Tess Hellebrekers

Full-stack roboticist. Starting in mechatronics and systems, continuing to teleoperation and data collection, up through policy training and deployment.

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🌲 Redmond, Washington

EXPERIENCE

Meta (Redmond) — *Research Scientist*
March 2022 - **PRESENT**

- Developed human2robot perception pipeline, learning dexterity from human videos
- Designed, built, integrated palmar tactile sensing glove
- Contributed to team-wide stack for Franka Research 3 and Allegro Hand with teleoperation
- Managed 7 interns towards peer-reviewed publication

Meta (Pittsburgh) — *Postdoctoral Researcher*
August 2020 - March 2022 with Dr. Abhinav Gupta

- Design and integration of contact microphone in Hearing Touch, audio pre-training for manipulation
- Built and collaborated on three custom robot systems - D'Manus, DragonClaw, and Delta robots

Carnegie Mellon University — *Researcher*
August 2016 - May 2020 with Dr. Carmel Majidi

- Initiated and developed soft magnetic tactile sensor for contact localization and 3-axis force estimation
- Multimodal sensing skin for shape-memory soft gripper with liquid-metal
- Cross-university team for chemical sensing with E.Coli cells and a soft gripper

Carnegie Mellon University — *Visiting Researcher*
May 2015 - August 2015 with Dr. Yong-lae Park

- Mechanical characterization and electronic design for fiber optic soft sensors

Georgia Institute of Technology — *Visiting Researcher*
May 2014 - August 2014 with Dr. Andrea Thomaz

- Integrated local Meka robot into website for remote control and accessible operators towards data collection infrastructure

EDUCATION

Carnegie Mellon University
Ph.D. in Robotics

School of Computer Science
Robotics Institute
August 2016 - May 2020

Thesis: Soft Sensor Design, Fabrication, and Integration for Robotic Systems

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University of Texas at Austin

B.S. Biomedical Engineering
August 2012 - May 2016

SKILLS

Robotics: ROS2, teleoperation

ML/AI: Pytorch, wandb

Software: Python, C/C++, MATLAB

Firmware: STM32, ARM Cortex
Hardware: Altium, CircuitMaker

Rapid prototyping: 3D printing, machining, CO2 and UV lasers

Modeling: Solidworks

Misc: Project management, cross-team and university collaborations, resource allocation

Selected Publications

Representation Learning

- Bhirangi, Raunaq, Chenyu Wang, Venkatesh Pattabiraman, Carmel Majidi, Abhinav Gupta, **Tess Hellebrekers**, and Lerrel Pinto. "Hierarchical state space models for continuous sequence-to-sequence modeling." (ICML 2024).
- Mejia, Jared, Victoria Dean, **Tess Hellebrekers**, and Abhinav Gupta. "Hearing Touch: Audio-Visual Pretraining for Contact-Rich Manipulation." (ICRA 2024)

Reinforcement/Imitation Learning

- Bhirangi, Raunaq, Venkatesh Pattabiraman, Enes Erciyes, Yifeng Cao, **Tess Hellebrekers**, and Lerrel Pinto. "Anyskin: Plug-and-play skin sensing for robotic touch." arXiv preprint arXiv:2409.08276 (2024).
- Yin, Jessica, Haozhi Qi, Jitendra Malik, James Pikul, Mark Yim, and **Tess Hellebrekers**. "Learning in-hand translation using tactile skin with shear and normal force sensing." arXiv preprint arXiv:2407.07885 (2024).

Sensors and Systems

- Bhirangi, Raunaq, Abigail DeFranco, Jacob Adkins, Carmel Majidi, Abhinav Gupta, **Tess Hellebrekers**, and Vikash Kumar. "All the Feels: A dexterous hand with large-area tactile sensing." IEEE Robotics and Automation Letters (2023).
- Patil, Sarvesh, Tony Tao, **Tess Hellebrekers**, Oliver Kroemer, and F. Zeynep Temel. "Linear delta arrays for compliant dexterous distributed manipulation." In 2023 IEEE International Conference on Robotics and Automation (ICRA), pp. 10324-10330. IEEE, 2023.
- Bhirangi, Raunaq, **Tess Hellebrekers**, Carmel Majidi, and Abhinav Gupta. "Reskin: versatile, replaceable, lasting tactile skins." In 5th Annual Conference on Robot Learning. 2021.
- **Hellebrekers, Tess**, Kevin Zhang, Manuela Veloso, Oliver Kroemer, and Carmel Majidi. "Localization and force-feedback with soft magnetic stickers for precise robot manipulation." In 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), pp. 8867-8874. IEEE, 2020.
- Chin, Keene, **Tess Hellebrekers**, and Carmel Majidi. "Machine learning for soft robotic sensing and control." Advanced Intelligent Systems 2, no. 6 (2020): 1900171.
- **Hellebrekers, Tess**, Nadine Chang, Keene Chin, Michael J. Ford, Oliver Kroemer, and Carmel Majidi. "Soft magnetic tactile skin for continuous force and location estimation using neural networks." IEEE Robotics and Automation Letters 5, no. 3 (2020): 3892-3898.
- **Hellebrekers, Tess**, Oliver Kroemer, and Carmel Majidi. "Soft magnetic skin for continuous deformation sensing." Advanced Intelligent Systems 1, no. 4 (2019): 1900025.
- Justus, Kyle B., **Tess Hellebrekers**, Daniel D. Lewis, Adam Wood, Christian Ingham, Carmel Majidi, Philip R. LeDuc, and Cheemeng Tan. "A biosensing soft robot: Autonomous parsing of chemical signals through integrated organic and inorganic interfaces." Science Robotics 4, no. 31 (2019): eaax0765.