



Rameshwar (Ram) Rao MD PhD

- Affiliate, Dean's Office Operations - Dean Other
- Fellow in Pediatrics - Hematology & Oncology

Bio

BIO

My scientific training spans over a decade of published research in the fields of vascularized bone tissue engineering, biomineralization, gene therapy, and spectral ultrasound. I earned my BS from UC Davis and MS/PhD in Biomedical Engineering at the University of Michigan. I have aimed to form highly collaborative and multidisciplinary research groups at each level of training. This work has resulted in 21 publications, award-winning manuscripts, and multiple national conference research awards. My successful research career began during my undergraduate studies where my work in Prof. Kent Leach's lab resulted in 3 publications and the Department of Biomedical Engineering Outstanding Undergraduate Research Award. My graduate thesis under the guidance of Prof. Jan Stegemann resulted in 12 publications (7 as first author) in high quality, peer-reviewed journals in the fields of engineering and biotechnology. My graduate studies were funded by an NIH T32 Training grant and the NSF Graduate Research Fellowship. My graduate work culminated in the 2013 Outstanding PhD Research Award from the Society for Biomaterials (SFB) and the 2013 Outstanding Student Award from the Tissue Engineering and Regenerative Medicine Society (TERMIS). Recognizing the gap in translation of bioengineering research into clinical practice, I opted to pursue an MD at the University of Michigan to become the physician-scientist that identifies clinical problems, engineers the solution, and delivers it back to the patient to advance treatments and improve survival outcomes. My success continued through medical school with 4 clinical research manuscripts and Graduation with Distinction in Research, awarded to 10% of the class.

In the next phase of my training, I will complete my fellowship in Pediatric Hematology/Oncology at Stanford through the Accelerated Research Pathway by the American Board of Pediatrics. Prof. Sarah Heilshorn, Associate Chair of Materials Science at Stanford, will be my primary research and career development mentor. Together, we have designed an innovative approach targeting the extracellular matrix to improve survival outcomes in pediatric osteosarcoma.

CLINICAL FOCUS

- Fellow
- Pediatric Hematology and Oncology

HONORS AND AWARDS

- Pediatric Scientist Development Program Fellowship, Eunice Kennedy Schriver National Institute of Child Health and Human Development, NIH K12 (2022 - 2024)
- Anne T. and Robert M. Bass Endowed Fellow, Stanford Maternal and Child Health Research Institute (MCHRI) (2021 - 2023)
- Excellence in Teaching with Humanism Residents and Fellows Award, UCLA (2020)
- Graduation with Distinction in Research, University of Michigan Medical School (2017)
- Graduation with Distinction in Service, University of Michigan Medical School (2017)
- Graduate Student Entrepreneur of the Year, University of Michigan (2013)
- Outstanding PhD Student Award, Tissue Engineering International and Regenerative Medicine Society (2013)

- Outstanding Research Award - Ph.D. Candidate, Society for Biomaterials (2013)

PROFESSIONAL EDUCATION

- Residency, UCLA , Pediatrics, Accelerated Research Pathway (2020)
- MD, University of Michigan (2017)
- PhD, University of Michigan , Biomedical Engineering (2013)
- BS, University of California: Davis , Biomedical Engineering (2008)

Publications

PUBLICATIONS

- **Leiomyomatosis in an Infant With a SUFU Splice Site Variant: Case Report.** *Journal of pediatric hematology/oncology*
Rao, R. R., Dulken, B. W., Matalon, D. R., Borensztein, M., McGuinness, M., Cizek, S. M., Bruzoni, M., Tan, S. Y., Kreimer, S.
2022
- **Ewing's Sarcoma in a Patient with Crohn's Disease Treated with Ustekinumab: A Case Report** *Journal of Adolescent and Young Adult Oncology*
Rao, R. R., Majlessipour, F., Ziring, D. A., Baca, N. M.
2020
- **Mapping the Road to Recovery: Shorter Stays and Satisfied Patients in Posterior Spinal Fusion.** *Journal of pediatric orthopedics*
Rao, R. R., Hayes, M., Lewis, C., Hensinger, R. N., Farley, F. A., Li, Y., Caird, M. S.
2017; 37 (8): e536-e542
- **Treatment of Unicameral Bone Cysts of the Proximal Femur With Internal Fixation Lessens the Risk of Additional Surgery.** *Orthopedics*
Wilke, B., Houdek, M., Rao, R. R., Caird, M. S., Larson, A. N., Milbrandt, T.
2017; 40 (5): e862-e867
- **Ultrasound Utility in the Diagnosis of a Morel-Lavallée Lesion.** *Case reports in emergency medicine*
LaTulip, S., Rao, R. R., Sielaff, A., Theyyanni, N., Burkhardt, J.
2017; 2017: 3967587
- **Vocal Cord Paresis After Posterior Spinal Fusion to Treat Adolescent Idiopathic Scoliosis: A Case Report.** *JBJS case connector*
Rao, R. R., Ha, J., Farley, F. A., Koopmann, C. F., Caird, M. S.
2016; 6 (4): e97
- **Collagen/fibrin microbeads as a delivery system for Ag-doped bioactive glass and DPSCs for potential applications in dentistry** *JOURNAL OF NON-CRYSTALLINE SOLIDS*
Chatzistavrou, X., Rao, R. R., Caldwell, D. J., Peterson, A. W., McAlpin, B., Wang, Y., Zheng, L., Fenno, J., Stegemann, J. P., Papagerakis, P.
2016; 432: 143-49
- **Dual-phase osteogenic and vasculogenic engineered tissue for bone formation.** *Tissue engineering. Part A*
Rao, R. R., Vigen, M. L., Peterson, A. W., Caldwell, D. J., Putnam, A. J., Stegemann, J. P.
2015; 21 (3-4): 530-40
- **Vasculogenesis and Angiogenesis in Modular Collagen-Fibrin Microtissues.** *Biomaterials science*
Peterson, A. W., Caldwell, D. J., Rioja, A. Y., Rao, R. R., Putnam, A. J., Stegemann, J. P.
2014; 2 (10): 1497-1508
- **Effects of hydroxyapatite on endothelial network formation in collagen/fibrin composite hydrogels in vitro and in vivo.** *Acta biomaterialia*
Rao, R. R., Ceccarelli, J., Vigen, M. L., Gudur, M., Singh, R., Deng, C. X., Putnam, A. J., Stegemann, J. P.
2014; 10 (7): 3091-7
- **Noninvasive quantification of in vitro osteoblastic differentiation in 3D engineered tissue constructs using spectral ultrasound imaging.** *PLoS one*
Gudur, M. S., Rao, R. R., Peterson, A. W., Caldwell, D. J., Stegemann, J. P., Deng, C. X.
2014; 9 (1): e85749
- **Cell-based approaches to the engineering of vascularized bone tissue.** *Cytotherapy*

- Rao, R. R., Stegemann, J. P.
2013; 15 (11): 1309-22
- **Use of micro-computed tomography to nondestructively characterize biomineral coatings on solid freeform fabricated poly (L-lactic acid) and poly ((#-caprolactone) scaffolds in vitro and in vivo.** *Tissue engineering. Part C, Methods*
Saito, E., Suarez-Gonzalez, D., Rao, R. R., Stegemann, J. P., Murphy, W. L., Hollister, S. J.
2013; 19 (7): 507-17
 - **Winner for outstanding research in the Ph.D. category for the 2013 Society for Biomaterials meeting and exposition, April 10-13, 2013, Boston, Massachusetts: Osteogenic differentiation of adipose-derived and marrow-derived mesenchymal stem cells in modular protein/ceramic microbeads.** *Journal of biomedical materials research. Part A*
Rao, R. R., Peterson, A. W., Stegemann, J. P.
2013; 101 (6): 1531-8
 - **Assembly of discrete collagen-chitosan microenvironments into multiphase tissue constructs.** *Advanced healthcare materials*
Caldwell, D. J., Rao, R. R., Stegemann, J. P.
2013; 2 (5): 673-7
 - **Delivery of mesenchymal stem cells in chitosan/collagen microbeads for orthopedic tissue repair.** *Cells, tissues, organs*
Wang, L., Rao, R. R., Stegemann, J. P.
2013; 197 (5): 333-43
 - **Noninvasive, quantitative, spatiotemporal characterization of mineralization in three-dimensional collagen hydrogels using high-resolution spectral ultrasound imaging.** *Tissue engineering. Part C, Methods*
Gudur, M., Rao, R. R., Hsiao, Y. S., Peterson, A. W., Deng, C. X., Stegemann, J. P.
2012; 18 (12): 935-46
 - **Matrix composition regulates three-dimensional network formation by endothelial cells and mesenchymal stem cells in collagen/fibrin materials.** *Angiogenesis*
Rao, R. R., Peterson, A. W., Ceccarelli, J., Putnam, A. J., Stegemann, J. P.
2012; 15 (2): 253-64
 - **Exogenous mineralization of cell-seeded and unseeded collagen-chitosan hydrogels using modified culture medium.** *Acta biomaterialia*
Rao, R. R., Jiao, A., Kohn, D. H., Stegemann, J. P.
2012; 8 (4): 1560-5
 - **Biomineralized composite substrates increase gene expression with nonviral delivery.** *Journal of biomedical materials research. Part A*
Rao, R. R., He, J., Leach, J. K.
2010; 94 (2): 344-54
 - **Betacellulin inhibits osteogenic differentiation and stimulates proliferation through HIF-1alpha.** *Cell and tissue research*
Genetos, D. C., Rao, R. R., Vidal, M. A.
2010; 340 (1): 81-9
 - **Biomimetic scaffolds fabricated from apatite-coated polymer microspheres.** *Journal of biomedical materials research. Part A*
Davis, H. E., Rao, R. R., He, J., Leach, J. K.
2009; 90 (4): 1021-31

PRESENTATIONS

- Dr. Rameshwar Rao's List of Presentations