



Gerry Chen

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OVERVIEW

Interested in robotics perception and computer vision. Duke University class of 2019.

EDUCATION

Duke University

08/2015 to 05/2019

Pratt School of Engineering

BSE Electrical & Computer Engineering, BSE Mechanical Engineering, Math (minor)

3.87/4.00 cumulative GPA, Dean's List every semester

RESEARCH EXPERIENCE

Power Electronics

08/2018 to Present

Duke University - Dr. Stefan Goetz and Dr. Angel Peterchev

- Implementing FOC motor controller using modular multilevel series-parallel converter to reduce noise and losses
- Thermal analysis of battery/converter modules for use in automotive setting
- Electrical losses analysis for MOSFET selection in converter modules

Fuel Cell Hybrid Vehicle

08/2017 to 05/2018

Duke University - Dr. Josiah Knight and Dr. Nico Hotz

- Optimization of fuel cell operating parameters for use in hybrid vehicle to achieve 58.9% in-system efficiency (increase from baseline efficiency of 40%)
- Design and optimization of voltage converter for active supercapacitor load power leveling system resulting in 22% higher efficiency
- Writing papers for fuel cell optimization, hybrid system integration, and vehicle system level design

Robotics Motion Planning

01/2017 to 05/2018

Intelligent Motion Laboratory - Dr. Kris Hauser

- Applied convolution-based image similarity metrics for database assisted vehicle path planning
- Fabricated silicon and polyurethane cornea models with <50um repeatability for use in surgical robot testing
- Submitted joint paper to IEEE International Conference on Robotics and Automation 2018 (Accepted 01/12/2018) - work funded by NSF Research Experiences for Undergraduates (REU) to implement a Precision Positioning Unit (PPU) on the Tele-Robotic Intelligent Nursing Assistant (TRINA)
- Fabricated polyurethane "finger" tip with integrated tactile sensor and 95.7% actuation success rate

EXTRACURRICULAR ACTIVITIES

Co-President

08/2015 to Present

Duke Electric Vehicles Team

- World Record (2018): World's most fuel efficient vehicle
- Leading creation of a fully autonomous vehicle to allow the vehicle to follow a "total system energy" optimized path subject to physical control constraints
- Leading effort towards World's most efficient electric vehicle (2019)
- Co-lead hydrogen fuel cell hybrid vehicle for 2018 to achieve 14,573 MPGe
- Design + Manufacture + Test the high power super-capacitor control board to increase vehicle efficiency by 22%
- Create an automated testing system resulting in fuel cell efficiency increase from 40% to 63%
- Design + Manufacture + Install the carbon fiber inserts to decrease weight and increase modularity
- 2018: 1st place H2, 1st place battery-electric (12,398 MPGe), Technical Innovation Award

Project Lead

01/2016 to 01/2018

Solar Benches

- Lead technical, financial, and administrative aspects of augmenting existing campus benches with solar powered night-time task lighting and laptop/phone chargers to raise enthusiasm for clean energy
- Installed 2 test benches on campus after passing safety inspection on an off-site prototype bench

WORK HISTORY

Controls Engineer Intern

05/2018 to 08/2018

Deka R&D - Dirk Van Der Merwe

- Developed novel 2-wheel balancing control scheme with constrained wheel displacement (patent pending)
- Created multi-system integration over CAN, EtherCAT, RS232 to create hybrid wheeled/legged robot
- Developed stability control of robot w/ powered casters + differential steering to test high speed dynamics

Robotics Motion Planning Intern

01/2017 to 05/2018

Intelligent Motion Laboratory - Dr. Kris Hauser

- Work on PPU for TRINA (see entry in Research Experience)
- Coded (Python, C++) and tested max. continuous range / min. manipulability arm configurations

Teaching Assistant

08/2016 to 05/2018

Duke University

- **EGR201:** Mechanics of Statics Fall 2017
- **ECE230:** Microelectronics Fall 2017
- **ECE230:** Microelectronics Summer 2017
- **EGR103:** Computational Methods in engineering Fall 2016
- **CS201:** Data structures and Algorithms Fall 2016

Tutor

05/2014 to Present

Multiple Employers

- Duke Academic Resource Center - group instruction:
 - Multivariable Calculus 08/2016 to Present
 - Linear Algebra 01/2017 to 01/2018
 - Differential Equations 01/2017 to 01/2018
- Duke Academic Resource Center - individual instruction:
 - Multivariable Calculus 08/2016 to 05/2017
 - Linear Algebra 08/2016 to 05/2017
 - Differential Equations 08/2016 to 05/2017
- America Reads America Counts at Duke 08/2015 to 06/2016
 - Durham Public Schools
 - Math + Reading
- Kumon Math and Reading Center of Fox Chapel 05/2014 to 08/2016
 - personalized curriculum generation for 40+ students
 - student performance evaluations

SKILLS

- Fluency in Matlab, Python, and C++
- Proficiency in Java, MATHEMATICA, L^AT_EX
- Embedded Software Development
- Path Planning + Classical Controls
- Eagle, SPICE, Solidworks, Autodesk Fusion
- Experimental design and sensor data acquisition

CONFERENCE PAPERS

1. F. Wang, G. Chen, and K. Hauser, “[Robot Button Pressing in Human Environments](#)”, *2018 IEEE International Conference on Robotics and Automation (ICRA)*. p 7173-7180 (2018).