Rebecca Fenton Friesen

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Research Interests

- Actuation and perception of tactile cues for enhancing virtual interactions and prosthetic control
- Virtual texture discrimination and parameterization for haptic surface displays
- Biomechanical properties of the body and their effect on tactile perception

Education

2020	P.h.D. Mechanical Engineering, Northwestern University, Evanston IL
2016	M.S. Mechanical Engineering, Northwestern University, Evanston IL
2009	B.A. Physics, *summa cum laude*, Goshen College, Goshen IN

Research and Professional Experience

2022	**Department of Mechanical Engineering, Texas A&M University** *Assistant Professor* Beginning a tenure-track faculty position in January 2022
2020-2021	**Department of Cognitive Robotics, Delft University of Technology** *Postdoctoral Researcher* Exploring wearable vibrotactile stimulation as a method for texture rendering during active touch and targeted localization of haptic effects
2013-2020	**Neuroscience and Robotics Laboratory, Northwestern University** *Masters Student 2013-2014, Graduate Research Assistant 2014-2020* Developed surface haptic technology with a focus on characterizing ultrasonic friction reduction and rendering discriminable textures via friction modulation
2009-2013	**Miller Laboratory of Limb Motor Control, Northwestern University** *Laboratory Technician* Assisted with equipment maintenance, animal training, and data analysis in a neural engineering lab developing brain-machine interface technology
2006-2009	**Biophysics Research Group, Goshen College** *Undergraduate Research Assistant* Studied the role of sterol molecules within cell membranes in ion channel formation

Leadership and Professional Service

2021	Moderator for European Control Conference
2020-present	Member of Hesston College Engineering Advisory Council
2018	Selected Attendee at Rising Stars in Mechanical Engineering Workshop
2018	Workshop leader for Northwestern's New TA Conference
2017-present	Peer reviewer for World Haptics and Transactions on Haptics technical papers
2015	Member of Local Arrangements Committee for World Haptics Conference
2014-2017	Tour Coordinator for Neuroscience and Robotics Lab
2009	Member of Goshen College Search Committee for new Physics Professor

Honors and Awards

2019	Co-authored paper nominated for Best Paper, World Haptics Conference (WHC)
2017	Winner of Martin Outstanding Doctoral Fellowship
2015	Winner of Best Student Presentation and nominated for Best Paper, WHC

Teaching Experience

	CIRTL Network completed courses
2018	Advancing Learning Through Evidence-Based STEM Teaching
2018	An Introduction to Evidence-Based STEM Undergraduate Teaching
	Northwestern University
2018	*Co-Instructor: Introduction to Dynamic Systems*
	Co-taught a senior level mechanical engineering class of 90 students. Responsibilities included lecturing, creating assignments, and administrative work (e.g. attendance, grading, managing learning accommodations)
2017	*Guest Lecturer: Experimental Engineering*
	Taught a class period on the principles of Psychophysics
2017	*Teaching Assistant: Experimental Engineering*
	Supervised weekly labs, graded lab reports and homework assignments
2014-2015	*Teaching Assistant: Introduction to Dynamic Systems*
	Held weekly office hours, assisted flipped classroom activities, graded exams
	Goshen College
2008	*Teaching Assistant: German II*
2006-2008	*Lab Assistant: Physical World (Introductory Physics course)*
2006-2008	*Academic Tutor, Writing and Math*

Invited Talks

2020	Rehabilitation Neural Engineering Labs, University of Pittsburgh
2019	Science Speaker Series, Goshen College
2014	Featured Speaker, Women in Science Workshop, Goshen College

Papers

Friesen, R.F., Klatzky, R. L., Peshkin, M. A., & Colgate, E. (2021). Building a navigable fine texture design space. IEEE Transactions on Haptics.

Bodas, P., Friesen R.F., Nayak A., Tan H.Z., and Klatzky, R. (2019, July). Roughness Rendering by Sinusoidal Friction Modulation: Perceived Intensity and Gradient Discrimination. In World Haptics Conference (WHC), 2019 IEEE. *Nominated for Best Paper Award*

Friesen, R.F., Klatzky, R.L., Peshkin, M.A. and Colgate, J.E. (2018, March). Single Pitch Perception of Multi-frequency Textures. Haptics Symposium (HAPTICS), 2018 IEEE. (pp. 290–295).

Friesen, R. F., Wiertlewski, M., Peshkin, M. A., & Colgate, J. E. (2017, June). The Contribution of Air to Ultrasonic Friction Reduction. In World Haptics Conference (WHC), 2017 IEEE. (pp. 517-522).

Friesen, R. F., Wiertlewski, M., & Colgate, J. E. (2016, April). The role of damping in ultrasonic friction reduction. In Haptics Symposium (HAPTICS), 2016 IEEE (pp. 167-172).

Wiertlewski, M., Friesen, R. F., & Colgate, J. E. (2016). Partial squeeze film levitation modulates fingertip friction. Proceedings of the National Academy of Sciences, 113(33), 9210-9215.

Friesen, R. F., Wiertlewski, M., Peshkin, M. A., & Colgate, J. E. (2015, June). Bioinspired artificial fingertips that exhibit friction reduction when subjected to transverse ultrasonic vibrations. In World Haptics Conference (WHC), 2015 IEEE (pp. 208-213). *Nominated for Best Paper Award*

Weber, D. J., Friesen, R., & Miller, L. E. (2012). Interfacing the somatosensory system to restore touch and proprioception: essential considerations. Journal of Motor Behavior, 44(6), 403-418.

Select Conference Abstracts, Posters, and Demonstrations

Friesen, R. F., and Y. Vardar, "Exploration of Velocity-dependent Scaling Methods for a Wearable Vibrotactile Texture Display." Proceedings of the World Haptics Conference (WHC), IEEE, 2021.

Friesen, R. F., M.A. Peshkin and J. E. Colgate, "Discriminating Gradients: Communicating via Continuous Change in Texture." Proceedings of the World Haptics Conference (WHC), IEEE, 2019.

Friesen, R. F., R.L. Klatzky, M.A. Peshkin and J. E. Colgate, "Two Frequencies, One Pitch: Exploring Pitch Perception When Scanning Multi-frequency Textures." Hand Brain Technology Conference, 2018.

Friesen, R. F., M. Wiertlewski, M.A. Peshkin and J. E. Colgate, "Stroboscopic investigation of ultrasonic friction reduction on a vibrating plate." Proceedings of the World Haptics Conference (WHC), IEEE, 2015.

Oby E.R., R. Friesen, and L.E. Miller. "Muscle-like neurons for a muscle-like BMI: No evidence for extrinsic neurons in M1." Society for Neuroscience annual meeting, San Diego, CA, 2010.

Friesen, R., C. Helrich, E. Sucipto, and K. Steiner. "Monte Carlo Simulations of Sterol Superlattice Mosaics in Bilayers Yield Simultaneous Agreement with Concentration and Chemical Potential Data." Biophysical Society annual meeting, Boston, MA, 2009.