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Engineering & Scientific Consulting

Shuyang Fang, Ph.D.

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Professional Profile

Dr. Fang specializes in mechanics of materials, custom mechanical testing, and finite element analysis. Trained as a mechanical engineer with a focus in medical research, he uses the combined strength of experimental testing and computational analysis to evaluate various materials and mechanical systems. His expertise also includes the acquisition, interpretation, and modeling of data collected by a wide range of imaging modalities (e.g., ultrasound, magnetic resonance imaging).

Before joining Exponent, Dr. Fang obtained his Ph.D. in Mechanical Engineering at Columbia University. His research focused on characterizing the mechanical behavior of biological tissues to understand the failure mechanisms of preterm birth, the leading cause of neonatal birth worldwide. He performed mechanical testing, including indentation and uniaxial tension testing coupled with digital image correlation (DIC) and conducted computational modeling on primate reproductive organs. Through this work, he developed expertise in the characterization of the mechanical behavior of hyperelastic, viscoelastic, and anisotropic soft materials. Additionally, he had extensive experience working in medical settings including recruiting and obtaining informed consent from human subjects, discussing surgical procedures with surgeons, and performing tissue dissection in the operating room.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Columbia University, 2023

M.S., Mechanical Engineering, Columbia University, 2020

B.S., Mechanical Engineering, Huazhong University of Science and Technology, 2016

First Place - Ph.D. Student Paper Competition, Mechanical Engineering Division, ASME 2022

Professional Development Fellowship, 2021

Columbia International Fellowship, 2019

Chinese National Scholarship, 2013 & 2014

Honors Student, Huazhong University of Science and Technology, 2013 & 2014

Professional Affiliations

American Society of Mechanical Engineers (ASME)

Languages

Mandarin Chinese

Publications

Fang S, Shi L, Rosado-Mendez I, Feltovich H, Hall TJ, Myers KM. “Equilibrium Mechanical Properties of Nonhuman Primate Cervix”. ASME Journal of Biomechanical Engineering, 2023.

Pappalardo A, Alvarez-Cespedes D, Fang S, Herschman A, Jeon E, Myers KM, Kysar JW, Abaci H. Wearable engineered human skin with region-specific cellular and extracellular properties. Science Advances, 2023.

Shi L, Hu L, Lee N, Fang S, Myers K. Three-dimensional anisotropic hyperelastic constitutive model describing the mechanical response of human and mouse cervix. Acta Biomaterialia, 2022.

Barnum CE, Shetye SS, Fazelinia H, Garcia BA, Fang S, Alzamora M, Li H, Brown L, Tang C, Myers KM, Wapner R, Soslowsky L, Vink J. The nonpregnant and pregnant human cervix: a systematic proteomic analysis. Reproductive Sciences, 2022.

Fang S, McLean J, Shi L, Vink J, Hendon CP, Myers KM. Anisotropic mechanical properties of the human uterus measured by spherical indentation. Annals of Biomedical Engineering, 2021.

Louwagie E, Carlson L, Over V, Mao L, Fang S, Westervelt A, Vink J, Hall TJ, Feltovich H, Myers KM. Longitudinal ultrasonic dimensions and parametric solid models of the gravid uterus and cervix. PloS One, 2021.

McLean J, Fang S, Gallos G, Myers KM, Hendon CP. Three-dimensional collagen fiber mapping and tractography of human uterine tissue using OCT. Biomedical Optics Express, 2020.

Presentations

Fang S, Russell S, Feltovich H, Hall TJ, Myers KM. Fetal Membrane Adhesion Strength during Gestational Remodeling. Poster presentation, Biomedical Engineering Society Annual Meeting 2022 (BMES), San Antonio, TX, 2022.

Fang S, Shi L, Rosado-Mendez I, Feltovich H, Hall TJ, Myers KM. Cervical material remodeling in pregnancy using a nonhuman primate model. Podium presentation, 9TH World Congress of Biomechanics (WCB), Taipei, 2022.

Fang S, Shi L, Rosado-Mendez I, Feltovich H, Hall TJ, Myers KM. Cervical material remodeling in pregnancy using a nonhuman primate model. Podium presentation, Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Cambridge, MD, 2022.

Fang S, Shi L, Rosado-Mendez I, Hall T, Feltovich H, Myers K, Cervical material remodeling in pregnancy using a nonhuman primate model. Poster presentation, 48th Annual Northeast Bioengineering Conference (NEBEC), New York, NY, 2022.

Fang S, Shi L, Rosado-Mendez I, Feltovich H, Hall TJ, Myers KM. Cervical material remodeling in pregnancy using a nonhuman primate model. Podium presentation, European Mechanics of Materials Conference (EMMC18), Oxford, UK, 2022.

Fang S, Shi L, Rosado-Mendez I, Feltovich H, Hall TJ, Myers KM. Mapping the mechanical properties of nonhuman primate cervix to inform quantitative ultrasound measurements. Podium presentation, Society of Reproductive Investigation (SRI), Denver, CO, 2022.

Fang S, McLean J, Shi L, Vink J, Hendon CP, Myers KM. Anisotropic mechanical properties of the human uterus measured by spherical indentation. Poster presentation, Society of Reproductive Investigation (SRI), Boston, MA, 2021.

Fang S, McLean J, Shi L, Vink J, Hendon CP, Myers KM. Anisotropic mechanical properties of the human uterus measured by spherical indentation. Poster presentation, Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Virtual conference, 2021.

Fang S, McLean J, Shi L, Vink J, Hendon CP, Myers KM. Anisotropic mechanical properties of the human uterus. Podium presentation, Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Vail, CO, 2020.

Fang S, McLean J, Vink J, Hendon CP, Myers KM. Fiber orientation and structure characterization of pregnant and nonpregnant human uterus. Podium presentation, International Conference on Biomedical Engineering (ICBME), Singapore, 2019.

Fang S, McLean J, Vink J, Hendon CP, Myers KM. Fiber orientation and structure characterization of pregnant and nonpregnant human uterus. Podium presentation, Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Pittsburgh, PA, 2019.