Alex Mazursky (he/him)

PhD Student at the University of Chicago
alexmazursky@uchicago.edu | www.alexmazursky.com

RESEARCH INTERESTS

I investigate unconventional approaches to engineering haptic actuators from the ground up. I build haptic devices that can overlay tactile feedback onto *any number of surfaces* in the environment to achieve **"ubiquitous haptics"**. In my recent work, I've applied this idea to a range of wearable actuators that provide feedback such as vibration, variable friction, & thermal rendering.

My multidisciplinary background in mechanical engineering, material science, and computer science supports designing and implementing interactive devices from the fundamental mechanics to the end application.

EDUCATION

University of Chicago   **2019 – Present**
PhD (& MS) in Computer Science
Advisor: Prof. Pedro Lopes, Human Computer Integration Lab

Miami University   **2019**
MS in Mechanical Engineering
Advisor: Prof. Jeong-Hoi Koo, Smart Materials Lab
Thesis: Application of Electrorheological Fluid for Conveying Realistic Haptic Feedback in Touch Interfaces
Supported by a Graduate Fellowship from NASA and the Ohio Space Grant Consortium

Miami University   **2018**
BS in Mechanical Engineering, Energy Co-Major   GPA: 3.92/4.00
Summa Cum Laude, Departmental and University Honors

REFEREED CONFERENCE PROCEEDINGS

[C.3] **Physical Touch from a Robot Caregiver: Examining Factors that Shape Patient Experience**
       Alex Mazursky, Maddie DeVoe, Sarah Sebo
       In Proc. IEEE RO-MAN 2022.

[C.2] **MagnetIO: Passive yet Interactive Soft Haptic Patches Anywhere**
       Alex Mazursky, Shan-Yuan Teng, Romain Nith, Pedro Lopes
       In Proc. ACM CHI 2021, with demos at CHI and SIGGRAPH Emerging Technologies.
       Acceptance Rate: 26.3%

[C.1] **Multiphysics Modeling and Parametric Analysis of an Inductor for Heating Thin Sheet Materials**
       Alex Mazursky, Hee-Chang Park, Sung-Hyuk Song, Jeong-Hoi Koo
       In Proc. ASME International Mechanical Engineering Congress & Exposition (IMECE) 2018.

JOURNAL PUBLICATIONS

[J.4] **A Stretchable and Strain-insensitive Pressure Sensor for Accurately Digitizing the Sensation on Human and Robotic Skins**
       Qi Su, Yang Li, Yuzhen Chen, Shan-Yuan Teng, Jane Tunde Kelleher, Romain Nith, Ping Cheng, Nan Li, Wei Liu, Shilei Dai, Youdi Liu, **Alex Mazursky**, Jie Xu, Lihua Jin, Pedro Lopes, Qiang Zou, Sihong Wang
       Science Advances 2021.

[J.3] **Design and Experimental Evaluation of an Electrorheological Haptic Module with Embedded Sensing**
       Alex Mazursky, Jeong-Hoi Koo, Taylor Mason, Sam-Yong Woo, Tae-Heon Yang
       Applied Sciences 2021, SI: Haptics: Technology and Applications. **Feature Paper**.

[J.2] **A Compact and Compliant Mixed Mode Electrorheological Actuator for Generating a Wide Range of Haptic Sensations**
Alex Mazursky, Tae-Heon Yang, Jeong-Hoi Koo
Smart Materials and Structures 2020.

[J.1] **Design, Modeling, and Evaluation of a Slim Haptic Actuator based on Electrorheological Fluid**
Alex Mazursky, Jeong-Hoi Koo, Tae-Heon Yang
Journal of Intelligent Material Systems and Structures 2019.

SHORT PUBLICATIONS, WORKSHOP PAPERS & ABSTRACTS

[W.6] **Democratizing Soft Magnetic Materials Fabrication**
Alex Mazursky, Pedro Lopes
Actuated Materials and Soft Robotics Strategies for Human-Computer Interaction Design. Workshop at CHI 2022.

[W.5] **Smell & Paste: Low-Fidelity Prototyping of Olfactory Experiences**
Jas Brooks, **Alex Mazursky**, Yudai Tanaka, Pedro Lopes
Toolkits & Wearables:Developing Toolkits for Exploring Wearable Designs (TOWEAR). Workshop at CHI 2022.

[W.4] **Soft Magnetic Actuators for Wearable Tactile Feedback**
Alex Mazursky, Shan-Yuan Teng, Romain Nith, Pedro Lopes
MRS Fall Meeting 2020. Symposium on Materials and Mechanics Challenges in Haptics for Human-Machine Interfaces.

[W.3] **Incorporating Sensing Capability in an Electrorheological Haptic Module**
Alex Mazursky, Tae-Heon Yang, Sam-Yong Woo, Jeong-Hoi Koo
In Proc. International Conference on Adaptive Structures and Technologies (ICAST) 2019.

[W.2] **Application of Electro-Rheological Fluids for Conveying Realistic Haptic Feedback**
Alex Mazursky, Jeong-Hoi Koo, Tae-Heon Yang
In Proc. International Conference on Adaptive Structures and Technologies (ICAST) 2018.

[W.1] **Experimental Evaluation of a Miniature Haptic Actuator based on Electrorheological Fluids**
Alex Mazursky, Tae-Heon Yang, Jeong-Hoi Koo
In Proc. SPIE Smart Structures and Nondestructive Evaluation 2018.

DEMOS AT CONFERENCES

[D.2] MagnetIO, ACM SIGGRAPH 2021

[D.1] MagnetIO, ACM CHI 2021

HONORS AND AWARDS

Chicago Materials Research Center (MRSEC) SEED Grant, University of Chicago, 2021–2022
$24,500 grant for "Enabling End-Users to Customize Active Materials using a CAD Assistant," with Pedro Lopes

Center for Data and Computing (CDAC) Doctoral Fellowship, University of Chicago, 2019–2020
$2,500 grant for "Health Monitoring Based on Wearable Sweat Sensors," with Pedro Lopes and Sihong Wang

Biochips Travel Grant, University of Colorado Boulder, 2019
$500 travel award to attend Biochips Summer School

Daniels Fellowship, University of Chicago, 2019–2020
$8,000 award for select incoming doctoral students

NASA/OSGC Fellowship, Ohio Space Grant Consortium, 2018–2019
$16,000 award and tuition waiver for "Design of a miniature actuator based on electrorheological fluid for conveying realistic haptic feedback"

Provost's Student Academic Achievement Award, Miami University, Fall 2017
Given to select students from the university who have demonstrated outstanding academic excellence and have made notable contributions to their department. 10-15 awards issued per year across all undergraduates.

NASA/OSGC Undergraduate STEM Scholarship, Ohio Space Grant Consortium, 2017–2018
$3,500 award for "Modeling and Simulation of an Electrorheological Fluid-based Haptic Device"

Undergraduate Research Award, Miami University, Spring 2017
$720 grant for "Design and Performance Evaluation of a Miniature Haptic Actuator based on Electrorheological Fluids"

NASA/OSGC Undergraduate STEM Scholarship, Ohio Space Grant Consortium, 2016–2017
$3,500 award for "Application of Electrorheological Fluids for Haptic Feedback"

Redhawk Excellence Scholarship, Miami University, 2014–2018
Scholarship award based on academic achievement and rigor

President's List, MU College of Engineering and Computing, Spring 2016, 2017, 2018
Semester GPA = 4.00/4.00

Dean's List, MU College of Engineering and Computing, Fall 2014, 2015, 2016, 2017, Spring 2015
Semester GPA $\geq$ 3.70/4.00

Start the Trend Challenge: First Place, MU College of Engineering and Computing, 2015
Innovation hackathon during Engineers Week with focus on contemporary issues in STEM education

RESEARCH EXPERIENCE

University of Chicago, Department of Computer Science　　　　　　Aug 2019 – Present
Graduate Research Assistant　　　　　　　　　　　　　　　　　　　　　*Chicago, IL*
▷ Investigating unconventional approaches to engineering haptic actuators from the ground up

Miami University, Department of Mechanical Engineering　　　　　　Feb 2016 – May 2019
Under/Graduate Research Assistant　　　　　　　　　　　　　　　　　　*Oxford, OH*
▷ Designed, fabricated and tested a combined kinesthetic-tactile actuator based on electrorheological fluids

Korea Advanced Institute of Science and Technology (KAIST)　　　　May 2018 – Aug 2018
Visiting Student Researcher　　　　　　　　　　　　　　　　*Daejeon, South Korea*
▷ Prototyped a "multicopter-to-mothership" drone docking mechanism, supervised by Prof. Jae-Hung Han in the Smart Systems and Structures Lab: Design and Control

Miami University, Department of Mechanical Engineering　　　　　　Aug 2017 – Dec 2017
Undergraduate Research Assistant　　　　　　　　　　　　　　　　　　*Oxford, OH*
▷ Developed COMSOL multiphysics models of a new induction heating coil geometry for thin sheet workpieces, in collaboration with the Korea Institute of Machinery and Materials (KIMM)

Korea Advanced Institute of Science and Technology (KAIST)　　　　Jun 2017 – Jul 2017
Senior Capstone Research　　　　　　　　　　　　　　　　　*Daejeon, South Korea*
▷ Designed applications for a multimodal (combined visual, audio and haptic feedback) tablet, in collaboration with the Korea Research Institute of Standards and Science (KRISS)

Miami University, Institute for the Environment and Sustainability　　Jan 2016 – May 2016
Undergraduate Research Assistant　　　　　　　　　　　　　　　　　　*Oxford, OH*
▷ Performed energy policy and engineering research with a focus on university's efforts toward efficiency in buildings under the supervision of Dr. Sarah Dumyahn

TEACHING, MENTORING, AND OUTREACH

Teaching Assistant
CMSC 20300: Introduction to Human Computer Interaction, University of Chicago   Fall 2019, 2021
MME 311: Dynamic Modeling of Mechanical Systems, Miami University   Fall 2016, Spring 2017

Mentoring During Ph.D. at UChicago
Beza Desta, Undergraduate, *under review*   Boris Li, Undergraduate, *under review*
Joyce Passananti, Undergraduate, *under review*   Dasha Shifrina, Undergraduate, *under review*
Maddie DeVoe, Undergraduate, *Human-Robot Touch*   Arjun Voruganti, Undergraduate, *Magnetic Mechanisms*
Antony Awad, Undergraduate, *Magnetic Mechanisms*   Elizabeth deButts, Undergraduate, *Soft Magnet Fabrication*
Theodore Mah, High school, *3D-printed prostheses*

Mentoring During M.S. at Miami University
Jake Zafar, Undergraduate, *Haptics and Flexible Sensors*
Adam Coon, Undergraduate, *Magnetorheological Fluid-based Actuators*
Sae-Hyun Sone, Undergraduate, *Modeling of Induction Heating*

Modern Materials Technology   2019 – 2020
▷ Volunteered during the school year to co-teach a materials science course at Lindblom Math and Science Academy
▷ Developed lecture slides, handouts, and hands-on labs and demos covering material science fundamentals

SERVICE AND MEMBERSHIPS

Program Committee
ACM CHI Late-Breaking Work Associate Chair   2022 – 2023

Reviewing
I have reviewed 50+ submissions across the venues below and have received **7 special recognitions** for outstanding reviews.

ACM CHI	2020 – 2022
ACM UIST	2020 – 2022
IEEE World Haptics	2019
ACM/IEEE HRI	2021 – 2022
IEEE VR	2022
ACM TEI	2022
ACM DIS	2020
IEEE RO-MAN	2022
ISWC	2022
ACM Augmented Human	2020, 2022

Student Volunteer
ACM/IEEE HRI	2022
Augmented Humans	2021
ACM CHI (canceled due to COVID-19)	2020
ACM UIST	2019
UChicago AdaWeek	2020
Smell, Taste, & Temperature Symposium	2020

Miami University
Undergraduate Research Forum Session Moderator	2019
Dept. of MechE Faculty Search Committee (Student Member)	2018 – 2019
Discover the Sciences Presenter	2017, 2018

Professional Memberships
ACM SIGCHI
American Society of Mechanical Engineers (ASME)

Tau Beta Pi: The Engineering Honor Society
The Processing Foundation (Student Member)

SELECTED PRESS

MagnetIO (CHI 2021)
"This could get sticky," Hackster.io	2021
"Magnet IO: New tactile actuator with voice coil," Auror Design	2021
"Ten Papers at CHI 2021 Flourish Frontiers of HCI Research at UChicago CS, UChicago CS"	2021

Strain-Invariant Pressure Sensor (Science Advances 2021)
"Stretchable pressure sensor could lead to better robotics, prosthetics," UChicago PME	2021
"Stretchable sensors could improve prosthetics and robotics," labroots	2021

About Alex
"Alex Mazursky researches fluid to help people "feel" the digital world," Miami University CEC	2018
"Two CEC students receive Provost's Student Academic Achievement Award," Miami University CEC	2017

PROFESSIONAL DEVELOPMENT ACTIVITIES

Biochips Summer School, University of Colorado Boulder, 2019
Five-day course on digital microfluidics research led by Prof. Mirela Alistar at the ATLAS Institute

Leadership in the Real World, Miami University, 2015
Semester-long course on leadership hosted by the Lockheed Martin Leadership Institute

EXTRACURRICULARS

UChicago HCI Club	2020 – Present
UChicago CS Design Reading Group	2020
Alpha Epsilon Pi, *New Member Educator, Secretary, Community Advancement Chair*	2015 – 2018
Miami University Eco Representatives	2015 – 2016

WORK EXPERIENCE

Bruner Corporation	May 2016 – Aug 2016
Energy Engineering Intern	*Columbus, OH*

▷ Implemented energy savings solutions and improved company workflows through scripting and automation

HBK Engineering	May 2015 – Aug 2015
Engineering Intern	*Chicago, IL*

▷ Performed topographic land survey, settlement monitoring and construction layout using robotic total stations and GPS for utilities industry in the Chicago Metropolitan Area

GRADUATE LEVEL COURSEWORK

HCI/Computer Science: Emergent Interface Technologies, Human-Robot Interaction, Printed Circuit Board Engineering, Human Computer Interaction meets Neuroscience, Machine Learning, Deep Learning for 3D Geometry, Algorithms, Discrete Math, Computer Networking

Mechanical Engineering: Adv. Mechanics of Materials, Engineering Analysis/Numerical Methods, Adv. Vibration, Mechanical Behavior of Materials, Biomaterials, Scientific Programming, Applied Nonlinear Dynamics

REFERENCES

1.	**Pedro Lopes**	Asst. Professor, University of Chicago
2.	**Jeong-Hoi Koo**	Professor, Miami University
3.	**Sarah Sebo**	Asst. Professor, University of Chicago