UCSF Mentored Surgeon Scientist Training Program

Six-year Orthopaedic Surgery Residency Research Track

UCSF Department of Orthopaedic Surgery

Tiffany Pham, BA, an orthopaedic researcher in the Laboratory for Musculoskeletal Crosstalk, investigates the intricate signaling mechanisms between adipose and musculoskeletal tissues, pioneering new approaches to revolutionize osteoarthritis therapies.

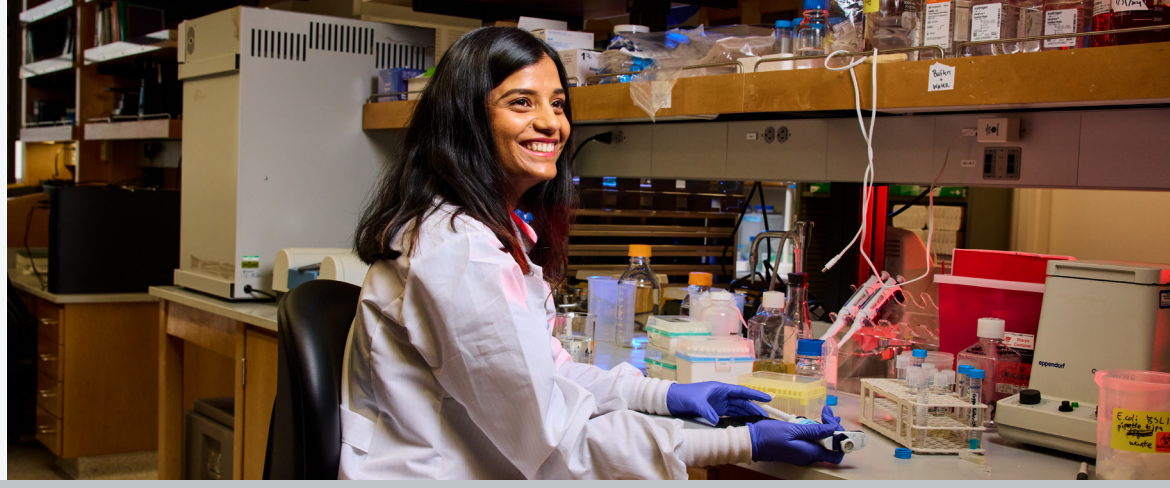
Ashraf El Naga, MD, James Mok, MD, Avionna Baldwin, MD, Ryan Halvorson, MD, and Anna Filley, MD present research at the Department's annual LeRoy C. Abbott Society Scientific Program and Annual Verne T. Inman Lectureship.

Front Cover Photos:

Top: Andres Betancourt-Torres, a graduate student researcher, examines a slide at the Alliston Laboratory for Skeletal Cell Differentiation and Signaling.

Bottom Left: Ryan Halvorson, MD, participates in a clinical research study on the Mission Bay campus.

Researcher Aditi Dubey, MS, from the lab of Christopher J. Hernandez, PhD, explores the impact of the gut microbiome on musculoskeletal tissues and orthopaedic surgery.



Message from the Chair

Dear Applicant,

Thank you for your interest in the UCSF Mentored Surgeon Scientist Training Program. It is my pleasure to introduce you to an extraordinary opportunity within the UCSF Department of Orthopaedic Surgery: our 6-year research track. This unique initiative is designed to train the next generation of clinician-scientists committed to advancing our understanding and care of musculoskeletal (MSK) diseases.

At UCSF, we recognize that the complexities of MSK conditions demand an integration of advanced scientific research and exceptional clinical expertise. Our research track goes beyond the standard 5-year residency structure by incorporating an additional dedicated research year. This allows our residents to engage deeply in scientific inquiry, develop robust investigative skills, and contribute meaningfully to advancements in the field, all while honing their clinical acumen.

Why Choose UCSF's Research Track?

The UCSF research track offers unparalleled resources, mentorship, and a collaborative environment tailored to foster your growth as a surgeon-scientist. You will work alongside some of the world's leading researchers and clinicians, leveraging UCSF's rich history of innovation and excellence. From state-of-the-art research facilities to diverse clinical exposure, our program ensures a well-rounded and rigorous training experience.

Key Highlights of Our Program Include:

Dedicated Research Year

Immerse yourself in cutting-edge projects with support from staunch mentors and access to substantial funding.

Broad Research Opportunities

Explore a wide spectrum of scientific inquiries, ranging from basic science and translational research to clinical trials and population health studies.

Proven Success

Our residents have a track record of securing competitive grants, publishing in high-impact journals, and establishing impactful careers as leaders in academic orthopaedics.

Additionally, our program has been structured to provide ample support to residents through mentorship from experienced clinician- scientists, collaboration with interdisciplinary research teams, and opportunities to present at national and international conferences.

Enclosed in this guide, you will find detailed information about:

- Recent research accomplishments and funding highlights
- Types of research available
- A timeline overview of the program
- Feedback from former research residents
- Graduate outcomes and their professional trajectories

The UCSF Mentored Surgeon Scientist Training Program is more than a residency—it is an investment in your future as a clinician-scientist and a chance to shape the future of orthopaedic care.

Warm regards,

C. Benjamin Ma, MD
Chair, UCSF Department of Orthopaedic Surgery
Dr. Peter and Sophie Pappas Endowed Chair
V-nee Yeh Endowed Professor of Orthopaedic Surgery

Orthopaedic Residency Research Track

Why choose the Research Track?

This track is ideal for candidates interested in pursuing careers as academic surgeon-scientists. The goal of the program is to prepare residents for an academic career that includes both clinical practice and independent, hypothesis-driven research. UCSF provides unique opportunities for residents to engage in groundbreaking research, access state-of-the-art facilities, research cores, and collaborate with leading faculty in orthopaedic surgery and beyond. The program emphasizes both clinical excellence and scientific inquiry, preparing residents to become leaders in the field.

Jeff Lotz, PhD, vice chair of research, at left, collaborates with Noah Bonnheim, PhD, a postdoctoral researcher in the Fields Laboratory for Orthopaedic Biomechanics and Biotransport.

Impactful Research

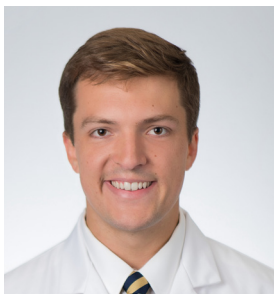
Residents in this track have contributed to impactful research and publications. Many residents have recently received awards or grant funding for their research from agencies including the OREF, AOSSM, and NIH. For example, here are some accomplishments for the prior five research residents:

Dr. Michael Davies was the recipient of the AOSSM Young Investigator Grant and was awarded the AOSSM Excellence in Research Award for his research on the role of fibroadipogenic progenitor cells in rotator cuff injury.

Dr. Steven Garcia was awarded NIH funding for his work related to stem cell function in muscle adipogenesis and fibrosis.

Dr. Favian Su was awarded an NIA R38 award for his research on nonoperative treatment for glenohumeral arthritis.

Dr. Syed Ali and Dr. Ryan Halvorson were both recipients of the UCSF NIH T32 Musculoskeletal Training Program Fellowship.



Dr. Ryan Halvorson was the recipient of an OREF Resident Research Award and a Kunal Patel Catalyst Award ($100,000) to develop a mobile app to study patient biomechanics.

Orthopaedic Residency Research Track

At the Muscle Injury and Translational Orthopaedic Research Lab, Sankalp Sharma, above, focuses on studying muscular dystrophy, kinematic tests with mice, and isolating various cell populations.

Timeline Overview

The 6-year orthopaedic residency research track parallels the 5-year orthopaedic residency for the PGY1-PGY3 years. After PGY3, residents in the 6-year research track complete a year of dedicated research training before resuming their PGY4 year. The timing of the research year is a natural transition point between junior and senior residency and is optimally positioned before fellowship applications are due.

Types of Research

UCSF Orthopaedic Surgery Principal Investigators conduct research across the entire spectrum from basic science to pure clinical science. Prior research residents have been successful doing bench work, animal studies, global health, biomechanical studies, and clinical studies. Some examples of labs are listed below.

Global Health

The Institute for Global Orthopaedics and Traumatology (IGOT) was established in 2006 at UCSF to address global disparities in orthopaedic trauma care. IGOT is recognized as one of the leading academic and global outreach initiatives in the field of orthopaedic trauma. Prior residents have collaborated with IGOT to perform impactful global health projects, and have traveled to countries in Africa, including Ghana and Tanzania. Key faculty include Dr. David Shearer, Dr. Saam Morshed, Dr. Ted Miclau, and Dr. Meir Marmor.

Muscle Stem Cell Biology

The MITO (Muscle Injury and Translational Orthopedic) research lab, co-led by Dr. Brian Feeley and Xuhui Liu, performs research on muscle tissue quality and its impact on common problems, including rotator cuff tears, knee pain, limb immobilization, joint contractures, and low back pain.

Bone Biology

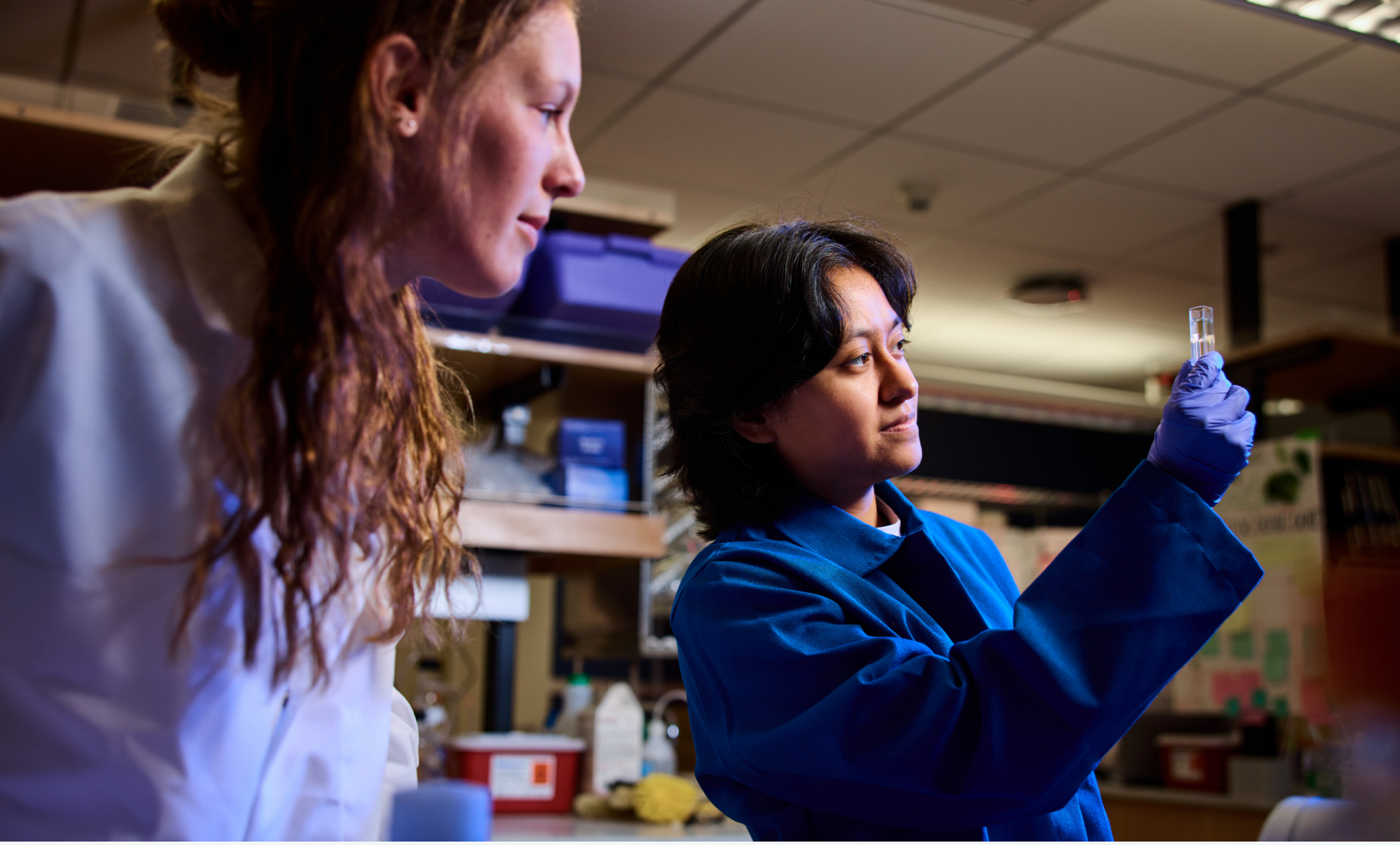
Aaron Fields, PhD and his lab are performing broad research related to structure-function relationships in musculoskeletal tissues, with a particular focus on the mechanisms of nutrient transport in bone and cartilage and harnessing nutrient transport for tissue repair and regeneration.

Clinical Research

There are opportunities to lead clinical research in every orthopaedic subspecialty with several available clinical mentors.

Biomechanics

The UCSF Digital Orthopaedic Biomechanics Lab, led by Dr. Jeannie Bailey, is focused on developing new ways to assess MSK patients and predict response to treatments and surgery. Their work includes developing MRI biomarkers for joint and muscle pathology, using sensors and markerless motion capture for in-clinic and remote biomechanical assessments, and developing analytical approaches to patient outcomes and recovery.



Through the Hernandez Research Group, Erika Cyphert, PhD, postdoctoral fellow and Gissell Jimenez, BS, PhD student, investigate the effects of the microbiome on bone and joint disorders, periprosthetic joint infection, and the biomechanics and mechanobiology of infectious bacteria. A recent NSF award supports this effort to build living materials inspired by Dr. Hernandez's research on bacteria and bone.

Q&A

Is there a separate rank for the research track or do you pick after you match?

The UCSF research track is a separate rank item.

Are there opportunities for clinical involvement during the research year?

Yes. Research residents historically have opportunities to cover cases or moonlight.

What are advantages of UCSF's research track compared to other programs?

Timing: Positioning the research year between PGY3-4 is a natural transition point where residents typically know what they are applying into and can hone their efforts to set up
their career

Flexibility: Research residents can select any project or mentor they want and are guaranteed funding for the year, although they may seek additional funding.

What support will I receive for research?

There are opportunities for additional funding for travel and conferences, opportunities for outside funding, and the ability to apply for UCSF NIH T32 Musculoskeletal Training Program

What kinds of mentorship and advising are available?

There are several faculty in the Department who are eager to serve as research mentors. Many of them have NIH, DoD, OREF, and society level research funding and dedicate portions of their career to research. There are both clinician-researchers and dedicated researchers in the department who have served as mentors.

Can I take additional classes?

Formal courses and workshops are available through the UCSF Graduate Division and cover topics such as biostatistics, grant writing, and designing clinical research.

At the Muscle Injury and Translational Orthopedic Research Lab, medical students Adoubacar Wague, Luke Sang, and Alex Youn research muscle tissue quality and its impact on common problems, such as rotator cuff tears, knee pain, limb immobilization, joint contractures, and low back pain.

How to Apply

Applications for the UCSF Orthopaedic Surgery Residency, including the 6-year research track, can be submitted through the standard ERAS system. For more information, contact the UCSF Orthopaedic Surgery Residency Office.

Graduate Outcomes of the Six-Year Program (2010-2020)

Faculty Positions: 87.5% of surgeons now hold academic faculty positions, compared to 20% of their peers who completed the five-year program.

Publications: 44 peer-reviewed papers, 60% more than the traditional residency group, which published 27.4 papers.

Research Grants: 6.75 grants, 2.5 times more than the traditional residency group, which had 2.75 grants.

Graduate Outcomes: Where are they now?

Rosie Wustrack, MD
Mentors: Shane Burch, MD and Dennis Black, MD

Project: spine sx outcomes; HORIZON trial (2012)

Current: Faculty, UCSF

Daniel Thuillier, MD
Mentors: Tamara Alliston, PhD and Brian Feeley, MD

Project: Smad3 repression and cartilage (2013)

Current: Faculty, UCSF

Lionel Metz, MD
Mentor: Jeffrey Lotz, PhD

Project: T2DM and disc degeneration (2014)

Current: Faculty, UCSF

Amanda Whitaker, MD
Mentor: Tamara Alliston, PhD

Project: Smad4 and chondrocyte polarity (2015)

Current: Faculty, UC Davis

Drew Lansdown, MD
Mentor: Brian Feeley, MD and C. Benjamin Ma, MD

Project: qMRI & rotator cuff/ACL pathology (2016)

Current: Faculty, UCSF

Alekos Theologis, MD
Mentor: Ralph Marcucio, PhD and Theodore Miclau, MD

Project: BPA and endochondral ossification (2017)

Current: Faculty, UCSF

Debbie Dang, MD
Mentor: Alfred Kuo, MD, PhD

Project: Role of Cadherin-11 in fracture healing (2018)

Current: Sutter Health

Patrick Curran, MD
Mentor: Brian Feeley, MD and Saam Morshed MD, MPH, PhD

Project: RCT of k-wires vs. nails; motion analysis (2019)

Current: Faculty, UCSD

Graduate Outcomes: Where are they now?

Trevor Grace, MD
Mentor: Erik Hansen, MD

Project: Outcomes in total hip arthroplasty and total knee arthroplasty (2020)

Current: Kaiser

Musa Zaid, MD
Mentor: Erik Hansen, MD

Project: Clinical research in arthroplasty (2021)

Current: Private Practice

Heather Roberts, MD
Mentor: Erik Hansen, MD

Project: Healthcare disparities in arthroplasty; strategies to improve outcomes after femoral neck fracture (2022)

Current: Private Practice

Michael Davies, MD
Mentor: Brian Feeley, MD

Project: Role of FAPs in Rotator Cuff Injury (2023)

Current: Faculty, UCSF

Steven Garcia, MD
Mentor: Brian Feeley, MD

Project: Stem cell function in muscle adipogenesis and fibrosis (2024)

Current: Orthopaedic Surgery Resident

Favian Su, MD
Mentor: Brian Feeley, MD and Drew Lansdown, MD

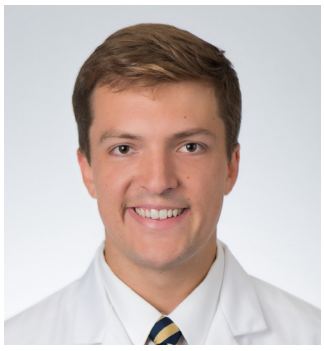
Project: MOON Imaging, Shoulder OA (2025)

Current: Orthopaedic Surgery Resident

Syed Ali, MD
Mentor: Saam Morshed MD, MPH, PhD and David Shearer, MD

Project: RCT of local antibiotics for open tibia fractures in Tanzania (GO Tibia) (2026)

Current: Orthopaedic Surgery Resident



Ryan Halvorson, MD
Mentor: Jeannie Bailey, PhD; Brian Feeley, MD, and Drew Lansdown, MD

Project: Biomechanics, LLMs for EHR Data (2027)

Current: Orthopaedic Surgery Resident

Feedback from our graduates

"The research track kick-started my career. The resources and outstanding mentorship I received throughout residency and during my research year helped me establish a track record of academic success, which in turn led to a competitive fellowship and my ideal academic job following fellowship."

– Michael Davies, MD

"The research year is formative for those who want to pursue an academic career. I thought I knew how to do research because I had taken two years to do research before residency. However, throughout this year, I really learned how to be a clinical researcher, which included study conception and grant writing to supervising the clinical study. I also had time to take courses at UCSF graduate school to build upon skills I had an interest in, such as statistical analysis."

– Favian Su, MD

Feedback from our graduates

"The research year allowed me to better understand the entire research process and to present our research at several national and an international meetings. This enabled me to connect with other orthopedic surgeons with similar research interests and develop my professional and presentation skills."

– Rosanna Wustrack, MD

"I think the six-year research program was such a unique opportunity in my training towards becoming an academic orthopedic surgeon. This program provided me with an opportunity to have outstanding clinical training and focused high-level training in how to perform impactful research. I was able to develop research interests and expertise that allowed me to transition well into a faculty position."

– Drew Lansdown, MD

Pioneering musculoskeletal discovery and innovative care to transform lives.

UCSF Department of Orthopaedic Surgery