

John F Morrow IV, PhD

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Research Scientist

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Well-rounded Robotics Scientist. John's background encompasses the practical skills needed for prototyping robotic systems: mechanical design and validation, electronics hardware knowledge, coding software packages and robot controllers, systems thinking and practice, holistic systems debugging and integration experience. John's previous experience in an early R&D lab showed him that research science is an area where he thrives.

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

TECHNICAL EXPERIENCE

Research Scientist at Amazon Robotics Jan 2025 — Present
under Andy Marchese through Apex Systems

- Led development, execution, and analysis of bi-weekly testing of a multi-robot pick system.

Postdoc at Amazon Robotics Dec 2022 - Dec 2024
under Beth Marcus. Advised by Ken Salisbury

- Led three person team to complete three early R&D zero-to-one style projects focused on robot pick and place.
- Developed early-stage prototype benchmarking procedures currently used by two end effector teams.
- Adjusted development trajectories of two end effector projects after running characterization studies.
- Kick-started multi-robot picking initiatives using human pick and manipulation studies.
- Analyzed itemsets for five robot picking projects.
- Led third party contractors (Helbling Inc) on two projects.
- Invented two custom hardware solutions with external vendors.

PhD: Studying Human Manipulation Strategies to Measure Robot Hand Design 2017 - 2022
Advisors: Cindy Grimm and Ravi Balasubramanian

- Pinpointed improvements to underactuated hands for manipulative tasks using human study experiments [6].
- Developed Asterisk Test metric to assess in-hand manipulation performance of robot hands [4].
- Designed human-intuitive measurements to communicate graspable region of a hand and actuation space [5].
- Assessed a robot hand's performance potential using the above metrics and human study design for robot hands [3].
- Contributed human-expert data to train reinforcement learning models for basic in-hand manipulation skills.

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.
- Developed a prototype FDM printer capable of printing hollow structures out of silicone with no support [2, 1, 8]. Master thesis level work under Yigit Menguc.

Other Management and Mentoring

- PhD* - Managed/mentored masters and undergraduate students (30 students, cumulatively) across 4 lab projects.
- Organized and lectured ME351 (Instrumentation) in Fall 2019 (120 students, in-person) and Spring 2022 (100 students, hybrid teaching but primarily in-person). Managed a team of 3 Teaching Assistants. Developed lab curriculum.
- OSU Table Tennis Club President* - Increased club from 3 member avg attendance to 15. Grew annual club funding by 100%.

SKILLS

Hardware	Arduino • Raspberry Pi • 3D Printers • UR Robot Arms • Piab Suction Cups • Haply Inverse 3/3x Haptic Devices • Casting Silicone (Smooth-On) • EGaIn Sensor Fabrication • Basic Machining
Software	Solidworks • ROS • Linux • Git • OBS • ArUco • LCM • RTOS • \LaTeX • Markdown
Programming Languages	Python (+++) • C/C++/C# (++) • Julia (++) • Matlab (+)

CURRENTLY EXCITED ABOUT

- Robot Hand Design & Actuation with Suction and Fingers for Tasks in Home • Complex + Simple End-Effector Systems • Human Grasping and Manipulation Strategies • Shared-Autonomy Human in the Loop Control Paradigms for Robot Teleoperation
- Robotics Pedagogy • The Human Element in Robot Ethics

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.