Joseph Liechty

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General Information

Education

Ph.D. Candidate, Robotics (Computer Science) University of Utah *2024 – Present*
GPA: 3.94/4.00
Learning Lab for Manipulation Autonomy (Ll4ma)
Kuntz Lab

M.S. Degree, Mechanical Engineering (Robotics), University of Utah *2022 – 2024*
GPA: 3.89/4.00
Human-Centered Haptics and Robotics Lab

B.S. Degree, Mechanical Engineering, Brigham Young University *2015 – 2022*
GPA: 3.89/4.00
Mars Rover Team, Mini-Baja Club, Rocketry Club, Student Innovator of the Year

Expertise

Robotic Manipulation	AI/ML	Python
Controls and Dynamics	Hardware Design	ROS2
Motion Planning	Product Development	C++

References (Contact Information Upon Request)

Tucker Hermans – *Ph.D. Advisor, University of Utah*

Alan Kuntz – *Ph.D. Co-Advisor, University of Utah/Vanderbilt*

Chris Mattson – *Undergraduate Advisor, Brigham Young University*

Experience

Research

Graduate Research Assistant: *Ll4ma, U. of Utah*
Aug. 2025 – Present
40 hours/week
- ∞ Studying control and state estimation for tendon-driven multi-finger hands
- ∞ Designing control software for magnetic manipulation of objects in space
- ∞ Building predictive dynamics models for robot manipulation tasks

Graduate Research Assistant: *Kuntz Lab, U. of Utah*
Aug. 2024 – Aug. 2025
20 hours/week
- ∞ Designed action policies for autonomous robotic surgery
- ∞ Studied task and motion planning for human-robot handovers of objects

- ∞ Designed robotic pick-and-place pipeline using Kuka/Kinova arms, depth cameras

Graduate Research Assistant: *Human-Centered Haptics and Robotics Lab, U. of Utah*
Aug. 2022 – Aug. 2024
20 hours/week
- ∞ Studied user experience in haptic interactions
- ∞ Built haptic knob to deliver physical renderings integrated with GUI programmed in C++
- ∞ Created algorithms for system identification of robot parameters
- ∞ Designed electronics for open-source powered prosthetic leg for Utah Bionics Lab

Undergraduate Research Assistant: *Design Exploration Lab, Brigham Young University*
Apr. 2020 – Apr. 2022
10 hours/week
- ∞ Studied better ways of creating market requirements and evaluating prototypes
- ∞ Researched modeling the environmental impacts of products in agent-based simulations
- ∞ Designed products for communities in developing countries

Undergraduate Research Assistant: *CREATE Lab, Brigham Young University*
Jan. 2019 – Aug. 2019
10 hours/week
- ∞ Built binder-jet 3D printer from high precision linear motion stages
- ∞ Programmed 3D printers in LabView
- ∞ Data collection and analysis using high-speed camera and MATLAB

Teaching

Teaching Assistant: *Computer-Based Problem Solving for Engineering Systems, U. of Utah*
Aug. 2022 – Dec. 2023, Jan. 2024 – May 2024
20 hours/week
- ∞ Taught freshman programming mechatronic systems and basic numerical methods
- ∞ Ran weekly lab sessions, lectured and gave one-on-one instruction
- ∞ Graded and assisted in other course administrative duties

Professional and Extracurricular

Robotics Engineer: *Mars Rover Competition Team, Brigham Young University*
Aug. 2021 – Apr. 2022
10 hours/week
- ∞ Improved hardware for robot SCARA manipulator
- ∞ Designed folding rocker-bogie suspension for rover drivetrain
- ∞ Manufactured custom parts with optimized strength-to-weight ratios

Information Technology Engineer: *J. Rueben Clark Law School, Brigham Young University*
Jun. 2019 – Dec. 2020
20-40 hours/week
- ∞ Lead engineer for backup and replication of all faculty and administrative data
- ∞ Negotiated multi-year contract for new backup and replication software package
- ∞ Maintained and updated Windows servers and Windows active directory environment

Publications

Conference and Journal

S. Kim, M. D. Shanthi, **J. C. Liechty**, and T. Hermans, "Contact Makes It Multimodal: Learning Probabilistic Skill Effects from Partial Point Clouds," submitted for publication, 2026.

B. Y. Cho, D. Esser, **J. C. Liechty**, R. J. Webster III, and A. Kuntz, "Attention-based Kinematics: Sequential Shape Modeling of Tendon-driven Continuum Robots via Causal Transformers," submitted for publication, *IEEE Robotics and Automation Letters*, 2026.

T. Watts, S. S. Stern, A. Chara, J. d'Almeida, **J. Liechty**, B. Jordan, and A. Kuntz, "PushCVAE: Generative Autonomous Nonprehensile Surgical Retraction from Monocular Endoscopic Images," in *Proc. 2026 Int. Symp. Medical Robotics (ISMR)*, Knoxville, TN, USA, 2026, pp. 1–7.

J. C. Liechty, P. Tang, J. C. Liechty, and E. Battaglia, "Modeling Subjective User Experience in Haptics Through Individualized Bayesian Models," in *IEEE Transactions on Haptics*, doi: 10.1109/TOH.2026.3719775.

M. A. Schoen, **J. C. Liechty**, I. F. Zeringue, and E. Battaglia, "Design and evaluation of user experience for a virtual reality equine-assisted therapy system," submitted for publication 2025.

K. R. Cernucan, T. Bartunek, **J. C. Liechty**, and E. Battaglia, "Impact of a Respiratory Aerosol Containment Device on Posture Ergonomics and Perceived Workload During Intubation," *Ergonomics in Design: The Quarterly of Human Factors Applications*, Mar. 2026.

J. C. Liechty, C. S. Mabey, C. A. Mattson, J. L. Salmon, and J. M. Weaver, "Trade-off characterization between social and environmental impacts using agent-based product adoption models and life cycle assessment," *Journal of Mechanical Design*, vol. 145, no. 3, p. 032001, 2023.

T. Colton, **J. Liechty**, A. McLean, and N. Crane, "Influence of drop velocity and droplet spacing on the equilibrium saturation level in binder jetting," in *2019 International Solid Freeform Fabrication Symposium*, 2019. doi: 10.26153/tsw/17243.

Workshop Proceedings

J. C. Liechty, A. Belsare, Z. Karimi, J. Koster, D. Brown, and A. Kuntz, ""Hey Medbot": Toward Autonomous Assistants in Operating Rooms," presented at the ICRA Workshop on The Evolving Landscape of Surgical Robotics: Towards AI-Powered Unconventional Instruments and Technologies in the Operating Theatre, Atlanta, GA, USA, May 19, 2025.

J. Prime, **J. Liechty**, H. Zhang, J. Abbott, and E. Battaglia, "An exosuit to assist with arm swing in pathological gait," in *2023 IEEE World Haptics Conference (WHC)*, 2023.

Invited Talks

"Flow matching and generative modeling" Guest Lecture, Deep Learning Class, Univ. of Utah, Salt Lake City, UT, USA, Nov. 2025.

Mentoring

Undergraduate Students

Reynaldo Villarreal Zambrano – H-CHAR Lab

Jack Koster – Kuntz Lab

Simon Padgen –Kuntz Lab

Serena Wu – Ll4ma