

# Alex Mazursky (he/him)

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

## RESEARCH INTERESTS

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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

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### 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

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[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

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[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

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- [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

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- [D.2] MagnetIO, ACM SIGGRAPH 2021
- [D.1] MagnetIO, ACM CHI 2021

## WORKSHOPS ORGANIZED

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

## HONORS AND AWARDS

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**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

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**Meta, Reality Labs Research** June 2023 – Oct 2023  
*Haptics Research Scientist Intern* Redmond, WA

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

**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)***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**

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**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 UChicago**Beza 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**

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**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 (&amp; alt.chi)

2020 – 2024

ACM UIST

2020 – 2023

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**

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### **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**

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**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

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### **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

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**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

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