

University of California, San Francisco
CURRICULUM VITAE

Name: Daniel Amos Lim, MD, PhD

Position: Associate Professor In Residence, Step 1
Neurological Surgery
School of Medicine

Address: Box 0525
35 Medical Center Way, RMB 1037
University of California, San Francisco
San Francisco, CA 94143
Voice: 476-8138
Fax: 514-2346
Email: limd@neurosurg.ucsf.edu

EDUCATION

1990 - 1994	University of California, Berkeley	A.B.	Biochemistry
1994 - 2001	Rockefeller University	Ph.D.	Neuroscience
1994 - 2002	Cornell University Medical College	M.D.	Medicine
2002 - 2003	University of California, San Francisco	Intern	General Surgery
2003 - 2007	University of California, San Francisco	Resident	Neurological Surgery
2007 - 2008	University of California, San Francisco	Chief Resident	Neurological Surgery

LICENSES, CERTIFICATION

2002	California Medical License A87344
2015	Certified Diplomate, American Board of Neurological Surgery

PRINCIPAL POSITIONS HELD

06/2008 - 07/2015	University of California, San Francisco	Assistant Professor	Dept. of Neurological Surgery
06/2008 - present	San Francisco Veteran's Affairs Medical Center (SFVAMC)	Neurosurgeon- Researcher	Surgery Service
06/2008 - present	San Francisco Veteran's Affairs Medical Center (SFVAMC)	Neurosurgeon	Parkinson's Disease Research and Clinical Center (PADRECC)
07/2015 - present	University of California, San Francisco	Associate Professor	Dept. of Neurological Surgery

OTHER POSITIONS HELD CONCURRENTLY

06/2008 - present	Biomedical Sciences (BMS), UCSF	Faculty Member
06/2008 - present	Eli and Edythe Broad Center of Regeneration Medicine and Stem Cell Research, UCSF	Faculty Member
06/2008 - present	Restorative Neurosurgery, Dept. of Neurological Surgery, UCSF	Director
01/2009 - present	Molecular Medicine Pathway (MMP), UCSF	Faculty Member
06/2010 - present	Development and Stem Cell Biology (DSCB), UCSF	Faculty Member
08/2015 - present	Program in Biological Sciences (PIBS), UCSF	Faculty Member

HONORS AND AWARDS

1990	Undergraduate scholarship	National Merit
1990	Regents' undergraduate scholarship	University of California
1993	Undergraduate fellowship	Howard Hughes Medical Institute
1993	Alpha Chapter membership	Phi Beta Kappa
1994	Yanaba-Jung Memorial Research Award	University of California, Berkeley
1994	Medical Scientist Training Grant	National Institutes of Health
2005	Young Investigator Award	UCB Pharma
2006	Boldrey Award for Neuroscience Research	San Francisco Neurological Society
2008	Boldrey Award for Neuroscience Research	San Francisco Neurological Society
2009	Distinguished Researcher Award	Sontag Foundation
2009	NIH Director's New Innovator Award	National Institutes of Health
2010	Kavli Fellow	U.S. National Academy of Sciences

KEYWORDS/AREAS OF INTEREST

Stem cells, adult neurogenesis, chromatin regulators, long non-coding RNA (lncRNA), epigenetics, cell transplantation, gene therapy, stereotactic neurosurgery, MRI-guided neurosurgery, neurodegenerative disease, Parkinson's disease, demyelinating diseases

CLINICAL ACTIVITIES SUMMARY

Attending Neurosurgeon, UCSF/SFVAMC: Since 2008, I have been performing general neurosurgery cases with a resident one day per week. This activity includes resident supervision and direct performance of the clinical assessment, preoperative workup, surgical

procedures, and postoperative care. I also see new and follow-up patients in clinic one-half day per week.

Attending Neurosurgeon, Parkinson's Disease Research and Clinical Center (PADRECC), San Francisco, SFVAMC: Since 2008, approximately 25% of my surgical cases have been related to deep brain stimulation for Parkinson's disease and other movement disorders.

MEMBERSHIPS

- 2003 - present American Association of Neurological Surgery (AANS)
- 2003 - present Congress of Neurological Surgeons (CNS)
- 2003 - present AANS/CNS Tumor Section
- 2009 - present American College of Surgeons (ACS)
- 2009 - present Society for Neuroscience (SfN)
- 2010 - present International Society for Stem Cell Research (ISSCR)
- 2012 - present American Society of Stereotactic and Functional Neurosurgery (ASSFN)
- 2014 - present American Society of Gene & Cell Therapy (ASGCT)

SERVICE TO PROFESSIONAL ORGANIZATIONS

- 2012 - American Society of Stereotactic and Functional Neurosurgery (ASSFN) Co-director of biennial meeting (Local Chairman)
- 2016 - International Society for Stem Cell Research (ISSCR) Meeting abstract reviewer

SERVICE TO PROFESSIONAL PUBLICATIONS

- 2008 - 2014 Referee for the following journals: Nature (9 papers since 2009), Nature Neuroscience (3 papers since 2010), Nature Methods (1 paper since 2010), Cell (1 paper since 2011), Cell Stem Cell (22 papers since 2010), Cell Reports (2 papers since 2014), Neuron (22 papers since 2009), Developmental Cell (4 papers since 2012), Genes and Development (1 paper since 2010), New England Journal of Medicine (1 paper since 2012), Journal of Neuroscience (20 papers since 2009), Neuroscience (2 papers since 2009), International Journal of Dev. Neuroscience (1 paper since 2011), Oncogene (1 paper since 2011), Journal of Neurooncology (8 papers since 2010), Neoplasia (1 paper since 2011), Neuro-Oncology (1 paper since 2010), Aging Cell (1 paper since 2010), Neurosurgery (3 papers since 2009), Behavioral Brain Research (1 paper since 2011), Brain (1 paper since 2011), Journal of Comparative Neurology (2 papers since 2011), Developmental Biology (1 paper since 2011), Molecular Psychiatry (1 paper since 2010), PLOS Genetics (1 paper since 2014), Nature Communications (2 papers since 2014), ACS Chemical Neuroscience (1 paper since 2014), Genome Medicine (1 paper since 2014).

2015 - present Nature (3), Cell Stem Cell (3), Neuron (2), Genes and Development (1), Developmental Cell (3), Cell Reports (2), PNAS (1), Journal of Neuroscience (2), Nature Communications (1), Scientific Reports (1), Bioinformatics (1), Developmental Biology (2), Cellular Physiology and Biochemistry (1), Molecular Biology of the Cell (1), Journal of Cell Biology (1), Journal of Neuro-Oncology (1), Oncotarget (2)

2015 - present Guest Associate Editor: PLOS Genetics

2016 - present Editorial Board Member: Stem Cells Reviews and Reports

INVITED PRESENTATIONS - INTERNATIONAL

2008	Mission "Stem Cells" France, Institut de Biologie du Développement, Marseille Luminy	Invited Speaker
2010	IFOM, European Institute of Oncology, Milan, Italy	Invited Speaker
2013	International Society for Stem Cell Research (ISSCR), Boston, MA.	Speaker
2013	8th Annual Symposium, Seoul National University, Movement Disorders Center, Seoul, Korea	Invited Speaker
2013	International Joint Symposium on the Advancements in Neurosurgery, Seoul National University, Seoul, Korea	Invited Speaker
2014	International Society for Stem Cell Research (ISSCR), Vancouver, Canada	Speaker
2014	Guangzhou International Conference on Stem Cell and Regenerative Medicine, Guangzhou, China	Invited Speaker
2016	Lund University, Lund, Sweden	Invited Lecture

INVITED PRESENTATIONS - NATIONAL

2004	American Association of Neurological Surgeons, Tumor Section, SF, CA	Speaker
2004	Society of Neuro-oncology, Toronto, Canada	Speaker
2009	American Association of Neurological Surgeons, San Diego, CA	Session Discussant
2010	Kavli Frontiers of Science Symposium, U.S. National Academy of Sciences	Invited Speaker
2011	American Association of Cancer Research, Orlando, FL	Invited Speaker
2012	American Society of Stereotactic and Functional Neurosurgery, SF, CA.	Speaker
2013	Congress of Neurological Surgeons, SF, CA	Speaker

2013	CIRM Annual Grantee meeting, SF, CA	Plenary Session Speaker
2014	International Conference on Brain Tumor Research, Lake Tahoe, CA	Speaker
2014	Gordon Conference, Neural Development, Newport, RI	Invited Speaker
2015	Keystone Symposium, Epigenetic and Transcriptional Influences on Stem Cell States, Steamboat Springs, CO	Invited Speaker
2015	Gordon Conference, Tissue Repair and Regeneration, Colby Sawyer College, NH	Invited Speaker
2015	Society of Neuro-oncology - Society for CNS Interstitial Delivery of Therapeutics Joint Conference, San Antonio, TX	Invited Speaker
2016	American Association of Neurological Surgeons, Chicago, IL	Speaker

INVITED PRESENTATIONS - REGIONAL AND OTHER INVITED PRESENTATIONS

1994	Cold Spring Harbor Laboratories, Cold Spring Harbor, NY	Speaker
1999	Sackler Institute for Neurobiology, NY, NY	Speaker
1999	Affymetrix Corporation, Santa Clara, CA	Speaker
2001	Grand Rounds, Dept. of Neurosurgery, University of California, San Francisco	Speaker
2003	Sami Disharoon Foundation, San Francisco, CA	Speaker
2006	San Francisco Neurological Society, Boldrey Award Lecture, Napa, CA	Speaker
2006	Affymetrix Microarray Bulletin Symposium, webcast from San Francisco, CA	Speaker
2007	Cancer Center/Genetics Department, Dartmouth University, Hanover, NH	Speaker
2007	Grand Rounds, Dept. of Neurosurgery, Dartmouth University, Hanover, NH	Speaker
2007	Smilow Neuroscience Institute, New York University, NY, NY	Speaker
2007	Grand Rounds, Dept. of Neurosurgery, Brigham and Women's Hospital, Boston, MA	Speaker
2008	Dana Farber Cancer Institute, Boston, MA	Speaker
2008	San Francisco Neurological Society, Boldrey Award Lecture, Monterey, CA	Speaker
2008	UCSF Biomedical Sciences Retreat, Lake Tahoe, CA	Speaker
2008	Veteran's Affairs Medical Center, San Francisco, CA	Speaker
2008	UCSF Biomedical Science Faculty Lunch	Speaker
2009	UCSF Annual Stem Cell Retreat, Asilomar, CA	Speaker
2009	Parkinson's Disease Research and Education Center, SFVAMC, San Francisco, CA	Speaker
2009	UCSF Biomedical Science Retreat, Session Chair, Lake Tahoe, CA	Speaker

2009	Department of Defense, Veteran's Affairs Medical Center, San Francisco, CA	Speaker
2009	Parkinson's Disease Research and Education Center, Videocast, San Francisco, CA	Speaker
2010	Eli and Edythe Broad Centers of Regeneration Medicine and Stem Cell Research (UCSF, USC, UCLA) Retreat, Asilomar, CA	Speaker
2010	NCIRE/DoD, Brain at War Symposium, San Francisco, CA	Speaker
2010	Washington Hospital Healthcare System, Fremont, CA	Speaker
2011	St. Jude Children's Hospital, Chemical Biology Department, Memphis, TN	Speaker
2011	UCSF Neurosurgery Update, Napa, CA	Speaker
2013	NIH-CIRM Cell Therapies for Parkinson's Disease Workshop, Oakland, CA	Speaker
2013	CIRM Bridges Meeting, San Francisco, CA	Speaker
2013	Developmental and Stem Cell Biology program, Annual Retreat, Marconi Center, CA	Speaker
2013	Baylor College of Medicine, Center for Cell and Gene Therapy, Houston, TX	Speaker
2013	Dept. of Bioengineering, BE290H, University of California, Berkeley.	Speaker
2013	Dept. of Experimental Pathology, University of California, Irvine.	Speaker
2013	Cell Biology Research and Development, Clontech Laboratories, Inc., Mountain View, CA.	Speaker
2014	Institute for Cell Engineering, Johns Hopkins University, Baltimore, MD	Speaker
2014	Dept. of Neuroscience, Ohio State University, Columbus, OH	Speaker
2014	Dept. of Molecular Medicine, University of Texas Health Science Center, San Antonio, TX	Speaker
2015	Parkinson's Disease Research and Education Center, San Francisco, CA	Speaker
2015	Dept. of Neurosurgery, Mayo Clinic, Rochester, MN	Speaker
2015	NIH SPORE annual meeting, MD Anderson Cancer Center, Houston, TX	Speaker
2015	Pfizer CTI annual meeting, Pfizer Global Headquarters, NY, NY	Speaker
2015	Association of Health Care Journalists, Santa Clara, CA	Speaker
2015	Developmental Neuroscience Seminar, Cleveland Clinic, Cleveland, OH	Speaker
2016	Johns Hopkins University School of Medicine, Baltimore, MD	Speaker

GOVERNMENT AND OTHER PROFESSIONAL SERVICE

2008 - 2008	University of Michigan Geriatrics Center	ad hoc Grant Reviewer
2008 - 2013	Medical Research Council (MRC), London	ad hoc Grant Reviewer

2009 - 2009	Indo-US Science & Technology Forum, Smithsonian Institution, Washington DC	ad hoc Grant Reviewer
2011 - 2011	U.S. Civilian Research and Development Foundation, Arlington, VA	ad hoc Grant Reviewer
2011 - 2011	Arizona Biomedical Research Commission	ad hoc Grant Reviewer
2011 - 2015	Associazione Italiana per la Ricerca sul Cancro, Milan, Italy	ad hoc Grant Reviewer
2012 - 2012	NIH Common Fund Strategic Planning Forward Focus Workshop	Presenter
2012 - 2014	The Thiel Foundation, Breakout Labs	ad hoc Grant Reviewer
2014 - 2015	Society of Neuro-Oncology (SNO)	Abstract Reviewer
2016 - 2016	Netherlands Organization for Scientific Research	ad hoc Grant Reviewer
2016 - 2016	International Society for Stem Cell Research (ISSCR)	Abstract Reviewer
2016 -	NIH/NINDS Study Section ZNS1 SRB-N (10)	ad hoc Reviewer
2016 -	Swiss National Science Foundation	ad hoc Reviewer

SERVICE ACTIVITIES SUMMARY

For the medical and graduate school programs at UCSF, I participate in both educational and recruitment efforts. In addition to being a regular interviewer for the MSTP, BMS, and DSCB programs, I also serve as a member of the DSCB admissions committee, helping identify and recruit top candidates to this growing program. More recently, I was invited to serve as a member of the BMS Course Curriculum Committee to provide input regarding the changing educational needs of our student body. For the Eli and Edythe Broad Center of Regenerative Medicine, I have served as a session chair (2009) and also as co-chair (2010) of the Annual Retreat, which now includes multiple institutions outside of UCSF. From 2009-2010, I organized the Bay Area Stem Cell Club seminar series, coordinating the invitations and visits of speakers from Stanford, Berkeley, and UCSF. For the Department of Neurological Surgery, I have been the Director of the Resident Journal Club educational series, which is a core component of their training program. I am also an Internal Advisory Board member of an NIH U54 grant lead by colleagues at UCSF. I have served on the Human Gamete, Embryo and Stem Cell Research Committee (GESCR) since 2010, evaluating proposals for both scientific quality and ethical considerations. Also since 2010, I have served as a voting member of the SFVAMC Research and Development Committee, helping ensure that research at that UCSF-affiliated campus is conducted with appropriate oversight. In 2008, I served on a Root Cause Analysis committee at the SFVAMC, working to identify systems issues and implement changes that may improve patient care. In 2010, 2012, and 2013, I also served as an expert medical reviewer for the SFVAMC, to help identify and rectify other patient care issues. To provide service to the broader research community, I serve as an ad hoc grant reviewer for a number of national and international funding agencies. I am a frequent reviewer for a wide range of publications including both basic science and clinical research journals. In

2012, I served as the local chairman and co-chair of the biannual conference of the American Society of Stereotactic and Functional Neurosurgery.

UCSF CAMPUSWIDE

2010 - present	Human Gamete, Embryo and Stem Cell Research Committee	Member
2013 - present	BMS Course Curriculum Committee	Member
2014 - present	QB3, Rosenman Institute	Scientific Advisory Board Member
2015 - present	Faculty Philanthropy Committee	Member

SCHOOL OF MEDICINE

2008 - present	Medical Sciences Training Program (MSTP)	Interviewer
2009 - present	Biomedical Sciences (BMS) Program	Interviewer
2012 - present	Developmental and Stem Cell Biology (DSCB) Program	Member, Admissions Committee
2013 - present	Biomedical Sciences (BMS) Program	Member, Course Curriculum Committee

DEPARTMENTAL SERVICE

2007 - 2008	Department of Neurosurgery, Residency Education Committee	Member
2009 - 2009	Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research at UCSF, Annual Retreat	Session Chair
2009 - 2010	Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research at UCSF, Bay Area Stem Cell Club	Director
2009 - present	Department of Neurosurgery, Resident Journal Club	Director
2010 - 2010	Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research at UCSF, Annual Retreat	Co-Chair
2012 - present	Department of Neurosurgery, U54 Brain Tumor Microenvironment Research Grant (PI: Bergers and Weaver), Internal Advisory Board	Member

COMMUNITY AND PUBLIC SERVICE

1999 - 2002	The Millennium Kids Foundation (A non-profit organization supporting the development of school-based health clinics in Harlem, NYC.)	President and Chair of the Board of Directors
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TEACHING SUMMARY

As a member of the Biomedical Sciences (BMS), Developmental and Stem Cell Biology (DSCB) graduate school programs, and medical school faculty, I teach in both formal and informal contexts. Since 2008, I have served on 7 graduate school PhD qualifying exam committees. I have also mentored a number of students for the proposals and oral

presentations for the BMS 225A course. At least once a year, I have served as a journal club "coach" for the BMS and DCSB student journal club series. Since 2011, I have been the co-director and lecturer of a BMS 270 mini-course, " Epigenetics in development and disease," which has been very well received by students and generally oversubscribed. For DSCB 257/BMS 220, I am a regular lecturer. From 2008-2011, I served as a lecturer and small group leader for the medical school NEURO 110 course, providing instruction about common neurological diseases. For the MSTP curriculum, I have instructed four MSTP students in the MED 160.04 clinical preceptorship. Since 2013, I have served on the BMS Course Curriculum Committee, to help design a new educational curriculum to meet the changing needs of our students.

For the Department of Neurosurgery residency training program, I instruct fourth year residents in outpatient clinical evaluation, operative techniques, and postoperative neurosurgical care. I also regularly present at the Clinical Case Conference series for neurosurgery residents, to provide more didactic teaching.

As Principle Investigator of a basic science laboratory, I am responsible for the training and supervision of postdoctoral fellows, graduate students, and medical students. I meet with each individual trainee at least one hour every other week and provide guidance about all aspects of experimental design and analysis. I provide feedback regarding the composition of all manuscripts and fellowship applications.

FORMAL TEACHING

Not UCSF	Academic Yr	Course No. & Title	Teaching Contribution	School	Class Size
	2008 - present	MED 160.04	MSTP Clinical Preceptor		1
	2008 - 2011	NEURO 110	Lecturer and small group leader		4-25
	2010 -	Stanford University, HumBio 19-SI (Stem Cells: Multidisciplinary Perspective)	Guest Lecturer		
	2011 - present	BMS 270: Epigenetics in development and disease	Co-director, lecturer		12
	2011 - 2012	California Institute for Regenerative Medicine (CIRM), Stem Cell Course for postdoctoral fellows, UCSF	Lecturer		
	2012 - 2013	DSCB 257/BMS 220	Lecturer		15

Not UCSF	Academic Yr	Course No. & Title	Teaching Contribution	School	Class Size
	2013 -	U.C. Berkeley, Bioengineering graduate school class, Medical Devices	Guest Lecturer		
	2015 -	DSCB 257: Developmental & Stem Cell Biology	Lecturer		15

INFORMAL TEACHING

- 2008 - BMS 225A, Faculty Advisor for 2 student proposals
- 2008 - present Examiner for PhD qualifying exam for BMS, Tetrad, and DSCB graduate students (7 exam committees since 2008)
- 2008 - present BMS and DSCB journal club student advisor (8 students since 2008)
- 2010 - Mentor for O.R. Assist: Clinical Experience Elective (UCSF)
- 2011 - 2012 Mentor for visiting high school student (2 summers)
- 2014 - present NSF fellowship application advisor for BMS and DSCB students

MENTORING SUMMARY

As Principle Investigator of a basic science laboratory, I mentor a wide diversity of postdoctoral fellows, graduate students, medical students, visiting students, and staff research associates. Since 2008, I have been the primary mentor to 8 postdoctoral fellows, 6 graduate students, 3 medical students, 4 staff research associates (SRA), and 1 high school student. I have been committed to providing mentorship tailored to the career objectives of each individual trainee. For instance, one of my early postdoctoral fellows (Ki-Youb Park) expressed an interest in a teaching position in Korea, and she successfully obtained such a position in 2012. Another postdoctoral fellow (Bill Hwang) wanted to work in the biotechnology industry, and he is now a senior scientist at Radiant Genomics in Emeryville, CA.

By working closely with my graduate and medical students, all of them have been successful at obtaining fellowships from the NIH, CIRM, NSF, or HHMI. My first graduate student (Alex Ramos, MSTP) obtained his PhD in 2014, and he is interested in a neurosurgical research career. I have been working with him closely to ensure that his research and clinical trajectory will position him well for a research-oriented neurosurgical residency. One of my HHMI medical student fellows (Ryan Salinas, MD, UCSF 2014) is also interested in a neurosurgical research career, and in addition to mentoring him in the publication of his experimental work, I provided detailed advice about his residency applications, interviews, and the interactions involved in matching to an ideal training program. I have provided similar career guidance to other medical students, including several MSTP students who did not work in my lab. I have also been keenly interested in extending similar mentorship to SRAs. Three of my recent SRAs have contributed significantly to scientific manuscripts, earning them authorship of published experimental works, and they have all obtained postgraduate training positions of their first choice (two are students at a UCSF graduate school program and one is an MSTP student at Ohio State). The one high school student who worked in my lab for three summers

in a row has developed a very strong commitment to basic science research, and I am proud to report that he started his undergraduate students at Stanford this fall (2014).

PREDOCTORAL STUDENTS SUPERVISED OR MENTORED

Dates	Name	Program or School	Mentor Type	Role	Current Position
1997 - 1997	Dhruv Kaushal	Rockefeller University		Research Mentor (summer intern)	Patent Attorney, Bingham McCutchen, Boston
1998 - 2001	Melanie Napier	Rockefeller University		Research Mentor (Intel Competition - semifinalist)	Research, Robert Wood Johnson Foundation
1999 - 2000	Masafumi Muritani	Rockefeller University		Research Mentor (summer intern)	Genome Institute of Singapore
2006 - 2007	Anika Mirick	Dartmouth University		Research Mentor (co-advisor, BA thesis)	Resident Physician, U. of Washington, Seattle
2008 - 2008	Carly Christensen	UCSF		Research Mentor (summer intern)	Nursing School, UCSF
2008 - 2011	Jason Siu	SF State University		Research Mentor (post-baccularate work)	MSTP student, University of Ohio
2008 - 2009	Catherine Christie	Medical School, UCSF		Research Mentor	Resident Neurosurgeon, UC Irvine
2009 - 2009	Brett Johnson	BMS Program, UCSF		Research Mentor (lab rotation)	Postdoctoral fellow
2009 - 2013	Mantissa Johnston	BMS Program, UCSF (NIH NIGMS fellow)		Research Mentor (thesis advisor)	Obtained M.A. degree

Dates	Name	Program or School	Mentor Type	Role	Current Position
2009 - 2009	Beatriz Aldaz	University of Navarra, Pamplona, Spain		Research Mentor (visiting lab rotation)	Postdoctoral Fellow, MSKCC, NY
2010 - 2014	Ryan Salinas	HHMI medical student fellow, UCSF		Research Mentor (MD honors thesis advisor)	Neurosurgery resident, U. Penn.
2010 - 2014	Alex Ramos	MSTP, UCSF (NIH F31 fellowship)		Research Mentor (PhD thesis advisor)	PhD awarded 2014, now on clinical rotations, UCSF
2010 - present	Fong Koh	BMS Program, UCSF		Member, PhD thesis committee	Graduate student, UCSF
2010 - 2014	Brett Johnson	BMS Program, UCSF		Chair, PhD thesis committee	Postdoctoral fellow
2010 - 2015	Ryan Delgado	MSTP, UCSF (CIRM fellowship)		Research Mentor (PhD thesis advisor)	PhD awarded 2015, now on clinical rotations, UCSF
2010 - 2014	Pankaj Sahai	BMS Program, UCSF		Chair, PhD thesis committee	Postdoctoral fellow, UCSD
2010 - 2010	Paola Castro	University of Castilla, la Mancha		Research Mentor (visiting lab rotation)	Graduate student, Spain
2010 - 2014	Ian Vaughn	Tetrad Graduate Program, UCSF		Member, PhD thesis committee	PhD awarded 2014
2011 - present	Siang Yun Ang	BMS Program, UCSF		Member, PhD thesis committee	Graduate student, UCSF

Dates	Name	Program or School	Mentor Type	Role	Current Position
2012 - present	Dylan Lowe	BMS Program, UCSF		Faculty advisor	Graduate student, UCSF
2012 - present	Sung Hong	SF State University (CIRM Bridges Program)		Research Mentor (MA thesis advisor)	Lim Lab
2013 - present	Rebecca Anderson	DSCB Program, UCSF (NSF fellowship)		Research Mentor (PhD thesis advisor)	Lim Lab
2013 - present	S. John Liu	MSTP, UCSF		Research Mentor (PhD thesis advisor)	Lim Lab
2014 - 2015	Hosnya Zarabi	HHMI medical student fellow, Chicago Medical School		Research Mentor	Chicago Medical
2015 - present	Daniel He	DSCB Program, UCSF		Research Mentor (PhD thesis advisor)	Lim Lab
2015 - present	Harjus Birk	HHMI medical student fellow, UCSF		Research Mentor (MD honors research thesis)	Lim Lab

POSTDOCTORAL FELLOWS AND RESIDENTS MENTORED

Dates	Name	Fellow	Mentor Role	Faculty Role	Current Position
2005 - 2007	Yin-Cheng Huang, MD	Postdoctoral Researcher		Research Mentor	Researcher, ChangGung University, Taiwan

Dates	Name	Fellow	Mentor Role	Faculty Role	Current Position
2009 - 2012	Ki Youb Park, PhD (2009, U. of Iowa)	Postdoctoral Researcher		Research Mentor	Korea Institute for Advanced Studies, Seoul, Korea
2009 - 2014	William Hwang, PhD (2009, UCSF)	Postdoctoral Researcher		Research Mentor	Senior Scientist, Radiant Genomics, Emeryville, CA
2009 - 2015	Dae Hwi Park, PhD (2008, UC Davis)	Postdoctoral Researcher		Research Mentor	Senior Scientist, GreenCross, LTD, Seoul, Korea
2010 - 2013	Gabriel Roybal, PhD (2010, UC Santa Cruz)	Postdoctoral Researcher (NIH ISIS fellow)		Research Mentor	Medical Leave
2011 - 2012	Mathew Potts, MD (2005, UCSF)	Postdoctoral Researcher (NIH F32/NRSA Fellow)		Research Mentor	Assistant Professor, Northwestern University
2011 - 2012	Marcus Zacharia, PhD (2009, UCSF)	Medical Student		Career Mentor	Resident, Neurosurgery, MGH, Harvard
2012 - 2014	Dali Yin, MD, PhD	Assistant Researcher		Research Mentor	Fellow, Functional Neurosurgery, U. of Illinois, Chicago
2014 - 2015	Frank Attenello, MD (2009, Johns Hopkins University)	Postdoctoral Researcher		Research Mentor	Chief Resident, USC

Dates	Name	Fellow	Mentor Role	Faculty Role	Current Position
2014 - present	Martina Malatesta, PhD (2009, University of Rome)	Postdoctoral Researcher		Research Mentor	Lim Lab
2016 - present	Sajad Hamid, PhD (2013, University of Pune, India)	Postdoctoral Researcher		Research Mentor	Lim Lab
2016 - present	Miao Cui, PhD (2016, Cal Tech)	Postdoctoral Researcher		Research Mentor	Lim Lab

VISITING FACULTY MENTORED

2014 - 2015 Changqing Lu, PhD Department of Anatomy, Sichuan University, China

RESEARCH AND CREATIVE ACTIVITIES SUMMARY

Chromatin regulators in neural development and disease

The ability of stem cells to self-renew and produce multiple daughter cell lineages requires the expression of certain sets of genes, repression of other loci, and transcriptional “plasticity” of many others. In normal development, such genome-wide transcriptional programs are in part regulated by chromatin structure – the “packaged” state of DNA with histone proteins. Genomic studies of neurodevelopmental and psychiatric disorders have revealed mutations in many chromatin regulators. Furthermore, chromatin regulators are frequently mutated or aberrantly expressed in brain tumors.

The Polycomb group (PcG) and trithorax group (trxG) factors are part of an evolutionarily conserved cellular “memory” system that specify cell identity by regulating the chromatin state of specific loci. We found that trxG member MLL1 is required for neurogenesis – but not gliogenesis – from neural stem cells (NSCs) in the adult mouse brain ventricular-subventricular zone (V-SVZ) (Lim, Nature, 2009; Potts, Neurosurgery, 2014). Without MLL1, key neurogenic genes are enriched with histone-3 lysine-27 trimethylation (H3K27me3), a chromatin modification that correlates with local transcriptional repression. In our studies of EZH2 – a PcG factor that catalyzes H3K27me3 – it does not appear that EZH2 is downregulated during neurogenesis (Hwang, eLIFE, 2014), suggesting that active removal of H3K27me3 is required for transcriptional activation. In support of this model, we discovered that the H3K27-demethylase JMJD3 is required for V-SVZ neurogenesis, de-repressing the chromatin state of transcriptional promoters and enhancers of neurogenic genes (Park, Cell Rep., 2014). Interestingly, in Mll1-deleted V-SVZ cells, JMJD3 does not localize to a key neurogenic enhancer, suggesting that MLL1 is required for the local recruitment of this H3K27-demethylase. Understanding the potential physical interactions between MLL1, JMJD3, and EZH2 at promoters and enhancers, and whether these factors interact with transcription factors for targeting to specific DNA regions represent current mechanistic research aims. Our studies of these chromatin regulators as well as Ink4a/Arf (Price, J Neurosci., 2014) – the locus most frequently inactivated in brain tumors – suggested that JMJD3 is an ideal target for glioma

therapy. In collaboration with Pfizer and the Gupta lab (UCSF), we are working to test JMJD3-specific inhibitors being developed for clinical use.

The brain develops from NSCs that have distinct regional identities, and defects in the positional information of NSCs results in abnormal brain development. Mutations in MLL1 have been identified as a cause of Wiedemann-Steiner syndrome, a disorder that includes developmental delay and autism. Our current data indicate that MLL1 maintains NSC regional identity during embryonic brain growth. The mechanisms that enable the “ scaling” of developmental patterns during tissue growth are poorly understood. Given that the human brain grows to a very large size, the mechanisms of scaling are especially relevant to our understanding of human neurodevelopmental disorders.

Long non-coding RNAs (lncRNAs) in neural development

The mammalian genome transcribes many thousands of lncRNAs – transcripts >200 nucleotides long with no evidence of protein coding potential, and it is now clear that lncRNAs can have critical biological functions and roles in human neurological disease. Many lncRNAs interact with chromatin regulators and appear to regulate their function. In our recent annotation and genome-wide analysis of lncRNAs in the adult V-SVZ (Ramos, Cell Stem Cell, 2013), we identified a novel, evolutionarily conserved lncRNA transcript that we have named Pinky (Pnky), a novel lncRNA transcript that is a potent regulator of neural stem cells in the embryonic and postnatal brain (Ramos, Andersen et al., Cell Stem Cell 2015). Using mass spectrometry, Western blot, and RNA immunoprecipitation analysis, we identified proteins that specifically interact with this lncRNA. We are continuing to determine the function of this lncRNA in vivo and the molecular mechanisms by which it regulates neurogenesis.

Development of novel neurosurgical devices for cell transplantation to the human brain

Intracerebral cell transplantation is being pursued as a treatment for many neurological diseases, and effective cell delivery is critical for clinical success. To facilitate intracerebral cell transplantation at the scale and complexity of the human brain, we developed a platform technology that enables radially branched deployment (RBD) of cells to multiple target locations at variable radial distances and depths along the initial brain penetration tract with real-time interventional magnetic resonance image (iMRI) guidance (Silvestrini, Mol Therapy, 2014). This iMRI-guided RBD device has been licensed to a medical device company (Accurexa, Inc.), and we are now working to commercialize the technology. We believe that this device will facilitate the clinical testing of cell, drug, and gene therapies that require direct delivery to the brain (reviewed in Potts, Surg Neurol Int., 2013 and Rowland, Movement Dis., 2014).

RESEARCH AWARDS - CURRENT

1. 1R01NS091544-01A1	PI		Lim (PI)
NIH/NINDS		04/01/2016	03/31/2021
Long noncoding RNA regulation of neural stem cells		\$ 218,000 direct/yr 1	\$ 1,090,000 total
<hr/>			
2. 5I01 BX000252-06	PI		Lim (PI)
Veterans Affairs BLRD		10/01/2009	09/30/2017
Role of MLL chromatin remodeling factor in neural stem cells		\$ 200,000 direct/yr 1	\$ 1,150,000 total

3. CTI Research Grant	co-PI		
Pfizer		12/01/2014	11/30/2016
Targeting the a chromatin regulator for the treatment of diffuse intrinsic pontine gliomas		\$ 120,000 (for Lim projects) direct/yr 1	\$ 240,000 (for Lim projects) total

4. 5P50CA097257-08	Project Leader		Berger (PI)
NCI - SPORE		10/01/2014	09/30/2016
Developmental Research Project: Role of lncRNAs in glioblastoma		\$ 45,000 direct/yr 1	\$ 90,000 total

5. LoGlio	Investigator		Costello (PI)
LoGlio Foundation		10/01/2015	09/30/2018
Project 2: Intratumoral heterogeneity in low grade glioma		\$ 84,887 (for Lim projects) direct/yr 1	\$ 254,661 (for Lim projects) total

RESEARCH AWARDS - PAST

1. RT2-01975	PI		Lim (PI)
CIRM Tools and Technology Award (includes 1 year PA 14-04 Extraordinary Supplement Award)		04/01/2012	03/31/2015
Development and preclinical testing of new devices for cell transplantation to the human brain		\$ 400,000 direct/yr 1	\$ 1,363,000 total

2. 1DP2OD006505-01	PI		Lim (PI)
NIH Director's New Innovator Award		10/01/2009	06/30/2014
Chromatin-based cellular memory in neural stem cells		\$ 300,000 direct/yr 1	\$ 1,500,000 total

3. Distinguished Researcher Award	PI		Lim (PI)
Sontag Foundation		10/01/2009	09/30/2015
Role of chromatin remodeling factor MLL1 in the development of malignant gliomas		\$ 150,000 direct/yr 1	\$ 600,000 total

4.	Neuroscience Center of Excellence Sub-Award Department of Defense Induction of new neurons for treatment of temporal lobe epilepsy	PI	07/01/2010 \$ 125,000 direct/yr 1	Lim (PI) 06/30/2012 \$ 250,000 total
5.	Career Development Award Neurosurgery Research and Education Foundation (ACS/NREF) Gene-therapy based induction of new neurogenesis from adult human precursor cells	PI	07/01/2009 \$ 80,000 direct/yr 1	Lim (PI) 06/30/2011 \$ 80,000 total
6.	Opportunity Award Sandler Family Foundation Chromatin Remodeling Determinants of Neural Stem Cell Fate	PI	07/01/2008 \$ 100,000 direct/yr 1	Lim (PI) 06/30/2010 \$ 200,000 total
7.	Pilot Research Award Research Evaluation and Allocation Committee, UCSF The MLL-dependent program for adult neurogenesis	PI	07/01/2008 \$ 30,000 direct/yr 1	Lim (PI) 06/01/2009 \$ 30,000 total
8.	Research Fellowship Neurosurgery Research and Education Foundation (NREF) Role of MLL in adult neurogenesis	PI	07/1/2006 \$ 40,000 direct/yr 1	Lim (PI) 12/31/2007 \$ 40,000 total
9.	Research Award Shurl and Kay Curci Foundation Regulation of neural stem cells by lncRNAs	PI	03/01/2014 \$ 100,000 direct/yr 1	Lim (PI) 12/31/2015 \$ 100,000 total
10.	Stem Cell Research Grant	PI		Lim (PI)

BD Biosciences	04/01/2012	03/30/2014
Defining the chromatin-based epigenetic landscape of adult neural stem cells	\$ 10,000 direct/yr 1	\$ 10,000 total

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*co-corresponding author

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SIGNIFICANT PUBLICATIONS

1. **Lim DA***, Huang Y-C, Swigut T, Mirick AL, Garcia-Verdugo JM, Wysocka J, Ernst P, Alvarez-Buylla A, (2009). Chromatin remodeling factor Mll1 is essential for neurogenesis from postnatal neural stem cells, Nature, 458: 529-533.

D.A.L. (co-senior author) conceived the project, designed and performed experiments, trained and mentored Y-C Huang, interpreted results, coordinated all collaborations, and wrote the manuscript.

2. Ramos AD, Diaz A, Nellore A, Delgado RN, Park KY, Gonzales-Roybal G, Oldham MC, Song JS, **Lim DA**, (2013). Integration of genome-wide approaches identifies lncRNAs of adult neural stem cells and their progeny in vivo, Cell Stem Cell, 12(5): 616-28.

D.A.L. (senior author) conceived the project, designed experiments, interpreted results, coordinated collaborations, and helped write the manuscript.

3. Hwang WW, Salinas RD, Siu JJ, Kelley KW, Delgado RN, Paredes MF, Alvarez-Buylla A, Oldham, MC, **Lim DA**, (2014). Distinct and separable roles for EZH2 in neurogenic astroglia, eLIFE, May 27;3:e02439.

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D.A.L. (senior author) conceived the project, helped design the device, designed and performed experiments, coordinated collaborations, and wrote the manuscript.

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D.A.L. (senior author) conceived the project, designed experiments, interpreted results, coordinated collaborations, and wrote the manuscript.

PATENTS ISSUED OR PENDING

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ADDITIONAL RELEVANT INFORMATION

The stereotactic neurosurgical device and intellectual property regarding the "Microinjection catheter (a system for therapeutic delivery to the brain)" was licensed to Accurexa, Inc. on 09-17-2014.