2009. Mammalian expression of infrared fluorescent proteins engineered from a bacterial phytochrome. *Science* 324:804-807.

Lin JY, **Lin MZ**, Steinbach P, Tsien RY. 2009. Characterization of engineered channelrhodopsin variants with improved properties and kinetics. *Biophysical Journal* 96: 1803-1814.

Lin MZ, Wang L. 2008. Selective labeling of proteins with chemical probes in living cells. *Physiology* 23: 131-141.

Lin MZ, Glenn JS, Tsien RY. 2008. A drug-controllable tag for specific labeling of newly synthesized proteins in cells and whole animals. *PNAS* 105: 7744-7749. (Cover article, featured in "A time stamp for proteins" *Nature Method*s 5: 662-663.)

Shaner NC, **Lin MZ**, McKeown MR, Steinbach PA, Hazelwood KL, Davidson MW, Tsien RY. 2008. Improving the photostability of bright monomeric orange and red fluorescent proteins. *Nature Methods* 5: 545-551

Sahin M*, Greer PL*, **Lin MZ***, Poucher H, O'Connell S, Schmidt S, Wright TM, Shamah SM, Eberhart J, Cowan CW, Hu L, Goldberg JL, Debant A, Corfas G, Krull CE, Greenberg ME. 2005. Eph-dependent tyrosine phosphorylation of ephexin1 modulates growth cone collapse. *Neuron* 46: 191-204. *Equal authorship. (Featured in "New Exchanges in Eph-Dependent Growth Cone Dynamics" *Neuron* 46: 141.)

Cowan CW, Shao YR, Sahin M, Shamah SM, **Lin MZ**, Greer PL, Gao S, Griffith EC, Brugge JS, Greenberg ME. 2005. Vav family GEFs link activated Ephs to endocytosis and axon guidance. *Neuron* 46: 205-217.

Lin MZ, Teitell M, Schiller G. 2005. The evolution of antibodies into versatile tumor targeting agents. *Clinical Cancer Research* 11: 129-138.

Zhang X, Boles RG, Law SK, **Lin M**. 2004. Ocular findings in geleophysic dysplasia. *Journal of the American Association for Pediatric Ophthalmology and Strabismus* 8:198-200.

Datta SR, Ranger AM, **Lin MZ**, Sturgill JF, Ma YC, Cowan CW, Dikkes P, Korsmeyer SJ, Greenberg ME. 2002. Survival factor-mediated BAD phosphorylation raises the mitochondrial threshold for apoptosis. *Developmental Cell* 3: 631-643.

Watson FL, Heerssen HM, Bhattacharyya A, Klesse L, **Lin MZ**, Segal RA. 2001. Neurotrophins use the Erk5 pathway to mediate a retrograde survival response. *Nature Neuroscience* 4: 981-988.

Shamah SM*, **Lin MZ***, Goldberg JL, Estrach S, Sahin M, Hu L, Bazalakova M, Neve RL, Corfas G, Debant A, Greenberg ME. 2001. EphA receptors regulate growth cone dynamics through the novel guanine nucleotide exchange factor ephexin. *Cell* 105:233-244. *Equal authorship. (Featured in "Signaling Downstream of Eph Receptors and Ephrin Ligands" Cell 105: 701.)

Sun Y, Nadal-Vicens M, Misono S, **Lin MZ**, Zubiaga A, Hua X, Fan G, Greenberg ME. 2001. Neurogenin promotes neurogenesis and inhibits glial differentiation by independent mechanisms. *Cell* 104: 365-376.

Dalva MB, Takasu MA, **Lin MZ**, Shamah SM, Hu L, Gale NW, Greenberg ME. 2000. EphB receptors interact with NMDA receptors and regulate excitatory synapse formation. *Cell* 103:945-56

Lin MZ, Greenberg ME. 2000. Orchestral maneuvers in the axon: Trio and the control of axon guidance. *Cell* 101:239-42.

Brunet A, Bonni A, Zigmond MJ, **Lin MZ**, Juo P, Hu LS, Anderson MJ, Arden KC, Blenis J, Greenberg ME. 1999. Akt promotes cell survival by phosphorylating and inhibiting a Forkhead transcription factor. *Cell* 96:857-68.

Watson FL, Heerssen HM, Moheban DB, **Lin MZ**, Sauvageot CM, Bhattacharyya A, Pomeroy SL, Segal RA. 1999. Rapid nuclear responses to target-derived neurotrophins require retrograde transport of ligand-receptor complex. *Journal of Neuroscience* 19:7889-900.

Dong X, Tsuda L, Zavitz KH, **Lin M**, Li S, Carthew RW, Zipursky SL. 1999. ebi regulates epidermal growth factor receptor signaling pathways in Drosophila. *Genes & Development* 13:954-65.

Dong X, Zavitz KH, Thomas BJ, **Lin M**, Campbell S, Zipursky SL. 1997. Control of G1 in the developing *Drosophila* eye: *rca1* regulates Cyclin A. *Genes & Development* 11:94-105.