

John F Morrow IV, PhD

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- **Accomplished System Integrator.** John has built/integrated a wide variety of systems including, a soft robot hand with liquid metal proprioception, a liquid silicone 3d printer, robot hands, a haptic interface for controlling robot manipulators, and a robot arm driven by an ACT policy. Able to get quickly up to speed with new technology.
- **Expert in breaking down and testing complex systems.** John's PhD was focused on breaking down robot manipulator systems to assess the contribution of a robot hand's morphology. Has also tested performance of additional custom industrial end effectors and three robot bin-picking manipulator systems. Able to quickly break down systems with the experience to know what will go wrong.

TECHNICAL EXPERIENCE

Amazon Robotics

Dec 2022 — Jan 2026

Postdoc, then Research Scientist/Test Engineer

- Led three person team to complete early R&D zero-to-one style projects for internal teams.
 - Built and demonstrated proof of concept bin picking robot using a UR10 in python, with a 2 million dollar entitlement.
 - Established testing methodologies and benchmarks, built testing rigs, and oversaw testing of complex end effector prototypes. These human-study based tests accelerated development trajectories of two core R&D by three months.
 - Led teams of third-party contractors to design a custom suction cup assembly and a novel bin picking robot.
 - Performed systematic evaluation of inventory to establish data-driven testing procedures and understanding, improving operational validation.
- Engineered a high-performance haptic teleoperation interface in python using Haply Inverse 3 devices, enabling low-latency control of a custom bi-manual system with kinesthetic force feedback. Advised by Ken Salisbury.
 - Designed a custom high performance grip controller for Haply Inverse 3 devices, in collaboration with Haply Robotics.
 - Performed human-factors styled tests to assess operator workload.
- Led a three-person team to execute large-scale human-in-the-loop data collection for behavior cloning methods (50 hours).
- Established testing methodologies and benchmarks and oversaw testing of a complex bi-manual robot built off of the Amazon Blue Jay robot platform.
 - Redesigned and implemented suction control software, reducing amnesty rates by 99% and reducing system complexity.
 - Optimized robot speed and suction force parameters, decreasing task completion times by 50%.

PhD: Studying Human Manipulation Strategies to Measure Robot Hand Design

2017 - 2022

Advisors: Cindy Grimm and Ravi Balasubramanian

- Characterized two-fingered robot hands for manipulative tasks using human study experiments and novel metrics, measuring the potential performance of hands without actuation or software [3, 4, 5, 6].
- Contributed human-expert data to train reinforcement learning models for basic in-hand manipulation skills.
- Managed/mentored masters and undergraduate students (30 students, cumulatively) across 4 lab projects.
- Organized and lectured Intro to Instrumentation (120 students, in-person) in Fall 2019 and Spring 2022. Managed 3 TAs.

Masters, Undergrad: Soft Robotics

2015-2017, 2012-2015

Advisors: Yigit Menguc, Dmitry Berenson

- Manufactured and designed custom soft robot hand with integrated liquid metal sensors [7]. Research under Dmitry Berenson.
- Prototyped a FDM printer capable of printing hollow silicone structures [2, 1, 8]. Masters work under Yigit Menguc.

Personal Projects

- *SO101 Arm* - used lerobot library to train an ACT policy to pick and place blocks.

EDUCATION

PhD in Robotics, Oregon State University

Nov. 2022

M.S. in Robotics, Oregon State University

Mar. 2018

B.S. in Robotics, Worcester Polytechnic Institute

May 2015

SKILLS

Hardware/Skills

Arduino • Raspberry Pi • 3D Printing • UR Robot Arms • Suction Cups • Haply Inverse 3 • Casting Silicone (Smooth-On) • EGaIn Sensor Fabrication • SO101 Arm

Software

Solidworks • ROS • Linux • Git • OBS • ArUco • LCM • $\LaTeX$ • Unity

Programming Languages

Python • C# • Julia • C++

REFERENCES

- [1] **J. Morrow**, S. Hemleben, and Y. Menguc. Directly fabricating soft robotic actuators with an open-source 3-d printer. *IEEE Robotics and Automation Letters*, 2(1):277–281, Jan 2017.
- [2] **John F. Morrow IV**. Direct 3d printing of silicone elastomer soft robots without support. Master’s thesis, Oregon State University, Corvallis, OR, 2018.
- [3] **John Morrow**. *A Novel Method for the Quantitative Assessment of Fingered Robot Hand Designs for In-Hand Manipulation using Human Studies and Object-Centric Benchmarks*. Phd thesis, Oregon State University, Corvallis, OR, November 2022. Available at https://ir.library.oregonstate.edu/concern/graduate_thesis_or_dissertations/4b29bf159.
- [4] **John Morrow**, Joshua Campbell, Ravi Balasubramanian, and Cindy Grimm. Benchmarking a robot hand’s ability to translate objects using two fingers. *IEEE Robotics and Automation Letters*, 7(1):588–593, 2021.
- [5] **John Morrow**, Joshua Campbell, Nuha Nishat, Ravi Balasubramanian, and Cindy Grimm. Measuring a robot hand’s graspable region using power and precision grasps, 2022.
- [6] **John Morrow**, Ammar Kothari, Yi Herng Ong, Nathan Harlan, Ravi Balasubramanian, and Cindy Grimm. Using human studies to analyze capabilities in underactuated and compliant hands in manipulation tasks. In *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE, 2018.
- [7] **John Morrow**, Hee-Sup Shin, Calder Phillips-Grafflin, Sung-Hwan Jang, Jacob Torrey, Riley Larkins, Steven Dang, Yong-Lae Park, and Dmitry Berenson. Improving soft pneumatic actuator fingers through integration of soft sensors, position and force control, and rigid fingernails. In *Robotics and Automation (ICRA), 2016 IEEE International Conference on*, pages 5024–5031. IEEE, 2016.
- [8] Osman Dogan Yirmibesoglu, **John Morrow**, Stephanie Walker, Walker Gosrich, Reece Aidan Canizares, Hansung Kim, Uranbileg Daalkhaijav, Chloe Fleming, Callie Branyan, and Yigit Menguc. Direct 3d printing of silicone elastomer soft robots and their performance comparison with molded counterparts. In *Proceedings of the 2018 IEEE/RAS International Conference on Soft Robotics*. IEEE, April 2018.