

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 have 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. I have been privileged to do this work at places like the **University of Chicago, Meta, and KAIST**.

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.6] **Stick&Slip: Altering Fingerpad Friction via Liquid Coatings**

Alex Mazursky, Jacob Serfaty, Pedro Lopes

In Proc. ACM CHI 2024, with demo at IEEE Haptics Symposium.

[C.5] **ThermalGrasp: Enabling Thermal Feedback even while Grasping and Walking**

Alex Mazursky, Jas Brooks, Beza Desta, Pedro Lopes

In Proc. IEEE VR 2024.

[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.

[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.

[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] Stick&Slip, IEEE Haptics Symposium 2024
- [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 per year across entire undergraduate student body.

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

Haptics Research Scientist Intern

June 2023 – Oct 2023

Redmond, WA

- ▷ Developed a new haptic device (paper in progress), supervised by Priyanshu Agarwal

University of Chicago, Department of Computer Science

Graduate Research Assistant

Aug 2019 – Present

Chicago, IL

- ▷ Investigating unconventional approaches to engineering haptic actuators from the ground up

Miami University, Department of Mechanical Engineering

Under/Graduate Research Assistant

Feb 2016 – May 2019

Oxford, OH

- ▷ Designed, fabricated and tested a combined kinesthetic-tactile actuator based on electrorheological fluids

Korea Advanced Institute of Science and Technology (KAIST)*Visiting Student Researcher*

May 2018 – Aug 2018

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*Undergraduate Research Assistant*

Aug 2017 – Dec 2017

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)*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

Inventing, Engineering and Understanding Interactive Devices (CMSC 23220), University of Chicago Winter 2024

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 UChicagoJacob Serfaty, Undergraduate, *Stick&Slip*Beza Desta, Undergraduate, *ThermalGrasp*Borui Li, Undergraduate, *ThermalRouter*Joyce Passananti, Undergraduate, *ThermalRouter*Daria Shifrina, Undergraduate, *ThermalRouter*Maddie DeVoe, Undergraduate, *Human-Robot Touch***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, *Induction Heating Modeling***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 – 2024

Reviewing

I have reviewed 100+ submissions across the venues below and have received **10 special recognitions** for outstanding reviews.

Conferences

ACM CHI

2020 – 2024

ACM UIST

2020 – 2024

IEEE World Haptics

2019, 2023

ACM/IEEE HRI

2021 – 2022

ACM SIGGRAPH Asia (E-Tech)

2023

IEEE VR	2022
IEEE ISMAR	2023 – 2024
ACM TEI	2022
ACM DIS	2020
ACM C&C	2024
IEEE RO-MAN	2022
Eurohaptics	2024
ISWC	2022
ACM Augmented Humans	2020, 2022
ACM MUM	2023

Journals

IEEE Transactions on Haptics
 IEEE TVCG
 Smart Materials and Structures (**Outstanding Reviewer Award 2023**)
 Sensors and Actuators: A. Physical

Session Chair

"Haptics and Embodied Interaction B" session at ACM CHI 2024

Student Volunteer

IEEE Haptics Symposium 2024
 IEEE VR 2024
 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

Professional Memberships

ACM SIGCHI
 American Society of Mechanical Engineers (ASME)
 Tau Beta Pi: The Engineering Honor Society
 The Processing Foundation (Student Member)

At Miami University

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

SELECTED PRESS

ThermalRouter (UIST 2023)

"Can you take the heat?," Hackster.io 2023

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

- 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

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|--|----------------|
| 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
<i>Energy Engineering Intern</i> | May 2016 – Aug 2016
Columbus, OH |
| ▷ Implemented energy savings solutions and improved company workflows through scripting and automation | |
| HBK Engineering
<i>Engineering Intern</i> | 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