

# ERIC T. CHANG

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## EDUCATION

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**Columbia University**, New York, NY expected 2026  
**Ph.D. in Mechanical Engineering** (in 3<sup>rd</sup> year), advisor: Matei Ciocarlie  
**M.S. in Mechanical Engineering (Fall 2022)** GPA: 4.03/4.00  
NASA Graduate Research Fellow (NSTGRO)

**Duke University**, Durham, NC Spring 2021  
**B.S.E. in Mechanical Engineering, B.A. in Computer Science** GPA: 3.97/4.00  
Magna Cum Laude, Graduation With Distinction

## AWARDS AND HONORS

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<b>Graduate Research Fellowship (NSTGRO), NASA</b>	2022 - 2026
Best Inventions of 2023 (Khandate et al., 2023), <i>TIME Magazine</i>	2023
Oscar and Vera Byron Fellowship, <i>Columbia Engineering</i>	2021
<b>Raymond C. Gaugler Award in Materials Science &amp; Engineering, Duke Engineering</b>	2021
<b>Best Poster Award, Materials Research Society 2021 Virtual Spring Conference</b>	2021
Symposium Award (2 <sup>nd</sup> place), <i>Materials Research Society 2021 Virtual Spring Conference</i>	2021
Tau Beta Pi Engineering Honors Society (Treasurer), <i>Duke Engineering</i>	2019 - 2021
Pi Tau Sigma Mechanical Engineering Honors Society, <i>Duke Engineering</i>	2019 - 2021
Pratt Research Fellowship, <i>Duke Engineering</i>	2020
Dean's Undergraduate Research Fellowship, <i>Duke Undergraduate Research Support Office</i>	2020

## PUBLICATIONS

### Peer-Reviewed Publications

[\* indicates equal contribution]

- [U.1] G. Khandate\*, T. Saidi\*, S. Shang\*, **E.T. Chang**, Y. Liu, S. Dennis, J. Adams, M. Ciocarlie, "R×R: Rapid eXploration for Reinforcement Learning via Sampling-based Reset Distributions and Imitation Pre-training," *under review* **2024**. <https://arxiv.org/abs/2401.15484>
- [C.2] **E.T. Chang**\*, R. Wang\*, P. Ballentine, J. Xu, T. Smith, B. Coltin, I. Kymissis, M. Ciocarlie, "An Investigation of Multi-feature Extraction and Super-resolution with Fast Microphone Arrays," *IEEE Intl. Conf. on Robotics and Automation (ICRA)* **2024**. <https://arxiv.org/abs/2310.00206>
- [C.1] G. Khandate\*, S. Shang\*, **E.T. Chang**, T.L. Saidi, J. Adams, M. Ciocarlie, "Sampling-based Exploration for Reinforcement Learning of Dexterous Manipulation," *Robotics: Science and Systems (RSS)* **2023**. <https://arxiv.org/abs/2303.03486>  
– **Named to TIME's Best Inventions of 2023**
- [J.2] **E.T. Chang**, G. Koknat, G.C. McKeown Wessler, Y. Yao, V. Blum, D.B. Mitzi, "Phase Stability, Band Gap Tuning, and Rashba Splitting in Selenium-Alloyed Bournonite:  $\text{CuPbSb}(\text{S}_{1-x}\text{Se}_x)_3$ ," *Chemistry of Materials* **2023** 35, 595-608. <https://doi.org/10.1021/acs.chemmater.2c03109>
- [J.1] S. Tran, J. Chen, G. Kozel, **E.T. Chang**, et al., "Development of an optically transparent kidney model for laser lithotripsy research," *BJU International* **2023**. <https://doi.org/10.1111/bju.16015>

### Posters, Workshop Extended Abstracts, and Technical Reports

- [W.2] **E.T. Chang**\*, P. Ballentine\*, I. Kymissis, M. Ciocarlie, "Development Towards a PVDF-Based Tactile Finger with distributed Vibration Sensing," May 2024. Extended abstract and poster presentation. ICRA 2024 ViTac Workshop.

- [W.1] **E.T. Chang**, P. Ballentine, I. Kymissis, M. Ciocarlie, "Towards Development of a Signal-Dense Multimodal Tactile Finger," June 2023. Extended abstract and poster presentation. ICRA 2023 ViTac Workshop.
- [P.1] **E.T. Chang**, G. Koknat, V. Blum, D.B. Mitzi, "Synthesis and Characterization of Selenium-Alloyed Bournonite  $\text{CuPbSb}(\text{S}_{1-x}\text{Se}_x)_3$ : a Prospective Semiconductor for Optoelectronic Applications," March 2021. Poster presentation. Materials Research Society 2021 Virtual Spring Conference.
- **Won best poster award and placed 2<sup>nd</sup> in symposium award.**
- [TR.1] Duke RoboSub Team, "CTHULHU: The Design and Implementation of the Duke Robotics Club's 2019/2020/2021 RoboSub Competition Entry," RoboSub: San Diego, USA, 2019/2020/2021.  
[https://robonation.org/app/uploads/sites/4/2019/10/Duke\\_RS19\\_TDR.pdf](https://robonation.org/app/uploads/sites/4/2019/10/Duke_RS19_TDR.pdf)  
[https://robonation.org/app/uploads/sites/4/2020/08/RS20\\_TDR\\_Duke.pdf](https://robonation.org/app/uploads/sites/4/2020/08/RS20_TDR_Duke.pdf)  
[https://robonation.org/app/uploads/sites/4/2021/07/RoboSub\\_2021\\_Duke\\_TDR.pdf](https://robonation.org/app/uploads/sites/4/2021/07/RoboSub_2021_Duke_TDR.pdf)  
**Placed 1<sup>st</sup> of 54 (2021) and 4<sup>th</sup> of 33 (2020) in technical design report portion of competition**

## RESEARCH EXPERIENCE

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**R.O.A.M. Lab**, Columbia University **Fall 2021 - Present**  
*Ph.D. Candidate*, advisor: Matei Ciocarlie

- Designing multimodal tactile fingers for dexterous manipulation
- Took courses in robotics, control, dynamics, mechatronics, machine learning, robot learning
- Research interests: tactile sensing (multimodal tactile finger design, tactile vibration sensing), dexterous manipulation

**Intelligent Robotics Group**, NASA Ames Research Center **Fall 2023, Summer 2024**  
*NSTGRO Fellowship Program Intern*, advisors: Trey Smith, Brian Coltin

- Improved design of 3-fingered underactuated hand for Astrobeer (ISS' free-flyer robot)
- Work towards integrating tactile sensor work into NASA applications, e.g. for intravehicular space robots

**Mitzi Research Group**, Duke University **Spring 2018 - Spring 2021**  
*Research Assistant*, advisor: David B. Mitzi

- First authored paper on bournonite band gap engineering, working to develop solar materials and devices that are cost effective and sustainable

**Duke Robotics Club**, Duke University **Spring 2018 - Spring 2021**  
*Task Planning Lead, Mechanical Engineer*

**Project:** Design autonomous underwater vehicle for and compete in International RoboSub Competition

- Designed and implemented task planning architecture (Python); designed, prototyped, and tested servo-controlled torpedo launcher (iterative design, Solidworks)

## INDUSTRY EXPERIENCE

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**Nauticus Robotics (formerly Houston Mechatronics)**, Houston, TX **Summer 2021**  
*Robotics R&D Intern*, manager: John Yamokoski

**Project:** Refine point cloud compression algorithms for underwater untethered data transmission

- Investigated optimizations for compressing point cloud data from TOF, structured light, and lidar sensors with compression ratio > 300 (C++, Python, ROS, Docker)

**Realtime Robotics**, Boston, MA **Summer 2020**  
*Mechanical and Applications Engineering Intern*, manager: Nathan Koontz

**Project:** Develop test cell for application of company's motion planning technology to spot welding cells

- Designed and prototyped scaled spot-welding gun and work cell for testing for a major customer (OnShape)

- Wrote software to control robots and weld guns for multi-robot motion planning demo (Python, Arduino)

**Coherix**, Ann Arbor, MI

**Summer 2019**

*Product Development Intern*

**Project:** Improve robot programming methods in automotive manufacturing

- Improved potential plant efficiency by 25 minutes per part through development of machine vision software to self-correct manually programmed nozzle position of an adhesive-dispensing robot (Python)

## **SERVICE**

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- Reviewer for T-RO (2024), ICRA (2024), and BioRob (2024)
- Created and led an arduino activity for Columbia's Girls' Science Day event (Nov 2021, Spring 2022)