

MacKenzie C. Harnett, Ph.D.

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EDUCATION

Texas A&M University (TAMU) J. Mike Walker '66 Department of Mechanical Engineering Ph.D. in Mechanical Engineering	2021 - 2026
Cornell University Sibley School of Mechanical and Aerospace Engineering B.S. in Mechanical Engineering	2017 - 2021

TECHNICAL SKILLS

Programming, Modeling & Simulation: Python, C/C++, MATLAB/Simulink, feedback control systems, R, LabVIEW, ROS, Finite Element Analysis (FEA), ANSYS, COMSOL

CAD, Microfabrication & Systems Tools: SOLIDWORKS, Fusion 360, MEMS Pro, Data Acquisition (DAQ) systems, LaTeX

Data, Computer Vision & Experimental Methods: Data analysis, computer vision (OpenCV, optical flow), behavioral analytics, user studies, Laser Doppler Vibrometry (LDV), microscopy, forward and inverse kinematics, multimodal perception (vision/proprioception/touch), Adobe CC

RESEARCH EXPERIENCE

Perceptual Engineering Group, Massachusetts Institute of Technology <i>METEOR Postdoctoral Fellow</i> Studied surface haptics as a creative, expressive medium to detect the emergence of salient, distinct tactile languages across different haptic actuation modes.	Sept 2026 -
Friesen Haptics Lab, Texas A&M University <i>Graduate Research Assistant</i> Developed surface haptic technology with a focus on developing hardware and software guidelines and tools for rendering 2- and 3-D tactile graphics via haptic shape displays and friction modulation.	May 2022 - May 2026
Nanorobotics, Energy harvesting and Sensing (NES) Lab, Texas A&M University <i>Graduate Research Assistant</i> Synthesized and tested gold-coated SPIO nanoparticles for targeted delivery of retinoic acid to the brain for neurodegenerative disease treatment.	Aug 2021 - May 2022
Cornell Micro/Nanofluidics Lab, Cornell University <i>Undergraduate Research Assistant</i> Developed a machine learning pipeline to evaluate the tumorigenicity of hPSCs filtered through microfluidic devices; quantified growth for <i>Borrelia</i> in mammalian host-mimicking environments; maintained bacterial cultures.	Jan 2020 - May 2021

TEACHING EXPERIENCE

Texas A&M University

Graduate Teaching Assistant: Dynamic Systems and Controls Lab 2025
Supervised three weekly lab sections, graded lab reports and memos, and prepared lab materials and assignments.

Graduate Teaching Assistant: Dynamics and Vibrations 2023
Hosted weekly recitation, assisted with classroom activities, and graded exams and homework assignments.

Graduate Teaching Assistant: Mechanical Measurements 2021
Supervised two weekly lab sections, hosted weekly office hours, and graded lab reports and exams.

Cornell University

Undergraduate Teaching Assistant: Mechatronics 2020

Undergraduate Teaching Assistant: Supplementary Machining Course 2020

Undergraduate Teaching Assistant: Mechanical Synthesis 2020-2021

REACH Tutor, Science and Math 2018

PROFESSIONAL SERVICE and LEADERSHIP

Tour Coordinator for Friesen Haptics Lab 2025-2026

Peer reviewer, Displays 2026

Peer reviewer, ACM CHI Conference on Human Factors in Computing Systems and Haptics Symposium technical papers 2025

Volunteer for hands-on demonstrations at Sam Houston Elementary School 2024

Volunteer at Texas Science and Engineering Fair (TXSEF) 2022

Outreach coordinator for Mechanical Engineering Female Graduate Student Association (MEFEFS) 2022

Chassis Designer for Cornell Cup Robotics Project Team 2021

COVID-19 Peer Ambassador for Cornell University 2020

Orientation Assistant for Cornell University College of Engineering 2018

HONORS and AWARDS

METEOR Postdoctoral Fellowship, MIT Schwarzman College of Computing 2026

Graduate Summer Research Grant, TAMU Department of Mechanical Engineering 2025

Graduate Student Travel Award, TAMU Department of Mechanical Engineering 2023, 2026

Finalist, Aggie PITCH Competition, TAMU McFerrin Center for Entrepreneurship 2022

Byron Anderson '54 Fellowship, TAMU Department of Mechanical Engineering 2021

ELI Undergraduate Research Award, Cornell University College of Engineering 2021

Dean's List, Cornell University College of Engineering 2020-2021

Moskowitz Scholarship , Cornell University	2019-2021
Emerald Coast Scholarship , Cornell University	2018-2021
Finalist, Make-a-thon , Cornell University	2020
First Place Award, Cornell Mechatronics Robotics Competition , Cornell University Department of Mechanical Engineering	2019
Finalist, MAE 2250 Best Original Design Project , Cornell University Department of Mechanical Engineering	2019

PEER-REVIEWED PUBLICATIONS

Harnett, M., Hawkins, K. & Friesen, R. F., 'Evaluation of rendering strategies for supporting recognition of raised pin shape geometries,' Proceedings of the 2026 IEEE Haptics Symposium (HAPTICS). (Accepted)

Harnett, M., Yu, P. & Friesen, R. F., 'A Cross-Modal Perceptual Design Space for Turing Pattern Textures', Journal of Computing and Information Science in Engineering (JCISE) 2026; ASME. 1.
URL: <https://doi.org/10.1115/1.4071385>

Harnett, M., Kumar, P. & Friesen, R. F. (2025), 'Effects of distributed friction actuation during sliding touch', IEEE Transactions on Haptics, vol. 18, no. 3, pp. 796-802, July-Sept. 2025.
URL: <https://doi.org/10.1109/TOH.2025.3581009>

Harnett, M., Lacy, A. K., Yu, P. & Friesen, R. F. (2025), 'Haptic interaction methods for freehand contour generation on a refreshable pin display', Journal of Computing and Information Science in Engineering 25(3), 031003.
URL: <https://doi.org/10.1115/1.4067417>

Harnett, M., Yu, P. & Friesen, R. F. (2025), 'Texture design for diverse virtual touch sensations: Perceptual breadth of parameter-driven turing patterns', Proceedings of the ASME 2025 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference.
URL: <https://doi.org/10.1115/DETC2025-169067>

Yan, T.-H., Yuan, M., Nguyen, N., Chen, J., Feng, X., Fan, T., Harnett, M. C., Xiao, Z., Li, Y., Pellois, J.-P. et al. (2023), 'Surface-modified gold-coated superparamagnetic iron oxide nanoparticles promoting light-controlled drug release', Advanced Composites and Hybrid Materials 6(6), 226.
URL: <https://doi.org/10.1007/s42114-023-00811-4>

Yuan, M., Harnett, M. C., Yan, T.-H., Georgas, E., Qin, Y.-X., Zhou, H.-C. & Wang, Y. (2022), 'Progress, opportunities, and challenges of magneto-plasmonic nanoparticles under remote magnetic and light stimulation for brain-tissue and cellular regeneration', Nanomaterials 12(13).
URL: <https://doi.org/10.3390/nano12132242>

PUBLICATIONS (IN-PROGRESS)

Harnett, M. & Friesen, R. F., 'Virtual 3-d shape rendering: Strategies for supporting the information encoding potential of surface haptic displays,' in preparation for submission to IEEE Transactions on Visualization and Computer Graphics (TVCG). (Under Review)

CONFERENCE PRESENTATIONS, POSTERS, and WORKS-IN-PROGRESS

Harnett, M., Hawkins, K. & Friesen, R. F., 'Evaluation of rendering strategies for supporting recognition of raised pin shape geometries,' to be presented at: 2026 IEEE Haptics Symposium, Reno, NV, USA.

Harnett, M. & Friesen, R. F. (2025), "Texture design for diverse virtual touch sensations: Perceptual breadth of parameter-driven turing patterns." Paper presented at: International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Anaheim, CA.

Harnett, M. & Friesen, R. F. (2025), "Conveying 3D Surface Information on 2D Haptic Displays." Extended abstract. Poster presented at: Ubiquitous Robots (UR), College Station, TX.

Harnett, M. & Friesen, R. F. (2024), "Evaluation of Different Drawing Modalities and their Impact on Tactile Free Hand Drawing on a Refreshable Pin Display." Poster presented at: Texas Regional Robotics Symposium (TEROS), College Station, TX.

Harnett, M. & Friesen, R. F. (2023) "Addressing the Limitations of Tactile Touchscreens: Response of Fingerpad to Discrete Friction Patches" Presented at: International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC-CIE), Boston, MA.