Patrick Grady

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Education

Georgia Institute of Technology *PhD Robotics*

Georgia Institute of Technology *MS Computer Science - Machine Learning*

Duke University

BS Computer Science, BS Electrical and Computer Engineering

Atlanta, GA 2018-Dec 2023 est.

Atlanta, GA 2018-2020

Durham, NC 2014-2018

Publications

- Visual Contact Pressure Estimation for Grippers in the Wild Jeremy A. Collins, Cody Houff, Patrick Grady, Charles C. Kemp, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2023
- Visual Estimation of Fingertip Pressure on Diverse Surfaces using Easily Captured Data Patrick Grady, Jeremy A. Collins, Chengcheng Tang, Christopher D. Twigg, James Hays, Charles C. Kemp, arXiv 2023
- Force/Torque Sensing for Soft Grippers using an External Camera Jeremy A. Collins, Patrick Grady, Charles C. Kemp, IEEE International Conference on Robotics and Automation (ICRA) 2023
- BodyPressure Inferring Body Pose and Contact Pressure from a Depth Image Henry M. Clever, Patrick Grady, Greg Turk, Charles C. Kemp, IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI) 2023
- Visual Pressure Estimation and Control for Soft Robotic Grippers Patrick Grady, Jeremy A. Collins, Samarth Brahmbhatt, Christopher D. Twigg, Chengcheng Tang, James Hays, Charles C. Kemp, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2022
- PressureVision: Estimating Hand Pressure from a Single RGB Image Patrick Grady, Chengcheng Tang, Samarth Brahmbhatt, Christopher D. Twigg, Chengde Wan, James Hays, Charles C. Kemp, European Conference on Computer Vision (ECCV) 2022, Oral
- ContactOpt: Optimizing Contact to Improve Grasps Patrick Grady, Chengcheng Tang, Christopher D. Twigg, Minh Vo, Samarth Brahmbhatt, Charles C. Kemp, Conference on Computer Vision and Pattern Recognition (CVPR) 2021, Oral
- Masked Reconstruction based Self-Supervision for Human Activity Recognition Harish Haresamudram, Apoorva Beedu, Varun Agrawal, Patrick Grady, Irfan Essa, Judy Hoffman, Thomas Ploetz, Ubiquitous Computing/International Semantic Web Conference (UbiComp/ISWC) 2020
- Learning to Collaborate from Simulation for Robot-Assisted Dressing Alexander Clegg, Zackory Erickson, Patrick Grady, Greg Turk, Charles Kemp, C. Karen Liu, IEEE Robotics and Automation Letters (RA-L) 2020
- A Study of Energy Losses in the World's Most Fuel Efficient Vehicle Patrick Grady, Gerry Chen, Shomik Verma, Aniruddh Marellapudi, Nico Hotz, IEEE Vehicle Power and Propulsion Conference (VPPC) 2019, Oral

Technical Experience

Healthcare Robotics Lab

Advised by Charlie Kemp, co-advised by James Hays

- Developed computer vision algorithms for visually estimating contact and pressure for human hands
- Developed closed-loop robotic grasping and manipulation algorithms using visually inferred tactile information
- Generated 3D human body model fits from depth imagery using optimization
- Transferred deep RL policies from sim-to-real for robot-assisted dressing

Meta Reality Labs

Research Intern with Chengcheng Tang

- Developed methods for estimating hand pressure from single RGB images. Designed multi-view camera cages, collected datasets of diverse participants manipulating force-sensitive objects, developed deep models
- Developed methods for inferring hand-object contact for grasps and optimization methods to enforce physical consistency and achieve high-quality poses

Summer 2020, Summer 2021, Summer 2022

2019 - cur

Duke Electric Vehicles

President (2016-2018), Electrical Lead (2014-2016)

- Guinness World Record: Most efficient electric vehicle: 27,482 MPGe (battery-electric). Previous record, 2016 TU Munich
- Guinness World Record: Most fuel-efficient vehicle: 14,573 MPG (hydrogen fuel cell). Previous record, 2005 ETH Zurich
- Led team of 15 undergraduates to design battery and fuel cell powered vehicles for the Shell Eco-Marathon
- Led two year initiative to push the team past Eco-Marathon competition, to seek and achieve two World Records
- Vehicle designer, high level architect of vehicle powertrain and aerodynamics. Justified with extensive simulation and real-world testing

NVIDIA Circuits Research Group

Research Intern

- Benchmarked high-speed signalling test chips for for next-gen memory-to-GPU communications
- Developed automatic optimization to minimize bit error-rate of 25 Gbps ground-referenced link
- Designed setup for characterization of SRAM devices in high-radiation environments

Shell Eco-Marathon: First place battery-electric prototype. Best of 30 teams

ACM IC Programming Contest: 5th of 180 teams in Mid-Atlantic conference

Media Coverage: [Clean Technica] [News and Observer] [Killer Innovations] [Duke Chronicle]

Georgia Tech CreateX: Idea2Prototype grant

FAA Private Pilot: Glider, Airplane

Microsoft Code Competition: Winner. Best of 30 teams

Soaring Records: Holder of 11 Georgia state soaring records

HackMIT: Winner

HackDuke: Winner

Teaching Experience

Invited Talks	
• Sensing Touch from Vision for Humans and Robots. Amazon Lab126	August 2023
• Sensing Touch from Vision for Humans and Robots. Carnegie Mellon University	May 2023
• 14,500 MPG: Design of the World's Most Fuel Efficient Vehicle. Duke University	Feb 2019
Visiting Lecturer	
Politeknik Brunei, Brunei	<i>Mar</i> 2019
 Invited to host tutorial on design and integration of BLDC motor drives 	
Graduate Teaching Assistant	
• CS 6601 - Artificial Intelligence	Fall 2020
• CS 7463 - Deep Learning	Spring 2020
• CS 6476 - Computer Vision	Fall 2019
• ECE 3072 - Electrical Energy	Fall 2018
Undergraduate Teaching Assistant	
 ECE 110 - Fundamentals of Electrical and Computer Engineering 	Spring 2016
• ECE 230 - Microelectronic Devices and Circuits, Projects Lab	Fall 2016
Awarda	
Awarus	
Reviewer: CVPR, ECCV, ICCV, ICRA, IROS, TPAMI, 3DV, WACV	
Finalist: Meta PhD Research Fellowship	2022
Guinness World Record: Most efficient electric vehicle, 27,482 MPG	2019
Guinness World Record: Most fuel efficient vehicle, 14,573 MPG	2018
Shell Eco-Marathon: First place battery-electric prototype. Best of 25 teams	2018
Shell Eco-Marathon: First place hydrogen prototype. Best of 7 teams	2018

Summer 2017

2017

2019

2016

2015

2015, 2017 2015

2014, 2021