Exponent®
Engineering & Scientific Consulting

Alyssa Oberman, Ph.D.

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Professional Profile

Dr. Oberman's expertise is in injury biomechanics, tissue mechanics, and orthopedics. She has a combined experience of over 10 years in biomechanics, exploring both whole body injury and individual tissue mechanics. Dr. Oberman applies her skillset and expertise to evaluate human kinematics and injury mechanics in diverse incident types, including during automotive, occupational, and recreational activities.

Dr. Oberman has vast experience using a variety of techniques to evaluate and characterize material properties, including the use of mechanical testing systems (Bose, Instron), scanning electron microscopy (SEM), bright field and confocal microscopy, and 3-dimentional image processing and evaluation. Her multi-disciplinary background provides her with a complex understanding of the interplay between physics and the human body and uses that background to evaluate injury risk and possible injury outcomes.

Prior to joining Exponent, Dr. Oberman was a Postdoctoral Fellow at Johns Hopkins School of Medicine. Here, she explored how mechanical input influences cranial morphology during cranial development by designing experiments to isolate the impacts of local biochemical signaling from soft tissues and mechanical forces induced by masticatory forces during post-natal skull development. Her graduate work at The University of Notre Dame focused on targeting cells in bone marrow and in the bone matrix, either concurrently or independently, to understand their roles in osseointegration of orthopedic implants in order to inform device design.

Academic Credentials & Professional Honors

Ph.D., Bioengineering, University of Notre Dame, 2022

M.S., Biomedical Engineering, Arizona State University, 2016

B.S.E., Biomedical Engineering, Arizona State University, 2015

Prior Experience

Postdoctoral Fellow, Anatomy and Evolution, Johns Hopkins School of Medicine, 2023-2024

Postdoctoral Fellow, Biological Sciences, University of Notre Dame, 2022-2023

Graduate Research Assistant, Aerospace and Mechanical Engineering, University of Notre Dame, 2016-2022

Teaching Assistant, Aerospace and Mechanical Engineering, University of Notre Dame, 2016-2019

Professional Affiliations

Orthopedic Research Society 2022-2023

Publications

Machireddy, M., Oberman, A.G., et al., Controlled mechanical loading affects the osteocyte transcriptome in porcine trabecular bone in situ. Bone. 2024.

Consolini, J, Oberman, A.G., et al. Investigation Of Direction- And Age-Dependent Prestretch In Mouse Cranial Dura Mater. Biomechanics and Modeling in Mechanobiology. 2024.

Curtis, K.J., Mai, C., Martin, H., Oberman, A.G., et al. The Effect of Marrow Secretome and Culture Environment on the Rate of Metastatic Breast Cancer Cell Migration in Two and Three Dimensions. Molecular Biology of the Cell. 2021.

Curtis, K.J., Oberman, A.G., & Niebur, G.L. Effects of mechanobiological signaling in bone marrow on skeletal health. Annals of the New York Academy of Sciences. 2019.

Presentations

Oberman, A.G., Machireddy, M., Bangasser, D., James, B., Nano, S., Tong, W., & Niebur, G.L., Validation Of A Bioreactor Culture System To Quantify The Effects Of Mechanical Loading On Osseointegration Of Additively Manufactured Ti6Al4V Scaffolds, Orthopaedic Research Society Annual Meeting, February 4, 2022. Poster.

Oberman, A.G., English, B., Tong, W., & Niebur, G.L., An In Vitro Model of Bone Formation In A Porous Titanium Scaffold, SB3C 2021: Summer Biomechanics, Bioengineering and Biotransport Conference, June 17, 2021. Poster

Oberman, A.G., English, B., Tong, W., & Niebur, G.L., An In Vitro Model of Bone Formation In A Porous Titanium Scaffold, SB3C 2020: Summer Biomechanics, Bioengineering and Biotransport Conference, June 17, 2020. Oral Presentation

Oberman, A.G., Patel, A.A., & Niebur, G.L., Inhibition of GSK-3β by LiCl Does Not Affect MSC Differentiation In Vitro on Bone Formation In Situ, SB3C 2019: Summer Biomechanics, Bioengineering and Biotransport Conference, June 28, 2019. Oral Presentation

Oberman, A.G. & Niebur, G.L., The effects of LiCl treatment and mechanical loading on bone formation in situ, College of Science and Engineering Joint Annual Meeting, December 7, 2018. Oral Presentation