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Melissa Mendoza-Seale, Ph.D.

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Professional Profile

Dr. Mendoza-Seale specializes in tissue engineering, cellular biology, biomechanics, biomaterials science, and in vitro assay development. Her multidisciplinary training in the field of biomedical engineering includes vast cell culture experience (ex. 2D and 3D, stem cells, and primary cells), biomaterial development and selection, biofluid mechanics, and the qualitative and quantitative analysis of tissues, cells, and proteins.

Dr. Mendoza-Seale also has technical expertise in the fabrication of microfluidic devices for biological applications and the evaluation of preclinical tissue models for pharmaceutical testing. In addition, she has experience with the biocompatibility assessment of novel biomaterials using polymeric and natural materials.

Prior to joining Exponent, Dr. Mendoza-Seale obtained her Ph.D. at Binghamton University in Biomedical Engineering, where she developed and characterized microfluidic models of the aortic valve fibrosa to further understand disease onset and progression. From her doctoral research, she has experience in primary tissue and cell isolations, mammalian cell culture, 2D and 3D cell culture, hydrogel fabrication, immunofluorescent and histological staining, biocompatibility assays, confocal microscopy, scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), photolithography, and polymer bonding. She also serves an active mentor and advocate for underrepresented minorities in STEM through the Diversity Committee of the Biomedical Engineering Society, Binghamton's Watson Scholars Program, and the LatinXinBME community.

Academic Credentials & Professional Honors

Ph.D., Biomedical Engineering, Binghamton University (SUNY), 2022

B.S., Biomedical Engineering, Rochester Institute of Technology, 2017

2022 Distinguished Dissertation Award, Binghamton University, 2023

Award for Excellence in Research, Binghamton University, 2022

Career Development Award, Biomedical Engineering Society, 2020

Predoctoral Fellowship, American Heart Association, 2020-2022

LSAMP Bridge to Doctorate Fellowship, Binghamton University, 2019-2022

Clifford D. Clark Diversity Fellowship, Binghamton University, 2017-2022

Academic Appointments

Graduate Research Assistant, Mahler Organs-on-a-chip Lab, Binghamton University, 2017-2022

Teaching Assistant, Biomedical Engineering, Binghamton University, 2018-2019

Undergraduate Research Assistant, Gaborski NanoBio Device Lab, Rochester Institute of Technology, 2015-2017

Prior Experience

Summer Research Fellow (ORISE), US Food and Drug Administration, 2020

Clinical Supply Chain Strategy Co-op, Janssen (Johnson & Johnson), 2016

Research Intern, Renal Research Institute (Fresenius Medical Care), 2014

Professional Affiliations

Biomedical Engineering Society (BMES), Board Member

Women in Bio (Philadelphia Chapter), Member

ASTM International (Committee F04), Member

American Heart Association (AHA), Professional Member

LatinXinBME, Member

Society of Hispanic Professional Engineers (SHPE), Professional Member

Languages

Spanish

Publications

Mendoza-Seale M, Chen MH, Huang P, Mahler GJ. Oxidative low-density lipoprotein and shear induced calcification within a calcific aortic valve disease-on-a-chip platform. Frontiers in Cardiovascular Medicine 2025; 12:1655341.

Arefin A, Mendoza M, Dame K, Garcia MI, Strauss DG, Ribeiro AJS. Reproducibility of drug-induced effects on the contractility of an engineered heart tissue derived from human pluripotent stem cells. Frontiers in Pharmacology 2023; 14:1212092.

Bramsen JA, Alber BR, Mendoza M, Murray BT, Chen M, Huang P, Mahler GJ. Glycosaminoglycans affect endothelial to mesenchymal transformation, proliferation, and calcification in a 3D model of aortic valve disease. Frontiers in Cardiovascular Medicine 2022; 9:975732.

Brown M, Somma L, Mendoza M, Noh Y, Mahler G, Koh A. Upcycling Compact Discs for Bioelectronic Applications. Nature Communications 2022; 13 (1):1–12.

Mendoza M, Chen M, Huang P, Mahler G. Shear and Endothelial Cell Induced Late-stage Calcific Aortic Valve Disease-on-a-chip Model Develops Calcium Phosphate Mineralizations. Lab on a Chip 2022; 22, 1374–1385.

Mendoza M, Chen M, Huang P, Mahler G. Abstract P332: Microfluidic Model of Late-stage Calcific Aortic Valve Disease Develops Calcium Phosphate Mineralizations. Circulation Research 2021; 129 (Suppl_1), AP332–AP332

Mendoza M, Chen M, Murray B, Huang P, Mahler G. Late-stage Calcific Aortic Valve Disease within an Aortic Valve-on-a-chip Model. Heart Valve Society (HVS) Conference Proceedings. Structural Heart 2021; 5 (sup1), 69–70.

Brown M, Mendoza M, Chavoshnejad P, Mahler G, Razavi M, Koh A. Electronic-ECM: A Permeable Microporous Elastomer for an Advanced Bio-integrated Continuous Sensing Platform. Advanced Materials Technologies 2020; 5 (7), 2000242.

Han M, Williams S, Mendoza M, Ye X, Zhang H, Calice de Silva V, Thijssen S, Kotanko P, Meyring-Wösten A. Quantifying Physical Activity Levels and Sleep in Hemodialysis Patients Using a Commercially-Available Activity Tracker. Blood Purification 2016; 41(1-3): 194–204.

Mendoza M, Han M, Meyring-Wösten A, Wilund K, Kotanko P. It's a Non-Dialysis Day... Do You Know How Your Patient Is Doing? A Case for Research into Interdialytic Activity. Blood Purification 2015; 39, 74–83.

Presentations

Mendoza M, Chen M, Murray B, Huang P, Mahler G. Oxidative Low-density Lipoprotein and Shear Induced Early Calcific Aortic Valve Disease on a Chip. Poster Presentation, Keystone Symposia: Engineering Multi-Cellular Living Systems, Keystone, CO, 2022.

Arefin A, Mendoza M, Dame K, Garcia MI, Strauss DG, Ribeiro AJS. Characterization of an Engineered Heart Tissue Containing Cardiomyocytes Differentiated from Human Induced Pluripotent Stem Cells for Predicting Drug Inotropic Effects. Poster Presentation, Society of Toxicology (SOT), 2022.

Mendoza M, Chen M, Murray B, Huang P, Mahler G. Early and Late Calcific Aortic Valve Disease-on-a-chip. Short Talk, Microphysiological Systems (MPS) World Summit, Virtual, 2021.

Mendoza M, Chen M, Murray B, Huang P, Mahler G. Shear- and Chondroitin Sulfate-Induced Microcalcifications within an Aortic Valve-on-a-chip Model. Oral Presentation, Biomedical Engineering Society (BMES), Orlando, Florida, 2021.

Mendoza M, Porras AM, Bellas E. Mental Health Strategies and Resources for Unrepresented Minorities - Celebration of Minorities Luncheon. Co-Moderator, Biomedical Engineering Society (BMES), Orlando, Florida, 2021.

Mendoza M, Chen M, Murray B, Huang P, Mahler G. Microfluidic Model of Late-stage Calcific Aortic Valve Disease Develops Calcium Phosphate Mineralizations. Video E-poster, American Heart Association’s Basic Cardiovascular Sciences (BCVS) Scientific Sessions, Virtual, 2021.

Mendoza M, Chen M, Murray B, Huang P, Mahler G. Late-stage Calcific Aortic Valve Disease within an Aortic Valve-on-a-chip Model. Video Presentation, Heart Valve Society (HVS), Virtual, 2021.

Mendoza M, Chen M, Murray B, Huang P, Mahler G. Late-stage Calcific Aortic Valve Disease within a Valve-on-a-chip Model of the Aortic Valve Fibrosa. Short-Talk, LatinXinBME Symposium, Virtual, 2021.

Mendoza M, Huang P, Murray B, Mahler G. Late-stage Calcific Aortic Valve Disease within a Three-Dimensional Valve-on-a-chip Model of the Aortic Valve Fibrosa. Video Presentation, Biomedical Engineering Society (BMES), Virtual, 2020.

Mendoza M, Murray B, Huang P, Mahler G. Glycosaminoglycan-Induced Calcification within a Three-Dimensional Microfluidic Model of the Aortic Valve Fibrosa. Oral Presentation, Emerging Researchers National (ERN) Conference in STEM, Washington, DC, 2020.

Brown M, Mendoza M, Mahler G, Koh A. Fibrous Elastomer for Bio-Integrated Epidermal Electronics. Poster Presentation, Material Research Society (MRS) Fall Meeting, Boston, MA, 2019.

Mendoza M, Huang P, Murray B, Mahler G. An In Vitro Three-Dimensional Microfluidic Model of the Aortic Valve Fibrosa. Poster Presentation, Biomedical Engineering Society (BMES), Philadelphia, PA, 2019.

Mendoza M, Huang P, Murray B, Mahler G. Three-Dimensional Microfluidic Models of the Aortic Valve Fibrosa. Poster Presentation, ComSciCon – Cornell, Ithaca, NY, 2019.

Mendoza M, Huang P, Murray B, Mahler G. Three-Dimensional Microfluidic Models of Healthy and Early Diseased Aortic Valve Fibrosa. Poster Presentation, Gordon Research Conference: Tissue Repair and Regeneration, New London, NH, 2019.

Mendoza M, Mina S, Huang P, Murray B, Mahler G. Investigating Endothelial to Mesenchymal Transformation: A Microfluidic Model of Calcific Aortic Valve Disease. Poster Presentation, Binghamton Biomedical Research Conference, Binghamton, NY, 2019.

Mendoza M, Jones A, Brennan J. Graduate School Misconceptions. Panelist, Society of Hispanic Professional Engineers (SHPE) Region 4: Regional Leadership Development Conference (RLDC), Washington, DC, 2019.

Mendoza M, Mina S, Huang P, Murray B, Mahler G. Investigating Endothelial to Mesenchymal Transformation: A Microfluidic Model of Calcific Aortic Valve Disease. Poster Presentation, Biomedical Engineering Society (BMES), Atlanta, GA, 2018.

Agnello T, Alderfer L, Charlebois C, Choi S, Mendoza M. 1Haler: The Pocket Rescue Inhaler Revolutionizing Asthma Care. Interactive Exhibit, ImagineRIT. Rochester, NY, 2017.

Agnello T, Alderfer L, Charlebois C, Choi S, Mendoza M. 1Haler: The Pocket Rescue Inhaler Revolutionizing Asthma Care. Poster Presentation, Northeast Bioengineering Conference, New Brunswick, NJ, 2017.

Han M, Williams S, Meyring-Wösten A, Calice de Silva V, Mendoza M, Zhang H, Ye X, Thijssen S, Kotanko P. Quantifying Physical Activity Levels and Sleep in Hemodialysis Patients Using Commercially-Available Physical Activity Tracker. Poster Presentation, American Society of Nephrology Kidney Week, San Diego, CA, 2015.

Mendoza M, Perry S, Carter R, Casillo S, Gaborski T. Cell Characterization on Polydimethylsiloxane (PDMS) of Varying Stiffness and Surface Topography. Poster Presentation, Upstate Louis Stokes Alliance for Minority Participation Student Leadership Conference, Syracuse, NY, 2015.

Mendoza M, Perry S, Carter R, Casillo S, Gaborski T. Cell Characterization on Polydimethylsiloxane (PDMS) of Varying Stiffness and Surface Topography. Poster Presentation, RIT Undergraduate Research Symposium, Rochester, NY, 2015.

Research Grants

Predoctoral Fellowship (20PRE34990041, $62,032), American Heart Association, 2020-2022