

Patrick Grady

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Education

Georgia Institute of Technology <i>PhD Robotics</i>	Atlanta, GA 2018- <i>cur.</i>
Georgia Institute of Technology <i>MS Computer Science - Machine Learning</i>	Atlanta, GA 2018-2020
Duke University <i>BS Computer Science, BS Electrical and Computer Engineering</i>	Durham, NC 2014-2018

Publications

- *BodyPressure - Inferring Body Pose and Contact Pressure from a Depth Image* - Henry M. Clever, **Patrick Grady**, Greg Turk, Charles C. Kemp, *under review*
- *ContactOpt: Optimizing Contact to Improve Grasps* - **Patrick Grady**, Chengcheng Tang, Christopher D. Twigg, Minh Vo, Samarth Brahmabhatt, 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

Facebook Reality Labs Research

Research Intern, Nimble VR

Summer 2020, Summer 2021

- Designed protocol and multi-view RGB-D camera cage, collected a dataset of diverse participants manipulating force-sensitive objects
- Developed methods for inferring hand-object contact for grasps and optimization methods to enforce physical consistency and achieve high-quality poses

Healthcare Robotics Lab

Graduate Research Assistant with Dr. Charlie Kemp

2019 - cur

- Generation of hand-object grasp contact maps from soft-body physics simulation
- Simulation-to-real transfer of Deep RL policies for robot-assisted dressing
- Generation of high-quality fits of human body meshes to depth imagery from SLP dataset

Duke Electric Vehicles

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

2014 - 2018

- **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

Summer 2017

- 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

Cummer Lab

Undergraduate Research Assistant

2017 - 2018

- Developed 4D imaging of lightning strikes using wide-bandwidth interferometry

Teaching Experience

Visiting Lecturer

Politeknik Brunei, Brunei

Mar 2019

- Invited to host tutorial on design and integration of BLDC motor drives

Invited Talks

- *14,500 MPG: Design of the World's Most Fuel Efficient Vehicle.* Duke University

Feb 2019

Graduate Teaching Assistant

- CS 6601 - Artificial Intelligence
- CS 7463 - Deep Learning
- CS 6476 - Computer Vision
- ECE 3072 - Electrical Energy

Fall 2020

Spring 2020

Fall 2019

Fall 2018

Undergraduate Teaching Assistant

- ECE 110 - Fundamentals of Electrical and Computer Engineering
- ECE 230 - Microelectronic Devices and Circuits, Projects Lab

Spring 2016

Fall 2016

Selected Projects

Next-gen Variometers for Gliders using Inertial Sensing

Mid-Georgia Soaring Association

2020

- Developed RTK-INS for high-precision sensing of aircraft orientation and velocity
- Integrated INS into a high-performance glider, collected 30 hours of flight data
- Designed sensor fusion filters to exceed performance of current-gen barometric variometers

Online Imitation Learning for Warm-Starting of DQN

CS 8803 Class Project [\[Link\]](#)

2019

- Developed RL agent to play OpenAI Gym car racing environment
- Leveraged experience of an oracle agent to accelerate training of Deep Q Network
- Achieved human-level performance with 6x fewer training episodes

EasyController2 BLDC Motor Drive

Duke Electric Vehicles

2019

- Released open source design of BLDC motor controller, PCB and code
- Supported 7 international teams using the EasyController2 as a reference design

Awards

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

Shell Eco-Marathon: First place battery-electric prototype. Best of 30 teams 2017

Georgia Tech CreateX: Idea2Prototype grant 2019

HackMIT: Winner 2016

HackDuke: Winner 2015

Microsoft Code Competition: Winner. Best of 30 teams 2015, 2017

ACM IC Programming Contest: 5th of 180 teams in Mid-Atlantic conference 2015

FAA Private Pilot: Glider, Single Engine Airplane

Soaring Records: Holder of 11 Georgia state soaring records

Media Coverage: [\[Clean Technica\]](#) [\[News and Observer\]](#) [\[Killer Innovations\]](#) [\[Duke Chronicle\]](#)