RACHANA VAIDYA

St. Louis, MO 63108 · +17742978235
vaidya@wustl.edu · www.linkedin.com/in/rachanavaidya

Education and Training

Washington University in St. Louis, MO, USA **2021-present**
Position: Postdoctoral Fellow
Department: Physical Therapy /Orthopaedic Surgery

University of Massachusetts Dartmouth, Dartmouth, MA, USA **2017-2021**
Degree: Doctor of Philosophy in Biomedical Engineering and Biotechnology

St. Xavier's College, Mumbai, India **2012-2014**
Degree: Master of Science
Major: Biotechnology

Funding

Centre of Regenerative Medicine Distinguished Postdoctoral Scholars Fellowship **2023**
Washington University School of Medicine in St. Louis
Amount: $1,000
Project: AGE/RAGE signaling in osteocyte for bone regeneration

ICTS Just-In-Time Core Usage Funding Program **2022**
Washington University School of Medicine in St. Louis
Role: Co-Investigator (PI: Jennifer Zellers), Amount $5,000
Project: Protein Profile of Human Tendon

Publications

Peer-reviewed journal articles

Zellers JA, Li R, **Vaidya R**, Lohse K, North A, Cui S, Houston B, Chen M, Zheng J, Baxter J. Minimal effect of scanning parameters on ultrasound shear wave elastography variability in tendon. Knee Surg Sports Traumatol Arthrosc. Jun 2024. https://doi.org/10.1002/ksa.12325.

Jahani B*, **Vaidya R***, Jin JM, Aboytes DA, Broz KS, Krothapalli S, Pujari B, Baig WM, Tang SY. Assessment of bovine cortical bone fracture behavior using impact microindentation as a surrogate of fracture toughness. JBMR Plus. 2024 Jan 4;8(2):ziad012. doi: 10.1093/jbmrpl/ziad012. PMID: 38505533; PMCID: PMC10945719.***Authors contributed equally**

Emerzian SR, Wu T**, Vaidya R,** Tang SY, Abergel RJ, Keaveny TM. Relative Effects of Radiation-Induced Changes in Bone Mass, Structure, and Tissue Material on Vertebral Strength in a Rat Model. J Bone Miner Res. 2023 Jul;38(7):1032-1042. doi: 10.1002/jbmr.4828. Epub 2023 Jun 4. PMID: 37191221; PMCID: PMC10524463.

Youmans NJ, **Vaidya RS,** Chen L, Jeong HJ, York A, Commean PK, Hastings MK, Zellers JA. Rate of tarsal and metatarsal bone mineral density change in adults with diabetes mellitus and peripheral neuropathy: a longitudinal study. J Foot Ankle Res. 2023 Feb 13;16(1):6. doi: 10.1186/s13047-023-00606-2. PMID: 36782282; PMCID: PMC9924878.

Vaidya R, Rezaee T, Edwards T, Bender R, Vickneswaran A, Chalivendra V, Karim L. Accumulation of fluorescent advanced glycation end products and carboxymethyl-lysine in human cortical and trabecular bone. Bone Rep. 2022 Nov 3;17:101634. doi: 10.1016/j.bonr.2022.101634. PMID: 36389626; PMCID: PMC9650004.

Vaidya R, Lake SP, Zellers JA. Effect of Diabetes on Tendon Structure and Function: Not Limited to Collagen Crosslinking. J Diabetes Sci Technol. 2022 Jun 2:19322968221100842. doi: 10.1177/19322968221100842. Epub ahead of print. PMID: 35652696.

Merlo K, Aaronson J, **Vaidya R**, Rezaee T, Chalivendra V, Karim L (2020). In Vitro-Induced High Sugar Environments Deteriorate Human Cortical Bone Elastic Modulus and Fracture Toughness. J Orthop Res. 2020 May;38(5):972-983. PMID: 31793028; PMCID: PMC7162721.

Karim L, Rezaee T, **Vaidya R**. (2019) The Effect of Type 2 Diabetes on Bone Biomechanics. Current Osteoporosis Rep, 17(5):291-300, 2019. PMID 31392668. PMCID: PMC6819250.

Book chapters

Vaidya R, Church A, Karim L. Effect of Type 2 Diabetes on Bone Cell Behavior. Gefen A (Ed.) The Science, Etiology and Mechanobiology of Diabetes and its Complications, ISBN 978-0-12-821070-3, London: Academic Press (Elsevier) 2021.

Karim L, Hussein A, **Vaidya R**, Morgan E, Bouxsein M. (2020) Mechanical Behavior of bone, in Dempster D, Cauley J, Bouxein M, Cosman F (Ed) Marcus and Feldman' Osteoporosis (5th Edition, Vol 1, 283-307), Elsevier.

Honors and Awards

- New Investigator Research Award Finalist, Orthopaedic Research Society Nov 2023
- Presenter of the Year from InPrint -Science Communication Network, WUSTL Dec 2023
- The International Sigma Xi Research Honor's Society, inducted May 2021
- "Gibco Cell Culture Hero" Award from ThermoFisher Scientific Aug 2021
- Student Trainee Award from Orthopaedic Research Society Feb 2021
- ASBMR Young Investigator Travel Grant, ASBMR Sep 2021
- Graduate Travel Award from Office of the Provost, UMASS Dartmouth Feb 2021
- Graduate travel Award from Graduate Student Senate, UMASS Dartmouth Aug 2020
- Graduate Travel Award from Department of Bioengineering, UMASS Dartmouth Jan 2020
- Finalist, Biorender graphical abstract contest (science illustration) Apr 2020
- Graduate travel Award, Graduate Student Senate, UMASS Dartmouth Aug 2019
- Poster presentation Award, Sigma Xi Annual Research Symposium Apr 2019
- Oral presentation award, 3 Minute Thesis competition, UMASS Dartmouth Apr 2019

Research Experience

Postdoctoral Research Associate 2021-present
Washington University in St. Louis, MO, USA
Mentors: Dr. Jennifer Zellers and Dr. Simon Tang
Experience: Clinical Research, In-vivo animal research, Translational Research, Project Management and Community Engagement

- Managing **multiple projects** in a co-mentored position in two different departments- physical therapy and Orthopaedic Surgery.
- Conducting clinical research on tendon pain in injury and disease, working with human subjects to gain experience in **clinical research and medical writing** skills.
- Conducting in vivo animal research using **mouse models of diseases** to study tissue healing response to injury, demonstrating expertise in experimental design, data analysis, and interpretation
- **Collaborating** with peers from different universities on various tendon and bone projects, showcasing excellent **teamwork and communication skills.**
- Involved in **community engagement** as a **presentation consultant** for the university at InPrint services improving presentation and science communication skills for faculty and students.
- Gained **entrepreneurship skills** via entrepreneurship for biomedicine course by creating a startup idea for a diabetes management app.
- Gaining **leadership and lab management skills** via COMPASS training and mentoring program offered by WUSTL, building effective communication and management strategies for scientific teams.
- Assisting mentors in **grant writing** in the areas of tendons and bone research, demonstrating technical writing and grant management skills.
- Published one review article and two co-authored manuscripts, contributing to the field of musculoskeletal research and exhibiting **high scholarly productivity and impact**.

Graduate Research Assistant 2017-2021
Mentor: Dr. Lamya Karim
University of Massachusetts Dartmouth, Dartmouth, MA, USA
Experience: Invitro research, Project Management, Mentoring and Collaboration

- Conducted and spearheaded several molecular biology and biomechanics projects as the first PhD student in a new faculty lab, demonstrating **initiative and scientific leadership**.
- Gained experience in managing, organizing, and maintaining a BSL2 laboratory, including chemical and supply inventory, equipment troubleshooting, implementing SOPs, and budgeting for different projects, demonstrating a **strong work ethic and attention to detail**.
- Collaborated with other teams and professors within and outside the university to promote crosstalk and community engagement culture in academia, demonstrating strong interpersonal skills and the **ability to work effectively in a team environment**.
- Mentored and provided guidance to undergraduate and graduate students, as well as senior capstone design teams, demonstrating a commitment to fostering student development and **a passion for teaching and mentorship**.
- Published two book chapters, a review article, and two primary articles (one first author and one co-author) in peer-reviewed journals, **contributing to the advancement of knowledge in the field of molecular biology and biomechanics**.

Research Student 2013 – 2014
Indian Institute of Technology (IITB), Mumbai, India
Mentor: Dr. Swati Patankar
Experience: Genomics, Bioinformatics, Molecular parasitology

- The project focused on investigating the role of translatable upstream open reading frames during protein translation in the malarial parasite Plasmodium falciparum, providing the opportunity to develop skills in genome-wide analysis, cell culture, PCR, cloning vectors, and analysis of sequencing data. This experience sparked a passion for scientific inquiry and a commitment to ongoing learning in the field of molecular biology.

Research Student 2012 – 2013
St. Xavier's College, Mumbai, India
Mentor: Dr. Biswaprasun Chatterjee
Experience: Biopolymers, bacterial culture, biochemistry

- The project aimed to identify the microorganism from soil that produces the highest amount of biodegradable polymer, such as polyhydroxybutyrate (PHB), using bacterial culture, staining, and bacterial identification techniques. Further optimization of the yield of the bioplastic was achieved through different co-culture, media formulation, and co-polymerization methods. This experience provided an opportunity to develop skills in laboratory techniques and sparked a passion for exploring innovative solutions to real-world problems through scientific research.

Work Experience

Document Specialist 2015 – 2017
Tata Consultancy Services (TCS), Mumbai, India
Experience: Teamwork and Time Management, clinical trial knowledge

- Developed skills in teamwork, time management, and clinical trial knowledge that provided a strong foundation for my subsequent pursuit of a PhD.

Presentation

Oral Presentations:

Impact microindentation measure of bone quality strongly correlate with whole bone strength across multiple skeletal sites and tissue-level material properties in post-menopausal women Feb 2024
New Investigator Research Finalist Talk, Orthopedic Research Society Annual meeting, LA, CA

The Effect of Diabetes on Bone Quality via Changes in Gene Expression Markers in Osteocytes. Aug 2021
Gibco Cell Culture Hero webinar series, ThermoFisher Scientific , USA

Investigating Altered Osteocyte Function in Diabetes. Dec 2020
American Society for Bone and Mineral Research Spotlight Series

Effect of Diabetes on Osteocyte Bone Cell Behavior in Context of Bone Fragility. Mar 2019
Biomedical Engineering and Biotechnology seminar series, UMASSD,MA

Effect of Type II diabetes on bone cell behavior Apr 2019
Three minute thesis competition, University of Massachusetts Dartmouth, MA

Poster Presentations:

Impact Microindentation Measures of Bone Quality is Strongly Correlated with Whole Bone Strength at the Hip, Wrist and Lumbar Spine. Oct 2023
45th Annual Meeting of American Society for Bone and Mineral Research, Vancouver, BC, Canada

Nε-carboxymethyl-Lysine (CML) Alters Gene Expression of Bone Remodelling, Glycation, and Inflammation Markers in OCY454-12H Osteocytes. Feb 2022
68th Annual Meeting of the Orthopaedic Research Society.

Hyperglycemia Upregulates Gene Expression of Key Bone Remodelling Markers and Glycation Markers in OCY454-12H osteocytes Sep 2021
43rd Annual Meeting of American Society for Bone and Mineral Research, San Diego, CA

TNF-α in Presence of High Glucose Affects Bone Remodeling Markers in Ocy454 Cells Feb 2021
67th Annual Meeting of the Orthopaedic Research Society (Virtual).

Hyperglycemia and collagen Glycation Alters Expression of Sclerostin and RANKL in Ocy454 Osteocytes Sep 2020
42nd Annual Meeting of American Society for Bone and Mineral Research, Seattle, WA (Virtual)

Hyperglycemia Alters Expression of Sclerostin but not RANKL in osteocytes. Sep 2019
41st Annual Meeting of American Society for Bone and Mineral Research, Orlando, FL

Effect of Hyperglycemia on Sclerostin Expression in Osteocyte-like Ocy454 Cells. Mar 2019
25th Annual Research Exhibit of Sigma Xi, Dartmouth, MA

Teaching and Mentorship Experience

Teaching

Workshop on Science communication to a non-scientific audience, ProsPER graduate students at WUSTL, MO May2024

- Led a workshop on science communication, providing practical tips and resources to effectively convey scientific concepts to a general audience.

Seminar on Effective Graphical Abstracts , Pathology and Immunology Department, Oct 2023
Washington University in St. Louis, MO

- Conducted a seminar and interactive workshop on the skillful development of graphical abstracts, presented to department faculty members.

Lecturer for MRC minicourse, Musculoskeletal Research Core,
Washington University in St. Louis, MO Sep 2023

- Delivered an interactive and engaging lecture on Achilles tendon health and pathologies to professors, postdocs, graduate and undergraduate students, as well as medical students within the department.

Guest Lecturer for Biomechanics Lab, Mechanical Engineering-sophomore class,
Washington University in St. Louis, MO Feb 2023

- Delivered a lecture on effective data visualization, covering topics such as data formatting, choosing appropriate graphs and charts, and best practices for conveying scientific information to different audiences.

Guest Lecturer for IMSE 510 course, Washington University in St. Louis, MO Feb 2022

- Delivered a lecture on the structure and function of bone and cartilage, covering topics such as bone biology, biomechanics, and pathology, as well as the mechanical properties and modeling of cartilage.

Mentoring

Mentor to Medical Student June-Aug 2023
Walee Baig, Missouri Southern State University

- Provided guidance and training on biochemical assays for bone tissue as well as analysis techniques.
- Shared best practices to get reproducible results and acknowledged their contributions by granting authorship on the manuscript resulting from the experimental work.

Mentor to Undergraduate Research Student Aug-Dec 2022
Stephane Cui, WUSTL

- Provided guidance and training to an undergraduate student on using ultrasound scanners for clinical research studies, as well as data collection and analysis techniques.

Mentor to Graduate Students Aug-Oct 2022
Siva Krothappali and Bhanu Pujari, Saint Louis University

- Provided guidance and training to two graduate students on conducting immunoassays for bone samples and data analysis using GraphPad Prism.
- Shared best practices and tips with students to improvise their experimental protocols and obtain reliable results.

Mentor to Graduate Student Aug 2019-Mar 2021
Lauren Conlon, UMASS Dartmouth

- Provided extensive mentorship and training to a graduate student on in vitro cell culture techniques using the OCY454 cell line, as well as qPCR and ELISA assays.
- Supervised and guided the student's MS thesis project, which involved investigating the role of a specific protein in cell signaling pathways.

Mentor to Undergraduate Student Aug 2019-Aug 2021
Arune Vickneswaran, UMASS Dartmouth

- Provided training to an undergraduate student on handling and processing human bone samples for in vitro assays.

- Trained the student in various in vitro techniques, including cell culture, molecular assays, and protein analysis, to investigate the mechanisms underlying bone regeneration and remodeling.

Mentor to Graduate Student Aug 2020-Aug 2021
Brooke DeSimone, UMASS Dartmouth

- Provided extensive training to an undergraduate student on working with an HPLC system for protein analysis, as well as processing human bone samples for protein assays.
- Trained the student on in vitro cell culture techniques, including seeding, maintaining, and analyzing various cell lines, and microscopy for imaging and quantification of cellular and molecular changes.

Mentor to Graduate Student Aug 2020-May 2021
Olivia Duclos, UMASS Dartmouth

- Provided training to a graduate research student on reviewing scientific literature, including strategies for conducting effective searches and critically evaluating research articles
- Trained the student in writing and formatting a comprehensive review article, focusing on the organization and structure of the manuscript, as well as the use of appropriate scientific language and terminology.

Mentor to Undergraduate Student Aug 2018-May 2019
Richard Bender, UMASS Dartmouth

- Provided training to an undergraduate research student on processing bone samples for subsequent analysis, including techniques for homogenization, extraction, and quantification of biological molecules.
- Taught the student about data collection and analysis, including statistical methods for interpreting and visualizing data, as well as strategies for communicating research findings to different audiences.

Mentor to Bone Pulverizer Senior capstone team Aug 2019-April 2020

- Helped students in designing an automated homogenizer for crushing small bone specimens while in liquid nitrogen, to improve the efficiency and consistency of sample processing.
- Provided guidance and training on engineering principles, materials selection, and fabrication techniques, to help the students develop a functional and reliable device.

Mentor to 3D gel damage device senior capstone team Aug 2019-April 2020

- Helped students design and develop a device for creating controlled damage in a 3D gel-embedded cell culture using acupuncture needles, to investigate the response of cells to mechanical stimulation.

Service

Community Engagement Chair, Women in STEM (WiSTEM) group at WUSTL Aug 2024

Member, Policy Committee, Washington University postdoc society July 2024

Peer reviewer for Bone Reports and Osteoarthritis and Cartilage Journals, 2023-24

- Reviewed 5 journal articles by providing constructive feedback and recommendations for improvement to the authors, contributing to the advancement of scientific knowledge in the field of musculoskeletal research.

Associate Editor, POSTDOCket Committee, National Postdoc Association 2023-2024
- Collaborated with other committee members to edit and write articles for the Postdocket quarterly magazine, which is distributed to over 15,000 postdocs and research professionals nationwide.
- Reviewed submissions for clarity, accuracy, and adherence to editorial standards, and provided feedback to authors as needed.

Reviewer , Musculoskeletal research (MRC) symposium, WUSTL Apr 2023
- Reviewed and graded symposium abstracts for postdoc division

Organizer, Movement Science Program Retreat, WUSTL Feb 2023
- Collaborated with other postdocs in the Department of Physical Therapy to plan and execute a retreat showcasing ongoing research projects from different labs.
- Facilitated knowledge-sharing and collaboration among attendees to encourage interdisciplinary research and networking.

Member, ASBMR Innovation Committee Sep 2022
- Recommended innovative ideas and initiatives to improve and enhance the meeting experience for attendees, including new session formats, networking opportunities, and educational content.
- Collaborated with the ASBMR Annual Meeting Program Committee to identify strategic priorities for the ASBMR Annual Meeting.

Presentation and Schema Consultant at InPrint organization, WUSTL Feb 2022
- Provided consultation services for faculty, medical professionals, graduate students, undergraduate students, and high school students to improve their presentation and science communication skills.

Judge, St. Louis Science Fair for high school students May 2022
- Evaluated fair projects and provided constructive feedback.

Reviewer, Annual Biomedical Research Conference for Minority Students Jun 2022
- Evaluated conference abstracts for graduate division and provided constructive feedback.

Reviewer, Biomedical Engineering Society (BMES) Conference. Sep 2021
- Evaluated conference abstracts for graduate division and provided constructive feedback.

Outreach

Leader, Muscle lab activity, National Biomechanics Day April 2024
- Orchestrated and led an educational activity focused on biomechanics and musculoskeletal health research, tailored for high school students. Aimed to foster engagement and stimulate interest in research careers during National Biomechanics Day.

Volunteer, BrightPath STEAM Academy outreach event Oct 2023

- Engaged K-12 students by demonstrating bone mechanical testing on cadaver bones, illustrating key concepts of orthopedic research and bone biomechanics and musculoskeletal health.

Volunteer, Virtual lab tour for Girls Inc- St louis May 2023

- Engaged in an outreach event designed to inspire and empower middle school students from the Black community to explore careers in STEM fields. This event highlighted the accomplishments and contributions of female scientists and engineers.
- Presented a talk on spinal biomechanics, incorporating active learning activities to illustrate spinal injuries and repair processes, offering a hands-on experience with the tools and techniques utilized in musculoskeletal research.

Volunteer, WUSTL International Biomechanics Day event Apr 2023

- Educated K-12 students about the principles and applications of biomechanics, highlighting the role of technology in advancing our understanding of human movement and health.
- Demonstrated the real-time skeleton display with motion capture, allowing students to see how movement is tracked and analyzed in real time, and providing a hands-on experience of the technology used in biomechanical research.

Volunteer, WUSTL Women in Stem Day 2022 Tang Lab Demonstration Nov 2022

- Participated in an outreach event aimed at inspiring and empowering women to pursue careers in STEM fields, showcasing the contributions and achievements of female scientists and engineers.
- Used active learning activities to demonstrate spinal injury and repair to middle and high school students, providing a hands-on experience of the tools and techniques used in musculoskeletal research.

Volunteer, WUSTL Catalyst for change outreach event Mar 2023

- Participated in an outreach event aimed at encouraging young students to pursue careers in STEM fields, sharing insights and experiences about the scientific process and the importance of problem-solving skills.
- Taught middle and high school students about problem-solving through a forensic lab activity, providing hands-on experience of the tools and techniques used in forensic science and emphasizing the ways in which science can be used to solve real-world problems.
- Contributed to the advancement of diversity and equity in STEM fields, serving as a role model and advocate for underrepresented communities and inspiring the next generation of scientists and engineers.

Media/Interviews

Gibco cell culture Hero research recognition award Aug 2021
https://www.thermofisher.com/us/en/home/references/gibco-cell-culture-basics/cell- culture-heroes.html

ASBMR member spotlight series Dec 2020
https://www.youtube.com/watch?v=utlyRV-wwr8&t=284s

3-Minute thesis presentation, UMASS Dartmouth Apr 2019
https://www.umassd.edu/our/three-minute-thesis/video-graduate/

Professional Memberships

- Association of Science Communication since 2024
- American society of bone and mineral research since 2018
- Orthopaedic research society since 2019
- Sigma Xi Research Society since 2020
- Association of Women in Science since 2021
- National Postdoctoral Association since 2022
- American Diabetes Association 2020-2023
- Society of Women Engineers 2019-2021
- Biomedical engineering society 2019-2022

References

- **Simon Y. Tang**, PhD, MDPI (Postdoctoral fellowship co-mentor)
  Associate Professor of Orthopaedic Surgery
  Washington University in St Louis, MO
  Phone-314-286-2664
  Email – simonytang@wustl.edu

- **Jennifer A. Zellers**, PT, DPT, PhD (Postdoctoral fellowship co-mentor)
  Assistant Professor for Physical Therapy and Orthopaedic Surgery
  Washington University in St Louis, MO
  Phone- 314-286-1436
  Email- jzellers@wustl.edu

- **Lamya Karim**, PhD (PhD mentor)
  Associate Professor at Department of Bioengineering
  University of Massachusetts Dartmouth, MA
  Phone- 757-818-3345
  Email- lkarim@umassd.edu