

RESEARCH INTERESTS

I am a new tenure-track faculty member establishing a lab exploring bone and dental cell mechanotransduction and associated signaling pathways to identify novel treatments that form mineralized tissues when and where needed. In my undergraduate career, I specialized in orthopaedic biomaterials to learn about materials and mechanics involved in total joint replacements. For my MS thesis, I designed and built a device to measure the fatigue lifetime of bone grafts. During my PhD, I identified the role of a sensory organelle, the primary cilium, in mechanical stimulation of bone cells and utilized genetically altered mouse models to show periosteal progenitor cells and their primary cilia are important for postnatal development and adult load-induced bone formation. As a postdoc, I continued to characterize the role of periosteal progenitor cells and their primary cilia in bone growth and repair and built expertise in cell signaling pathways. I also investigated stem cell populations in tooth regeneration and developed novel experimental models and protocols to build my own research program. I intentionally developed this multifaceted skill set – ranging from molecular biology to animal models to device design – to study bone/dental cell behavior at multiple levels.

Employment

<i>Assistant Professor</i>	Jan 2025 – current
Department of Biology	
Northeastern University	

Education and Training

<i>Postdoctoral Fellow</i>	Dec 2020 – Dec 2024
Developmental Biology	
Harvard School of Dental Medicine	
Advisor: Dr. Vicki Rosen	
<i>Postdoctoral Fellow</i>	Feb 2018 – Nov 2020
Developmental Biology	
Harvard School of Dental Medicine	
Advisor: Dr. Yingzi Yang	
<i>Doctor of Philosophy</i>	Sep 2012 – Dec 2017
Biomedical Engineering	
Columbia University	
Advisor: Dr. Christopher R. Jacobs	
<i>Master of Philosophy</i>	Sep 2012 – May 2013
Biomedical Engineering	
Columbia University	
<i>Master of Science</i>	May 2011 – May 2012
Biomedical Engineering	
Case Western Reserve University	
Advisors: Dr. Ozan Akkus, Dr. Steven Eppell, Dr. Clare Rimnac	
<i>Bachelor of Science</i>	Aug 2007 – May 2011
Biomedical Engineering	
Case Western Reserve University	

Professional Societies and Appointments

Guest Editor, Journal of Visualized Experiments	2023 – current
Member, American Society for Bone and Mineral Research (ASBMR)	2023 – current
Editorial Board Member, Mechanobiology in Medicine Journal	2022 – current
Member, Center for Skeletal Regeneration	2018 – current
Reviewer: https://publons.com/researcher/1644899/emily-r-moore/	2018 – current
Member, American Association for Dental Research (AADR)	2018 – 2019
Member, Orthopaedic Research Society (ORS)	2014 – 2018
Member, Biomedical Engineering Society (BMES)	2014 – 2018
Member, American Society for Cell Biology (ASCB)	2014 – 2018
Member, Society for Women in Engineering (SWE)	2010 – 2012
Copy Editor, Discussions Undergraduate Research Journal	2007 – 2010

Honors and Awards

<i>Awardee</i> , ASBMR John Haddad Young Investigator Award	2024
<i>Invited speaker</i> , Advances in Mineral Metabolism ASBMR annual meeting	2024
<i>Invited speaker</i> , Osteo Science Foundation Bone Symposium	2024
<i>Session Chair and podium presentation</i> , Gordon Research Seminar: Bones and Teeth	2022
<i>Session Chair and Invited Speaker</i> , 9 th World Congress of Biomechanics	2022
<i>Awardee</i> , National Institute of Dental and Craniofacial Research Loan Repayment Program	2019 – 2021
<i>Awardee</i> , FFS Travel Grant to attend the AADR Fall Focused Symposium	2018
<i>Class Day Speaker</i> , School of Engineering and Applied Science at Columbia University	2018
<i>Finalist</i> , Stryker/ORS Women's Research Fellowship	2018
<i>Finalist</i> , Young Investigator Award Arnold and Madaleine Penner 6th Annual Musculoskeletal Repair and Regeneration Symposium	2017
<i>Attendee</i> , University of Michigan NextProf Fall Engineering Workshop	2017
<i>Finalist</i> , PhD Paper Competition at the SB3C Annual Meeting	2017
<i>Awardee</i> , Chroma Technology Corporation travel grant for the Annual ASCB Meeting	2016
<i>Awardee</i> , Young Investigator Award, Arnold and Madaleine Penner 5th Annual Musculoskeletal Repair and Regeneration Symposium	2016
<i>Awardee</i> , Alice L. Jee Young Investigator Award, ORS 46th International Sun Valley Workshop on Musculoskeletal Biology	2016

Scientific Presentations

Poster, ASBMR Annual Meeting, Toronto, Canada	2024
Poster, ASBMR Annual Meeting, Vancouver, Canada	2023
Podium presentation, Center for Skeletal Regeneration Musculoskeletal Symposium, Boston, MA	2023
Podium presentation, Gordon Research Seminar: Bones and Teeth, Ventura, CA	2022
Poster, Gordon Research Conference: Bones and Teeth, Ventura, CA	2022
Podium presentation, 9 th World Congress of Biomechanics, Taipei, Taiwan	2022
Podium presentation, Harvard Stem Cell Institute Seminar Series, Boston, MA	2022
Podium presentation, Center for Skeletal Regeneration Seminar Series, Boston, MA	2022
Podium presentation, Center for Skeletal Regeneration Seminar Series, Boston, MA	2020
Podium presentation, Harvard Quantitative Biology Symposium, Cambridge, MA	2019
Poster, AADR Fall Focused Symposium, Bethesda, MD	2018
Poster, ORS Annual Meeting, San Diego, CA	2017
Podium presentation, Junior Investigator Symposium at the ORS International Section on Fracture Repair, San Diego, CA	2017
Podium presentation, Summer Biomechanics, Bioengineering, and Biotransport Conference, Tucson, AZ	2017

Poster, Annual Musculoskeletal Repair and Regeneration Symposium, New York, NY	2017
Podium presentation, Biomedical Engineering Bilateral Symposium, Beijing, China	2017
Poster, BMES Cellular and Molecular Biology Special Interest Group Annual Meeting, Big Island, HI	2016
Poster, ORS Sun Valley Workshop, Sun Valley, ID	2016
Poster, Annual Musculoskeletal Repair and Regeneration Symposium, New York, NY	2016
Poster, ASCB Annual Meeting, San Francisco, CA	2016
Podium presentation, ORS Annual Meeting, Orlando, FL	2016
Poster, BMES Cellular and Molecular Biology Special Interest Group Annual Meeting, St. Thomas, Virgin Islands	2015
Poster, ORS Annual Meeting, Las Vegas, NV	2015
Podium presentation, Musculoskeletal Research Day, Columbia University, New York, NY	2014
Poster, ASCB Annual Meeting, Philadelphia, PA	2014
Poster, Musculoskeletal Research Day, Case Western Reserve University, Cleveland, OH	2012

TEACHING AND MENTORING EXPERIENCE

Certifications

1. Innovative Teaching Summer Institute for graduate students led by the Center for Teaching and Learning at Columbia University, June 12-15, 2017, New York, NY.
2. Teaching Institute: Theory and Practice for the STEM Professions, August 1-4, 2022, Boston, MA.

Teaching

<i>Mineralized Tissue Biology and Diseases, Prof. Francesca Gori</i>	2023 – current
Harvard School of Dental Medicine, Boston, MA	
• Delivered 1-2 lectures per semester to class of 10+ MS and doctoral dental students	
<i>Scholarship in Oral Health, Prof. Francesca Gori</i>	2020 – current
Harvard School of Dental Medicine, Boston, MA	
• Delivered 1-2 lectures per semester to class of 30+ DMD students	
• Provided feedback on grant writing assignments in small groups of 8-10 students	
<i>Cellular Biomechanics, Prof. Christopher Jacobs</i>	2013
Columbia University, New York, NY	
• Graded weekly homework assignments and exams	
• Compiled a solutions manual and edits for a second edition of the course textbook, which is co-written by the instructor	
<i>Tissue and Molecular Engineering Lab, Prof. Christopher Jacobs</i>	2012
Columbia University, New York, NY	
• Supervised 15-20 students as they performed weekly experiments utilizing molecular biology techniques	
<i>Thermodynamics, Prof. David Matthiesen</i>	2011
Case Western Reserve University, Cleveland, OH	
• Held tutoring sessions and taught a weekly recitation of 20-30 students	
• Assisted with syllabus design and writing/grading homework assignments and exams	
<i>Chemistry of Materials, Prof. Mark DeGuire</i>	2011
Case Western Reserve University, Cleveland, OH	
• Held tutoring sessions and taught a weekly recitation of 30-40 students	
• Assisted with writing/grading homework assignments, weekly quizzes, and exams	

Mentoring

I have had the privilege to mentor trainees of diverse backgrounds and various levels of experience. Our interactions involved training/advising in areas including wetlab techniques, data analysis, experimental design, scientific writing, presentation skills, and career planning. Many trainees obtained authorship on my publications and pursued scientific careers in part because of their training experience.

Kyler Hayes, DMSc at Harvard School of Dental Medicine	2023 – 2024
Emily VanDoren, DMSc at Harvard School of Dental Medicine	2023 – current
Abigail Fox, BS at Northeastern University	2023
Jillian Scott, BS at Northeastern University	2023 – current
Gustavo Loyola, BS at CSU Fullerton	2023
Christian McIver, BS at Harvard University	2023
Kathryn Burton, BS at Carleton College	2022 – current
Ana Garcia Castineiras, DDS at Harvard School of Dental Medicine	2021 – 2023
Gavin Chen, DDS at Harvard School of Dental Medicine	2021 – 2024
Ondrea Mathews, BS at University of Dallas	2019
Aisha Ba, DDS at Harvard School of Dental Medicine	2018 – 2020
Daniel Shen, DDS at Harvard School of Dental Medicine	2018 – 2019
Quincy Delp, BS at Bard College	2018
Joana Capacete, MS at Instituto Superior Técnico	2017
Fabiana Rodrigues, MS at Columbia University	2016
Ya Xing Zhu, MS at Columbia University	2016 – 2017
Kelly Ryu, BS at Columbia University	2015 – 2017
Yu Chen Yang, MS at Columbia University	2015 – 2016

Seminars and Lectures

1. Bone development, adaptation, fracture, and regeneration, Oxford Academic Programs Medical Science Minor, Barnard College, New York, NY, July 13th, 2017, Lecture.
2. Strategies for K-12 teachers to encourage STEM participation and retention, Oxford Academic Programs Boston Teacher Seminar, Harvard University, Cambridge, MA, June 30th, 2017, Seminar and workshop.
3. Activating periosteal cells to make bone, STEM Outreach Colloquium, Columbia University, New York, NY, April 6th, 2017, Seminar.

ACADEMIC SERVICE

Boston Postdoc Association

Jan 2022 – Dec 2024

Advocacy Committee Member

- Worked with postdocs from several institutions to implement large-scale changes for Boston-based postdocs
- Hosted quarterly Q&A sessions with an immigration attorney to help international postdocs navigate their visa and immigration options

Harvard Medical Postdoc Association

Committee Member

May 2018 – Dec 2024

Advocacy Committee Chair

Sep 2020 – Aug 2022

- Worked with postdocs and administration to provide resources for underrepresented postdocs
- Designed and implemented a survey for 1,000+ postdocs and worked with HMPA and administration to address problems identified in the survey results

Engineering Graduate Student Council at Columbia University

President

May 2016 – Dec 2016

- Elected by peers to represent graduate engineering students at highest levels of administration
- Worked with administration to provide programming for and enhance representation of underrepresented groups in STEM

University Senate at Columbia University

Student Affairs Committee Vice-Chair

May 2015 – May 2016

Graduate Senator for the School of Engineering and Applied Sciences

May 2014 – May 2016

- Elected to represent entire graduate student for SEAS at highest levels of administration and function

as a liaison to external schools

- Further elected by student Senators to represent all Columbia University, Teachers College, and Barnard College students at highest levels of administration
- Worked with the University President, Provost, Executive Officers, and Senate administration to address issues spanning Columbia University and its affiliates
- Served on the University Senate Education Committee to revise, approve, and implement changes to academic scheduling and programs

Graduate Biomedical Engineering Organization at Columbia University

President

May 2013 – Jun 2014

Social Chair

Aug 2012 – May 2013

- Developed and ran programs to enhance the social and academic experiences for graduate students in the Biomedical Engineering Department
- Worked with faculty and administration to organize recruitment events for potential PhD candidates, with special programming for candidates from underrepresented groups

Graduate Society for Women Engineers at Columbia University

Outreach Chair

Aug 2012 – May 2013

- Developed and ran scientific experiments and workshops for girls at a high school in Harlem to foster their interest in STEM
- Hosted campus tours and college application workshops to encourage said high school girls to apply for and attend college, with a focus on science and engineering

Relay for Life Planning Committee at Case Western Reserve University

Alumni Co-Chair

Aug 2011 – Apr 2012

- Developed, oversaw, and ran several fundraisers and events for cancer research
- Worked with a variety of students, faculty, staff, administration, and community members to plan and run a community-wide 24 hour event

PUBLICATIONS

1. **Moore ER**, Maridas DE, Gamer L, Chen G, Burton K, Rosen V. A periosteum-derived cell line to study the role of BMP/TGF β signaling in periosteal cell behavior and function. *Front Physiol.* 2023. PMID: 37799511.
2. Maridas D, Gamer L, **Moore ER**, Doedens A, Yu Y, Revollo L, Whitman M, Rosen V. Loss of Vlk in Prx1+ cells delays the initial steps of endochondral bone formation and fracture repair in the limb. *JBMR.* 2022. PMCID: 35080046.
3. **Moore ER**. Primary Cilia: The New Face of Craniofacial Research. *Biomolecules.* 2022. PMCID: PMC9776107.
4. **Moore ER**, Michot B, Erdogan O, Ba A, Gibbs J, Yang Y. CGRP and Shh mediate the dental pulp cell response to neuron stimulation. *JDR.* 2022. PMCID: PMC9305843.
5. Guo Y, Li B, Ma T, **Moore ER**, Xie H, Wu C, Li L. Unraveling the binding microprocess of individual *Streptococcus mutans* cells via sucrose-dependent adhesion based on surface plasmon resonance imaging. *J Oral Microbiol.* 2022. PMCID: PMC8856052.
6. **Moore ER**, Mathews OA, Yao Y, Yang Y. Prx1-expressing cells contributing to fracture repair require primary cilia for complete healing in mice. *Bone.* 2021. PMCID: PMC7769995.
7. **Moore ER**, Feigenson M, Maridas D. Transverse fracture of the mouse femur with stabilizing pin. *J Vis Exp.* 2021. PMID: 35037663.
8. Fang F, Schwartz AG, **Moore ER**, Sup ME, Thomopoulos S. Primary cilia as the nexus of biophysical and hedgehog signaling at the tendon enthesis. *Sci Adv.* 2020. PMCID: PMC7608799.
9. **Moore ER**, Chen JC, Jacobs CR. Prx1-Expressing Progenitor Primary Cilia Mediate Bone Formation in response to Mechanical Loading in Mice. *Stem Cells Int.* 2019. PMCID: PMC6877967.
10. **Moore ER**, Yang Y, Jacobs CR. Primary cilia are necessary for Prx1-expressing cells to contribute to postnatal skeletogenesis. *J Cell Sci.* 2018. PMCID: PMC6127732.

11. **Moore ER**, Jacobs CR. The primary cilium as a signaling nexus for growth plate function and subsequent skeletal development. *J Orthop Res*. 2018. PMCID: PMC5839937.
12. **Moore ER**, Zhu YX, Ryu HS, Jacobs CR. Periosteal progenitors contribute to load-induced bone formation in adult mice and require primary cilia to sense mechanical stimulation. *Stem Cell Res Ther*. 2018. PMCID: PMC6042447.
13. **Moore ER**, Ryu HS, Zhu YX, Jacobs CR. Adenylyl cyclases and TRPV4 mediate Ca^{2+} /cAMP dynamics to enhance fluid flow-induced osteogenesis in osteocytes. *J Mol Biochem*. 2018. PMCID: PMC6529196.
14. **Moore, E.R.** Jacobs, C.R., The Primary Cilium as a Strain Amplifying Microdomain for Mechanotransduction at the Cell Membrane, *Molecular and Cellular Mechanobiology* (pp. 3 – 27), Springer, New York, ISBN:978-1-4939-5615-9, 2016.
15. Islam A, Chapin K, **Moore ER**, Ford J, Rimnac C, Akkus O. Gamma Radiation Sterilization Reduces the High-cycle Fatigue Life of Allograft Bone. *Clin Orthop Relat Res*. 2016. PMCID: PMC4746152.