# Christopher J. Hernandez

**Contact Information**
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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
*Director*
Health Innovations Via Engineering (HIVE)

Cornell University, Ithaca, NY
*Professor* 2020-2022
Sibley School of Mechanical and Aerospace Engineering

*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**

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**

2325011 Heveran, Gerlach, Hernandez (multiple-PI) 04/01/23-03/31/28
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

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

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

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

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

2125491 Hernandez (PI) 09/01/22-08/31/26
NSF $2,000,000 Total Costs
"EFRI ELiS Preliminary Proposal: 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

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

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

**Pending Research Support**
No Number Hernandez (co-I, Chen PI) 07/01/23-06/30/25
NIH $133,039 Total Costs
"Adaptor-protein shuttling mechanism for bacterial drug efflux"
In this project we seek to understand how mechanical stress and strain in the bacterial cell envelope influence drug efflux mechanisms involved in antibiotic resistance.
Role: PI

R21 AR082096 Hernandez (PI) 04/01/23-03/31/25
NIH $441,310 Total Costs
"Measuring Mechanical Failure in Microscale Tissue Samples"
In this project we seek to establish methods of measuring mechanical failure in boney nodules generated during in vitro culture.
Role: PI

Number Pending Leach, Hernandez (multiple PI) 01/01/24-12/31/27
DoD/CDMRP $1,158,741 Total Costs
"Microbiota regulation to potentiate antimicrobial efficacy in polytrauma-related bone repair"
In this project we test the idea that the gut microbiome can influence healing after polytrauma.
Role: Partnering PI

U01 AG 086162 Hernandez (PI) 04/01/24-03/31/29
NIH/NIA $3,192,597 Total Costs
"Interactions between the gut microbiome and joint tissue in aging"
In this project we examine the effects of the gut microbiome on the development of osteoarthritis in mice.
Role: PI

**Completed Research Support**

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:
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**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. 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*. Submitted.

2. Zhang, W., Harper, C.E., Lee, J., Fu. B., Ramsukh, M., +**Hernandez, C.J.**, +Chen, P. (2023) "Transporter excess and clustering facilitate adaptor-protein shuttling for bacterial efflux." *Proc Nat Acad Sci USA*. Submitted.

3. Lee, J., Jha, K., Harper, C.E., Zhang, W., Ramsukh, M., Bouklas, N., Chen, P., **Hernandez, C.J.** (2023) "Determining the Young's Modulus of the Bacterial Cell Envelope Using Microfluidic-based Extrusion Loading". Submitted.

4. *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*. In Press.

5. Heveran, C.M., **Hernandez, C.J.** (2023) "Make Engineered Living Materials Carry Their Weight." *Matter*. In Press.

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

7. 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

8. 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.

9. 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

10. 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

11. 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

12. 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. In Press. DOI: 10.1093/jn/nxab332

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

14. 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

15. 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

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

17. *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

18. 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

19. **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

20. 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

21. **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.

22. 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*.

23. 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

24. 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

25. 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

26. 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

27. 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.

28. **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.

29. *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

30. 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* 16 (49) 24457-24462. https://www.pnas.org/content/116/49/24457

31. Guss, J.D., Taylor, E., Rouse, Z., Roubert, S., Higgins, C.H., Thomas, C.J., Baker, S.P., Vashishth, D., Donnelly, E., Shea, M.K., Booth, S.L., Bicalho, R.C., **Hernandez, C.J.**. (2019) "The microbial metagenome and bone tissue composition in mice with microbiome-induced reductions in bone strength." *Bone.* 2019. 127:146-154. doi: 10.1016/j.bone.2019.06.010.

32. **Hernandez, C.J.**, Yang, X., Ji, G., Niu, Y., Sethuraman, A.S., Koressel, J., Shirley, M., Fields, M.W., Chyou, S., Li, T.M., Luna, M., Callahan, R.L., Ross, F.P., Lu, T.T., Brito, I.L., Carli, A.V., Bostrom, M.P.G. (2019) "Disruption of the Gut Microbiome Increases Risk of Periprosthetic Joint Infection in Mice" *Clin Orthop Rel Res.* 477(11):2588-2598. doi: 10.1097/CORR.0000000000000851.

33. Hunt, H.B., Torres, A.M., Palomino, P.M., Marty, E., Saiyed, R., Cohn, M., Jo, J., Warner S., Sroga, G.E., King, K.B., Lane, J.M., Vashishth, D., **Hernandez, C.J.,** Donnelly, E. (2019) "Altered tissue composition, microarchitecture, and mechanical performance in cancellous bone from men with type 2 diabetes mellitus" *J Bone Miner Res.* https://doi.org/10.1002/jbmr.3711.

34. Mosquera M., Kim, S., Zhou, H., Jing, T.T., Luna, M., Guss, J.D., Lai, K., Leifer, C.A., Brito, I.L., **Hernandez, C.J.**, Singh, A. (2019) "Gut microbiome and systemic metabolic syndrome modulates humoral immunity against nanovaccines." *Science Advances*. March 27 5(3): EAAV9788. doi: 10.1126/sciadv.aav9788

35. Guss, J.D., Ziemian, S.N., Luna, M., Sandoval, T.N., Holyoak, D.T., Guisado, G.G., Roubert, S., Callahan, R.L., Brito, I.L., van der Meulen, M.C.H., Goldring, S.R., **Hernandez, C.J.** (2019) "The effects of metabolic syndrome, obesity, and the gut microbiome on load-induced osteoarthritis" *Osteoarthritis Cartilage*. 27 (1): 129-139. https://doi.org/10.1016/j.joca.2018.07.020

36. Cresswell, E.N., McDonough, S.P., Palmer, S.E., **Hernandez, C.J.**, Reesink, H.L. (2019) "Can Quantitative Computed Tomography Detect Bone Morphological Changes Associated with Catastrophic Proximal Sesamoid Bone Fracture in Thoroughbred Racehorses?" *Equine Vet J.* 51 (1): 123-130. doi: 10.1111/evj.12965

37. *Levack, A.E., *Cyphert, E.L., Bostrom, M.P., **Hernandez, C.J.**, von Recum, H.A., Carli, A. (2018) "Current Options and Emerging Biomaterials for Periprosthetic Joint Infection" *Curr Rheumatol Rep*. https://doi.org/10.1007/s11926-018-0742-4

38. Cresswell, E.N., Nguyen, T.M., Horsfield, M.W., Alepuz, A.J., Metzger, T.A., Niebur, G.L., **Hernandez, C.J.** "Mechanically induced bone formation is not sensitive to local osteocyte density" (2018). *J Orthop Res*. 36(2): 672-81. doi: 10.1002/jor.23606.

39. Alliston, T., **Hernandez, C.J.**, Findlay, D.M., Felson, D.T., Kennedy, O.D. (2017) "Bone Marrow Lesions in Osteoarthritis: What Lies Beneath?" *J Orthop Res*. 36:1818-1825.

40. **Hernandez, C.J.** "The Microbiome and Bone and Joint Disease" (2017) *Curr Rheumatol Rep*. 19(12):77. doi.org/10.1007/s11926-017-0705-1

41. Matheny, J.B., Goff, M.G., Pownder, S.L., Koff, M.F., Hayashi, K., Yang, X. Bostrom, M.P.G., van der Meulen, M.C.H., **Hernandez, C.J.** "An In Vivo Model of a Mechanically-Induced Bone Marrow Lesion" (2017) *J Biomech*. 64:258-261. doi: 10.1016/j.jbiomech.2017.09.020.

42. Guss J.D., Horsfield, M.W., Fontenele, F.F., Sandoval, T.N., Luna, M., Apoorva, F., Lima, S.F., Bicalho, R.C., Singh, A., Ley, R.E., van der Meulen, M.C.H., Goldring, S.R., **Hernandez, C.J.** (2017) "Alterations to the Gut Microbiome Impair Bone Strength and Tissue Material Properties" *J Bone Miner Res*. 32(6):1343-1353. doi: 10.1002/jbmr.3114.

43. Matheny J.B., Torres, A.M., Ominsky, M.S., **Hernandez, C.J.** (2017) "Romosozumab Treatment Converts Trabecular Rods into Trabecular Plates in Male Cynomolgus Monkeys" *Calcif Tiss Int*. 101(1):82-91. doi 10.1007/s00223-017-0258-3.

44. **Hernandez, C.J.**, van der Meulen, M.C.H. (2017) "Understanding Bone Strength Isn't Enough" *J Bone Miner Res*. 32(6):1157-1162. doi: 10.1002/jbmr.3078.

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51. Lambers, F.M., Bouman, A.R., Tkachenko, E.V., Keaveny, T.M., **Hernandez, C.J.** (2014) "Effects of loading mode and microstructure on the number and volume of microdamage sites in human vertebral cancellous bone." *J Biomech* 47:3605-3612.

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81. **Hernandez, C.J.**, Beaupré, G.S. and Carter, D.R. (2003). "A theoretical analysis of the relative influences of peak BMD, age-related bone loss and menopause on the development of osteoporosis." *Osteoporos Int*. 14: 843-7.

82. **Hernandez, C. J.**, Beaupré, G. S., and Carter, D. R. (2003). "A theoretical analysis of the changes in basic multicellular unit activity at menopause." *Bone*. 32:357-363.

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84. **Hernandez, C.J.,** Beaupré, G.S., Marcus, R. and Carter, D.R. (2001). "A theoretical analysis of the contributions of remodeling space, mineralization and bone balance to changes in bone mineral density during alendronate treatment." *Bone*. 29: 511-516.

85. **Hernandez, C.J.,** Beaupré, G.S., Keller, T.S. and Carter, D.R. (2001). "The influence of bone volume fraction and ash fraction on bone strength and modulus." *Bone*. 29: 74-78.

86. **Hernandez, C. J.,** Beaupré, G. S. and Carter, D. R. (2000). "A model of mechanobiologic and metabolic influences on bone adaptation." *J Rehab Res Develop*. 37: 235-44.

87. **Hernandez, C. J.,** Hazelwood, S. J. and Martin, R. B. (1999). "The relationship between BMU activation and origination in cancellous bone." *Bone*. 25: 585-587.

**Book Chapters**

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

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

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. 4th Edition ed. San Diego, CA, USA: Elsevier; 2013.

**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**
"Rigid Engineered Living Materials" Multifunctional Materials and Structures Gordon Research Conference. Ventura, CA, USA. 2024.

"The Microbiome and Bone and Joint Disease" Tissue Repair and Regeneration Gordon Research Conference. Colby College, NH, USA. 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" 7$^{th}$ 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" 12$^{th}$ 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**

University of Texas, San Antonio, Department of Biomedical Engineering, Fall 2023
University of Michigan, Department of Molecular and Cellular Biology, 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 110 total)**

1. van Wijngaarden, E.W., **Hernandez, C.J.** (2023) "Nutrient Transport for Increasing the Active Lifespan of Engineered Living Materials." Materials Research Society Spring Meeting. San Francisco, CA, USA.

2. 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.

3. Liu, C., Cyphert, E.L., Nixon, J.C., Morales, A.L., Natsoulas, N.R., **Hernandez, C.J.** (2022) "Modulation of Bone Strength by the Gut Microbiome is Not Limited to Newly Formed Bone Matrix." American Society for Bone and Mineral Research. Austin, TX, USA. Young Investigator Award. Plenary Poster.

4. Harper, C.E., Zhang, W., Shin, J-H., Lee, J., Chou E., Chen, P., Dörr, T., **Hernandez, C.J**. (2022) "VxrAB signaling in *Vibrio cholerae* is activated by diverse mechanical stimuli." Biophysical Society Annual Meeting. San Francisco, CA, USA.

5. Cyphert, E.L., Clare, S., Dash, A., Nixon, J.C., Harrison, J., Raphael, J., Kim, H.J., Cunningham, M., Schwab, F., Lebl, D., Stein, E.M., **Hernandez, C.J.** (2022) "Spinal fusion patients with osteopenia and osteoporosis have distinct gut microbiota" Trans. Orthopaedic Research Society. Tampa, FL, USA.

6. Harper, C.E., Zhang, W., Shin, J-H., Chen, P., Dörr, T., **Hernandez, C.J**. (2021) "Mechanical stress activates VxrAB signaling in Vibrio cholerae" EMBO-EMBL Symposia "Life at the Periphery: Mechanobiology of the Cell Surface". Virtual.

7. Sacher, S.E., Hunt, H.B., Lopez, K., Lekkala, S., **Hernandez, C.J.,** Donnelly, E. (2021) "Trabecular Morphology and Microdamage Accumulation in Cancellous Bone from Men with Type II Diabetes Mellitus" Orthopaedic Research Society. Virtual.

8. Castaneda, M., Smith, K., Nixon, J.C., Rowan, S., **Hernandez, C.J.** (2020) "Alterations to the Gut Microbiome Impair Bone Tissue Strength in Aged Mice" American Society for Bone and Mineral Research. Seattle, WA, USA.

9. Luna, M., Guss, J.D., Vasquez-Bolanos, L.S., Castaneda, M., Vargas Rojas, M., Strong, J.M., Alabi, D.A., Dorenevil, S., Taylor, E.A., Bicalho, R., Donnelly, E.L., **Hernandez, C.J.** (2020) "Identifying Components of the Gut Microbiome that Regulate Bone Tissue Mechanical Properties" American Society for Bone and Mineral Research. Seattle, WA, USA.

10. 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.

11. Harper, C.E., Zhang, W., Chen, P., **Hernandez, C.J.** (2020) "Mechanical stress promotes the disassembly of the antibiotic efflux complex MacAB-TolC" Biophysical Society. San Francisco, CA, USA.

12. **Hernandez, C.J.**, Luna, M., Vasquez-Bolanos, L.S., Castaneda, M. (2019) "Identifying the Components of the Gut Microbiota that Influence Bone Strength" Biomedical Engineering Society, Phildelphia, PA, USA.

13. **Hernandez, C.J.,** Torres, A.M., Trikanad, A.A., Aubin, C., Lambers, F.M., Luna, M., Rimnac, C.M., Zavattieri, P. (2019) "Fatigue failure of cancellous bone is sensitive to an unexpected aspect of microarchitecture: A study with bone biomechanics and 3D printing." American Society for Bone and Mineral Research, Orlando, FL, USA. **Mid-Career Investigator Travel Award**.

14. Ellis, J.L., Fu, X., Karl, J.P., **Hernandez, C.J.,** Mason, J.B., Booth, S.L. (2019) "Purified and Food-based Menaquinones Accumulate in Liver and Feces of C57BL6 Mice" ASN Nutrition. Baltimore, MD, USA.

15. Luna, M., Guss, J.D., Vasquez-Bolanos, L.S., Alepuz, A., Strong, J., Callahan, R., Brito, I.L., van der Meulen, M.C.H., Goldring, S.R., **Hernandez, C.J.** (2019) "Early Joint Degeneration After Mechanical Overload is Not Sensitive to Obesity". Trans. Orthopaedic Research Society, Austin, TX, USA.

16. Vasquez-Bolanos, L.S., Luna, M., **Hernandez, C.J.** (2019) "Selective removal of components of the gut microbiome has differential effects on bone strength." Trans. Orthopaedic Research Society, Austin, TX, USA.

**Mentoring**

**Post-doctoral Fellows**

| Name | University | Year |
|---|---|---|
| Kelsey DeFrates | UC San Francisco | 2023-Present |

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|---|---|---|
| Eva Gonzalez Diaz | UC San Francisco | 2023-Present |
| Erika Cyphert | Cornell University | 2021-Present |
| Xuanhao Sun | Cornell University | 2012-2013 |
| Floor M. Lambers | Cornell University | 2011-2013 |

**Doctoral Students (Primary Advisor)**

| Name | Title - Year | Degree Field |
|---|---|---|
| Gissell Jimenez | Current | Bioengineering |
| Chongshan (Cleo) Liu | Current | Mechanical Engineering |
| Junsung Lee | Current | Mechanical Engineering |
| Christine E. Harper | "The Influence of Mechanical Stress on Components in the Bacterial Cell Envelope" | Biomedical Engineering |
| Marysol Luna | "The influence of the Gut Microbiome on Bone and Joint Disease" 2020 | Mechanical Engineering |
| Jason D. Guss | "The Role of the Gut Microbiome in Bone and Joint Disease" 2018 | Biomedical Engineering |
| Ashley Torres | "Fatigue Behavior of Cancellous Bone, Microdamage Accumulation and Biologically Inspired Cellular Solids" 2018 | Biomedical Engineering |
| Jonathan Matheny | "Interactions Between Bone Remodeling and Microdamage in Cancellous Bone" 2017 | Biomedical Engineering |
| Erin Cresswell (Litts) | "Spatial Regulation of Bone Formation in Functional Adaptation of Cancellous Bone" 2017 | Mechanical Engineering |
| Matthew Goff | "The Role of Micro and Ultra-Structure in Accumulation in Cancellous Bone" 2015 | Biomedical Engineering |
| Craig R. Slyfield | "The Biomechanics of Cancellous Bone Remodeling" 2012 | Mechanical Engineering |
| Meghan Cotter | "Gross Morphology, Microarchitecture, Strength and Evolution of the Hominoid Vertebral Body" 2011 Case Western Reserve University | Evolutionary Biology |
| Seetha Ramudu Kummari | "Experimental and Computational Evaluation of Microscopic Tissue Damage and Remodeling Cavities in Trabecular Bone" 2011 Case Western Reserve University | Mechanical Engineering |

**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 |

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|---|---|---|---|
| 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"<br>Case Western Reserve University | Mechanical Engineering | 2010 |
| Justin Daggett | "Measures of Remodeling Cavity Size and Number in Cancellous Bone Following Estrogen Depletion"<br>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"<br>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"<br>Case Western Reserve University | Mechanical Engineering | 2009 |
| Craig R. Slyfield | "Automoated Sub-Micron Resolution Serial Block Face Imaging of Cancellous Bone using Epifluorescence Microscopy"<br>Case Western Reserve University | Mechanical Engineering | 2008 |
| Andrew Schifle | "A Biomechanical Study of Vertebral Allometry in Primates"<br>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 |
|---|---|---|---|
| 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 | Current |
| 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 |
|---|---|---|---|
| Susana Lee | 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 |

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|---|---|---|---|
| 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 |

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|---|---|---|---|
| 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<br>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**

Kelsey DeFrates

UCSF Chancellor's Postdoctoral Fellowship, 2023

Eva Gonzalez Diaz
Burrough Welcome Fund Diversity Enrichment Program, 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 (currently, Ph.D. candidate UCSD)
National Science Foundation Graduate Research Fellowship 2019

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

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

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

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

**Teaching**

*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 |

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|---|---|---|---|---|
| MAE 2120<br>Spring 2013 | Mechanical Properties and Selection of Engineering Materials | 3 | Undergrad – Required for Mechanical Engineering | 152 |
| MAE 6640<br>Fall 2012 | Mechanics of Bone | 3 | Grad | 10 |
| MAE 2120<br>Spring 2012 | Mechanical Properties and Selection of Engineering Materials | 3 | Undergrad – Required for Mechanical Engineering | 154 |
| MAE 6640<br>Fall 2011 | Mechanics of Bone | 3 | Grad | 14 |
| MAE 6640<br>Fall 2010 | Mechanics of Bone | 3 | Grad | 9 |

*Case Western Reserve University*

| Course | Title | Units | Level | Enrollment |
|---|---|---|---|---|
| EMAE 689<br>Spring 2010 | Special Topics Cell Biomechanics | 3 | Grad<br>Covered 1/3 of class | 7 |
| EMAE 376<br>Spring 2010 | Aerostructures | 3 | Undergrad – Upper Required for AE | 29 |
| EMAE 372<br>Fall 2009 | Relation of Materials to Design | 4 | Undergrad – Upper<br>Required for Biomechanics Track | 15 |
| EMAE 376<br>Spring 2009 | Aerostructures | 3 | Undergrad – Upper<br>Required for AE | 20 |
| EMAE 372<br>Fall 2008 | Relation of Materials to Design | 4 | Undergrad – Upper<br>Required for Biomechanics Track | 20 |
| EMAE 415<br>Spring 2008 | Introduction to Musculoskeletal Biomechanics | 3 | Grad | 7 |
| EMAE 376<br>Spring 2008 | Aerostructures | 3 | Undergrad – Upper<br>Required for AE | 26 |
| EMAE 372<br>Fall 2007 | Relation of Materials to Design | 4 | Undergrad – Upper<br>Required for Biomechanics Track | 19 |
| EBME 105<br>Fall 2007 | Introduction to Biomedical Engineering | 3 | Undergrad<br>Covered 1/3 of class | 120 |
| EMAE 376<br>Spring 2007 | Aerostructures | 3 | Undergrad – Upper<br>Required for AE | 16 |
| EMAE 376<br>Spring 2006 | Aerostructures | 3 | Undergrad – Upper<br>Required for AE | 28 |
| EMAE 372<br>Fall 2006 | Relation of Materials to Design | 4 | Undergrad – Upper<br>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)*
2022 Nominating Committee
2022 – Present Diversity Committee

*Orthopaedic Research Society*
2018-2020 Board of Directors
2018-2020 Chair, Membership Committee
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 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
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*

*NIDDK*

Special Emphasis Review Panel Fall 2009

*NIAMS*

*2022 Member SBSR Study Section*
*Ad hoc Reviewer SBSR Study Section (R awards),* Summer 2017, Winter 2018, Summer 2021
*Ad hoc Reviewer ZRG1 MSOS-V Study section (SBIR/STTR awards)* Spring 2023
*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

*Bone Marrow Adiposity Society (BMAS)*

Fall 2021 Invited Speaker, "Grant Writing"

*International Bone and Mineral Society Sun Valley Workshop*

2010-2013 Member, Steering Committee

*International Society of Bone Morphology*

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

*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**

*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.

*BME UNITE*
March 2021- Present. 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 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-Present 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**

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.