

# Alex Mazursky (he/him)

PhD Student at the University of Chicago  
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## RESEARCH INTERESTS

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I create new haptic devices enabled by responsive materials. My multidisciplinary background in mechanical engineering, material science, and computer science helps me to design and implement 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*

## 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.

## REFEREED CONFERENCE PROCEEDINGS

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- [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*. To Appear.
- [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.*

## SHORT PUBLICATIONS, WORKSHOP PAPERS & ABSTRACTS

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- [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

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

## 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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| <b>University of Chicago, Department of Computer Science</b><br><i>Graduate Research Assistant</i> | Aug 2019 – Present<br>Chicago, IL |
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- ▷ Creating new haptic devices enabled by responsive materials

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|---|-----------------------------------|
| <b>Miami University, Department of Mechanical Engineering</b><br><i>Under/Graduate Research Assistant</i> | Feb 2016 – May 2019<br>Oxford, OH |
|---|-----------------------------------|

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

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|---|---|
| <b>Korea Advanced Institute of Science and Technology (KAIST)</b><br><i>Visiting Student Researcher</i> | May 2018 – Aug 2018<br>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

|  |                                   |
|--|-----------------------------------|
| <b>Miami University, Department of Mechanical Engineering</b><br><i>Undergraduate Research Assistant</i> | Aug 2017 – Dec 2017<br>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)

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|--|---|
| <b>Korea Advanced Institute of Science and Technology (KAIST)</b><br><i>Senior Capstone Research</i> | Jun 2017 – Jul 2017<br>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)

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|--|-----------------------------------|
| <b>Miami University, Institute for the Environment and Sustainability</b><br><i>Undergraduate Research Assistant</i> | Jan 2016 – May 2016<br>Oxford, OH |
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- ▷ Performed energy policy and engineering research with a focus on university’s efforts toward efficiency in buildings under the supervision of Dr. Sarah Dymyahn

## TEACHING, MENTORING, AND OUTREACH

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### Teaching Assistant

CMSC 20300: Introduction to Human Computer Interaction, University of Chicago  
MME 311: Dynamic Modeling of Mechanical Systems, Miami University

Fall 2019, 2021  
Fall 2016, Spring 2017

**Mentoring During Ph.D. at UChicago**

Maddie DeVoe, Undergraduate, *Human-Robot Touch*

Arjun Voruganti, Undergraduate, *3D Editor for Magnetic Mechanisms*

Antony Awad, Undergraduate, *3D Editor for Magnetic Mechanisms*

Elizabeth Ashby deButts, Undergraduate, *Soft Magnet Fabrication*

**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

**Reviewing**

I have reviewed 50+ works across the venues below and have received 6 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 ROMAN

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**

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**MagnetIO (CHI 2021)**

"This could get sticky," Hackster.io

2021

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| "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 |
| <b>Strain-Invariant Pressure Sensor (Science Advances 2021)</b>                                |      |
| "Stretchable pressure sensor could lead to better robotics, prosthetics," UChicago PME         | 2021 |
| "Stretchable sensors could improve prosthetics and robotics," labroots                         | 2021 |
| <b>About Alex</b>  |      |
| "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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|  |                |
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| UChicago HCI 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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|---|---------------------|
| <b>Bruner Corporation</b>   | May 2016 – Aug 2016 |
| <i>Energy Engineering Intern</i>  | <i>Columbus, OH</i> |
| ▷ Implemented energy savings solutions and improved company workflows through scripting and automation  |                     |
| <b>HBK Engineering</b>  | May 2015 – Aug 2015 |
| <i>Engineering Intern</i>   | <i>Chicago, IL</i>  |
| ▷ 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. <b>Pedro Lopes</b>   | Asst. Professor, University of Chicago |
| 2. <b>Jeong-Hoi Koo</b> | Professor, Miami University            |
| 3. <b>Sarah Sebo</b>    | Asst. Professor, University of Chicago |