

*The Faculty of Medicine of Harvard University*  
*Curriculum Vitae*

September 8, 2024

**Wei Hsu, Ph.D.**

**Professor of Developmental Biology, Harvard University**  
**Senior Member of Staff, ADA Forsyth Institute**

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Telephone: 617-892-8297 (Office)

Sex: Male  
Citizenship: USA  
Place of Birth: Taiwan  
Marital status: Married with children

**Education**

1989 B. S. in Chemistry, Tamkang University, Taipei, Taiwan  
1992 M. Ph. in Biomedical Sciences, Icahn School of Medicine at Mount Sinai, New York City  
1994 Ph. D. in Biomedical Sciences, Icahn School of Medicine at Mount Sinai, New York City

**Professional training**

1987-1989 *Undergraduate Assistant*  
Department of Chemistry, Tamkang University, Taipei, Taiwan

1989-1989 *Undergraduate Assistant*  
Institute of Botany, Academia Sinica, Taipei, Taiwan

1989-1994 *Graduate Fellow*  
Icahn School of Medicine at Mount Sinai, NYC  
Thesis title: Regulation of Nuclear Factors in the Interleukin-6 Signaling Pathway

1994-1997 *Postdoctoral Research Fellow*  
Vagelos College of Physicians and Surgeons, Columbia University, NYC

**Faculty Appointments**

1998 *Associate Research Scientist (equivalent to Research Assistant Professor)*  
Vagelos College of Physicians and Surgeons, Columbia University, NYC

2002 *Assistant Professor (Tenure-track)*  
Department of Biomedical Genetics, Center for Oral Biology  
University of Rochester Medical Center, Rochester, NY

2005 *Assistant Professor (Secondary)*  
James P. Wilmot Cancer Institute, University of Rochester Medical Center, Rochester, NY

2006 *Associate Professor with Tenure*  
Department of Biomedical Genetics, Center for Oral Biology

	University of Rochester Medical Center, Rochester, NY
2006	<i>Associate Professor (Secondary)</i> James P. Wilmot Cancer Institute, University of Rochester Medical Center, Rochester, NY
2007	<i>Member</i> University of Rochester Stem Cell & Regenerative Medicine Institute
2012	<i>Professor with Tenure</i> Department of Biomedical Genetics, Center for Oral Biology, Wilmot Cancer Institute University of Rochester Medical Center, Rochester, NY
2015	<i>Dean's Professor (Endowed Chair)</i> University of Rochester School of Medicine and Dentistry, Rochester, NY
2021	<i>Senior Member of Staff with Tenure</i> The Forsyth Institute
2021	<i>Professor with Indefinite Duration</i> Department of Developmental Biology Faculty of Medicine of Harvard University
2021	<i>Affiliate Faculty</i> Harvard Stem Cell Institute

#### **Major Administrative Leadership Position**

2011-2014	<i>Director: Advanced Genetics and Genomics Course</i> University of Rochester School of Medicine and Dentistry
2017-2021	<i>Co-Director</i> NIH/NIDCR T90/R90 Training Program, University of Rochester Medical Center
2021-Date	<i>Director</i> Forsyth Craniofacial and Skeletal Research Center
2022	<i>Organizer</i> Craniofacial Biology, Disease, and Regeneration, The 5 <sup>th</sup> Symposium Forsyth Institute
2022-Date	<i>Director: Craniofacial Development and Genetics Course</i> Harvard School of Dental Medicine

#### **Research Program: Morphogenetic Signaling Network in Development and Disease**

We are interested in the mechanisms that support embryonic morphogenesis, tissue homeostasis, disease pathogenesis, and organ repair and regeneration. Focusing initially on Wnt as one of the most prevalent signaling pathways in developmental biology, we are establishing how Wnt signaling and its crosstalk with other pathways control pluripotency, fate specification, and differentiation in stem cells and homeostasis in mature cells. More recently, we have also studied epigenetics, post-translational modification, ciliogenesis, mitochondrial regulation, nuclear lamina, and cross-tissue interaction, causally linked to human diseases. Our goal is to use this basic knowledge to develop innovative strategies for disease prevention and therapy. Current projects focus on craniofacial and skeletal development, congenital birth defects and aging diseases, and tissue regeneration.

**Research Supports**

Continuously funded by NIH and secured a total of ~\$25M in funding support for more than two decades

Active

- 7/2006-02/2026 NIH/NIDCR R01DE015654 HSU (PI)  
 Title: Genetic Regulatory Network in Craniofacial Development.  
 Role: PI; Total direct costs of the project: \$1.7M; Total costs of the project: \$2.8M; Total costs all years: 6.5M [Third competitive review cycle]. This competing renewal grant continues our efforts to elucidate the regulatory mechanism underlying the crosstalk of signaling pathways in skeletal development and disease.
- 6/2018-5/2025 NIH/NIDCR R01DE026936 HSU (PI)  
 Title: Stem Cells for Craniofacial Bone Repair and Regeneration  
 Role: PI; Total direct costs of the project: \$1.7M; Total costs of the project: \$2.8M. The main objective is to further elucidate the mechanism underlying skeletal repair and regeneration mediated by newly identified suture stem cells. We aim to explore their potential use for stem cell-based therapy and advance our knowledge base of regenerative medicine.
- 7/2022-4/2027 NIH/NIA R01AG075047 MICHAELIS/WORMAN (MPI)  
 Title: Role for Prelamin A in Premature and Physiological Aging  
 Role: Co-Investigator; Total costs of the sub-award: \$585,915. The objective of this proposal is to test the hypothesis that prelamin A accumulation drives age-associated osteoporosis and cardiovascular disease using a new mouse model engineered to have a progeria syndrome patient mutation in the Lamin A gene that abolishes protease processing.
- 7/2023-4/2028 NIH/NIDCR R01 DE033013-01 HSU (PI)  
 Title: Nonclassical  $\beta$ -catenin Signaling in Odontogenesis  
 Role: PI; Total direct costs of the project: \$1.36M; Total costs of the project: \$2.7M. The primary objective of this application is to elucidate the regulatory mechanisms underlying odontogenesis mediated by nonclassical  $\beta$ -catenin signaling. Elucidating the mechanism underlying the regulation of odontogenesis promises important insights into next-generation therapy for dental restoration.

Pending

- 2/2025-1/2030 NIH/NIDCR R01DE015654-17 HSU (PI)  
 Title: Genetic Regulatory Network in Craniofacial Development.  
 Role: PI; Total direct costs of the project: \$2.14M; Total costs of the project: \$4.27M; Total costs all years: 10.77M [Forth competitive review cycle]. This competing renewal grant continues our efforts to elucidate the regulatory mechanism underlying the crosstalk of signaling pathways in skeletal development and disease.  
 Impact Score: 2.0; Percentile: 6

Participation

- 7/2022-6/2027 NIH/NIDCR T90DE026110 Van Dyke (PI)  
 Title: Forsyth Training in Oral Health Research  
 Role: Potential Mentor. This training program is intended to provide research training and research education experiences to trainees in areas of oral health research.
- 5/2023-6/2024 NIH/OD S10OD034405-01 Borisy (PI)  
 Title: Spectral Confocal Imaging Instrumentation for Forsyth Advanced Microscopy Core  
 Role: Major User; Total direct costs of the project: \$600,000. This proposal is to acquire the laser-scanning confocal microscope Zeiss LSM 980 equipped with a 34-channel spectral

detector, excitation diode lasers, beam splitters, near-infrared (NIR) laser and detectors, and a ZEN Connect software module to enable correlative microscopy workflows.

Completed research grants/awards

7/1995-6/1997	National Kidney Foundation, Postdoctoral Research Award	HSU (PI)
	Title: The Role of Mouse Fused Gene in Kidney Development	
	Role: PI. Direct costs for year one: \$25,000; Total costs of the project: \$50,000.	
3/2004-2/2010	NIH/NCI R01CA106308	HSU (PI)
	Title: Genetic Regulatory Network in Mammary Development and Tumorigenesis.	
	Role: PI. Direct costs for year one: \$205,000; Total costs of the project: \$1,614,375. The primary objective of this project is to investigate the mechanisms by which the Wnt-Axin signaling network regulates breast development and tumorigenesis.	
5/2006-9/2018	NIH/NIAMS T32AR053459	Zuscik (PI)
	Title: Training in Orthopaedic Research.	
	Role: Affiliated Faculty/Potential Mentor. The goal of this proposal is to develop programs that will facilitate the development of outstanding investigators in orthopedic research.	
5/2007-5/2011	DOD Breast Cancer Research Program BC060349	HSU (PI)
	Title: Mammary Stem Cells in Development and Cancer.	
	Role: PI. Direct costs for year one: \$95,196; Total costs of the project: \$464,378. The primary focus of this proposal is to explore the role of mammary stem cells in mammary development and tumorigenesis.	
5/2008-4/2009	NYSTEM	GUZICK (PI)
	Title: NY Stem Cell Grant for Institutional Development of Stem Cell Research Capabilities.	
	Role: Co-I. Direct costs for year one: \$42,500; Total costs of the project: \$46,750. This is a supplemental subcontract to support mammary stem cell work.	
4/2009-2/2010	NIH/NCI 3R01CA106308-05S1	HSU (PI)
	Title: Genetic Regulatory Network in Mammary Development and Tumorigenesis.	
	Role: PI. Direct costs for year one: \$39,442; Total costs of the project: \$60,741. This is a supplement to accelerate the study of breast development and cancer.	
9/2009-8/2016	NIH/NCI T32CA009363	LAND (PI)
	Title: Cancer Center Training – Experimental Therapy Models.	
	Role: Training Faculty/Potential Mentor. The goal of this training grant is to develop independent investigators in cancer biology.	
5/2010-4/2016	NIH/NICHHD T32HD057821	SCHOR (PI)
	Title: Pediatric Research: Bench to Bedside to Curbside.	
	Role: Training Faculty/Potential Mentor. The goal of this training grant is to allow clinically trained fellows to engage in and understand basic, clinical, and/or translational research.	
9/2010-8/2015	NYSTEM C026877	NOBLE (PI)
	Title: Stem Cell Training Grant	
	Role: Training Faculty/ Mentor. The goal of this grant is to train graduate students and postdoctoral fellows to become stem cell scientists at the University of Rochester Stem Cell & Regenerative Medicine Institute.	
8/2011-7/2017	NIH/NIDCR T90DE021958	QUIVEY (PI)

Title: Training Program in Oral Science.  
 Role: Training Faculty/Mentor. The goal of this proposal is to train outstanding investigators to become leaders in the research of oral disease and oral/facial defects.

- 3/2011-4/2017 NIH/NCI 2R01CA106308 HSU (PI)  
 Title: Genetic Regulatory Network in Mammary Development and Tumorigenesis.  
 Role: PI; Percent effort: 30%; Total direct costs of the project: \$1M; Total costs of the project: \$1.53M; Total costs all years (2004-2017): 3.14M. [Second competitive renewal cycle]
- 2012-2014 NYSTEM Stem Cell Postdoctoral Fellowship Award Maruyama (PI)  
 Title: Molecular and Functional Characterizations of Suture Stem Cells.  
 Role: Mentor. The object of this award is to provide the necessary training in stem cell biology for Dr. Maruyama.
- 2/2012-1/2014 March of Dimes Basil O'Connor Grant Que (PI)  
 Title: The Role of Gpr177 in Lung Morphogenesis and Development of Bronchopulmonary Dysplasia.  
 Role: Co-Investigator; Percent effort: 3%. The overall goal of this proposal is to define the mechanism by which Wnt signals from the epithelium regulate the patterning and differentiation of the underlying mesenchyme in the developing lung.
- 2013 UR Stem Cell and Regenerative Medicine Pipeline Award Fu (PI)  
 Title: Identification of First Dermal Signal Essential for Epidermal Stem Cell Development in Hair Follicle Induction.  
 Role: Mentor. The object of this award is to develop a new research direction in stem cell biology and regenerative medicine.
- 2014-2015 NIH/NIDCR Postdoctoral Fellowship Award Maruyama (PI)  
 Title: Mesenchymal Stem Cells in Craniofacial Bone Development and Regeneration.  
 Role: Mentor. The object of this award is to provide necessary training in craniofacial biology for Dr. Takamitsu Maruyama.
- 8/2015-7/2018 NIH/NIDCR Postdoctoral Fellowship Award Lin (PI)  
 Title: Cellular Signaling and SUMO modification in development and disease.  
 Role: Mentor. The object of this award is to provide necessary training in genetics and development biology for dental scientist Dr. Heng Lin.
- 6/2014-5/2020 NYSTEM C029558 HSU (PI)  
 Title: Stem Cell-Mediated Craniofacial Skeletogenesis in Health and Disease.  
 Role: PI; Total direct costs of projects: \$884,184; Total cost of project: \$1.06M. The objective of this Investigator Initiated Research Project (IIRP) is to identify and characterize the stem cells responsible for the healthy development of the craniofacial skeleton, leading to achieving our goal of improving therapeutic strategies for molecular and regenerative medicine.
- 7/2017-6/2022 NIH/NIDCR T90DE021958 QUIVEY (PI)  
 Title: Training Program in Oral Science.  
 Role: Co-Director. The goal of this proposal is to train outstanding investigators to become leaders in the research of oral disease and oral/facial defects.
- 8/2021-5/2025 NIH/NICHD 1P50HD103536 Foxe (PI)  
 Title: University of Rochester intellectual and developmental disabilities research center

Role: Project Contributor. The University has a long and extraordinarily rich history of providing first-rate clinical services to persons with Intellectual and Developmental Disabilities (IDD) and driving discoveries through research that create increased opportunities for individuals with IDD to live their lives to the fullest of their potential.

3/2019-3/2022 NIH/NIDCR R21DE028696 MARUYAMA (PI)  
 Title: The essential role of miR-27a in craniofacial and body skeletons  
 Role: Co-Investigator; Total direct costs of the project: \$275K; Total costs of the project: \$423.5K. The main objective is to examine the function of miR-27a in osteoblast-mediated bone formation and osteoclast-mediated bone resorption. Our goal is to explore their potential use for preventive and therapeutic treatment for craniofacial and skeletal disorders.

### Intellectual Property

2021 International Application Number: PCT/US22/17264  
 U.S. Provisional Patent Application No. 63/154,293  
 Conversion to Patent Cooperation Treaty in 2022  
 U.S. Patent Application No. 18/547,438  
 Title: Skeletal Stem Cell Isolation and Uses Thereof

2022 International Patent Application No. PCT/US23/62716  
 U.S. Provisional Patent Application No. 63/311,692  
 Conversion to Patent Cooperation Treaty in 2023  
 Japanese National Phase of PCT Application in 2024  
 Title: Markers for Skeletal Stem Cell and Uses Thereof

2022 International Patent Application No. PCT/US23/77155  
 U.S. Provisional Patent Application No. 63/381,028  
 Conversion to Patent Cooperation Treaty in 2023  
 Title: Differentiation and Reprogramming of Chondrocyte

### Awards & Honors

1989-1994 Predoctoral Fellowship, Mount Sinai School of Medicine, NYC  
 1992 Traveling & Research Award, Mount Sinai School of Medicine, NYC  
 1993 Traveling & Research Award, Mount Sinai School of Medicine, NYC  
 1995 Postdoctoral fellowship, National Kidney Foundation  
 1997 Research Award, Northeast Regional Conference, Society for Developmental Biology  
 2007 Idea Award, Breast Cancer Research Program, US Department of Defense  
 2012 Distinguished Alumnus, Taipei Fuhsing Private School, Taiwan  
 2012 Pathways to Excellence Visiting Professorship, Texas A&M Health Science Center, Dallas  
 2013 Senior Author/Mentor for the 2013 ASBMR Raisz-Drezner Award honoring meritorious scientific reports published in the Journal of Bone and Mineral Research  
 2015 Dean's Professorship, University of Rochester School of Medicine and Dentistry  
 2015-2019 Charter Member of Skeletal Biology and Development Diseases Study Section, NIH  
 2016 Mentor for ASBMR Harold M. Frost Young Investigator Award  
 2021 Honorary Master of Arts, Harvard University, Cambridge, MA

### Referee

### Peer-reviewed Articles for Journals

2001-Date	Reviewer	Nature, Nature Communications, Science Translational Medicine, Science Advances, Science Signaling, Cell Stem Cell, Cell Research, Cell Discovery, PNAS, Cell Death and Differentiation, Cell Death and Disease, EMBO Reports, eLife, Development, Developmental Biology, Nature Bone Research, Bone, Disease Models & Mechanisms, Scientific Reports, PLoS Genetics, Nucleic Acid Research, Birth Defects Research, PLoS One, Cancer Research, Oncogene, Journal of Investigative Dermatology, Journal of Dental Research, Developmental Dynamics, Journal of Physiology, FASEB Journal, FEBS Letters, iScience, The American Journal of Pathology, International, Stem Cell Research & Therapy, Journal of Cancer, International Journal of Biological Sciences, International Journal of Oral Science, Molecular Reproduction and Development, Genesis, BioTechniques, Placenta, Cleft Palate-Craniofacial Journal, Cell Communication and Signaling, Acta Biochimica et Biophysica Sinica, Journal of Translational Medicine, Virology Journal, Alzheimer's & Dementia, Neural Regeneration Research, Frontiers in Cell & Developmental Biology, Genes & Diseases, and etc.
2008-2013	Editorial Board	International Journal of Women's Health Cancer Management and Research
2009-2014	Editorial Board	Breast Cancer - Targets and Therapy
2011-2021	Editorial Board	Human Genetics & Embryology
2011-2021	Editorial Board	Hereditary: Current Research
2012-Date	Editorial Board	Transcriptomics
2013-Date	Editorial Board	JSM Regenerative Medicine
2013-2020	Editorial Board	International Journal of Stem Cell Research and Transplantation
2013-2018	Associate Editor	PLOS Genetics
2018-2021	Editorial Board	Journal of Dental Research
2023-Date	Associate Editor	Frontiers in Cell and Developmental Biology
2024-Date	Editorial Board	Scientific Reports
<u>Committees for Grants</u>		
3/2006	Ad hoc	Developmental Biology Grant Review Committee CHHD Study Section, NIH/NICHD, USA
6/2006	Ad hoc	Developmental Biology Grant Review Committee CHHD Study Section, NIH/NICHD, USA
9/2007	External Member	Grant Review Committee for the Research Council University of Ghent, Ghent, Flanders, Belgium
2/2008	Ad hoc	NIAMS, Musculoskeletal Repair & Regeneration P&F Hospital for Special Surgery, NYC
9/2008	Ad hoc	Ovarian Cancer Research Programs Grant Review Panels for CDMRP, Department of Defense, USA
2008	Member	Ovarian Cancer Research Programs Grant Review Panels for CDMRP, Department of Defense, USA
2008-2011	Member	Research Grant Review Committees

		Alzheimer's Association, Chicago, IL
2009-2011	Member	Breast Cancer Research Programs Grant Review Panels for CDMRP, Department of Defense, USA
2010	Reviewer	Bankhead-Coley Cancer Research Program Florida Department of Health
2/2010	Ad hoc	Tumor Microenvironment (TME) Study Section NIH/NCI, USA
8/2010	Ad hoc	Developmental Systems, Developmental Mechanisms Cluster National Science Foundation, USA
4/2011	Member	Developmental Mechanisms of Human Structural Birth Defects 2011/05 ZHD1 DSR-Y (50), NIH/NICHD, USA
2011	Reviewer	James & Esther King Biomedical Research Program Florida Department of Health
6/2011	External Member	Grant Review Session Telethon Foundation, Italy
8/2011	Reviewer	Scientific Advisory Board Dutch Cancer Society, Netherlands
10/2011	Ad hoc	Developmental Biology Grant Review Committee CHHD Study Section, NIH/NICHD, USA
2012	Reviewer	Bankhead-Coley Cancer Research Program Florida Department of Health
3/2012	Member	ZRG1 F05-R: Cell Biology and Development Study Section NIH, USA
2012	Reviewer	Patton Trust Grant Program Kansas City Area Life Sciences Institute
6/2012	Reviewer	Molecular & Cellular Medicine Board, Regenerative Medicine MRC Research Grant, Medical Research Council, UK
6/2012	Member	ZDE1 JR (18), Molecular Characterization of Salivary Gland Tumors NIH/NIDCR, USA
2012	Reviewer	A*STAR (Agency for Science, Technology, and Research) Translational Clinical Research Partnership Grant Biomedical Research Council, Singapore
3/2013	Member	ZRG1 F05-D Cell & Developmental Biology and Bioengineering NIH, USA
4/2013	Reviewer	Molecular & Cellular Medicine Board, Developmental Biology



		MRC Research Grant, Medical Research Council, UK
8/2013	Member	Developmental Mechanisms of Human Structural Birth Defects 2013/10 ZHD1 DSG-D (40), NIH/NICHD, USA
11/2013	Reviewer	Molecular & Cellular Medicine Board, Developmental Biology MRC Research Grant, Medical Research Council, UK
01/2014	Reviewer	German-Israeli Foundation for Scientific Research & Development
2014	Reviewer	Patton Trust Grant Program Kansas City Area Life Sciences Institute
3/2014	Member	ZRG1 F05-D: Cell & Developmental Biology and Bioengineering NIH, USA
10/2014	Reviewer	Biotechnology and Biological Sciences Research Council Great British Bioscience, UK
10/2014	Ad hoc	Skeletal Biology Development and Disease (SBDD) Study Section NIH, USA
10/2014	Member	Musculoskeletal, Oral and Skin Science [MOSS] T-90 Study Section NIH, USA
02/2015	Ad hoc	Skeletal Biology Development and Disease (SBDD) Study Section NIH, USA
03/2015	Member	Special Emphasis Panel/Scientific Review Group ZRG1 MDCN-Q (03) S, NIH, USA
2015	Reviewer	Center for Oral Health Research Projects Medical University of South Carolina
2015-2019	Charter Member	Skeletal Biology Development and Disease (SBDD) Study Section NIH, USA
2016	Reviewer	NIH Director's New Innovator Award (NIA) Program
2017	Reviewer	Japan Society for the Promotion of Science (JSPS)
2017	Reviewer	Kentucky Science and Engineering Foundation
2019	Reviewer	Tissue Regeneration (TR) Grant Review Panels, PRMRP Grant Review Panels for CDMRP, Department of Defense, USA
2019	Member	Special Emphasis Panel/Scientific Review Group ZRG1 IDM-W (02) M, NIH, USA
2019	Reviewer	Molecular & Cellular Medicine Board, Developmental Biology MRC Research Grant, Medical Research Council, UK

2020	Member	Musculoskeletal, Oral, and Skin Sciences (MOSS) Study Section NIH, USA
2021	External Reviewer	Swiss National Science Foundation (SNSF), Bern, Switzerland
2021	Member	Special Emphasis Panel/Scientific Review Group ZRG1 IDIA-W (02) M, NIH, USA
2021	Member	Special Emphasis Panel/Scientific Review Group ZDE1 JK (04), NIH, USA
2022	Reviewer	Graduate Women in Science National Fellowship Program National Office, Mullica Hill, NJ, USA
2022	External Reviewer	JSPS International Joint Research Program with SNSF Swiss National Science Foundation, Bern, Switzerland
2023	Member	Special Emphasis Panel/Scientific Review Group ZRG1 MOSS-K (03), NIH, USA
2023	Member	Musculoskeletal Health – 2 (MSH-2) Grant Review Panels for CDMRP, Department of Defense, USA
2024	Reviewer	GenOmics of Rare Diseases Foundation Maladies Rares, Paris, France

Committees for Tenure/Promotion

2011-Date	External Reviewer	University of California Los Angeles University of Rochester University of Michigan Columbia University University of Pennsylvania The University of Texas Health Science Center at Houston Jordan University of Science and Technology
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**Professional Societies**

1992-Date	Member	American Association for the Advancement of Science
1995-1997	Member	American Society for Microbiology
1995-Date	Member	New York Academy of Sciences
1995-1997	Fellow	National Kidney Foundation
2001-Date	Member	Society for Developmental Biology
2001-Date	Member	International Society for Developmental Biologists
2005-Date	Member	Society for Craniofacial Genetics
2013-Date	Member	American Society for Bone and Mineral Research
2019-Date	Member	American Association for Dental, Oral, and Craniofacial Research

**Teaching experience**

Spring, 1991	<i>Teaching Assistant</i>	Molecular Biology graduate core course Mount Sinai School of Medicine
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Fall, 1992	<i>Teaching Assistant</i>	Biochemistry & Molecular Biology graduate core course Mount Sinai School of Medicine
Spring, 2004 Fall, 2005 Spring, 2006 Spring, 2008	<i>Lecturer</i>	Genetics Seminar (GEN 503/504) University of Rochester School of Medicine and Dentistry
Spring, 2004	<i>Lecturer</i>	Saliva and Salivary Glands (ORB 579) University of Rochester School of Medicine and Dentistry
Spring, 2004-2006	<i>Lecturer</i>	Pathways of Human Disease (PHD 509/510) University of Rochester School of Medicine and Dentistry
2004-2015	<i>Lecturer</i>	Advanced Genetics and Genomics (GEN 507) University of Rochester School of Medicine and Dentistry
2011-2014	<i>Course Director</i>	Advanced Genetics and Genomics (GEN 507) University of Rochester School of Medicine and Dentistry
2012-2014	<i>Lecturer</i>	Principles Stem Cell Biology (GEN 506) University of Rochester School of Medicine and Dentistry
2002-2021	<i>Faculty member</i>	Graduate Program in Genetics, Development & Stem Cells University of Rochester School of Medicine and Dentistry
2003-2021	<i>Faculty Member</i>	Graduate Program in Cell Biology of Disease University of Rochester School of Medicine and Dentistry
2014-2021	<i>Faculty Member</i>	Graduate Program in Neuroscience University of Rochester School of Medicine and Dentistry
2018-2021	<i>Faculty Evaluator</i>	Neuroscience Program Student Seminar (NSC 503/4) University of Rochester School of Medicine and Dentistry
2022-Date	<i>Course Director</i>	Craniofacial Development and Genetics AGE program, Harvard School of Dental Medicine
2023-Date	<i>Lecturer</i>	Craniofacial Development and Genetics DMD program, Harvard School of Dental Medicine

## Trainees

### Students, Postdoctoral Fellows & Staff Scientists

2002-Date	H-M Ivy Yu, M.S., Yale University, CT Senior Staff Scientist, The Forsyth Institute
2004-2008	Shang-Yi Chiu, B.S., National Taiwan University, Taiwan Department of Biomedical Genetics, Center for Oral Biology, University of Rochester Graduate Program in Pathology & Laboratory Medicine, University of Rochester Project Title: SUMO-specific protease 2 in stem cell and cancer biology An author of five papers including two first-author papers in <i>PLoS Biology</i> and <i>JVE</i>

Current position: Principal Investigator, National Applied Research Laboratories, Taiwan

- 2004-2008 Bo Liu, Ph.D., Peking University, China  
Department of Biomedical Genetics, Center for Oral Biology, University of Rochester  
Project Title: Wnt signaling in development and cancer  
An author of five papers including two first-author papers in *Dev Bio* and *Neoplasia*  
Current position: Research Associate, Stanford University
- 2004-2005 Sara Lim, Undergraduate Student  
Department of Biology, University of Rochester  
Current position: Assistant Professor, Northwestern University Feinberg School of Medicine
- 2006-2007 Ying Jin, M.D., Yanbian University, China  
Department of Biomedical Genetics, Center for Oral Biology, University of Rochester  
Project Title: Characterization of a novel G protein-coupled receptor in Wnt signaling
- 2007-2015 Takamitsu Maruyama, Ph.D., Tohoku University, Japan  
Department of Biomedical Genetics, Center for Oral Biology, University of Rochester  
Project Title: Crosstalk of cellular signaling in skeletal development and dysplasia  
An author of 8 papers including three first-author papers in *Nature Communications*, *Science Signaling*, and *JBMR*, and a recipient of the NYSTEM postdoctoral fellowship award in 2012, the NIH training award in 2014, the **ASBMR Young Investigator Award**, the **Raisz-Drezner Award** in 2013, and **Harold M. Frost Young Investigator Award** from ASBMR in 2016.  
Current position: Assistant Member of Staff, Forsyth Institute
- 2007-2015 Jiang Fu, Ph.D., National University of Singapore, Singapore  
Department of Biomedical Genetics, Center for Oral Biology, University of Rochester  
Project Title: Gpr177, a mouse homolog of Drosophila Wls, in development and cancer  
An author of 8 papers including three first-author papers in *PNAS*, *PLOS Genetics*, *JID*, and *Dev Dyn*, and a recipient of the UR Stem Cell and Regenerative Medicine Pipeline Award and ASCB Traveling Award  
Current position: Professor, Shandong University
- 2007-2011 Ming Jiang, Ph.D., Fudan University, China  
Department of Biomedical Genetics, Center for Oral Biology, University of Rochester  
Project Title: Proteomics approaches to delineate morphogenetic regulatory networks  
An author of 6 research articles including four first/co-first author papers published in *Cell Death & Differentiation*, *PNAS*, *JBMR*, and *Development*, and the recipient of the 2013 Raisz-Drezner Award.  
Current position: Professor, Zhenjiang University
- 2007 Daniel Kimm, Undergraduate Student for Independent Study  
Department of Biology, University of Rochester
- 2008-2013 Eri Ohfuchi Maruyama, Ph.D., Tohoku University, Japan  
Department of Biomedical Genetics, Center for Oral Biology, University of Rochester  
Project Title: Mammary stem cells in development and cancer  
An author of three papers, including first-author papers in *PLoS One*  
Current position: Staff Scientist, The Forsyth Institute
- 2010-2011 Dali Yang, M.D., Ph.D., Soochow Medical School, China  
Department of Biomedical Genetics, Center for Oral Biology, University of Rochester

Project Title: SUMO-specific protease 2 in skeletal development and disease

2012-2013	Xian-Peng Ge, D.D.S., Ph.D., Peking University, China Department of Biomedical Genetics, Center for Oral Biology, University of Rochester Project Title: Genetic regulation controls the development of the craniofacial skeleton Current position: Associate Professor, Xuanwu Hospital Capital Medical University, China
2012-2013	Ansa Zahid, Undergraduate Student/Research Assistant Department of Biology, University of Rochester
2013-2015	Jaeim “Jamie” Jeong, Undergraduate Student/Research Assistant Program in Neurosciences, University of Rochester Current position: Emergency Medicine Physician Assistant, Holy Name Medical Center
2014-2016	Keiko Kaneko, Ph.D., Yokohama City University, Japan Department of Biomedical Genetics, Center for Oral Biology, University of Rochester Project Title: Skeletal development, homeostasis, and regeneration Current position: Research Investigator, Surgery-Plastic Surgery, University of Michigan
2014	Ling-Chun “Cindy” Liou, Ph.D., University of Wyoming Department of Biomedical Genetics, Center for Oral Biology, University of Rochester Project Title: Mammary branching morphogenesis and alveolar differentiation Current position: Postdoctoral Fellow, Academia Sinica, Taiwan
2014-2015	Theresa Namhee Kim, Undergraduate Student/Research Assistant Program in Biology and Psychology, University of Rochester
2015-2016	Jacqueline Tran, Undergraduate Student/Research Assistant Program in Brain and Cognitive Sciences, University of Rochester
2015-2019	Heng Lin, D.D.S., Ph.D., Wuhan University Department of Biomedical Genetics, Center for Oral Biology, University of Rochester Project Title: Cellular signaling and SUMO regulation in development and disease Current position: Research Assistant Professor, University of Rochester
2015-2019	Qirong Huang, D.D.S., Wuhan University Department of Biomedical Genetics, Center for Oral Biology, University of Rochester Project Title: Skeletal stem cell regulation by crosstalk of cellular signaling pathways Current position: Resident, Eastman Institute of Oral Health
2015-2016	Alycia Abbott, Undergraduate Student/Research Assistant Program in Biomedical Engineering, University of Rochester Project Title: Rap1b in the development of the craniofacial and body skeleton Current position: Ph.D. student in Biomedical Engineering, Worcester Polytechnic Institute
2016-2017	Shumin Wang, Ph.D., Mia University, Japan Department of Biomedical Genetics, Center for Oral Biology, University of Rochester Project Title: Small regulatory RNAs in skeletal development, homeostasis, and regeneration Current position: Staff Scientist, University of Rochester
2016-2017	Julia Reichert, Undergraduate Student/Research Assistant Program in Genetics, University of Rochester

Project Title: SUMO-specific protease 2 in neural development and disease  
Current position: Associate Scientist II, Prime Medicine

2016-2018	Laura DiRienzo, Undergraduate Student/Research Assistant Program in Genetics, University of Rochester DMD, Harvard School of Dental Medicine Current position: General Practice Resident Dentist, UNC Health
2016-2017	Jana Jelušić, Undergraduate Student/Research Assistant Program in Neuroscience, University of Rochester Current position: Graduate Student in Chemistry, at Yale University
2018	Erica Shin, Undergraduate Student Program in Cell and Developmental Biology, University of Rochester
2018-2020	Alan Boka, Undergraduate Student/Research Assistant Program in Biochemistry, University of Rochester Current position: Ph.D. student, University of Pennsylvania
2018-2020	Connie Chang, Undergraduate Student/Research Assistant Program in Cell and Developmental Biology, University of Rochester Current position: M.D. student, University of Hawaii
2018-2020	Ronay Stevens, Undergraduate Student/Research Assistant Program in Microbiology and Epidemiology, University of Rochester Master of Science, Johns Hopkins University School of Public Health Current position: Research Associate, BluRock Therapeutics
2019	Hannah Song, Undergraduate Student/Research Assistant Program in Cell and Developmental Biology, University of Rochester Current position: Medical Assistant, Dermatology Associate of Rochester
2019-2020	Jianing Song, Undergraduate Student/Research Assistant Program in Cell and Developmental Biology, University of Rochester Current position: Student, Temple University Kornberg School of Dentistry
2019-2020	John Martinez, B.S., University of Rochester Center for Oral Biology, University of Rochester Project Title: The miRNA23a cluster in bone remodeling Current position: Ph.D. student in Translational Biomedical Science, University of Rochester
2019-2021	Cedric YueLin Hu, Undergraduate Student/Research Assistant Program in Molecular Genetics and Psychology, University of Rochester Current position: M.D. student, Case Western Reserve University School of Medicine
2020-2021	Natalie Hernandez, B.S., Johns Hopkins University Medical Student, University of Rochester School of Medicine and Dentistry
2020-2021	Jessica Danner, Undergraduate Student/Research Assistant Program in Molecular Genetics, University of Rochester
2020-2023	Justin Lopes, B.S., University of Wisconsin

	<p>Research Associate, The Forsyth Institute  Project Title: Epigenetic regulation in skeletal development and disease  Current position: Ph.D. student in Human Genetics, University of Pittsburg</p>
2020-2022	<p>Daigaku Hasegawa, D.D.S., Ph.D., Kyushu University, Japan  Staff Scientist, The Forsyth Insititute  Project Title: Cell fate determination in craniofacial and skeletal development  Current position: Assistant Professor, Kyushu University, Japan</p>
2021-2022	<p>Hitoshi Uchida, D.D.S., Ph.D., Osaka University, Japan  Staff Scientist, The Forsyth Insititute  Project Title: Stem cell-mediated skeletal development and regeneration  Current position: Assistant Professor, University of Toyama, Japan</p>
2021	<p>Matthew Godwin, Graduate Research Fellow  DMD Student, Harvard School of Dental Medicine</p>
2021-2022	<p>Andrea Akwiwu, Undergraduate Research Fellow  Program in Biological Engineering, Massachusetts Institute of Technology</p>
2021-2022	<p>Abhitha Vegi, Undergraduate Research Fellow  Program in Computational Biology, Massachusetts Institute of Technology  Project: Gene profiling of cell lineage and skeletal stem cells in craniofacial morphogenesis</p>
2021-2023	<p>Panhasopheak “Stephany” Pang, Undergraduate Research Fellow  Program in Biological Engineering, Massachusetts Institute of Technology  Project: Molecular and cellular analysis of craniofacial development and disease  Current position: Graduate Student, UC Berkeley</p>
2021-2024	<p>Yaser Peymanfar, Ph.D., The University of Adelaide, Australia  Postdoctoral Research Fellow, The Forsyth Institute  Project: The gut-osteoblast anabolic pathway disruption in diabetic bone diseases</p>
2022-Date	<p>Zhirui Jiang, Ph.D., The University of Adelaide, Australia  Postdoctoral Research Fellow, The Forsyth Institute  Project: Single-cell and spatial transcriptomics and epigenetics of skeletogenic lineages in craniofacial and skeletal development</p>
2022-Date	<p>Kai Li, PhD., Tokyo Medical/Dental University (TMDU), Japan  Postdoctoral Research Fellow, The Forsyth Institute  Project: Mechanisms underlying craniofacial and skeletal deformities of progeroid disorders</p>
2023	<p>Mandlin Almousa, D.M.D., King Saud bin Abdulaziz University for Health, Saudi Arabia  DMSc Student in Oral Medicine, Harvard School of Dental Medicine  Project: Mechanisms underlying temporomandibular joint development and disease</p>
2023-Date	<p>Ching-Shuan “Jolly” Huang, D.D.S., Taipei Medical University  DMSc Student in Endodontics and Oral Biology, Harvard School of Dental Medicine  Project: Mechanisms underlying odontogenesis and tooth agenesis  Recipient of <i>Harvard Presidential Scholarship in Dental Medicine Award</i></p>
2023-Date	<p>Catherine Klein, BDS, Universidad de Chile and Master, Universidad de los Andes, Chile</p>

RTC student, The Forsyth Institute  
Project: Biomimetic design for stem cell-guided bone ossification

2024-Date Yin Luo, PhD., University at Buffalo  
Postdoctoral Research Fellow, The Forsyth Institute  
Project: Metabolic pathways in craniofacial and skeletal development and disease

2024-Date Adrian Ke, Undergraduate Research Fellow  
DMD Student, Harvard School of Dental Medicine  
Project: Single-cell and spatial transcriptomics of skeletal stem cells in bone regeneration

#### Visiting Scholar

2006 Lianghui Zhang, M.D., Medical School of Fudan University, Ph.D., University of Rochester  
Current position: Assistant Professor of Medicine, University of Pittsburgh

2007 Yoshihiro Komatsu, Ph.D. National Institute of Environmental Health Sciences, USA  
A recipient of the NIDCR K99/R00 pathway to independent award in 2011  
Current position: Associate Professor, University of Texas Health Science Center, Houston

2020-2021 Nicolas Casellas, M.D., Universidad Central del Caribe School of Medicine  
Project Title: Wnt signaling in oropharyngeal cancer  
Current position: Otolaryngology Surgery Resident, University of Rochester Medical Center

2024-Date Yu Yamaguchi, D.D.S., Ph.D. in Dental Science, Nagasaki University  
Project Title: Cellular signaling in craniofacial development and disease  
Current position: Assistant Professor, Nagasaki University

#### Summer/Rotation Students

2004 Krystal Benyamein, D.M.D.-Ph.D. Training Student  
School of Dentistry, Howard University

2004 Ting-Hein Lee, Rotation Student  
Department of Pathology & Laboratory Medicine, University of Rochester

2004 Bhawana Bariar, Rotation Student  
Department of Biomedical Genetics, University of Rochester

2005 Jianquan Chen, Rotation Student  
Department of Biology, University of Rochester  
Current position: Professor, Orthopaedic Institute of Soochow University

2005 Ayhan Yoruk, Summer Student  
Department of Biology, Cornell University  
M.D., George Washington University School of Medicine and Health Sciences  
Residency and Fellowship, University of Rochester Medical Center  
Current position: Instructor, University of Rochester Medical Center

2006 Li-Ka "Allen" Liu, Rotation Student  
Department of Biology, University of Rochester

2007 Pranabananda Dutta, Rotation Student  
Department of Biochemistry and Biophysics, University of Rochester



2008	Jared Williams, D.M.D.-Ph.D. Training Student School of Dentistry, Meharry Medical College
2009	Philip Wan, Summer Student, Penfield High School M.D., SUNY Downstate College of Medicine
2010	Omar Chacon, D.M.D.-Ph.D. Training Student School of Dental Medicine, University of Puerto Rico
2012	Andrew Allbee, M.D.-Ph.D. Student Department of Biology, University of Rochester
2015	Vivian Yu, Summer Student, Pittsford Mendon High School Current position: Undergraduate student, University of Michigan
2015-2022	Trunee Hsu, Summer Student, Pittsford Barker Road Middle School, Mendon High School, and Case Western Research University
2016	Cynthia Tang, Rotation Student Cell Biology of Disease Program, University of Rochester
2017	Rahul Ribeiro, Summer Student, Pittsford Mendon High School
2018	Rubens Sautchuk, Rotation Student Translational Biomedical Science Program, University of Rochester

#### **Institutional Committee/Council Memberships**

##### Advisory Committees

2004-2007	Mo Chen, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester Thesis Title: Wnt/ $\beta$ -catenin in growth plate chondrocyte maturation
2004-2008	Han Liu, Ph.D. Student Department of Biology, University of Rochester Thesis Title: Using the Twirler mutant mouse as a model to investigate the molecular mechanisms of craniofacial development
2005-2006	Xue Shirley Yang, M.S. Student Graduate Program in Genetics, Genomics & Development, University of Rochester Thesis Title: The role of Axin in cartilage formation
2005-2008	Wenjin Liu, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester Thesis Title: Irx11 in mouse development
2006-2008	Yasser Elshatory, M.D., Ph.D. (MSTP) Student Graduate Program in Neuroscience, University of Rochester Thesis Title: LIM-Homeobox gene Islet-1 is a key regulator of restricted neuronal subtypes in the retina and forebrain

2006-2009	Qian Ding, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester Thesis Title: MBH1 in the development of the retina and proprioceptive pathway
2008-2011	Ming Kung, Ph.D. Student Graduate Program in Toxicology, University of Rochester Thesis Title: Cigarette smoke in chondrogenesis
2008-2012	Jeff Harder, Ph.D. Student Graduate Program in Pathology & Laboratory Medicine, University of Rochester Thesis Title: The role of Bcl2 family members in retinal ganglion cell death
2009-2013	Amita Vaidya, Ph.D. Student Department of Biology, University of Rochester Thesis Title: DNA double breakpoint repair in aging
2011-2015	Shweta Tiwary, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester Thesis Title: Identification of biomarkers for tumor-initiating cells in malignant melanoma
2011-2015	Nicole Paris, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester Thesis Title: Wnt signaling in diaphragm development
2011-2012	Wei Pan, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester Thesis Title: Notch signaling in inner ear development
2012-2013	Brenn Stacey, M.S. Student Graduate Program in Toxicology, University of Rochester Thesis Title: The role of the Aryl Hydrocarbon Receptor in the regulation of the balance between quiescence, senescence, and proliferation in hematopoietic stem cells
2013-2019	Eugene Kim, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester Thesis Title: Examine the role of Isl1 in tracheoesophageal separation
2021-Date	Takamitsu Maruyama, Assistant Member of Staff, Forsyth Institute Junior Faculty Mentorship Committee
2021-2022	Baptiste Depalle, Assistant Investigator, Forsyth Institute Junior Faculty Mentorship Committee
2022-2024	Emily Moore, Postdoctoral Research Fellow Developmental Biology, Harvard School of Dental Medicine Project Title: Interaction between nerves and mineralized tissues in calvarial injury repair

#### Qualifying Exam Committees

2006	Member for Yasser Elshatory, M.D., Ph.D. Student Graduate Program in Neuroscience, University of Rochester
2006	Member for Wenjin Liu, Ph.D. Student

	Graduate Program in Genetics, Genomics & Development, University of Rochester
2006	Member for Xue Shirley Yang, M.S. Student Graduate Program in Genetics, Genomics & Development, University of Rochester
2007	Member for Qian Ding, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester
2008	Member for Ming Kung, Ph.D. Student Graduate Program in Toxicology, University of Rochester
2009	Member for Jeff Harder, Ph.D. Student Graduate Program in Pathology & Laboratory Medicine, University of Rochester
2011	Chair for Shweta Tiwary, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester
2011	Chair for Nicole Paris, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester
2015	Member for Eugene Kim, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester

#### Thesis Defense Committees

2007	Member for Mo Chen, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester
2008	Member for Yasser Elshatory, M.D., Ph.D. Student Graduate Program in Neuroscience, University of Rochester
2009	Member for Han Liu, Ph.D. Student Department of Biology, University of Rochester
2009	Member for Wenjin Liu, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester
2009	Member for Qian Ding, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester
2011	Member for Ming Kung, Ph.D. Student Graduate Program in Toxicology, University of Rochester
2011	Chair for Kathleen McAvoy, Ph.D. Student Graduate Program in Neuroscience, University of Rochester
2012	Chair for Xin Yi Chan, Ph.D. Student Department of Biology, University of Rochester
2012	Member for Wei Pan, Ph.D. Student Graduate Program in Genetics, Genomics & Development, University of Rochester
2012	Member for Jeff Harder, Ph.D. Student

Graduate Program in Pathology & Laboratory Medicine, University of Rochester

- 2013 Chair for Wei Kan, Ph.D. Student  
Graduate Program in Pharmacology, University of Rochester
- 2015 Chair for Wei Sun, Ph.D. Student  
Graduate Program in Neuroscience, University of Rochester
- 2017 Chair for Xiaowei Wang, Ph.D. Student  
Graduate Program in Neuroscience, University of Rochester
- 2018 Eugene Kim, Ph.D. Student  
Graduate Program in Genetics, Genomics & Development, University of Rochester
- 2022 Yu-Chun Lin, DMSc Student  
Graduate Program in Prosthodontics, Harvard School of Dental Medicine  
Thesis: Role of Secreted Frizzled-Related Protein 4 (Sfrp4), a Wnt signaling antagonist, in tooth development and dental tissue mineralization

#### Institutional Committees

- 2004-2013 Medical Faculty Council, University of Rochester School of Medicine and Dentistry
- 2005-2021 Interview committee for the MSTP program, University of Rochester
- 2007-2021 Interview committee for the Genetics graduate program, University of Rochester
- 2007-2021 Interview committee for the Cell Biology graduate program, University of Rochester
- 2009-021 Dean's Research Advisory Committee/URMC Interim Funding, University of Rochester
- 2009-2013 Traveling Award Review Subcommittee, Medical Faculty Council, University of Rochester
- 2013-2021 Steering Committees for Tenure and Promotion, University of Rochester
- 2014-2021 Interview committee for the Neuroscience graduate program, University of Rochester
- 2015-2017 Faculty Recruitment, Center for Oral Biology, University of Rochester
- 2018-2019 Chair, Faculty Recruitment for Translational Medicine, University of Rochester
- 2022-2023 Member of Mentorship Policy Committee, Forsyth Institute
- 2022-Date Member of Strategic Advisory Committee, Forsyth Institute
- 2022-Date Member of Cores Advisory Committee, Forsyth Institute
- 2022 Faculty Recruitment for Harvard School of Dental Medicine
- 2022-Date Executive Committee, Harvard School of Dental Medicine

#### Award Committees

- 2004 Member, Research Award Committee  
American Association for Dental Research, Rochester Chapter
- 2005 Chair, Basil G. Bibby Fellowship Award Committee, Eastman Dental Center, NY
- 2006-2007 Member, Basil G. Bibby Fellowship Award Committee, Eastman Dental Center, NY
- 2022 Harvard School of Dental Medicine Student Research Day Poster, Boston, MA

## Invited/Platform Presentations

### Invited Talks - Research Conferences

1. Cold Spring Harbor Meeting on Molecular Biology of SV40, Polyoma, and Adenoviruses. "Convergent Regulation of E1A-independent Adenoviral DNA replication and Oct-1 synthesis by interleukin-6 and retinoic acid", Cold Spring Harbor, NY, August 1992.
2. Northeast Regional Developmental Biology Meeting. "The role of *Fused* gene in embryonic axis formation in vertebrates", Woods Hole, MA, May 1997.
3. WNT Meeting 2001. "Conditional expression of Axin by the tetracycline-dependent system in transgenic mice: the role of Axin in regulating cell growth, differentiation, and death during the postnatal development of mice", Memorial Sloan-Kettering Cancer Institute, New York City, 2001.
4. American Dental Association Dental Student Conference on Research. "Cellular signaling in craniofacial development and brain patterning", Rochester, NY, April 2003.
5. Keynote Speaker for the American Association for Dental Research. "Genetic regulatory pathways in skull morphogenesis and craniosynostosis", Rochester, NY, June 2005.
6. Society of Craniofacial Genetics, 28<sup>th</sup> annual meeting, and scientific symposium. "Wnt signaling in skull morphogenesis and craniosynostosis", Salt Lake City, Utah, October 2005.
7. Aso International Symposium on Stem Cell and Developmental Biology sponsored by the Institute of Molecular Embryology and Genetics, Kumamoto University, a Japanese government-nominated group. "Cell fate determination in craniofacial skeletogenesis", Kyushu, Japan, September 2010.
8. Emerging Information and Technology Conference (EITC)-2012. "Stem cell biology and regenerative medicine in skeletal development and disease", the University of Toronto, Toronto, Canada, August 2012.
9. Sixth International Stem Cells & Cell Signaling -2013 Meeting on Regenerative Medicine, Tissue Engineering & Therapeutics. "Interplay of skeletogenic signaling pathways: from development and disease to stem cell & regenerative medicine", Waltham-Boston, Massachusetts, May 2013.
10. Emerging Information and Technology Agriculture 2013, First EITA Conference on Agricultural Science and Engineering, Biosystems Engineering. "Stem cells in skeletal development, homeostasis, and injury repair", Cornell University, Ithaca, June 2013.
11. American Society for Bone and Mineral Research, 2013 Annual Meeting. "Wnt production and signaling in fate determination and differentiation of the skeletal precursors", Baltimore, MD, October 2013.
12. The 2014 EITA Conference on New Media and Biomedical Research. "Mesenchymal stem cells in tissue repair and regeneration", Massachusetts Institute of Technology, Cambridge, MA, July 2014.
13. Sixth Annual Symposium of Regenerative Medicine and Stem Cell. "Stem cell-mediated skeletal repair and regeneration", China, November 2014.
14. Cold Spring Harbor Asia Meeting – Bone & Cartilage: from Development to Human Disease. "Skeletal stem cells in craniofacial development, repair, and regeneration", Suzhou, China, October 2016.
15. International Bone Morphogenetic Protein Conference. "BMPR1A in skeletal stem cell-mediated craniofacial development, disease, and regeneration", Virtual BMP Forum, May 2022.
16. The 5<sup>th</sup> Scientific Symposium, on Craniofacial Biology, Disease, and Regeneration, Forsyth Institute, November 2022. "Nonclassical  $\beta$ -catenin signaling in skeletal cell fate determination" \*Symposium Organizer, Section Chair and Science Presenter

17. 2023 Medical Research Center Symposium on Oral Microbiome, Bone Biology, and Neuroscience. "Skeletal stem cells: from development & disease to regenerative medicine", Seoul National University, October 2023.
18. Second Joint Symposium for ADA Forsyth Institute and Seoul National University. "Skeletal stem cells: from development & disease to regenerative medicine", ADA Forsyth Institute, July 2024. Section Chair

Invited Seminars/Lectures at Academic Institutions

1. National Yang-Ming University, Department of Life Sciences, Taipei, Taiwan, December 1998. "Identification of a novel Wnt signaling regulator Axin in mammalian axis determination."
2. State University of New York at Albany, Center for Comparative Functional Genomics, Albany, NY, February 2002. "Cellular signaling in mammary gland development and tumorigenesis."
3. University of Alabama at Birmingham, Department of Biochemistry and Molecular Genetics, Birmingham, AL, March 2002. "Axin modulates Wnt signaling in mammary gland development and tumorigenesis."
4. University of Rochester, Department of Biomedical Genetics, Rochester, NY, March 2002. "Axin modulates Wnt signaling in mammalian development and tumorigenesis."
5. Georgetown University, Department of Pharmacology, Washington, DC, April 2002. "Axin modulates Wnt signaling in mammalian development and tumorigenesis."
6. Roswell Park Cancer Institute, Department of Cancer Genetics, Buffalo, NY, May 2002. "Genetic regulatory network in mammalian development and tumorigenesis."
7. Albert Einstein Medical College, Department of Pathology, Bronx, NY, May 2002. "Cellular signaling in mammalian development and tumorigenesis."
8. University of Rochester, Department of Biology, Rochester, NY, June 2002. "Genetic regulatory network in mammalian development and tumorigenesis."
9. Weil Medical College of Cornell University, Department of Pathology and Laboratory Medicine, New York City, September 2002. "Wnt signaling in development and cancer."
10. National Health Research Institutes, Division of Cancer Research, Taipei, Taiwan, February 2003. "Wnt signaling in development and cancer."
11. University of Massachusetts Medical Center, Department of Cell Biology Worcester, MA, September 2005. "Genetic regulatory circuits in development and disease: Tales of the Wnt-Axin network."
12. Mount Sinai School of Medicine, Department of Molecular, Cell and Developmental Biology, New York City, September 2005. "Genetic regulatory circuits in development and disease: Wnt/Axin signaling in skull morphogenesis and craniosynostosis."
13. University of Maryland, School of Medicine, Department of Orthopedics, Baltimore, MD, October 2005. "Genetic regulatory circuits in development and disease: Wnt/Axin signaling in skeletogenesis and craniosynostosis."
14. RIKEN Center for Developmental Biology, Kobe, Japan, November 2005. "Wnt signaling in tissue-specific stem cells."
15. Mackay Memorial Hospital, Department of Medical Research, Taipei, Taiwan, November 2005. "Wnt signaling in stem/progenitor cell research."
16. Academia Sinica, Genomics Research Center, Taipei, Taiwan, November 2005. "Wnt signaling and

- precursor cell biology in craniofacial morphogenesis, breast development, and cancer.”
17. National Health Research Institutes, Division of Cancer Research, Taipei, Taiwan, November 2005. “Cellular signaling in craniofacial morphogenesis, breast development, and cancer.”
  18. Harvard University, Department of Developmental Biology, Boston, MA, December 2005. “Wnt signaling in skeletal development and disease.”
  19. Indiana University, School of Medicine, Department of Biochemistry and Molecular Biology, Indianapolis, IN, January 2006. “Molecular and cellular mechanisms of craniofacial bone development and disease.”
  20. University of Maryland, School of Medicine, Department of Pharmacology and Experimental Therapeutics, Baltimore, MD, June 2008. “Wnt signaling in mammary stem cell development and cancer.”
  21. University of Hawaii, Cancer Research Center of Hawaii, May 2010. “A Wnt-Wnt situation: signal production and transduction in stem cell-mediated breast development and cancer.”
  22. Mayo Clinic, Department of Biochemistry and Molecular Biology, Rochester, MN, September 2010. “Wnt production and signaling in skeletal development and disease.”
  23. Weil Medical College of Cornell University, Department of Pathology and Laboratory Medicine, New York City, November 2010. “Morphogenetic signaling network in development and disease.”
  24. Boston University, Department of Molecular and Cell Biology, March 2011. “Mesenchymal stem cells in skeletal development and disease.”
  25. New York University, Department of Basic Science and Craniofacial Biology, April 2011. “Morphogenetic signaling network in stem cell-mediated skeletal development and disease.”
  26. Academia Sinica, Institute of Molecular Biology, Taipei, Taiwan, July 2011. “A Wnt-Wnt situation in stem cell-mediated development and disease.”
  27. Hangzhou Normal University, Institute of Developmental and Regenerative Biology, China, August 2011. “The SUMO pathway in development and cancer.”
  28. Chinese Academy of Science, Shanghai Institute of Biological Sciences, Institute of Biochemistry and Cell Biology, August 2011. “A Wnt-Wnt situation in stem cell-mediated development and disease.”
  29. East China Normal University, Institute of Biomedical Sciences, China, 2011. “Autocrine and Paracrine Wnt signaling mediated by Gpr177 in development and disease.”
  30. University of California Los Angeles, School of Dentistry, September 2011. “Wnt, FGF, and BMP signaling pathways in stem cell-mediated skeletal development and disease.”
  31. The University of Rochester, James P. Wilmot Cancer Center Grand Rounds, January 2011. “Regulators of Wnt production and signaling in development and cancer.”
  32. Texas A&M Health Science Center, Pathways to Excellence Seminar Series, February 2012. “Interplay of skeletogenic signaling pathways: from developmental and disease mechanisms to stem cell & regenerative medicine.”
  33. Ohio State University, the Comprehensive Cancer Center, Molecular Biology-Cancer Genetics, March 2012. “A Wnt-Wnt situation in development and cancer.”
  34. University of Texas – Austin, Dell Pediatric Research Institute, June 2012. “Interplay of Wnt, FGF, and BMP signaling in skeletogenesis: from developmental and disease mechanisms to stem cell biology & regenerative medicine.”
  35. Baylor College of Medicine, Department of Molecular and Human Genetics, July 2012. “Interplay of

- skeletogenic signaling pathways: from developmental and disease mechanisms to stem cell & regenerative medicine."
36. Georgia Health Sciences University, November 2012. "Interplay of Wnt, FGF, and BMP signaling: from developmental and disease mechanisms to stem cell biology & regenerative medicine."
  37. The University of Hawaii Cancer Center, October 2013. "Identification of a mesenchymal stem cell population with long-term self-renewal, differentiation, and regenerative abilities."
  38. Academia Sinica, Genomics Research Center, Taipei, Taiwan, July 2014. "Small ubiquitin-related modifiers in neural development and degeneration."
  39. Hangzhou Normal University, Institute of Developmental and Regenerative Biology, China, November 2014. "Stem cell in skeletal developmental, disease and regeneration."
  40. Wuhan University, China, November 2014. "Signaling crosstalk in fate determination and differentiation of skeletal stem cells."
  41. Chinese Academy of Science, Shanghai Institute of Biological Sciences, Institute of Biochemistry and Cell Biology, November 2014. "SUMO-specific protease 2: from embryonic and extraembryonic development to neurodegeneration."
  42. Soochow University, Orthopedic Institute, China, October 2016. "Skeletal stem cells in craniofacial development, repair, and regeneration."
  43. The University of Texas Health Science Center at Houston, Pediatrics Research Center, February 2017. "Morphogenic signaling pathways in skeletal development, homeostasis, and regeneration."
  44. UC Davis School of Medicine and the Shriners Hospitals for Children, Institute for Pediatric Regenerative Medicine, April 2017. "Skeletal stem cells: from development & disease to regenerative medicine."
  45. Tulane University, Department of Cell and Molecular Biology, February 2018. "Craniofacial bone development, disease, and regeneration."
  46. Medical University of South Carolina, December 2018. "Skeletogenic signaling in the development and maintenance of craniofacial and body skeletons."
  47. The University of Pennsylvania Perelman School of Medicine, March 2019. "Skeletal stem cells: from development & disease to regenerative medicine."
  48. Texas Scottish Rite Hospital for Children, April 2019. "Skeletogenic signaling pathways in stem cell-mediated development, homeostasis, and regeneration."
  49. The University of Maryland, School of Dentistry, April 2019. "Interplay of skeletogenic signaling pathways in stem cell-mediated craniofacial development and disease."
  50. The University of Maryland, Fischell Department of Bioengineering, July 2019. "Skeletal stem cells: from development & disease to regenerative medicine."
  51. The University of Texas Southwestern Medical Center, August 2019. "Stem cell regulation in skeletal development, disease, and regeneration."
  52. University of Southern California Medical Center, October 2019. "Craniofacial bone development, disease, and regeneration."
  53. Forsyth Institute, February 2020. "Skeletal stem cells in development, disease, and regeneration."
  54. University of Pennsylvania, March 2020. "Skeletal stem cells: from development & disease to regenerative medicine."
  55. Harvard School of Dental Medicine, November 2020. "Skeletal stem cells: from development & disease to regenerative medicine."



56. University at Buffalo, September 2022. "Skeletal stem cells: from development & disease to personalized therapy for craniofacial reconstruction."
57. National Yang-Ming Chiao Tung University, Taipei, Taiwan, June 2023. "Single-cell profiling deciphers calvarial morphogenesis and craniosynostosis and stem cell-mediated regeneration."
58. Harvard University, Department of Developmental Biology, Boston, MA, January 2024. "Stem cells in craniofacial development, disease, and regeneration."
59. Tufts University School of Medicine, Genetics, Molecular & Cellular Biology Seminar, January 2024. "Transcriptomic and epigenomic profilings elucidate stem cell-mediated craniofacial development at the single cell level."

## Bibliography

Jonathan M. Spergel, **Wei Hsu**, Shizuo Akira, Bayar Thimmapaya, Tadamitsu Kishimoto, and Selina Chen-Kiang (1992). NF-IL6, a member of the C/EBP family, regulates E1A-responsive promoters in the absence of E1A. *Journal of Virology*, 66, 1021-1030. PMID: [1309887](#)

Selina Chen-Kiang, **Wei Hsu**, Yasodha Natkunam, and Xiaokui Zhang (1993). Nuclear signaling by IL-6. *Current Opinion in Immunology*, 5, 124-128. PMID: [8452668](#)

**Wei Hsu** and Selina Chen-Kiang (1993). Convergent regulation of NF-IL6 and Oct-1 synthesis by interleukin-6 and retinoic acid in embryonal carcinoma cells. *Molecular and Cellular Biology*, 13, 2515-2523. PMID: [8455626](#)

**Wei Hsu**, Tom K. Kerppola, Phang-Lang Chen, Tom Curran, and Selina Chen-Kiang (1994). Fos and Jun repress transcription activation by NF-IL6 through association at the basic zipper region. *Molecular and Cellular Biology*, 14, 268-276. PMID: [8264594](#)

Lydiya Klampfer, Tae Ho Lee, **Wei Hsu**, Jan Vilc k and Selina Chen-Kiang (1994). NF-IL6 and AP-1 cooperatively modulate the activation of the TSG-6 gene by tumor necrosis factor alpha and interleukin-1. *Molecular and Cellular Biology*, 14, 6561-6569. PMID: [7935377](#)

Li Zeng, Francois Fagotto, Tong Zhang, **Wei Hsu**, Thomas J. Vasicek, William L. Perry III, James J. Lee, Shirley M. Tilghman, Barry M. Gumbiner, and Frank Costantini (1997). The mouse *Fused* locus encodes Axin, an inhibitor of the Wnt signaling pathway that regulates embryonic axis formation. *Cell*, 90, 181-192. This study describes the identification of Axin as a negative regulator of  $\beta$ -catenin in the canonical Wnt pathway. Axin exerts its effect on Wnt signaling at the level downstream of GSK3 $\beta$  but upstream of  $\beta$ -catenin. The loss of AXIN causes duplication of the embryonic axis, leading to the revealing of its mutations in classical mouse *Fu* alleles (*Fused*, *Kinky*, and *Knobby*). PMID: [9230313](#)

\*Created a new subcategory on Wnt Home Page: <http://www.stanford.edu/~rnusse/wntwindow.html>

**Wei Hsu**, Li Zeng, and Frank Costantini. Identification of a domain of Axin that binds to the Serine/Threonine Protein Phosphatase 2A and a self-binding domain (1999). *Journal of Biological Chemistry*, 274, 3439-3445. PMID: [9920888](#)

\*Cited by Wnt homepage: <https://web.stanford.edu/group/nusselab/cgi-bin/wnt/axin> and many review articles for Wnt signaling

MA Julius, B Schelbert, **Wei Hsu**, E Fitzpatrick, E Jho, F Fagotto, F Costantini and J Kitajewski (2000). Domains of axin and disheveled required for interaction and function in Wnt signaling. *Biochem Biophys Res Commun*, 276, 1162-1169. PMID: [11027605](#)

**Wei Hsu**, Reena Shakya, and Frank Costantini (2001). Impaired mammary gland and lymphoid development caused by inducible expression of Axin in transgenic mice. *Journal of Cell Biology*, 155, 1055-1064. [PMID: 11739413](#)

H-M Ivy Yu, Boris Jerchow, Tzong-Jen Sheu, Bo Liu, Frank Costantini, J Edward Puzas, Walter Birchmeier, and **Wei Hsu** (2005). The role of Axin2 in calvarial morphogenesis and craniosynostosis. *Development*, 132, 1995-2005. This study has linked Wnt signaling for the first time to craniofacial bone development and disease. Axin2 disruption causes aberrant cell proliferation and differentiation, leading to premature suture fusion and the development of craniosynostosis in mice. It is also one of the papers to first describe the regulation of bone development by the Wnt signal transduction pathway. [PMID: 15790973](#)

\*Cited by Wnt homepage: <https://web.stanford.edu/group/nusselab/cgi-bin/wnt/axin>

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types. They are responsible for craniofacial bone development, homeostatic maintenance, and injury-induced repair. The isolated SuSCs can regenerate bone from a single cell and repair critical-size bone defects via direct engraftment, indicating their potential use in regenerative medicine. [PubMed: PMID: 26830436](#), [PMCID: PMC4740445](#)

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This study is a collaboration with my colleague at Academia Sinica in Taiwan. We initiated this project to investigate the role of SUMO-specific protease 2 (SENP2) in T lymphocyte development and disease during my sabbatical several years ago.

I-Ying Lin, Hsia-Yuan Ying, Chien-Hsin Huang, Pan-Hung Hsu, Li-Yang Bai, Shii-Yi Yang, Chin-Hsiu Liu, Daisuke Kitamura, **Wei Hsu**, and Kuo-I Lin (In revision). Regulatory role of SENP2 in germinal center function and systemic autoimmunity via deSUMOylating IRF8. *Nature Immunology*  
This study is a collaboration with my colleague at Academia Sinica in Taiwan. We initiated this project to investigate the role of SUMO-specific protease 2 (SENP2) in B lymphocyte development and disease during my sabbatical several years ago.

Kai Li\*, Trunee Hsu\*, Hitoshi Uchida, Zhirui Jiang, H-M Ivy Yu, Susan Michaelis, Howard Worman, and **Wei Hsu** (In Preparation). Stem cell deficiency in craniofacial and skeletal deformities of progeroid disorders. \*equal contributors

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