

Alex Mazursky (he/him)

PhD Student at the University of Chicago
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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, friction modulation, & 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.4] **ThermalRouter: Enabling Novices to Design Thermally-Sound Devices**

Alex Mazursky, Borui Li, Shan-Yuan Teng, Dasha Shifrina, Joyce Passananti, Svitlana Midianko, Pedro Lopes
In Proc. ACM UIST 2023. To Appear.

[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

- [A.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.
- [A.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.
- [A.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.
- [A.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.
- [A.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.
- [A.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.3] ThermalRouter, ACM UIST 2023
- [D.2] MagnetIO, ACM SIGGRAPH 2021
- [D.1] MagnetIO, ACM CHI 2021

WORKSHOPS ORGANIZED

- [W.1] Soft Robotics and Actuated Materials for Human-Computer Interaction, ACM DIS 2023

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

Meta, Reality Labs Research <i>Haptics Research Scientist Intern</i>	June 2023 – Oct 2023 Redmond, WA
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- ▷ Developed a new haptic device (paper in progress), supervised by Priyanshu Agarwal

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

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

Korea Advanced Institute of Science and Technology (KAIST) <i>Visiting Student Researcher</i>	May 2018 – Aug 2018 Daejeon, South Korea
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- ▷ 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 <i>Undergraduate Research Assistant</i>	Aug 2017 – Dec 2017 Oxford, OH
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- ▷ 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)*Senior Capstone Research*

Jun 2017 – Jul 2017

Daejeon, South Korea

- ▷ Designed applications for a tablet with novel electrostatic haptic actuators, in collaboration with the Korea Research Institute of Standards and Science (KRISS)

Miami University, Institute for the Environment and Sustainability*Undergraduate Research Assistant*

Jan 2016 – May 2016

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

Introduction to Human Computer Interaction (CMSC 20300), University of Chicago

Fall 2019, 2021

Dynamic Modeling of Mechanical Systems (MME 311), Miami University

Fall 2016, Spring 2017

Mentoring During Ph.D. at UChicagoBeza Desta, Undergraduate, *under review*Boris Li, Undergraduate, *ThermalRouter*Joyce Passananti, Undergraduate, *ThermalRouter*Dasha Shifrina, Undergraduate, *ThermalRouter*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 70+ submissions across the venues below and have received **8 special recognitions** for outstanding reviews.

Conferences

ACM CHI (& alt.chi)

2020 – 2024

ACM UIST

2020 – 2022

IEEE World Haptics

2019, 2023

ACM/IEEE HRI

2021 – 2022

ACM SIGGRAPH Asia (E-Tech))

2023

IEEE VR

2022

ACM TEI

2022

ACM DIS

2020

IEEE ISMAR

2023

IEEE RO-MAN

2022

ISWC

2022

ACM Augmented Humans

2020, 2022

ACM MUM

2023

Journals

Smart Materials and Structures
Sensors and Actuators: A. Physical

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/People and Tech Club	2020 – Present
UChicago CS Design Reading Group	2020
Alpha Epsilon Pi, <i>New Member Educator, Secretary, Community Advancement Chair</i>	2015 – 2018
Miami University Eco Representatives	2015 – 2016

WORK EXPERIENCE

Bruner Corporation

Energy Engineering Intern

May 2016 – Aug 2016

Columbus, OH

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

HBK Engineering

Engineering Intern

May 2015 – Aug 2015

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