Maegan Tucker

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EDUCATION

California Institute of Technology

PH.D. IN MECHANICAL ENGINEERING — 2017-2023(anticipated)

- Academic Advisor: Dr. Aaron D. Ames

M.S. IN MECHANICAL ENGINEERING — 2017-2019

- Overall GPA: 4.0/4.0

Georgia Institute of Technology

B.S. IN MECHANICAL ENGINEERING — 2012-2017

- Overall GPA: 3.8/4.0, Major GPA: 3.88/4.0

RESEARCH

Research Interests

- Robotic assistive devices, bipedal robotic locomotion, human-robot interaction, preference-based learning

Publications

[A.1] **Tucker, M.**, Novoseller, E., Kann, C., Sui, Y., Yue, Y., Burdick, J., & Ames, A. D. *"Preference-Based Learning for Exoskeleton Gait Optimization."* In 2020 IEEE International Conference on Robotics and Automation (ICRA), 2020.

Best Overall Paper Award (of 3,512 submissions) at ICRA 2020.
Best Paper in Human-Robot Interaction Award at ICRA 2020.

[A.2] Gurriet, T., **Tucker, M.**, Duburcq, A., Boeris, G., & Ames, A. D. *"Towards Variable Assistance for Lower Body Exoskeletons."* IEEE Robotics and Automation Letters, 5(1), 266-273.

[A.3] **Tucker, M.**, Cheng, M., Novoseller, E., Cheng, R., Yue, Y., Burdick, J. W., & Ames, A. D. *"Human Preference-Based Learning for High-dimensional Optimization of Exoskeleton Walking Gaits."*In 2020 IEEE International Conference on Intelligent Robots and Systems (IROS), 2020.

[A.4] **Tucker, M.**, Csomay-Shanklin, N., Ma, W., & Ames, A. D. *"Preference-Based Learning for User-Guided HZD Gait Generation on Bipedal Walking Robots"* In 2021 IEEE International Conference on Robotics and Automation (ICRA), 2021.

[A.5] Li, K., **Tucker, M.**, Bıyık E., Novoseller, E., Burdick. W. J., Sui, Y., Sadigh, D., Yue, Y., & Ames, A. D. *"ROIAL: Region of Interest Active Learning for Characterizing Exoskeleton Gait Preference Landscapes."* In 2021 IEEE International Conference on Robotics and Automation (ICRA), 2021.

Submitted Papers

[B.1] **Tucker, M.**, et al. "Restoring Locomotion for People with Paraplegia: From Theorems to Dynamic Exoskeleton Walking." Under Review.

[B.2] Csomay-Shanklin, N., **Tucker, M.**, et al. "Learning Controller Gains on Bipedal Walking Robots via User Preferences" Under Review.

Posters

[C.1] "Preference-Based Learning for Dynamic Bipedal Locomotion." at Dynamic Walking 2021. Abstract, Poster

Patents

[D.1] Provisional patient (full patent in progress): Real-Time Feedback Module For Assistive Gait Training, Improved Proprioception, And Fall Prevention (CIT 8048-P)

Funding and Grants

- NSF Graduate Research Fellowship (Awarded 2019): one of 2,000 awarded of 13,000 applicants. Fellowship consists of three-year annual stipend of $34,000 along with a $12,000 cost of education allowance for tuition and fees (paid to the institution)
- Caltech Mechanical and Civil Engineering Department *Big Ideas Fund*: One year grant for research focused on developing a soft ankle exoskeleton
- Theodore Y. Wu Graduate Fellowship: Graduate Tuition and Stipend for the 2017 Academic year.

Teaching Experience

- Teaching assistant for CDS 131: Linear Systems Theory (Fall 2018)

Teaching Workshops

- STEMulate Learning Workshop: Closing the Gaps in Mathematics (October 6, 2020)
- Caltech Rise Program: Creating Math Skills Worksheets (January 29, 2020)

Academic Workshops

- ME Rising Stars Workshop (hosted by Berkeley), October 2, 2020

Undergraduate Advising

- Jesus Hernandez (Caltech Summer Undergraduate Research Fellowship (SURF) student, Summer 2018)
- Annabel Gomez (Caltech Freshman Summer Research Institute (FSRI) student, Summer 2019)
- Diana Frias Franco (FSRI student, Summer 2019)
- Allison Cheng (SURF student, Summer 2019)
- Paulina Ridland (SURF student, Summer 2019)
- Sofia Kwok (SURF student, Summer 2019)
- Lorenzo Shaikewitz (SURF student, Summer 2020)
- Toussaint Pegues (SURF student, Summer 2020)
- Toussaint Pegues (SURF student, Summer 2021)
- Neil Janwani (SURF student, Summer 2021)
- Ozioma Ozor-Ilo (WAVE student, Summer 2021)

Media Mentions

Personal:

- Caltech Graduate Admissions Page, "Meet our Students!", Accessed July 4 2021: link
- The Caltech Breakthrough Campaign, "The Math of Human + Machine", Nov 18 2019: link
- Women Doing Science, Oct 14 2019: Facebook link Instagram Link

Research:

- CNBC, "How robots are replacing wheelchairs to help people with disabilities walk again", May 30 2020: link
- IEEE Spectrum, "Caltechs Brain-Controlled Exoskeleton Will Help Paraplegics Walk", Jan 6 2020: link

Honors and Awards

- **Conference Awards:** Best Overall Paper ICRA 2020. Best Paper in Human-Robot Interaction ICRA 2020.
- **NSF Graduate Research Fellowship Program:** Awarded 2019
- **NSF Graduate Research Fellowship Program:** Honorable Mention 2017
- **Presidents Undergraduate Research Salary Award (Spring 2017):** $1500 student research stipend
- **First Place for overall presentation** among 40 students in Georgia Techs S.U.R.E. REU program (Summer 2016).

Industry Experience

Mechanical Engineering Co-op at NCR Corporation (Fall 2014, Summer 2015, Spring 2016)

- Completed 3 full-time semester rotations working closely with a 5-person hardware engineering team.
- Contributed to the design, testing, manufacturing and release of 3 new Point of Sale (POS) terminals.

DEI Efforts

- Caltech Rise Tutoring: Volunteer for 2 hours every week tutoring local high-school girls in math and science. (2017-Current)
- Outreach Chair for Caltech Department of Mechanical and Civil Engineering (2020-Current)
- Muir High School Engineering Week Panelist: Presented my research journey to a group of 12 high-school students pursuing careers in STEM, followed by a 30 minute QA session. (February 17, 2021)
- Engineering and Applied Sciences (EAS) Graduate Student Council (GSC) Member: Division-wide student council comprised of 2-3 peer-nominated student leaders from each EAS department. The council meets once per quarter and is tasked with providing a communication channel from the student body to the EAS leadership. (2021-Current)

Skills

- Programming Languages: Experienced - MATLAB, C++; Familiar - Python, Bash, HTML
- Modeling Software: Solidworks, AutoCad, Inventor, ProEngineer (Creo)
- Graphical Software: Inkscape, Adobe After Effects
- Machining: Certified to operate the Caltech Machine Shop (CNC Milling, Lathe, Waterjet, Vertical Band Saw, etc.)
- Languages: Native - English, Proficient - French