Christopher J. Hernandez

Contact Information
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San Francisco, CA 94143
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Education

Stanford University, Stanford, CA, 1996-2001
Ph.D., Mechanical Engineering 2001, Specialization: Biomechanics, Solid Mechanics
M.S., Mechanical Engineering 1997

Harvard University, Cambridge, MA, 1992-1996
S.B., Engineering Sciences (biomedical engineering), Cum Laude

Positions

University of California, San Francisco, CA
Professor 2023-Present
Department of Orthopaedic Surgery
Department of Bioengineering and Therapeutic Science

Vice Chair for Research 2025-Present
Department of Orthopaedic Surgery

Director
Health Innovations Via Engineering (HIVE)

University of California, Berkeley, CA
Professor in Residence 2024-Present
Department of Bioengineering

Cornell University, Ithaca, NY
Professor 2020-2022

Associate Director of Graduate Affairs 2017-2020
Director of Graduate Studies, Mechanical Engineering

Associate Professor 2012-2020
Assistant Professor 2010-2012
Sibley School of Mechanical and Aerospace Engineering
Meinig School of Biomedical Engineering

Hospital for Special Surgery, NY, NY
Adjunct Scientist 2010-2022
Biomechanics, Hospital for Special Surgery, NY, NY

Case Western Reserve University, Cleveland, OH
Assistant Professor 2005-2010
Department of Mechanical and Aerospace Engineering
Secondary Appointments:
Assistant Professor 2005 – 2010
Department of Orthopaedic Surgery
Department of Biomedical Engineering

Research Associate 2007 – 2012
Department of Physical Anthropology, Cleveland Museum of Natural History

University of California, Berkeley, CA
Visiting Post Doctoral Researcher 2002 – 2004
Associate Specialist 2004 – 2005
Department of Mechanical Engineering (advisor Tony Keaveny)

The Mount Sinai School of Medicine, NY, NY
Postdoctoral Fellow: 2001-2002
Department of Orthopaedics (advisor Mitchell Schaffler)

Stanford University, Stanford, CA
Doctoral Dissertation: 1996-2001
VA Palo Alto, Rehabilitation Research and Development Center, Palo Alto, CA and the Department of Mechanical Engineering, Stanford University, Stanford, CA. (advisor Dennis Carter)

Honors and Awards

Adele Boskey Award, American Society for Bone and Mineral Research (ASBMR), 2024
BRITE Fellow, National Science Foundation, CMMI Division, 2022
Educator of the Year, Society of Hispanic Professional Engineers (SHPE), 2021
Fellow, Biomedical Engineering Society (BMES), 2021
Fellow, American Society for Bone and Mineral Research (ASBMR), 2019
Mid-Career Travel Award, American Society for Bone and Mineral Research (ASBMR), 2019
Fellow, American Institute for Medical and Biological Engineering (AIMBE), 2019
Fuller Albright Award, American Society for Bone and Mineral Research, 2018
Fellow, American Society of Mechanical Engineers (ASME), 2017
Zellman Warhaft Faculty Commitment to Diversity Award, Cornell University, 2017
American Society for Bone and Mineral Research Harold M. Frost Young Investigator, 2006
Finalist, Orthopaedic Research Society New Investigator Recognition Award, 2006
Finalist, Orthopaedic Research Society New Investigator Recognition Award, 2004
Travel Award for Sun Valley Hard Tissue Workshop, 2001
Best Technical Paper, National Technical Career Conference, 2001
Society of Hispanic Professional Engineers Foundation Scholarship, 2000
Ford Foundation Dissertation Fellowship, 2000
Alice L. Jee Memorial Travel Award for Young Investigators, 1999
NSF Graduate Fellowship, 1996

Ongoing Research Support

R21AR085253 Hernandez (PI) 09/03/2025-09/02-2027
NIH/NIAMS $390,796
"Using In Vitro Culture to Detect Changes in Bone Matrix Mechanical Properties"
This project advances micromechanical testing to examine nodules of bone forme in vitro and compare the results to bone formed in vivo. The work is done in the context of the heterotrimeric G protein Gs mouse.
Role:PI

R01DE019284 Hernandez (PI) 07/29/2025-05/31/2026
NIH/NIDCR $585,350 Total Costs
"The mechanistic control of bone quality and joint crosstalk by osteocytes"
This project examines the effects of osteocytes on the development of osteoarthritis.
Role: PI

R01AG090407 Hernandez (PI) 07/29/2025-07/28/2030
NIH/NIA $3,441,835 Total Costs
"Triangulating Mechanisms of Microbiome-Joint Crosstalk"
This project examines the effects of the gut microbiome on severity of osteoarthritis in mice.
Role: PI

T32GM139794 Hernandez (PI) 07/01/21-06/30/26
NIH/NIGMS $2,769,346 Total Costs
"UCSF/UCB Joint Graduate Group in Bioengineering"
This training grant supports the UCSF/UC Berkeley Joint Graduate Program in Bioengineering
Role: PI

No Number Hernandez (PI) 01/01/23-12/31/27
Chan Zuckerberg Biohub San Francisco $1,000,000 Total Costs
Biohub Investigator
CZ Biohub Investigators have research funds to spend at their discretion.
Role: PI

2125491 Hernandez (CoI) 09/01/22-08/31/26
NSF $2,000,000 Total Costs
"EFRI ELiS: Mechanically Adaptive Living Building Materials"
This project explores technologies for using mechanosensitive cells to make building materials change density/stiffness in response to loading.
Role: PI

2135586 Hernandez (PI) 03/15/22-02/27/27
NSF $962,838 Total Costs
"BRITE Fellow: Rigid Engineered Living Materials"
The goal of this project is to make synthetic materials functionalized with living cells that are mechanosensitive in a way that mimics bone.
Role: PI

R01 AG067997-01 Hernandez (PI) 05/15/21-05/14/26
NIH/NIA $3,761,923 Total Costs
"The Microbiome and Bone Strength"
In this project we determine how changes in the gut microbiome regulate bone tissue material properties.
Role: PI

Completed Research Support

R25DK135989 Prisby, Bouxsein Hernandez (multiple-PI) 04/01/23-03/31/28
NIH/NIDDK $729,000 Total Costs
"Enhancing Workforce Diversity in the Bone, Mineral, and Musculoskeletal Field"
This project involves the creation of programs to enhance the diversity of the membership and leadership of the American Society for Bone and Mineral Research.
Role: multiple PI

2055214 Hernandez (PI) 05/01/21-04/30/24
National Science Foundation/CMMI
"Mechanoregulation in the Maintenance of the Bacterial Cell Wall" $430,000 Total Costs
In this project we explore the two-component response regulator VxrAB as a mechanosensitive system in V. Cholerae.
Role: PI

No Number Hernandez (PI) 01/01/23-12/31/23
Center for Disruptive Musculoskeletal Innovation, UCSF, NSF $40,000 Total Costs
"Understanding Bacterial Infiltration into Bone and Bone Allograft"
In this project we test the idea that S. aureus grows preferentially into nanoscale channels
Role: PI

2325011 Heveran, Gerlach, Hernandez (multiple-PI) 04/01/23-03/31/24
NSF $39,794 Total Costs
"Conference: Developing Community in Engineered Living Materials"
This conference grant supports the first workshop on Engineered Living Materials
Role: multiple PI

W911NF1910121 Chen, Hernandez co-PI 02/16/19-02/15/22
Army Research Office $180,000 Hernandez
"Single-cell Super-resolution Imaging of Bacterial Metal Efflux Mechanobiology"
In this project we examine the effects of mechanical forces on bacterial proteins involved in toxin resistance/efflux.
Role: Co-PI

Cornell Sibley School of Mechanical Engineering
"Funds to Support a Change in Research Direction"
These funds are an internal award to allow faculty to transition their research goals. I am using these funds to transition to microbiome-orthopaedics related research.
Role: PI

R21 AR073454 Hernandez (PI) 05/01/2018-02/28/2020
NIH/NIAMS $407,061 Total Costs
"The Role of Bone Resorption in Bone Marrow Lesions"
In this project we use a novel animal model to study the underlying mechanisms within bone marrow lesions
Role: PI

R56 AG067997-01 Hernandez (PI) 09/30/20-04/15/21
NIH/NIA $597,237 Total Costs
"The Microbiome and Bone Strength"
This the first year of support for R01 AG067997 awarded by the institute before awarding the R01 project.
Role: PI

R21AR071534-01 Hernandez, Bostrom (multiple PI) 02/01/2017-01/31/2020
NIH/NIAMS $430,855 Total Costs
"The Microbiome as a Risk Factor for Periprosthetic Joint Infection"
In this project we test the idea that an impaired gut flora can influence rates of infection during joint replacement.
Role: PI (multiple-PI)

1362934 Hernandez (PI) 03/15/15–03/14/18
NSF/CMMI $400,000 Total Costs
"Biomechanics and Mechanobiology of Live Bacteria"
In this project we use microfluidic devices to mechanically stimulate live bacteria.
Role: PI

R21 AR068061 Hernandez (PI) 03/01/15-02/28/17
NIH/NIAMS $370,946 Total Costs

"Separating Systemic Inflammation From Obesity in Load-Induced Osteoarthritis"
In this project we explore the effects of systemic inflammation on susceptibility to osteoarthritis following mechanical loading.
Role: PI

PR141864 Hernandez (PI) 08/24/2015-02/23/17
CDMRP/DoD $311,389 Total Costs
"Alterations in Gut Microbiota and Post-Traumatic Osteoarthritis"
In this project we determine how alterations in the microbiome influence the development of post-traumatic OA.
Role: PI

R01 AR057362-01 Hernandez (PI) 03/01/10-02/28/14
NIH/NIAMS $1,231,165 Total Costs
"Biomechanical Effects of Microstructural Flaws in Cancellous Bone"
In this project we seek to understand the influence of resorption cavities on the formation of microscopic tissue damage and the corresponding changes in cancellous bone strength and resistance to cyclic loading.
Role: PI

1068260 Hernandez (PI) 07/01/11-06/30/14
NSF $300,000 Total Costs
"Spatial Relationships Between Trabecular Bone Tissue Strain and Bone Formation"
In this project we use an in vivo animal model, finite element modeling and high resolution 3D fluorescent imaging to determine if local tissue strains are spatially related to regions of new bone formation.
Role: PI

No Number Hernandez (PI) 07/01/13 – 06/30/15
AMGEN $50,000 Total Costs
Formation of New Trabeculae with Sclerostin Antibody Treatment
This project involves applying three dimensional dynamic bone histomorphometry to specimens of monkey vertebral bone from animals treated with sclerostin antibody
Role: PI

S10 RR033461 Hernandez (PI) 04/20/13 – 04/19/14
NIH $754,684 Total Costs
"Acquisition of a Nano Computed Tomography Instrument for shared Cornell Imaging"

Number: F33AR065348 Hernandez (PI) 09/01/13 – 05/01/14
NIH $51,022 Total Costs
"Associations between gut microbiota, flagellin production and bone microstructure"
Role: PI

R21 AR 054448-01 Hernandez (PI) 09/01/07-08/31/09
NIH/NIAMS $337,514 Total Costs
"Three-Dimensional Dynamic Bone Histomorphometry"
Role: PI

RES 106726 Hernandez (PI) 01/01/08-06/30/09
Musculoskeletal Transplant Foundation $100,000 Total Costs
"Biomechanical Consequences of Gamma Radiation Sterilization on Cancellous Bone Allograft"
Role: PI

No Number Hernandez (PI) 04/05/11-07/01/13

Musculoskeletal Transplant Foundation $50,000 Unrestricted Gift
"Distribution of Bacteria in Allograft"
Role: PI

No Number Rimnac (PI) 01/01/09-12/31/09
Musculoskeletal Transplant Foundation $100,000
"Effect of microscopic tissue damage on the long-term viability of cortical bone allografts"
Role: Co-Investigator

RES 502548 Hernandez (PI) 07/01/07-06/30/09
Case Western Reserve University
Presidential Research Initiative
"An In Vivo Model of Damage and Repair of Cancellous Bone"
Role: PI

Publications
AUTHOR ORDER follows BIOSCIENCES CONVENTION: the first author performed the greatest direct effort and the last author is the Principal Investigator/Corresponding Author/Mentor

Underlined names are trainees mentored primarily by C.J. Hernandez
* Indicates that these authors contributed equally to the work.
+ Indicates co-corresponding authors

For h-index and other information:
ResearcherID: B-5290-2009 http://www.researcherid.com/rid/B-5290-2009
Google Scholar: https://scholar.google.com/citations?user=WdJj2AwAAAAJ&hl=en
ORCID: orcid.org/0000-0002-0712-6533
NIH NCBI Bibliography:
http://www.ncbi.nlm.nih.gov/sites/myncbi/christopher.hernandez.1/bibliography/41141664/public/?sort=date&direction=ascending

1. Sun, J., Cheng, M.M-C., van Wijngaarden, E., **Hernandez, C.J.**, Bernhardt, T.G., Huang, K.C. (2025) "A load bearing cytoplasmic membrane of Escherichia coli." Submitted.

2. *Cyphert E.L., *Liu, C., Chu, V.T., Dubey, A., Liu, M., Zhong, Z., Cockey, J.R., Gonzalez Diaz, E.C., Morales, A.L., Nixon, J.C., Garcia, M., Zeng, S., Rohatgi, S., Wong, J., Neff, N., Lee, J., Shea, M.K., Fu, X., Booth, S.L., Leifer, C.A., Singh, A., Langelier, C.R., **Hernandez, C.J.** (2025) "Commensal taxa within the gut microbiota limit antibiotic resistance during extended oral antibiotic use." Submitted.

3. DeFrates, K.G., Lee, J., Jimenez, G., Pinho, M.G., **Hernandez, C.J.** (2025) "Physical mechanisms that enable bacteria to traverse channels half their width." Submitted.
https://www.biorxiv.org/content/10.1101/2025.03.07.642077v1

4. Wang, B., Stephen, S., Cyphert, E.L., Liu, C., **Hernandez, C.J.**, Vashishth, D.P. (2025) "Fecal Microbiota Transplantation Improves Bone Material Properties in Mice Through Altered Mineral Quality" *JBMR Plus*. ziaf115, https://doi.org/10.1093/jbmrpl/ziaf115

5. Liu M, Liu C., Cevallos, N., Orbach, B.N., **Hernandez, C.J.**, Fu, X., Lee, J., Booth, S., Shea, K.M. (2025) "Dietary Menaquinone-9 Supplementation Does Not Influence Bone Tissue Quality or Bone Mineral Density in Mice." *JBMR Plus*. 10.1093/jbmrpl/ziaf059

6. Cyphert, E.L., Nand, S., Franco, G., Hajowski, M., Soto, L., Lee, D.M., Ferner, M.C., Zabin, C.J., Blumenthal, J., Deck, A.K., Boyer, K.E., Burrus, K., **Hernandez, C.J.**, Anand, A. (2025) "Combinatorial characterization of bacterial taxa-driven differences in the microbiome of oyster beds." 2(2):qvaf006, *Sustainable Microbiology* https://doi.org/10.1093/sumbio/qvaf006

7. *Zhang, W., *Harper, C.E., Lee, J., Fu. B., Ramsukh, M., +**Hernandez, C.J.**, +Chen, P. (2025) "Transporter excess and clustering facilitate adaptor-protein shuttling for bacterial efflux." *Cell Rep Phy Sci*. 10.1016/j.xcrp.2025.102441

8. Liu C., Cyphert E.L., Stephen S.J., Wang B., Morales A., Nixon J., Natsoulas N., Garcia M., Carmona PB, Vill A., Donnelly E., Brito I.L., Vashishth D., **Hernandez C.J**. (2024) "Microbiome-induced Increases and Decreases in Bone Tissue Strength can be Initiated After Skeletal Maturity. *J Bone Miner Res*. 39(11):1621-1632. doi: 10.1093/jbmr/zjae157

9. Heveran, C.M., Gerlach, R., **Hernandez, C.J.**, Intemann, K., Meyer, A., Ajo-Franklin, C., Charrier, M., Srubar, W.V., Joshi, N., Nelson, A., Fields, M. (2024) "Unlocking the societal potential of engineered living materials" *Matter* 7(9): 2846-2858. doi.org/10.1016/j.matt.2024.07.011

10. Cyphert, E.L., Liu, C., Morales, A.L., Nixon, J.C., Blackford, E., Garcia, M., Cevallos, N., Turnbaugh, P.J., Brito, I.L., Booth, S.L., **Hernandez, C.J.** (2024) "Effects of high dose aspartame-based sweetener on the gut microbiota and bone strength in young and aged mice" *JBMR Plus*. ziae082, https://doi.org/10.1093/jbmrpl/ziae082

11. Lee, J., Jha, K., Harper, C.E., Zhang, W., Ramsukh, M., Bouklas, N., Chen, P., **Hernandez, C.J.** (2024) "Determining the Young's Modulus of the Bacterial Cell Envelope Using Microfluidic-based Extrusion Loading". *ACS Biomater Sci Eng*. 13;10(5):2956–66. 10.1021/acsbiomaterials.4c00105

12. Schwarz, E.M., Archer, N.K., Atkins, G.J., de Mesey Bentley, K.L., Botros, M., Cassat, J.E., Chisari, E., Coraca-Huber, D.C., Daiss, J.L., Gill, S.R., Goodman, S.B., Harro, J., **Hernandez, C.J.**, Ivashkiv, L.B., Kates, S.L., Marques, C.N.H., Masters, E.A., Muthukrishnan, G., Owen, J.R., Raafat, D., Saito, M., Veis, D.J., Xie, C. (2023) "The 2023 Orthopaedic Research Society's International Consensus Meeting on Musculoskeletal Infection: Summary from the Host Immunity Section." *J Orthop Res*. 10.1002/jor.25758

13. Heveran, C.M., **Hernandez, C.J.** (2023) "Make Engineered Living Materials Carry Their Weight." *Matter*. 6 (11): 3705-3718. https://doi.org/10.1016/j.matt.2023.07.023.

14. van Wijngaarden, E.W., Bratcher, S., Lewis, K.J., **Hernandez, C.J.** (2023) "Solute Transport in Engineered Living Materials Using Bone-Inspired Microscale Channel Networks" *Adv Eng Mater* https://doi.org/10.1002/adem.202301032.

15. Cyphert, E.L., Clare, S., Dash, A., Nixon, J.C., Raphael, J., Harrison, J., Heilbronner, A., Kim, H.J., Cunningham, M., Lebl, D., Schwab, F., **Hernandez, C.J.**, Stein, E.M. (2023) "A Pilot Study of the Gut Microbiota in Spine Fusion Surgery Patients." *HSS J*. https://doi.org/10.1177/15563316231201410

16. *Harper, C.E., *Zhang, W., Shin, J., van Wjingaarden, E., Chou, E., Lee, J., Wang, Z., +Dörr, T., +Chen, P., +**Hernandez, C.J.** (2023) "Mechanical stimuli activate gene expression for bacterial cell-wall synthesis" *Sci Rep* **13**, 13979. https://doi.org/10.1038/s41598-023-40897-w

17. **Hernandez, C.J.** (2023) "Suppression of Bone Remodeling and Bone Fragility" *J Bone Miner Res*. doi: 10.1002/jbmr.4781

18. Deosthale, P., Balanta-Melo J., Creecy, A., Liu, C., Marcial, A., Morales, L., Cridlin, J., Robertson, S., Okpara, C., Sanchez, D.J., Ayoubi, M., Lugo, J., **Hernandez, C.J.**, Wallace, J., Plotkin, L.I. (2023) "Fragile X Messenger Ribonucleoprotein 1 (FMR1), a novel inhibitor of osteoblast/osteocyte differentiation, regulates bone formation, mass, and strength in young and aged male and female mice." *Bone Research*. 11:25. https://doi.org/10.1038/s41413-023-00256-x

19. Bowen A., Shamritsky, D., Santana J., Porter I., Feldman E., Pownder S. L., Koff, M.F., Hayashi, K., **Hernandez, C.J.**, (2022) "Animal Models of Bone Marrow Lesions" *JBMR Plus*. https://doi.org/10.1002/jbm4.10609.

20. Sacher, S.S., Hunt, H., Lekkala, S., Lopez, K., Potts, J., **Hernandez, C.J.**, Donnelly, E. (2022) "Distributions of Microdamage Are Altered Between Trabecular Rods and Plates in Cancellous Bone From Men With Type 2 Diabetes Mellitus." *J Bone Miner Res.* doi: 10.1002/jbmr.4509

21. Walliman, A., Magrath A., Pugliese, B., Stocker, N., Westermann, P., Heider, A., Gehweiler, D., Zeiter, S., Claesson, M.J., Richards, R.G., Akdis, C.A., **Hernandez, C.J.**, O'Mahony, L., Thompson, K., Moriarty, T.F. (2021) "Butyrate inhibits osteoclast activity in vitro and regulates systemic inflammation and bone healing in a murine osteotomy model compared to antibiotic-treated mice." *Mediators Inflamm*. 8817421 https://doi.org/10.1155/2021/8817421

22. Cyphert, E.L., Zhang, N., Learn, G.D., **Hernandez, C.J.**, von Recum, H.A. (2021) "Challenges and recent advances associated with evaluating antimicrobial materials to treat orthopaedic infections in vivo." *ACS Infect*. 7 (12): 3125-3160. DOI: 10.1021/acsinfecdis.1c00465

23. Ellis J.L., Fu, X., Karl, J.P., **Hernandez, C.J.**, Mason, J.B., Debose-Boyd, R.A., Booth, S.L. (2021) "Multiple dietary vitamin K forms are converted to tissue menaquinone-4 in mice." J Nutr. DOI: 10.1093/jn/nxab332

24. **Hernandez, C.J.**, Moeller, A.H. (2021) "The Microbiome: A Heritable Contributor to Bone Morphology?" *Semin Cell Dev Biol*. S1084-9521(21)00173-7.

25. Luna, M., Guss, J.D., Vasquez-Bolanos, L.S., Castaneda, M., Vargas Rojas, M., Strong, J.M., Alabi, D.A., Dornevil, S.D., Nixon, J.C., Taylor, E.A., Donnelly, E., Fu, X., Shea, M.K., Booth, S.L, Bicahlo, R., **Hernandez, C.J.** (2021) "Components of the Gut Microbiome and Influence Bone Strength" *J Bone Miner Res*. doi: 10.1002/jbmr.4341

26. Walliman, A., Magrath, W., Thompson, K., Moriarty, T.F., Akdis, C.A., O'Mahony, L., **Hernandez, C.J.** (2021) "Gut microbial-derived short chain fatty acids and bone: A potential role in fracture healing." *Eur Cell Mater*. DOI:10.22203/eCM

27. **Hernandez C.J**. "Musculoskeletal Microbiology: The Microbiome in Orthopaedic Biomechanics." (2021) *Curr Opin Biomed Eng*. https://doi.org/10.1016/j.cobme.2021.100290.

28. *Castaneda M., *Smith, K.M., Nixon, J.C., +**Hernandez, C.J.**, +Rowan, S. (2021) "Alterations to the Gut Microbiome Impair Bone Tissue Strength in Aged Mice." *Bone Reports*. https://doi.org/10.1007/s11914-020-00627-x

29. Sacher, S., **Hernandez, C.J.**, Donnelly, E. (2021) "Characterization of Ultralow Density Cellular Solids: Lessons from 30 years of Bone Biomechanics Research." *Adv Eng Mater*. https://doi.org/10.1002/adem.202100206

30. **Hernandez, C.J.,** Stein, E.M., Donnelly, E. (2021) "Impaired bone matrix: the key to fragility in type 2 diabetes?" *J Clin Endocrinol Metab* https://doi.org/10.1210/clinem/dgab150

31. Ellis, J.L., Fu, X., Karl, J.P., **Hernandez, C.J.**, Mason, J. B. Booth, S.L. (2020) "Multiple forms of orally-supplemented menaquinones (vitamin K) convert to tissue menaquinone-4 in mice" *Gut Microbes*. 13(1):1-16. DOI: 10.1080/19490976.2021.1887721

32. **Hernandez, C.J.** "Musculoskeletal Microbiology: The Utility of the Microbiome in Orthopaedics" (2021) *J Orthop Res* 39(2): 251-7. https://doi.org/10.1002/jor.24927.

33. Lu, Y., Birol, E.B., Johnson, C., **Hernandez, C.J.**, Sabin, J. (2020) "A Method for Load-Responsive Inhomogeneity and Anisotropy in 3D Lattice Generation Based on Ellipsoid Packing" *Computer-Aided Architectural Design Research in Asia*.

34. Castaneda, M., Strong, J.M., Alabi, D.A., **Hernandez, C.J.** (2020) "The Gut Microbiome and Bone Strength" *Curr Osteoporos Rep* doi: 10.1007/s11914-020-00627-x

35. Luna, M., Guss, J.D., Vasquez-Bolanos, L.S., Alepuz, A.J., Dornevil, S., Strong, J.M., Alabi, D.A., Shi, Q., Pannellini, T., Otero, M., Brito, I.L., van der Meulen, M.C.H., Goldring, S.R., **Hernandez, C.J.** (2021) "Obesity and Load-induced Post-traumatic Osteoarthritis in the Absence of Fracture or Surgical Trauma" *J Orthop Res* 39(5):1007-1016.. doi: 10.1002/jor.24799

36. Chiou, A.E., Hinckley, J.S., Khaitan, R., Varsano, N., **Hernandez, C.J.**, Estroff, L.A., Weiner, S., Addadi, L., Wiesner, U.B., Fischbach, C. (2021) "Fluorescent silica nanoparticles to label metastatic tumor cells in mineralized bone microenvironments" *Small* (15):e2001432 doi:10.1002/smll.202001432

37. Alliston, T., Foucher, K.C., Frederick, B., **Hernandez, C.J.**, Iatridis, J.C., Kozloff, K.M., Lewis, K.J., Liu, X.S., Mercer, D.M., Ochia, R., Queen, R.M., Rimnac, C.M., van der Meulen, M.C.H., Westendorf, J. J. (2020) "The Importance of Diversity, Equity and Inclusion in Orthopaedic Research." *J Orthop Res* doi: 10.1002/jor.24685

38. Harper, C.E., **Hernandez, C.J.** (2020) "Cell Biomechanics and Mechanobiology in Bacteria: Challenges and Opportunities" *APL Bioengineering*. 2020 Apr 1;4(2):021501. doi: 10.1063/1.5135585. Invited Submission. Featured Article.

39. **Hernandez, C.J.**, Zavattieri, P.D., Trikanad, A.A., Rimnac, C.M. (2020) "Reply to Zadpoor: Fatigue mechanisms observed in **bone** provide insight to microarchitectured materials." *Proc Natl Acad Sci U S* A. doi: 10.1073/pnas.2000331117.

40. *Genova, L.A., *Roberts, M.F., Wong, Y-C, Harper, C.E., Santiago, A.G., Fu, B., Srivastava, A., Jung, W., Kreminski, L., Mao, X., Sun, X., Yang, F., Hui, C-Y, +Chen, P, +**Hernandez, C.J.**. (2019) "Mechanical Stress Compromises Bacterial Toxin Efflux." *Proc Natl Acad Sci U S A*. 116 (51) 25462-25467 https://www.pnas.org/content/early/2019/11/25/1909562116

41. Torres, A.M., Trikanad, A.A., Aubin, C.A., Lambers, F.M., Luna, M., Rimnac, C.M., Zavattieri, P., **Hernandez, C.J.** (2019) "Bone-Inspired Microarchitectured Materials with Enhanced Fatigue Life" *Proc Natl Acad Sci U S A* 116 (49) 24457-24462. https://www.pnas.org/content/116/49/24457

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Book Chapters

1.

Sabin EBB **CJ Hernandez**, JE. PolyBrick 2.0: Design and fabrication of load responsive structural lattices for clay additive manufacturing. Structures and Architecture. A Viable Urban Perspective? In: Hvejsel, MF, Cruz PJS, editors. Structures and Architecture. A Viable Urban Perspective?. CRC Press; 2022.

van der Meulen M.C.H., **Hernandez C.J.**. Adaptation of Skeletal Structure to Mechanical Loading. In: Marcus R, Feldman D, Dempster D, Cauley J, Luckey M, editors. Osteoporosis. 5th Edition ed. San Diego, CA, USA: Elsevier; 2020.

Hernandez, C.J. "The Microbiome and Bone" In Burr, D.B. and Allen, M.R. Eds., Basic and Applied Bone Biology 2nd Ed.Academic Press. 2019.

Hernandez, C.J. "Bone Mechanical Function and the Microbiota" Understanding the Gut-Bone Signaling Axis: Mechanisms and Therapeutic Implications. Springer. 2018[10.1007/978-3-319-66653-2_12](https://doi.org/10.1007/978-3-319-66653-2_12)

Hernandez, C.J. "Cancellous Bone." In: Murphy, W. L. editor. Handbook of Biomaterial Properties, 2nd ed. Springer. 2016.

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Media Presence

2022
Hernandez, C.J. "Who gets to Innovate?" TEDx Bloomington, May 15, 2022
https://www.ted.com/talks/christopher_hernandez_who_gets_to_innovate

2021
Hernandez, C.J. "Sciencing while brown" *Science* 2021 **Dec 10;374(6573):1406**.
https://doi.org/10.1126/science.acx9755

"Researchers look to gut microbiome to improve bone health" Cornell Chronicle.
https://news.cornell.edu/stories/2021/06/researchers-look-gut-microbiome-improve-bone-health

2020
"Is Vitamin K the Secret Key to Bone Strength?"
https://now.tufts.edu/articles/vitamin-k-secret-key-bone-strength

2019
"Bone inspired microarchitectures with enhanced fatigue life" Physics World
https://physicsworld.com/a/breaking-the-mystery-of-bone-micro-architecture/.

"'Buildings' in human bone may hold key to stronger 3D-printed lightweight structures"
https://www.purdue.edu/newsroom/releases/2019/Q4/buildings-in-human-bone-may-hold-key-to-stronger-3d-printed-lightweight-structures.html

"Physical forces affect bacteria's toxin resistance, study finds" Cornell Chronicle Dec 5, 2019.
https://news.cornell.edu/stories/2019/12/physical-forces-affect-bacterias-toxin-resistance-study-finds

"Bone breakthrough may lead to more durable airplane wings" Cornell Chronicle, Nov. 21, 2019.
https://news.cornell.edu/stories/2019/11/bone-breakthrough-may-lead-more-durable-airplane-wings#

"Link Found between gut bacteria and successful joint replacement" Cornell Chronicle, July 17, 2019

https://news.cornell.edu/stories/2019/07/link-found-between-gut-bacteria-successful-joint-replacement#

"Bone and the Microbiome have a Brittle Relationship" The Scientist, July 11, 2019
https://www.the-scientist.com/news-opinion/bone-and-the-microbiome-have-a-brittle-relationship-66116

2017
Hernandez, C.J. Accepting Inconvenient Facts (Ithaca March for Science, April 22, 2017):
https://youtu.be/PM_kZvtbWAg
Orthopaedic Research Society Video Outreach Competition, Third Place
https://youtu.be/o4dgqJ9YcmE

2016
"Spongier Tissue, Stronger Bones" (2016) Mechanical Engineering Magazine. 138 (5): 22-23.
Featured on Academic Minute
http://academicminute.org/2016/05/chris-hernandez-cornell-university-bones-reveal-new-engineering-secret/

Featured on Cornell Chronicle
http://www.news.cornell.edu/stories/2016/02/function-after-failure-bone-translates-engineering-strategy

2015
Faculty help diversity the op-ed landscape through Public Voices program. Cornell Chronicle.
http://www.cornell.edu/video/public-voices-faculty-diversify-op-ed-landscape
Hernandez, C.J. "Use NIH to Stop the Job Killers" The Hill.
http://thehill.com/blogs/congress-blog/246971-use-the-nih-to-stop-job-killers
Hernandez, C.J. "My Own McFarland Story" Fox News Latino.
http://fxn.ws/1FDnAYG

2013
Hernandez, C.J. (2013) "Bone fatigue, stress fractures and bone repair (Sun Valley 2013)". Bonekey 10:448. doi:10.1038/bonekey.2013.182

2012
Highlighted in *BoneKEy Reports* (2012) 1, Article number: 54 (2012) doi:10.1038/bonekey.2012.54
Highlighted in *Science* 25 May 2012: Vol. 336 no. 6084 p. 974, doi: 10.1126/science.336.6084.974

2011
Over 100 internet news sites reported on "Human Evolution and Osteoporosis-related Spinal Fracture."
For one example see: http://www.sciencedaily.com/releases/2011/10/111019185817.htm

Invited Conference Presentations (* - International)
"The Microbiome, Bone and Aging Bone Matrix" Bone and Teeth Gordon Research Conference, Galveston, TX, USA, Jan 2026.

"Populating Materials with Living Bacteria" BMES-CMBE Annual Meeting. Puerto Rico. January 2026.

*"The Microbiome, Aging and Bone" XXIV Congreso de Osteoporosis y Enfermadades Metabólicas Óseas. Acapulco, Mexico. 2025.

"Populating and Feeding Rigid Engineered Living Materials" MRS Fall Meeting. Boston, MA, USA. 2024.

"The Microbiome and Bone Strength" American Society for Bone and Mineral Research. Toronto, Canada 2024.

*"The Gut Microbiome and Bone Morphometry" International Society for Bone Morphometry. Toronto, Canada. 2024. Keynote Speaker.

*"Getting Microbes Into Materials and Keeping Them Alive" Engineered Living Materials Symposia. Saarbrucken, Germany. 2024.

"Microbes and Biomechanics" UC-wide Bioengineering Meeting. La Jolla, CA, USA. 2024.

"An Introduction to Engineered Living Materials" Multifunctional Materials and Structures Gordon Research Conference. Ventura, CA, USA. 2024.

"Gut Microbiome-Induced Impairment of Bone Tissue Strength is Reversible in Adults" 8th Annual Vail Scientific Summit. Steadman Institute. Vail, CO, USA 2023.

“The Microbiome and Bone and Joint Disease” Tissue Repair and Regeneration Gordon Research Conference. Colby College, NH, USA. 2023.

*"Conversations between the Microbiome and Bone" XXII Congreso de Osteoporosis y Enfermadades Metabólicas Óseas. Puerto Vallarta, Mexico. 2023.

*"Biomechanics, the Microbiome and Orthopaedics" XXII Congreso de Osteoporosis y Enfermadades Metabólicas Óseas. Puerto Vallarta, Mexico. 2023.

“For the Motion Orthopaedic Research Needs more Discovery v. Hypothesis-based Research” Orthopaedic Research Society Annual Meeting. Dallas, TX, 2023.

“Mechanobiology of Microbes in Musculoskeletal Tissues” ORS Musculoskeletal Biology Workshop. Snowbird, UT, USA. 2022.

*“Mechanical Failure of Bone: What we know and wish we knew” 9th World Congress of Biomechanics, Taipei, Taiwan. 2022

“The Microbiome and Bone” American Association of Anatomy Annual Meeting. Philadelphia, PA, USA. 2022.

“The Microbiome and the Biomechanics of Bone” American Society for Bone and Mineral Research. Webinar Series. 2021.

*“The Microbiome, Bone Strength and Orthopaedic Implants” Gut Bone Axis Meeting. Ehrlangen, Denmark (Virtual) 2021.

“The Microbiome and Orthopaedic Disorders” Emory University School of Medicine, Musculoskeletal Research Symposium, April 2020 CANCELLED FOR PANDEMIC

*“The Microbiome and Implant Infection” Clare Valley Bone Meeting, Clare, South Australia Feb 2020.

*“Biological regulation of bone quality” Clare Valley Bone Meeting, Clare, South Australia Feb 2020.

“The Microbiome and Bone” Bone and Teeth Gordon Research Conference. Galveston, TX, USA, Feb 2020.

*“The Microbiome and Periprosthetic Joint Infection” eCM Orthopaedic Infection. Davos, Switzerland, June 2019.

"The Microbiome and Bone Strength" NYU/Orthopaedic Research Society Northeast Symposia, June 2019

"What is the Microbiome and How is it Relevant to Musculoskeletal Disease?" Orthopaedic Research Society. Austin, TX, USA. February 2019.

*"Bone Strength and the Microbiome" American Society for Bone and Mineral Research. "Gut Microbiome" session. Montréal, Québec, Canada. September 2018.

*"Effects of the Microbiome on Bone Strength and Tissue Material Properties" 7th International Conference on Osteoimmunology: Interactions of the Immune and Skeletal Systems. Chania, Crete, Greece. June 2018.

"Beyond Whole Bone Strength" American Society for Bone and Mineral Research Pre-Meeting Symposium: Current Concepts in Bone Fragility: From Cells to Surrogates*. Denver, CO, USA. September 2017.

*"Musculoskeletal Microbiology: The Microbiome and Bone and Joint Disease" Trinity College Dublin, Dublin, Ireland, July 2017.

*"Three Dimensional Imaging of Bone, Microdamage and Remodeling" Summer Symposium Royal College of Surgeons of Ireland, Dublin, Ireland, July 2017.

"The Microbiome and Bone" 12th Annual Meeting Update on Osteoporosis and Skeletal Health. Northern California Institute for Bone Health, Oakland, CA, 2017.

"Microdamage and Bone Remodeling in Bone Marrow Lesions" in the workshop "Bone Marrow Lesions: What Lies Beneath" organized by O. Kennedy and T. Alliston. Orthopaedic Research Society National Meeting 2017.

"Disruption of the Gut Microbiome Impairs Bone Strength and Tissue Mechanical Properties." Gordon Research Conference on Musculoskeletal Bioengineering. Andover, NH, USA, 2016.

"Microbiome and Joint Disease" AAOS/ORS Workshop Tackling Joint Disease by Understanding Crosstalk between Cartilage and Bone. Rosemont, IL, USA, 2016.

"Techniques for Probing Tissue-Level Mechanical Properties" Contribution to "Tissue Level Composition and Mechanical Measurements. What Could Possibly go Wrong?" Orthopaedic Research Society National Meeting. New Orleans, LA, USA, 2014.

"Bone Fatigue, Bone Repair: How does it relate to Stress Fractures" Workshop on Musculoskeletal Biology, Sun Valley, ID, USA, 2013

"Remodeling and Bone Quality" AAOS/ORS Bone Quality and Fracture Prevention Research Symposium. Rosemont IL, USA. 2013

"The Mechanical Impact of Bone Turnover: A Structural Analysis of the Effects of Remodeling Cavities on Cancellous Bone Strength" Workshop on Skeletal Tissue Biology, Sun Valley, ID, USA, 2006.

"Mechanobiologic and Metabolic Factors in Bone Remodeling." Hard Tissue Workshop, Sun Valley ID, USA. 1999.

Invited Institutional Seminars/Lectures (* - International)

Musculoskeletal Research Center, Washington University at St. Louis, Spring 2025

Bakar Aging Research Institute, UCSF, Spring 2025
Parnassus Faculty Lunch, UCSF, Spring 2025
*Bloomsbury Centre for Skeletal Research, London, United Kingdom, Spring 2024
Core Center for Musculoskeletal Biology and Medicine Retreat, UC San Francisco, Spring 2024
Lawrence Berkeley National Laboratory Molecular Foundry, Spring 2024
University of California, San Diego, Department of Mechanical & Aerospace Engineering, Spring 2024
University of Michigan, College of Engineering, Fall 2023
University of Texas, San Antonio, Department of Biomedical Engineering, Fall 2023
University of Michigan, Department of Molecular and Cellular Biology, Fall 2023
UCSF/UC Berkeley Program in Bioengineering Retreat, Fall 2023
Vanderbilt University, Department of Orthopaedic Surgery, Fall 2022
Montana State University, Center for Biofilm Engineering, Fall 2022
University of California, Berkeley, Bioengineering, Fall 2022
University of California, Davis, Department of Biomedical Engineering, Spring 2022
University of California, Merced, Engineering, Spring 2022
University of California, San Francisco, HIVE Seminar, Fall 2021,
Georgia Institute of Technology, Biomedical Engineering, Fall 2021, VIRTUAL
University of California, Los Angeles, Mechanical Engineering, Fall 2021
University of California, Berkeley, Mechanical Engineering, Fall 2021
Northeastern University, Department of Biomedical Engineering, Fall 2021, VIRTUAL
Emory University Medical Center, Department of Medicine, Spring 2021, VIRTUAL
University of Florida, Department of Biomedical Engineering, Spring 2021 VIRTUAL
Worchester Polytechnic Institute, Department of Biomedical Engineering, Spring 2021 VIRTUAL
University of Pennsylvania, Department of Bioengineering, Spring 2021 VIRTUAL
Forsythe Institute, Fall 2020, VIRTUAL
Washington University in St. Louis, Musculoskeletal Research Center, Fall 2020 VIRTUAL
Mayo Clinic, Department of Orthopaedics, Summer 2020 VIRTUAL
Columbia University, Department of Biomedical Engineering, Summer 2020 VIRTUAL
UC Davis, Department of Orthopaedics, Spring 2020 VIRTUAL
Georgia Institute of Technology, Petit Institute for Bioengineering and Bioscience, Spring 2020 CANCELLED
*University of Adelaide, Centre for Orthopaedic Trauma and Research, Adelaide, Australia, Spring 2020
*St. Vincent's Institute for Medical Research, Melbourne, Australia, Spring 2020
University of Arizona, Arthritis Center, Spring 2020
Brigham and Women's Hospital, Harvard Medical School, Department of Orthopaedics, Fall 2019
Iowa State University, Department of Mechanical Engineering, Fall 2019
*ETHZurich, Institute of Biomechanics, Zurich, Switzerland, Summer 2019
Rush University Medical Center, Medicine, Spring 2019
Columbia University, Department of Orthopaedics, Fall 2018
University of Illinois, Urbana-Champaign, Mechanical Science and Engineering, Fall 2018
University of Pennsylvania, Musculoskeletal Research Center, Fall, 2018
Purdue University, Department of Civil Engineering, Spring 2018
Indiana University Purdue University Indianapolis, Anatomy and Cell Biology, Spring 2018
Hospital for Special Surgery, Metabolic Bone Disease Grand Rounds, Spring 2018
Tufts University, Jean Mayer USDA Human Nutrition Research Center on Aging, Fall 2017
Boston University, Department of Mechanical Engineering, Fall 2017
Lawrence Livermore National Labs, Bioscience and Biotechnology Division, Spring 2017
*University of Toronto, Biomedical Engineering, Spring 2016
UC Riverside, Department of Mechanical Engineering, Spring 2015
Cornell University, Sibley School of Mechanical and Aerospace Engineering, Fall 2014
UC San Diego, Department of Mechanical Engineering, Spring 2014
Indiana University Purdue University Indianapolis, Fall 2013
Stanford University, Department of Mechanical Engineering, Fall 2013

University of Rochester, Department of Biomedical Engineering, Spring 2013
Rensselaer Polytechnic Institute, Department of Biomedical Engineering, Spring 2012
UC Davis, Department of Orthopaedics, Fall 2011
UC Berkeley, Department of Mechanical Engineering, Fall 2011
Stanford University, Department of Mechanical Engineering, Fall 2011
VA Palo Alto, Bone and Joint Center, Fall 2011
Hospital for Special Surgery, Metabolic Bone Disease Grand Rounds, Fall 2011
Hospital for Special Surgery, Biomechanics Division, Summer 2011
New York City Bone Club, City University of New York, Fall 2010
City College of New York, Department of Biomedical Engineering, Fall 2010
Alfred University, Inamori School of Engineering, Fall 2010
Ohio State University, Department of Biomedical Engineering, Spring 2010
Cornell University, Department of Mechanical and Aerospace Engineering, Spring 2009
University of Michigan, Department of Biomedical Engineering, Fall 2008
Indiana University Purdue University Indianapolis, Department of Anatomy and Cell Biology, Spring 2008
Case Western Reserve University, Department of Biomedical Engineering, Spring 2008
Columbia University, Department of Biomedical Engineering, Summer 2007
University of Toledo, Department of Mechanical Engineering, Fall 2007
Case Western Reserve University, Department of Orthopaedics, Fall 2006
Boston University, Department of Mechanical Engineering, Fall 2005

Abstract Presentations (national and international meetings, out of 122 total)

1. DeFrates, K., Lee, J., Jimenez, G., **Hernandez, C.J.** (2025) "Fluid pressure drives bacteria transport through nanoscale pores and channels in rigid materials." Second Engineered Living Materials Workshop, Rice University, Houston, TX, USA. *Best Poster Award*.

2. DeFrates, K., Lee, J., Jimenez, G., **Hernandez, C.J.** (2025) "The Mechanofiltration Assay: A New Technique to Study Bacterial Biomechanics at High Throughput." Biomedical Engineering Society, San Diego, CA, USA.

3. Gonzalez Diaz, EC, Liu, C., Cyphert, E., Stephern, S., Alliston, T.A., **Hernandez, C.J**. (2025) "Similarities in transcriptional changes in bone associated with microbiome-induced impairment of bone strength and natural aging in mice." American Society for Bone and Mineral Research, Seattle, WA, USA.

4. Hunt, N., Liu, C., Liu, J., Stephern, S., Wang, B., Schurman, C., Schilling, B., Vashishth, D., **Hernandez, C.J. (**2025) "Modifications to the gut microbiome alter matrix proteomics and fracture toughness at the cellular scale" American Society for Bone and Mineral Research, Seattle, WA, USA. *Young Investigator Award.*

5. Stephen, S., Liu, C., Cyphert, E.L., **Hernandez, C.J.** (2025) "Alteration to the Gut Microbiome Mimics the Age-Related Decline in Bone Tissue Strength" American Society for Bone and Mineral Research, Seattle, WA, USA.

6. Herzog, H., Lam, L., Fang, C., **Hernandez, C.J.**, Hsiao, E. (2025) "Ablation of the Gut Microbiome Uncovers a Metabolic-Immune Axis in Fibrodysplasia Ossificans Progressiva" American Society for Bone and Mineral Research, Seattle, WA, USA. *Young Investigator Award*.

7. DeFrates, K., Lee, J., Jimenez, G., **Hernandez, C.J.** (2024) "*Staphylococcus Aureus* does not use durotaxis to penetrate osteocyte canaliculi-like channels" American Society for Bone and Mineral Research, Toronto, Ontario, Canada.

8. DeFrates, K., Lee, J., Jimenez, G., **Hernandez, C.J.** (2024) "*Staphylococcus aureus* Colonization of Nanoscale Channels during Chronic Bone Infections." Biomedical Engineering Society, Baltimore, MD, USA.

9. Cyphert, E.L.; Liu, C.; Blackford, E.; Morales, A.L.; Nixon, J.C.; **Hernandez, C.J.** (2024) " Onset Of Obesity Late In Life Increases Bone Matrix Strength In A Sexually Dimorphic Manner." Orthopaedic Research Society, Long Beach, CA, USA.

10. Villarreal;, C.X. Jasinkiewicz, N.A.; Liu, C.; Cyphert, E.L.; **Hernandez, C.J.**; Chan, D.D. (2024) " Modification Of The Gut Microbiome Protects Against Age-related Subchondral Bone Changes In Mice" Orthopaedic Research Society, Long Beach, CA, USA

11. González Díaz, E.C.; Cyphert, E.L.; Liu, C.; Kaya, S.; Morales, A.L.; Nixon, J.C.; Garcia, M.; Jimenez, G.; Natsoulas, N.; DeFelice, B.C.; Gray, I.; Elias, J.; Alliston, T.; **Hernandez, C.J.** (2024) "The Gut Microbiome Regulates Osteocyte Transcription In A Sexually Dimorphic Manner", Orthopaedic Research Society, Long Beach, CA, USA.

12. Liu, C., Cyphert, E, Stephen, S., Wang, B., Morales, A., Nixon, J., Natsoulas, N., Blazquez Carmona, P., Garcia, M., Vill, A., Brito, I., Vashishth, D., **Hernandez, C.J.** (2023) "Alterations to the Gut Microbiome After Skeletal Maturity Leads to Changes in the Mechanical Properties of Cortical Bone." American Society for Bone and Mineral Research. Vancouver, BC, Canada.

13. Sroga, G.E., Wang, B., Stephen, S., **Hernandez, C.J.**, Vashishth, D. (2022) "Modifications to the Gut Microbiome Alter Osteopontin Levels in Bone Matrix." American Society for Bone and Mineral Research. Austin, TX, USA.

14. Ji, G., Yang, X., Bostrom, M.P.G., Carli, A.V., **Hernandez, C.J.** (2020) "The Microbial Metabolite Butyrate Improves Response to Periprosthetic Joint Infection in Mice with Compromised Gut Microbiota" Musculoskeletal Infection Society. Fort Lauderdale, FL, USA.

Mentoring

Post-doctoral Fellows

Name	University	Year
Erica Maissy	UC San Francisco	2025-Present
Mahima Choudhury	UC San Francisco	2025-Present
Tao (Leo) Lou	UC San Francisco	2025-Present
Samuel Stephen	UC San Francisco	2024-Present
Kelsey DeFrates	UC San Francisco	2023-Present
Eva Gonzalez Diaz	UC San Francisco	2023-2025
Erika Cyphert	Cornell University	2021-2024
Xuanhao Sun	Cornell University	2012-2013
Floor M. Lambers	Cornell University	2011-2013

Doctoral Students (Primary Advisor)

Name	Title - Year	Degree Field
Natasha Hunt	Current	Bioengineering
Hannah Herzog	Current	Oral and Craniofacial Biology/DDS
Gissell Jimenez	Current	Bioengineering

Chongshan (Cleo) Liu	"Measuring changing bone strength as a result of alteration to the gut microbiome" 2025	Mechanical Engineering Cornell University
Junsung Lee	"Deciphering Bacterial Cell Envelope Mechanics and Mechanosensing: A Mechanical Engineering Approach" 2024	Mechanical Engineering Cornell University
Christine E. Harper	"The Influence of Mechanical Stress on Components in the Bacterial Cell Envelope"	Biomedical Engineering Cornell University
Marysol Luna	"The influence of the Gut Microbiome on Bone and Joint Disease" 2020	Mechanical Engineering Cornell University
Jason D. Guss	"The Role of the Gut Microbiome in Bone and Joint Disease" 2018	Biomedical Engineering Cornell University
Ashley Torres	"Fatigue Behavior of Cancellous Bone, Microdamage Accumulation and Biologically Inspired Cellular Solids" 2018	Biomedical Engineering Cornell University
Jonathan Matheny	"Interactions Between Bone Remodeling and Microdamage in Cancellous Bone" 2017	Biomedical Engineering Cornell University
Erin Cresswell (Litts)	"Spatial Regulation of Bone Formation in Functional Adaptation of Cancellous Bone" 2017	Mechanical Engineering Cornell University
Matthew Goff	"The Role of Micro and Ultra-Structure in Accumulation in Cancellous Bone" 2015	Biomedical Engineering Cornell University
Craig R. Slyfield	"The Biomechanics of Cancellous Bone Remodeling" 2012	Mechanical Engineering Cornell University
Meghan Cotter	"Gross Morphology, Microarchitecture, Strength and Evolution of the Hominoid Vertebral Body" 2011 Case Western Reserve University	Evolutionary Biology Case Western Reserve University
Seetha Ramudu Kummari	"Experimental and Computational Evaluation of Microscopic Tissue Damage and Remodeling Cavities in Trabecular Bone" 2011	Mechanical Engineering Case Western Reserve University

Masters of Science Students (with Thesis, Primary Advisor)

Name	**Title**	**Degree Field**	**Year of Completion**
Jiren Liu	"Nanomechanical characterization of fracture toughness in bone"	Mechanical Engineering	2023
Karan Jha	"Mechanobiology in Bacteria"	Mechanical Engineering	2023
Ellen van Wijngaarden	Nutrient Delivery in Engineering Living Materials	Mechanical Engineering	N/A
Yu-Chern "Chad" Wong	"Stress Analysis of Bacteria Submitted to Extrusion Loading"	Mechanical Engineering	2018
Remy Walk	"Bone phenotype of Toll-like Receptor 5 Deficient (TLR5KO) Mice and PTH Treated Osteopenic Sheep"	Mechanical Engineering	2017
Katherine Ehlert	"Methods of Measuring Microscopic Tissue Damage in Cancellous Bone: Sampling and Statistical Power"	Mechanical Engineering	2013
Evgeniy Tkachenko	"Measures of Resorption Cavities in Three-dimensional Images of Cancellous Bone"	Mechanical Engineering	2011
Daniel Ramsey	"Effects of Irradiation on the Damage Processes in Human Trabecular Bone" Case Western Reserve University	Mechanical Engineering	2010

Justin Daggett	"Measures of Remodeling Cavity Size and Number in Cancellous Bone Following Estrogen Depletion" Case Western Reserve University	Biomedical Engineering	2009
David A. Loomis	"A Biomechanical Analysis of Ape and Human Thoracic Vertebrae Using Quantitative Computed Tomography Based Finite Element Models" Case Western Reserve University	Mechanical Engineering	2009
Stephanie Dux	"The Effect of Gamma Radiation Sterilization on Yield Properties and Microscopic Tissue Damage in Dense Cancellous Bone" Case Western Reserve University	Mechanical Engineering	2009
Craig R. Slyfield	"Automoated Sub-Micron Resolution Serial Block Face Imaging of Cancellous Bone using Epifluorescence Microscopy" Case Western Reserve University	Mechanical Engineering	2008
Andrew Schifle	"A Biomechanical Study of Vertebral Allometry in Primates" Case Western Reserve University	Mechanical Engineering	2007

Masters of Engineering Students and Non-Thesis Master's Degree (Primary Advisor)

Name	University	Degree Field	Year of Completion
Nicole Wang	Cornell University	Mechanical Engineering	2021
Bowen Luo	Cornell University	Biomedical Engineering	2021
James Abert	Cornell University	Mechanical Engineering	2021
Colby Johnson	Cornell University	Mechanical Engineering	2020
Josue Santana	Cornell University	Biomedical Engineering	2019
Melanie F. Roberts	Cornell University	Mechanical Engineering	2019
Ritvik Sarkar	Cornell University	Mechanical Engineering	2016
Kristin Lee	Cornell University	Mechanical Engineering	2016
Liza Man	Cornell University	Mechanical Engineering	2015
Rachel Sorna	Cornell University	Mechanical Engineering	2014
Will Weinlandt	Cornell University	Mechanical Engineering	2014
Yejin Kim	Cornell University	Biomedical Engineering	2013-2014
Melissa Xu	Cornell University	Biomedical Engineering	2013-2014
Daniel Blackman	Cornell University	Biomedical Engineering	2013-2014
Christopher Chapa	Cornell University	Mechanical Engineering	2013
Jin Yan	Cornell University	Mechanical Engineering	2013
Katarina Chang	Cornell University	Mechanical Engineering	2012
Kevin Yam	Cornell University	Mechanical Engineering	2012
Ting Li	Cornell University	Biomedical Engineering	2012
Abby George	Cornell University	Biomedical Engineering	2012
Bo Li	Cornell University	Mechanical Engineering	2012
Jung Kim	Cornell University	Biomedical Engineering	2012

M.D. Student Research Mentor

Name	University	Year
Nicholas Cevallos	UC San Francisco	2023-2025

Ph.D. Student Committee Member (not primary mentor)

Name	Advisor (University)	Degree Field	Year
Anja Zelmer	Gerald Atkins (U Adelaide)	Pharmacy	2026
Minying Liu	Kyla Shea (Tufts Univ)	Biomedical Sciences	2025
Nafisa Elghazali	Desai (UCSF)	Bioengineering	Current
Tonatzin Zertuche Arias	Juarez Camacho (CICESE)	Bioengineering	2025
Rachel Miller	Shepherd (Cornell University)	Materials Science Engineering	2023
Amanda Rooney	van der Meulen (Cornell University)	Biomedical Enginering	2020
Jessie Ellis	Booth (Tufts University)	Nutrition	2020
Lauren Genova	Chen (Cornell University)	Chemistry	2020
Sophia Ziemian	van der Meulen (Cornell University)	Biomedical Engineering	2020
Pablo Palomino	Donnelly (Cornell University)	Biomedical Engineering	2019
Ashley Lloyd	Donnelly (Cornell University)	Materials Science Engineering	2019
Derek Holyoak	van der Meulen (Cornell University)	Biomedical Engineering	2018
T. Julia Chen	van der Meulen (Cornell University)	Mechanical Engineering	2017
Garry Brock	van der Meulen (Cornell University)	Mechanical Engineering	2014
Chi Zhang	Gao (Cornell University)	Mechanical Engineering	2013
Frank Ko	van der Meulen (Cornell University)	Mechanical Engineering	2013
Matthew Leinebeweber	Gao (Cornell University)	Mechanical Engineering	2014
Radhika Patel	Gao (Cornell University)	Mechanical Engineering	2014
Lindsay Bonsignore	Greenfield (Case Western Reserve University)	Biomedical Science	2011
Elaine Lee	von Recum (Case Western Reserve University)	Biomedical Engineering	2011
Kerim Genc	Cavanaugh (Case Western Reserve University)	Biomedical Engineering	2011
Fuping Yuan	Prakash (Case Western Reserve University)	Mechanical Engineering	2007
Michael Sobieraj	Rimnac (Case Western Reserve University)	Mechanical Engineering	2007
Liren Tsai	Prakash (Case Western Reserve University)	Mechanical Engineering	2006
Karen Warden	Davy (Case Western Reserve University)	Mechanical Engineering	2006

Undergraduate Student Mentoring (not including senior projects)

Name	University	Degree Field	Years
Jae Won Hwang	UC Berkeley	Mechanical Engineering	2025-Present
Emilio Luis Garcia	UC Berkeley	Mechanical Engineering	2025
Damaris Cruz Alvarado	UC Berkeley	Bioengineering	2024
Susana Zeng	Cornell University	Biology	2022
Matthew Garcia	Cornell University	Biology	2022
Angie L. Morales	Cornell University	Biology	2021-2022
Nicholas Natsoukas	Cornell University	Mechanical Engineering	2021
Felipe Hanuch	Cornell University	Mechanical Engineering	2021
Emily Chou	Cornell University	Biological Engineering	2020-2021
Jacob Nixon	Cornell University	Mechanical Engineering	2020-2021
Meredith Dobrzynski	Cornell University	Computer Science	2019-2020

Malissa Ramsukh	Cornell University	Biology	2019-2021
Brian Arenas	Cornell University	Mechanical Engineering	2019
Sophie Dornevil	Cornell University	Biology	2018-2020
David Shamritsky	Cornell University	Biomedical Engineering	2019-2021
Denise Alabi	Cornell University	Biology	2017-2020
Jasmin Strong	Cornell University	Biology	2018-2020
Natalie Kalos	Cornell University	Biomedical Engineering	2018
Kimberly Hemmerling	Cornell University	Biological Engineering	2017-2017
Meghana Machireddy	Cornell University	Mechanical Engineering	2017-2019
Sebastian Roubert	Cornell University	Mechanical Engineering	2016-2018
Adrian Alepuz	Cornell University	Mechanical Engineering	2016-2018
Laura Vasquez-Bolanos	Cornell University	Mechanical Engineering	2016-2019
Kyle Cripps	UC Berkeley	Computer Science	REU 2016
Gabriel Guisado	University of Rochester	Biomedical Engineering	REU 2016, 2017
Taylor Sandoval	Cornell University	Mechanical Engineering	2015-2018
Jonlin Chen	Cornell University	Biological Engineering	2015-2016
Lucy Wang	Cornell University	Mechanical Engineering	2015-2017
Fernanda Fontenele	University Federal de Sergipe	Mechanical Engineering	Brazil Scientific Mobility Sum 2015
Nisha Gupta	Case Western Reserve University	Biomedical Engineeering	REU 2015
Saie Ganoo	Cornell University	Mechanical Engineering	2015
Ritvik Sarkar	Cornell University	Mechanical Engineering	2015
Lauren Henderson	Cornell University	Biology	2014-2015
Michael Horsfield	Cornell University	Biological Engineering	2014-2016
Aaron Chen	Cornell University	Unaffiliated	2014
Seth Kline	Cornell University	Physics	2013
Wei “Kristin” Lee	Cornell University	Mechanical Engineering	2013-2014
William Weinlandt	Cornell University	Biological Engineering	2012-2013
Harsh Patel	Cornell University	Physics	2012-2013
Irene Lin	Cornell University	Civil Engineering	2012-2014
John Widjaja	Cornell University	Biological Engineering	2012-2013
Thu Nguyen	Cornell University	Mechanical Engineering	2012-2015
Hellen Lopez	Cornell University	Mechanical Engineering	2012
Amanda Bouman	Cornell University	Mechanical Engineering	2011-2015
Robert Zhang	Cornell University	Mechanical Engineering	2011-2013
Sam Fischer	Cornell University	Mechanical Engineering	2011-2012
Christopher Chapa	Cornell University	Mechanical Engineering	2011-2013
Ingrid (Tse-Yin) Tu	Cornell University	Mechanical Engineering	2011-2012
Kristin Regan	Cornell University	Mechanical Engineering	2011-2013
Katarina Chang	Cornell University	Mechanical Engineering	2011
Paul Scilingo	Cornell University	Mechanical Engineering	2011-2012
Pritika Dasgupta	Cornell University	Biological Engineering	2010-2011
Abhinav Rao	Cornell University	Mechanical Engineering	2010-2011
J.P. Siemon	Case Western Reserve University	Biomedical Engineering	2009-2010
Brendan Goodwine	Case Western Reserve University	Biomedical Engineering	2009-2010
Katherine Ehlert	Case Western Reserve University	Mechanical Engineering	2007-2010
Shangjin Li	Case Western Reserve University	Biomedical Engineering	2009

Anthony Turner	Case Western Reserve University	Mechanical Engineering	2008
Ryan Tomlinson	Case Western Reserve University	Biomedical Engineering	2006-2008
Nathan Johnson	Case Western Reserve University	Mechanical Engineering	2006-2008
Stephanie Dux	Case Western Reserve University	Mechanical Engineering	2007-2008
Karina Hendarto	Case Western Reserve University	Biomedical Engineering	2007-2008
Matthew Aehle	Case Western Reserve University	Biomedical Engineering	2007-2008
Kyle Niemeyer	Case Western Reserve University	Mechanical Engineering	2007
Bojian Popovc	Case Western Reserve University	Mechanical Engineering	2006-2007
Fredrick Douglas	Case Western Reserve University	Computer Science	2007
Chiderah Okoye	Case Western Reserve University	Biomedical Engineering	2007
Delmer Lopez	Case Western Reserve University	Chemistry	2006
Evgeniy Tkachenko	Case Western Reserve University	Mechanical Engineering	2005-2009

Undergraduate Student Mentoring (Junior and Senior Projects)

Name	**University**	**Junior Project Senior Project (Department)**	**Years**
Do Hyun "Raymond" Chung	Cornell University	Senior Project (MAE)	2015
Paul Sclingo	Cornell University	Senior Project (MAE)	2011
Jennifer Doughty	Cornell University	Senior Project (MAE)	2011-2012
Chris Center	Case Western Reserve University	Senior Project (MAE)	2009
Jennifer Brinkman	Case Western Reserve University	Senior Project (MAE)	2009
Kenneth Hornfeck	Case Western Reserve University	Senior Project (MAE)	2009
Andrew Renckly	Case Western Reserve University	Senior Project (MAE)	2009
Xiaoxin Zhu	Case Western Reserve University	Junior Project (BME)	2009
Monica Clark	Case Western Reserve University	Junior Project (BME)	2009
Victoria Ma	Case Western Reserve University	Senior Project (MAE)	2007-2008
Tim O'Conner	Case Western Reserve University	Senior Project (MAE)	2007
Mark Shoukry	Case Western Reserve University	Senior Project (BME)	2007-2008
Eric Rodriguez	Case Western Reserve University	Senior Project (BME)	2008
Alex Sira	Case Western Reserve University	Senior Project (MAE)	2008
Tony Rotella	Case Western Reserve University	Senior Project (MAE)	2008
Adam Leiferman	Case Western Reserve University	Junior Project (MAE)	2007
Matt Somner	Case Western Reserve University	Junior Project (MAE)	2007
Michael Wiehagen	Case Western Reserve University	Senior Project (MAE)	2006
Anthony Nalley	Case Western Reserve University	Senior Project (MAE)	2006
Julio Oro	Case Western Reserve University	Senior Project (MAE)	2006
Amanda Putnam	Case Western Reserve University	Senior Project (MAE)	2006
Zachary Moore	Case Western Reserve University	Senior Project (MAE)	2006
Robert Malinoski	Case Western Reserve University	Senior Project (MAE)	2006
Kent Seaburn	Case Western Reserve University	Junior Project (MAE)	2006
Fred Mayse	Case Western Reserve University	Junior Project (MAE)	2006
David Loomis	Case Western Reserve University	Junior Project (MAE)	2006
Micah Thau	Case Western Reserve University	Junior Project (MAE)	2006
Jacob Crandall	Case Western Reserve University	Senior Project (MAE)	2006
Hunter Ewan	Case Western Reserve University	Senior Project (MAE)	2006

Awards Received by Trainees

Post-doctoral and Graduate Trainees

Hannah Herzog
- ASBMR Young Investigator Travel Award, 2025

Samuel Stephen
- UC Postdoctoral Fellowship, 2025

Natasha Hunt
- ASBMR Young Investigator Travel Award, 2025
- Tau Beta Pi Fellowship, 2024

Kelsey DeFrates
- Best Poster: Second Workshop on Engineered Living Materials, 2025
- NIH F32 Fellowship 2025
- PBBR Postdoc Independent Research Grant, UC San Francisco, 2024
- UCSF Chancellor's Postdoctoral Fellowship, 2023

Eva González Díaz
- Burrough Welcome Fund Diversity Enrichment Program, 2023
- T32 Fellowship in Musculoskeletal Biology, University of California, San Francisco, 2023
- Stanford.Berkeley.UCSF Next Generation Faculty Symposium, 2023

Erika L. Cyphert
- NIH F32 award 2022-2025

Gissell Jimenez
- National Science Foundation Graduate Research Fellowship 2023

Chongshan “Cleo” Liu
- ASBMR Young Investigator Travel Award 2022

Macy Castaneda
- Ford Foundation Predoctoral Fellowship 2020

Christine E. Harper
- Whetten Memorial Award, Cornell Center for Nanoscience & Technology (CNF) 2020
- National Science Foundation Graduate Research Fellowship 2019

Melanie F. Roberts
- Whetten Memorial Award, Cornell Center for Nanoscience & Technology (CNF) 2017

Marysol Luna
- Bouchet Society Member, 2019
- Finalist, Student Paper Award, World Congress of Biomechanics, 2018
- National Science Foundation Graduate Research Fellowship 2017

Jason Guss
- Best Presentation, Orthopaedic Research Society Preclinical Models Section, 2018
- 1st place, 3 Minute Thesis Competition, Cornell University, 2018
- American Society for Bone and Mineral Research Young Investigator Travel Award 2016

Jonathan Matheny
National Science Foundation Graduate Research Fellowship, 2013

Ashley Torres
European Society of Biomechanics Student Award Finalist, 2017
Bouchet Society Member, 2016
Best Poster, Society of Hispanic Professional Engineers RISE Symposia, 2015
Kappa Delta/ORS Travel Award 2015
National Science Foundation Graduate Research Fellowship 2013

Erin Cresswell (Litts)
American Society for Bone and Mineral Research Young Investigator Travel Award 2016
National Science Foundation Graduate Research Fellowship 2013

Floor M. Lambers, Ph.D.
Travel Award, International Society of Bone Morphometry, 2012

Meagan Cotter
Alice L. Jee Student Travel Award, Sun Valley Workshop on Musculoskeletal Biology, 2010

Craig R. Slyfield,
Alice L. Jee Student Travel Award, Sun Valley Workshop on Musculoskeletal Biology, 2010

Undergraduate Trainees
Laura Vasquez-Bolanos (Ph.D. UCSD)
National Science Foundation Graduate Research Fellowship 2019

Sebastian Roubert (Ph.D. Harvard)
National Science Foundation Graduate Research Fellowship 2018

Lucy Wang (Ph.D. Stanford)
National Science Foundation Graduate Research Fellowship 2017

Thu Nguyen (Ph.D. Stanford)
National Science Foundation Graduate Research Fellowship, 2016

Kyle Niemeyer (currently, Associate Professor, Oregon State University)
National Science Foundation Graduate Research Fellowship, 2010

Teaching
UCSF/UC Berkeley
2023 – Present – 1 guest lecture/year BioE 26: Introduction to Bioengineering
2025 – Present – 1 guest lecture/year MEC214: Advanced Tissue Mechanics

Cornell University

Course	Title	Units	Level	Enrollment
ENGRD/MAE 1170	Introduction to Mechanical Engineering	3	Undergrad	60
MAE/BME 6640 Spring 2021	Mechanics of Bone	3	Grad	12

MAE/BME 4640 – Spring 2021	Orthopaedic Tissue Mechanics	3	Undergrad – Elective	33
MAE/BME 6640 Spring 2020	Mechanics of Bone	3	Grad	9
MAE/BME 4640 – Spring 2019	Orthopaedic Tissue Mechanics	3	Undergrad – Elective	24
MAE/BME 4640 – Spring 2018	Orthopaedic Tissue Mechanics	3	Undergrad – Elective	31
MAE/BME 4640 – Spring 2017	Orthopaedic Tissue Mechanics	3	Undergrad – Elective	29
MAE 2120 – Spring 2016	Mechanical Properties and Selection of Engineering Materials	3	Undergrad – Required for Mechanical Engineering	122
MAE 6640 – Fall 2015	Mechanics of Bone	3	Grad	9
MAE 2120 Spring 2015	Mechanical Properties and Selection of Engineering Materials	3	Undergrad – Required for Mechanical Engineering	157
MAE 6640 Fall 2014	Mechanics of Bone	3	Grad	15
MAE 2120 Spring 2013	Mechanical Properties and Selection of Engineering Materials	3	Undergrad – Required for Mechanical Engineering	152
MAE 6640 Fall 2012	Mechanics of Bone	3	Grad	10
MAE 2120 Spring 2012	Mechanical Properties and Selection of Engineering Materials	3	Undergrad – Required for Mechanical Engineering	154
MAE 6640 Fall 2011	Mechanics of Bone	3	Grad	14
MAE 6640 Fall 2010	Mechanics of Bone	3	Grad	9

Case Western Reserve University

Course	Title	Units	Level	Enrollment
EMAE 689 Spring 2010	Special Topics Cell Biomechanics	3	Grad Covered 1/3 of class	7
EMAE 376 Spring 2010	Aerostructures	3	Undergrad – Upper Required for AE	29
EMAE 372 Fall 2009	Relation of Materials to Design	4	Undergrad – Upper Required for Biomechanics Track	15
EMAE 376 Spring 2009	Aerostructures	3	Undergrad – Upper Required for AE	20
EMAE 372 Fall 2008	Relation of Materials to Design	4	Undergrad – Upper Required for Biomechanics Track	20
EMAE 415 Spring 2008	Introduction to Musculoskeletal Biomechanics	3	Grad	7
EMAE 376	Aerostructures	3	Undergrad – Upper	26

Spring 2008			Required for AE	
EMAE 372 Fall 2007	Relation of Materials to Design	4	Undergrad – Upper Required for Biomechanics Track	19
EBME 105 Fall 2007	Introduction to Biomedical Engineering	3	Undergrad Covered 1/3 of class	120
EMAE 376 Spring 2007	Aerostructures	3	Undergrad – Upper Required for AE	16
EMAE 376 Spring 2006	Aerostructures	3	Undergrad – Upper Required for AE	28
EMAE 372 Fall 2006	Relation of Materials to Design	4	Undergrad – Upper Required for Biomechanics Track	16

Course Descriptions

Cornell University

ENGRD/MAE 1170: Introduction to Mechanical Engineering. This is a required course for first-year engineering students. The course includes introduction to solid mechanics, fluid mechanics, control systems and design. Laboratories include strain analysis of trusses, robotic control.

MAE/BME 4640: Orthopaedic Tissue Mechanics. This is a senior/master's student elective course covering the mechanical properties of tissues from the musculoskeletal system and orthopaedic implants.

MAE 2120: Mechanical Properties and Selection of Engineering Materials. This is a required course for a B.S. in mechanical engineering. It is a second semester solid mechanics course covering three dimensional stress states, introduction to fatigue, introduction to fracture mechanics, a design based material selection.

MAE 6640: Mechanics of Bone. This is a graduate level course covering the mechanical properties of bone and other mineralized tissues and interactions between bone structure and biology. A multiscale approach is taken ranging from whole bone structure across organisms to nano-scale effects on bone tissue mechanical performance.

Case Western Reserve University

EMAE 372: Relation of Materials to Design. A four unit course covering the design of mechanical and structural elements considering static failure, residual stresses, stress concentration, impact, fatigue, creep and environmental conditions on the mechanical behavior of engineering materials. Laboratories include materials testing (tension, bending, notch impact, fracture toughness).

EMAE 376: Aerostructures. A three unit course covering mechanical analysis of thin walled structures and pressure vessels, and introduction to finite element analysis and design and construction of novel, airworthy micro-air vehicles.

EMAE 415: Introduction to Musculoskeletal Biomechanics. A three unit graduate course introducing students to biomechanical analysis of the musculoskeletal system and mechanical properties of musculoskeletal tissues.

EMAE 689: Special Topics: Cell Biomechanics. A three unit graduate course introducing students to biomechanical cells. Provided three weeks of lectures, homework and exam material related to the biomechanics of bacteria.

EBME 105: Introduction to Biomedical Engineering. A three unit course for first year engineering students meant to introduce them to the field of biomedical engineering. Provided 9 lectures on Biomechanics, Biomaterials and Tissue Engineering, created two homework assignments and 1 exam.

Additional Instruction

EMAE 283: Mechanical Engineering Laboratory. This two-unit course involved open-ended laboratory projects in faculty laboratories. I provided laboratory projects in Spring 2006, Spring 2007 and Spring 2010.

- 2006 Students performed a four-point bending test of a whole bone model made of polymer. Students used a screw-driven Instron device and strain gage data acquisition to test composite beam theory calculations.
- 2007 Students developed testing fixtures to perform three point bending tests on rodent femurs and performed the tests using a Bose electroforce testing device.
- 2009 Students developed a new polymer embedding media for use with bone.

EBME 405: Biomaterials for Prosthetic and Orthotic Use. A three-unit graduate course examining the manufacture and material properties of orthopaedic tissues and biomaterials used for their replacement. Provided a guest lecture. Fall 2008.

PHOL512: Skeletal Biology. Provided 1 week of lectures/discussion on the topic "Osteocytes and Mechanotransduction in Bone." Spring 2007.

Surgical Anatomy: Musculoskeletal: A short course for medical students concentrating on musculoskeletal tissue. Provided 1 lecture each term on biomechanics of orthopaedic tissues. Fall 2006-2010

Orthopaedic Resident Education: A short course covering topics key to licensure in Orthopaedic Surgery. Provided 1 lecture each year to orthopaedic residents. Fall 2006-2010

Orthopaedic Grand Rounds: Provided grand rounds lectures to residents on Biomechanics, Biomaterials, Bone Regeneration and Repair (3 different lectures, 1-2 per year, 2006-2010)

Instructor, University of California, Berkeley.

ME176: Orthopaedic Biomechanics. Provided 1 week of lectures and a homework assignment.

ME 107b: Mechanical Engineering Laboratory. Students use a mechanical testing device to evaluate the mechanical properties of synthetic bone and aluminum and use asymmetric composite beam theory to predict mechanical strain in an entire synthetic bone with and without and aluminum intermedullary rod. Lectured, led laboratory sessions and graded assignments through entire semester. Spring 2003.

Teaching Assistant Stanford University

ME 281: Orthopaedic Biomechanics and ME 282: Biomechanics Projects. Graded assignments (research papers), gave two guest lectures, assisted students in organizing projects. Fall, Winter, Spring 1997-1998

Teaching Assistant, Phillips Academy Andover $(MS)^2$ program

Discrete Mathematics and Calculus: Gave three guest lectures. Graded homework, lead daily review sessions. Summer 1996.

Professional Service

American Institute for Medical and Biological Engineering (AIMBE)

2025 Biomechanics Review Committee
2022 Nominating Committee
2022 – 2023 DEI Committee

Orthopaedic Research Society

2023-2025, DEI Task Force
2018-2020 **Board of Directors**
2018-2020 **Chair, Membership Committee (elected position)**
2016-2020 Member, Membership Committee
2017 Panelist, ORS Sun Valley Skeletal Biology Workshop
2014 Presenter, Professional Development Session, ORS Sun Valley Workshop
2015-2016 Program Committee Member
2007, 2010, 2019 Session Moderator Annual Meeting
2007, 2009, 2011, 2012 Abstract Reviewer Annual Meeting

Professional Development Seminars and Annual Meetings

December 2021 "Practical Scientific Communication: Presenting Your Science to the General Public" VIRTUAL
February 2021 "Imposter Syndrome and Members of Underrepresented groups" VIRTUAL.
March 2020 "How to make the most of your sabbatical" Phoenix, AZ, USA.
March 2018 "Diversifying your candidate pool" New Orleans, LA, USA.

American Society for Bone and Mineral Research

2023-2025 Multi-PI: THRIVE by ASBMR professional development program
2023 Innovation Committee
2023 Social Media Taskforce
2023, 2019 Nominating Committee
2022 Presentation Coach: Harold Frost Awardees for ORS MSK Workshop
2022 Social Media Engagement Committee for 2022 Annual Meeting
2020- 2023 **Councilor (Board of Directors)**
2021 **Program Committee**

Served as part of a five person committed to organize the annual meeting in 2021 including invited speaker session, abstract review and challenges associated with COVID-19 restrictions.

Diversity in Bone and Mineral Research Subcommittee

2013-2019 Member
2016-2019 Co-Chair, Promoted Diversity and Inclusion efforts at Council meetings, organized annual diversity reception at the national meeting. Nominated and promoted URM society members to leadership positions.

Professional Development Seminars

Septemnber 2025 Meet the Professor: Science Communication for Academics
February 2020 Webinar: Bone and the Microbiome,
September 2019 Meet the Professor Seminar, Orlando, FL
March 2018 Webinar: "5 Ways Social Media Can Boost Your Career: The Fundamentals of Social Media in Science" Professional Development Webinar Series.
http://www.asbmr.org/courses/launch/9f5c20f3-91bc-4c00-8574-61363ee7b64d/aadf1138-41cc-435f-9cc6-7b5a9c533398
2014 Meet the Professor Seminar, Annual Meeting, Houston, TX, USA

National Institutes of Health

2025- Present **Standing Member**, SBSR Study Section, Center for Scientific Review

NIDDK

Special Emphasis Review Panel Fall 2009

NIAMS

Ad hoc Reviewer Special Emphasis Panel (SEP): ZRG1 MSOS-L(03) Spring 2024
Ad hoc Reviewer ZRG1 MSOS-V Study section (SBIR/STTR awards) Spring 2023
2022 Member SBSR Study Section
Ad hoc Reviewer SBSR Study Section (R awards), Summer 2017, Winter 2018, Summer 2021
Ad hoc Reviewer PPMOSS Study section (F awards), Fall 2017
Standing Member, ASM Study Section (K awards) 2012-2014

NIA

Ad hoc Reviewer NIA RFP Osteoimmunology, Fall 2021

Engineered Living Materials Workshop

2023 Program Committee (Montana State Univ. July 2022)
2025 Program Committee (Rice University, October 2025)

Bone Marrow Adiposity Society (BMAS)
Fall 2021 Invited Speaker, “Grant Writing”
Fall 2023 Invited Speaker, "Grant Writing"

International Bone and Mineral Society Sun Valley Workshop
2010-2013 Member, Steering Committee

International Society of Bone Morphology
2023 Webinar: "Shifting Gears, Integrating the Gut Microbiome into Bone Research"
2012-2015 Steering Committee Member,
2012 Abstract Reviewer for International Meeting

National Science Foundation
Panelist Fall 2008, Spring 2009, Spring 2011, Spring 2012, Spring 2015, Spring 2018, Spring 2020, Fall 2021, Spring 2023, Spring 2024

National Evolutionary Synthesis Center (NESCent)
2012-2015 Invited Participant “The Perils of Being Bipedal: An Evolutionary Perspective on Human Musculoskeletal Disorders.”

American Society of Mechanical Engineers
2011 Session Co-Chair Summer Bioengineering Meeting
2008. 2011 Abstract Reviewer Summer Bioengineering Meeting

Biomedical Engineering Society
2009 Co-chair Session Entitled “Bone Mechanics and Adaptation”
2008 Co-chair Session Entitled “Bone Mechanics and Adaptation”

Current Osteoporosis Reports
Section Editor, Biomechanics 2021-2022

Referee for Bone, Journal of Biomechanics, Journal of Biomechanical Engineering, Journal of Bone and Mineral Research, Clinical Biomechanics, Biomechanics and Modeling in Mechanobiology, Clinical Pharmacokinetics, Journal of Bone and Joint Surgery, Engineering Fracture Mechanics, Computer Methods in Biomechanics and Biomedical Engineering, Proceedings of the National Academy of Sciences

Member of the American Society for Bone and Mineral Research, the Orthopaedic Research Society, American Society of Mechanical Engineers, Biomedical Engineering Society, Society of Hispanic Professional Engineers and the American Association for the Advancement of Science.

University Service

UCSF

2023 – Present Director, Health Innovations Via Engineering (HIVE). Organized monthly faculty meetings, quarterly seminars, and coordinated center-level grant applications and development.
2023 – Present Graduate Program in Bioengineering (2 presentations/year)
2023 – Present Graduate Program in Oral and Craniofacial Sciences (2 presentations/year)
2023 – Present Active member of the Core Center for Musculoskeletal Biology and Medicine (CCMBM), Benioff Center for Microbiome Medicine (BCMM), Center for Cellular Construction (CCC), Bakar Aging Research Institute (BARI)

Cornell University

Department

2017-2020 Director of Graduate Studies, Mechanical Engineering

2017-2020 Associate Director for Graduate Affairs, Sibley School of Mechanical and Aerospace Engineering
Administered Cornell's PhD program (~150 students total) in Mechanical Engineering (rated within the top 10 in the U.S.). Led new student orientation, student-mentor matching, academic requirements, diversity outreach, long-term strategy for the graduate program.

- Established a first year student full semester professional development seminar covering grant writing, responsible conduct of research, review of journal articles, academic financial management, development of career goals.
- Established Cornell participation with the Big Ten Plus DGS Mechanical Engineering programs
- Led COVID-19 response and summer Black Lives Matter response

2015-2016 Member, Computational Mechanics Search Committee
2014-2016 Program Committee Member
2014-2015 Chair, Biomechanics Search Committee
2014-2015 Graduate Admissions Committee Biomedical Engineering
2011-2012 Chair, Graduate Programs Committee
2010-2012 Graduate Admissions Committee, Mechanical Engineering
2010-2011 Secretary of the Faculty

College

2019-2022 Member, Advisory Board, Cornell Sloan University Center for Exemplary Mentoring

University

2019 Chair, Graduate Grievance Review Board (Summer 2019)

2018-2021 Member and **Chair** (2018-2021), Research Advisory Committee. The Research Advisory Committee provides internal reviews for research proposals that limit the number of submissions from each institution.

2011 – 2017 Faculty in Residence. As a faculty member living within the first year dormitory, promoted the living-learning environment. I lead a team of faculty fellows to provide educational programs within the freshmen residences. I organize and lead two program events each month within the freshmen residences and additionally work with other faculty and professional staff in the New Student Programs. Activities include organizing mixers to get students to meet faculty as well as formal events twice per month promoting cultural awareness and pre-professional activities.

Case Western Reserve University

Department

2009-2010 Graduate Admissions Chair

School of Engineering

2009-2010 Research Committee
2007-2008 Continuing Education Committee
2006-2007 Graduate Studies Committee

University

2009-2010 President's Advisory Council on Minorities
2007-2008 Steering Committee. Research ShowCASE

Stanford University

Coordinator and Community Associate, Multicultural Theme House, Stanford University. Worked to provide a supportive environment for graduate students of color through educational and social events in student residences. 1997-2001.

Resident Fellow. Worked as an advisor and tutor in mathematics and engineering topics to incoming first-year engineering students for Stanford's Summer Engineer Academy. 2000.

Student Coordinator, Biomechanical Engineering Division. Student representative for the Division. Attended faculty meetings, interviewed candidates during a faculty search, developed undergraduate degree curriculum and recruited new graduate students. 1997-1998.

Outreach and Diversity

Society of Hispanic Professional Engineers National Organization

2023	"Building the Next Generation of Hispanic Leaders in STEM" Briefing at the White House, Office of Public Engagement.
2022	Faculty Development Symposium Committee Member
2021	Invited Speaker, Graduate Track, SHPE National Conference "Grant Writing: Transcend your Ideas into Action" Panelist: "Building a Faculty Career"
2021	Reviewer and Judge, Engineering Science Symposium
2018	Co-chair Faculty Development Institute (a one-day professional development program for assistant professors)
2015-2016	Faculty presenter at the Faculty Institute (mentoring event for junior engineering faculty) and the Graduate Institute (a mentoring program targeted to current graduate students/post-docs)
2016	Past Chair, Scientific Paper/Poster Sessions
2011-2015	Chair, Scientific Poster/Poster Sessions Each year I oversaw three the efforts of 3 other faculty and 3 undergraduate assistants to regarding advertising, web-based abstract submission, abstract review by other faculty, abstract selection, session organization, travel reimbursement.

THISGeN and NEXTGen programs Chan Zuckerburg Biohub

2023 Moderator, THISGen workshop

BME UNITE

March 2021- 2024 Participant.

April 2021 Led a group of BME UNITE faculty that met with the NIAMS director regarding concerns related to #FundBlackScientists

Annual Biomedical Research Conference for Minority Students (ABRCMS)

2021 Organizer and Panelist: "Cross-Disciplinary Collaborations: The Benefits and Challenges"

2021 Scientific Flash Talk: "Using the Microbiome in Orthopedic Biomechanics"

Invited Diversity and Recruitment Talks

Spring 2026,	Keynote Speaker (by videoconference) University of Florida, SHPE Chapter
Spring, 2025	BOREALIS R25 student seminar (virtual), Clarkson University
Summer, 2024	UC San Diego, ENLACE Summer Research Program
Fall, 2023	UT San Antonio, SHPE Chapter
Spring 2022	UC Davis, SHPE Chapter
Spring 2022	UC Merced, SHPE Chapter
Fall 2021	Stanford University SHPE Chapter
Fall 2021	UC Berkeley, SHPE Chapter; LAGSES Chapter
Fall 2021	Northeastern Univ., SHPE Chapter VIRTUAL
Spring 2021	Univ. of Florida, SACNAS Chapter VIRTUAL

Spring 2021 Univ. of Arizona SHPE Chapter VIRTUAL
Spring 2021 University of Pennsylvania VIRTUAL
Spring 2021 UC San Diego SHPE Chapter VIRTUAL
Spring 2021 Worchester Polytechnic Institute, Biomedical Engineering VIRTUAL
Fall 2019 Iowa State University, Mechanical Engineering
Fall 2018 University of Pennsylvania SHPE Chapter
Spring 2018 Purdue University SHPE Chapter
Fall 2017 Harvard University SHPE Chapter

Cornell University

2022, 2019, 2015 – Latino Studies Program: Fridays with Faculty Lunch Series Presenter
2012 – 2022 Two annual presentations to the "Ivy League Leadership Program" which brings Hispanic students from rural California to Ivy League Schools (see below).
2011 – 2022 Sloan Mentor. Mentored graduate students in engineering from under-represented groups.
2010 – 2022 Diversity Programs in Engineering. Provided a number of services to Cornell Diversity Programs in Engineering including graduate student recruitment at the Society of Hispanic Professional Engineers meeting, annual presentations for the CU Empower peer-mentoring organization, and to the CATALYST summer engineering/science program for high school students. References: Jami Joyner and Sara Xayarath Hernandez.
2021 – "Ivy Collective for Inclusion in Engineering Graduate Symposium" Panelist
2015 – Public Voices Fellow
2015 – CATALYST Scientific Program. Created and lead a one-week long laboratory experienced for high school students, predominately students from under-represented groups. The program included instruction in three-point bending, biomechanics, image analysis and statistics.

Ivy League Leadership Project

The Ivy League Leadership project is an informally networked group of high school instructors who bring students from lower economic parts of the U.S. (predominately Hispanic/Latino) on a week-long tour of Ivy League and sister colleges and universities in the Northeast. The programs all include weekly leadership and college preparation for the students.

2015-2019 Annual Presenter, Central Valley CA Ivy League Leadership Program
2013-2021 Annual Presenter, Watsonville CA Ivy League Leadership Program

Case Western Reserve University (2005-2010)

2006-2010. Faculty Advisor. Case Western Reserve University Chapter of the National Society of Black Engineers (NSBE).

Stanford University (1996-2001)

Resident Fellow. Worked as an advisor and tutor in mathematics and engineering topics to incoming first-year engineering students for Stanford's Summer Engineer Academy. 2000.

Graduate Peer Advisor. Advised undergraduates on coursework, research opportunities, technical careers and the graduate school application process. Helped place undergraduates in research assistant positions. 1998-2001.
Professional Advisor, Stanford Society of Chicano/Latino Engineers and Scientists (a chapter of the Society of Hispanic Professional Engineers). Guided officers and student members. 2000-2001.
Graduate Liaison, Stanford Society of Chicano/Latino Engineers and Scientists (a chapter of the Society of Hispanic Professional Engineers). Gave presentations to undergraduates about graduate school career options. 1998-1999.

President, Stanford Society of Chicano/Latino Engineers and Scientists (a chapter of the Society of Hispanic Professional Engineers). Met with industry representatives to solicit financial support and employment opportunities for members. 1999.

Invention Disclosure

DeFrates, K., Hernandez, C.J. " High throughput screening tool to characterize the mechanics of bacteria cells" UC San Francisco.

Hernandez, C.J., Sun, X."Microfluidic devices for mechanical testing/stimulating cells" Cornell. U.S. Provisional Patent 61892941.

von Recum H.A., Thatiparti T.R., Korley J. K., Hernandez C.J. "Slow-Release "Slow-Release Antibiotic Gel or Anti-Inflammatory Joint Injection" CWRU #2010-1915

von Recum H.A., Thatiparti T.R., Korley J. K., Hernandez C.J. "Slow-Release Antibiotic Coatings for Orthopaedic Implants" CWRU #2010-1914

Sira A., Tocci T., Marks J.M., Chak A., Trunzo J., Hernandez C.J. "Anti-reflux esophageal stent" CWRU.

O'Conner T., Shoukry M., Marks J.M., Chak A., Hernandez C.J. "Novel method of compressing and expanding stents" CWRU.

Dux S.J., Johnson, N., Kummari, S.R., Hernandez C.J. "Novel Fracture Fixation Device" CWRU.

Hernandez C.J., Gobezie R., Loomis D.A., Liu C.C.. "Smart Orthopaedic Implant that Detects Loosening" CWRU.

Hernandez, C.J., Beaupré, G.S., Marcus, R., Carter, D.R. "Computer Simulation Software for Osteoporosis Drug Treatment" Stanford Office of Technology and Licensing Docket #00-177.