

# BRYAN A. MACGAVIN

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## EDUCATION

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### Saint Louis University (June 2019 – Summer 2024)

Saint Louis, MO

Ph.D., Mechanical Engineering (Summer 2024)

M.S., Mechanical Engineering (Summer 2023)

### Rose-Hulman Institute of Technology, (September 2013 – May 2017)

Terre Haute, IN

B.S., Mechanical Engineering

## PUBLICATIONS

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### Journal Articles

- **MacGavin, B.**, Tennison, J. L., & Gorlewicz, J. L. “Understanding Haptic Interaction and Learning Between Diverse Groups in Classroom Settings.” *IEEE Transactions on Learning Technologies*. (2024). [In Submission].
- **MacGavin, B.**, Tennison, J. L., & Gorlewicz, J. L. “Wearable Haptic Systems for Measuring Touch Profiles and Facilitating Tactile Communication.” *IEEE Transactions on Haptics*. (2024) [Pending Review].
- **MacGavin, B.**, Edwards, T., & Gorlewicz, J. L. “A protactile-inspired wearable haptic device for capturing the core functions of communication.” *In IEEE Transactions on Haptics*, 14(2), 279-284. (2021). [Short Paper]

### Conference Articles

- Condoor, S., **MacGavin, B.**, & PV, R. S. “Teaching the Concept of Tipping in Statics: Pedagogy, Practical Examples, and Potential Activities.” *In ASEE Annual Conference & Exposition*. (2023).
- **MacGavin, B.**, Tennison, J. L., Condoor, S., & Gorlewicz, J. “The HapConnect: Teaching about Haptics and Inclusive Design with Modular, Wearable Technology.” *In ASEE Annual Conference & Exposition*. (2023).
- **MacGavin, B.** and Gorlewicz J. L. “A Wearable Haptic Interface for Protactile DeafBlind Individuals.” Hands-on Demonstration. *In IEEE Haptics Symposium*. (2020).

## GRANTS & FELLOWSHIPS

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### Current

- **NSF CHS, 1909121** “CHS: Small: Rethinking Haptic-Based Remote Communication Leveraging the DeafBlind Community’s Tactile Intuitions” J. L. Gorlewicz (PI), T. Edwards (Co-PI), F. Esposito (Collaborator). For \$200,000 over 3 years (12/31/19-12/31/23).
  - Provided content for sections of the proposal, and created device figures.

*Prior*

- **NSF Graduate Research Fellowship Honorable Mention (2021)**
- **Saint Louis University Travel Grant** for conference attendance. Covered \$400 in costs (2021).

## **RESEARCH EXPERIENCE**

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### **Collaborative Haptics, Robotics, and Mechatronics Lab (CHROME)**

*Saint Louis University (2019-2024)*

*Advisor: Dr. Jenna Gorlewicz*

*Position: Graduate Research Assistant (2019-2024)*

- Gained expertise in the field of mechatronics through the creation of wearable haptic devices in collaboration with Protactile DeafBlind individuals to facilitate remote communication.
- Created several wearable designs to replicate four core functions of communication and communication through touch with multi-modal sensory input/output.
- Developed short classroom modules on haptics and inclusive design, culminating in students modifying existing wearable tactile system to enhance learning in introductory electronics courses.
- Conducted research studies testing the functionality of haptic devices with R&D industry partners, traditional undergraduate engineering students, and DeafBlind, Blind, or Visually Impaired adults and students.
- Mentored undergraduate students in various disciplines with research surrounding wearable devices.

## **TEACHING EXPERIENCE**

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- Fall 2023, Fall 2022*     **Co-Instructor, Cura Personalis I – Dr. Michelle Mitchell & Nicole Mispagel, M.A.**
- Developed syllabus with newly implemented CORE curriculum of Saint Louis University.
  - Created and evaluated course content, learning objectives, and outcomes for first-year engineering students.
  - Lead for lectures, in-class projects, and activities for semester.
- Fall 2023*     **Teaching Assistant, Engineering Fundamentals Studio – Dr. Sridhar Condoor**
- Reworked curriculum for introduction to CAD modeling software (SolidWorks) course to include new sections on 3D printing applications, animation, and inclusion of AI tools.
  - Delivered specific content on additive manufacturing practices and translation of model to physical print.
- Spr. 2023*     **Teaching Assistant, Design Thinking – Dr. Sridhar Condoor**
- Aided in material delivery and mentoring, assessment of group projects throughout semester.
  - Developed short module on presentation methods for students to utilize in their own design presentations.
  - Coordinated external panel of faculty and graduate students for final deliverable presentations.
- Spr. 2022 – Spr. 2024*     **CHROME Lab Academic Chair**
- Guided new students in relation to coursework and program of study, led involvement in university research symposiums and competitions, and facilitated recruitment/interviews of prospective undergraduate and graduate students.

- Fall 2022*      **Teaching Assistant, Foundation to Engineering Design – Dr. Sridhar Condoor**
- Designed a 3-week module on haptics and inclusive design practices with lecture and project portions.
  - Included several student groups utilizing a wearable haptic design developed for this module to guide team members remotely through a maze through the sense of touch alone (see above Conference Articles #2).
- Spr. 2021, Spr. 2020*      **Laboratory Assistant, Mechanics of Solids Lab – Dr. K. Ravindra & Dr. Chi Hou Lei**
- Conducted experiments related to materials, solid mechanics, and related statistical concepts.
  - Helped students calibrate, understand, and safely use equipment, such as strain gauges, truss supports, and universal testing machines.
- Misc.*      **Additional Teaching and Course Guest Lectures**
- Statics – multiple single-day lectures
  - Dynamics – multiple week-long lectures
  - Linear Vibrations – multiple single-day lectures
  - Mathematics Help Session Tutor – single semester

## MENTORING

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### *Graduate Peer Mentorship*

- Provided peer mentorship (for role as Lab Academic Chair) in the capacity of design consultation, paired programming, electronics analysis, academic help, and program of study guidance:
  - Namrata Roy (Ph.D. Student), 2023 – 2024
  - Wilfredo Robinson (Ph.D. Student), 2023 – 2024
  - Nicolas Rojas (Ph.D. Student), 2022 – 2024
  - Colton Doherty (M.S. Student), 2021 – 2024
  - Joshua Adams (M.S.), 2021 – 2023

### *Undergraduate Students*

- Provided mentorship in the form of assistance related to project research or other tangentially related activities, developing skillsets in mechatronics and design, and guidance on career aspirations:
  - Clayton Stout, 2023 – 2024
  - Grace Yost, 2023 – 2024
  - Jake Little, 2022 – 2024
  - Laurel Leuwerke, 2022 – 2023
  - Robert Holzer, 2021 – 2022
  - Crystal Kimama, 2021
  - Julian Saliba, 2021

## SERVICE AND OUTREACH

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- Spr. 2023 – Spr. 2024*      **School of Science and Engineering Representative for Provost’s Graduate Assistant Committee (GAC)**
- Worked with Provost’s office to develop a 3-year plan for continual GA stipend increases, adopt a 12-month healthcare plan for all GAs, and standardize policies centered around GA roles within the university with the end goal of a graduate student reference handbook.

- Spr. 2023*     **Engineering Ambassador for Commander of USTRANSCOM, General Jacqueline Van Ovost**
- Acted as representative on behalf of the CHROME Lab and School of Science and Engineering.
- Fall 2022*     **Engineering Ambassador for US Head of National Intelligence, Dir. Avril Haines, and Dir. of National Geospatial-Intelligence Agency, Vice-Admiral Frank Whitworth**
- Directly presented research to government officials on behalf of the CHROME Lab and School of Science and Engineering.
- Spr. 2021 –*   **E4USA University Liaison**
- Fall 2022*     • Worked with local area high-school teacher to develop projects centered around sustainability to garner excitement from junior and senior students in engineering and general STEM practices.

## **PROFESSIONAL DEVELOPMENT**

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### *Saint Louis University*

- **Certificate in University Teaching Skills (Anticipated 2024)** – A teaching certificate program which promotes the development of faculty and graduate students in their journey toward transformative teaching. The certificate's requirements provide participants with pedagogical information to enhance their teaching practice, to draft and develop a philosophy of teaching, and to document teaching competencies.
- **KEEN Creating High Impact Courses Workshop** – A training workshop on “The Decoding the DNA of 3Cs & Creating High Impact Courses” aiming to better determine course outcomes, organize learning material, create engaging activities, and deliver effective lectures, resulting in nurturing students' entrepreneurial mindset.
- **IEEE RAS Workshop** – Attended a seasonal school titled “Rehabilitation and Assistive Technologies Based on Soft Robotics” aiming to provide young researchers with interdisciplinary knowledge about the design, control, simulation, and modeling of soft robotic systems for rehabilitation and assistance, to be used in clinical practice and to support activities of daily living.

## **ADDITIONAL WORK EXPERIENCE**

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### **Varsity Tutors** – *Saint Louis, MO*

#### *Tutoring Professional (2018-2020)*

- Worked with local area students on a variety of topics in STEM fields and ACT/SAT preparation ranging from middle school through college undergraduate education. Provided one-on-one and group mentorship sessions to students throughout a given academic year.

### **J.W. Hicks, Incorporated** – *Knox, IN*

#### *Project/Process Engineer (2017-2018)*

- Created an experimental, castable refractory mold for company to enter into new business opportunities. Redesigned refractory plate molds using lifespan data to account for material expansion in kiln cycles and to reduce plate banding inventory by over 50%. Experienced with on-site customer troubleshooting and data analysis to increase product life by 15%.

### **Rose-Hulman International Student Coach** – *Terre Haute, IN*

#### *On Campus Tutoring Program (2016-2017)*

- Provided personal, one-on-one tutoring sessions ranging from editing papers to creating situational mock presentations and interviews. Supervised weekly, conversational groups aimed at promoting

growth in English speech and engineering skills for beginning level students. Worked with a variety of multi-national students representing over ten countries.