David Russell

russeldj@clarkson.edu +1.603.454.8141 https://github.com/russelldj

EDUCATION

Clarkson University Anticipated Graduation May 2020
Pursuing B.S. in Computer Science (Honors)
Minor in Mathematics
GPA: **4.0**

RESEARCH

Undergraduate Researcher October 2019 - Present
Prof. Kathleen Kavanagh, Clarkson University

- Developing an optimization method for smoke detector placement on the International Space Station

Summer Scholar, Research Assistant June 2018 - December 2018
The Robotics Institute, Carnegie Mellon University

- Researched object tracking under the advisement of Prof. Martial Hebert, Robotics Institute Director
- Developed an approach for first-person video combining hand detection and visual object tracking
- Experimented with a tracking-by-detection approach and characterized the failure modes

Summer Scholar June 2017 - August 2017
The Robotics Institute, Carnegie Mellon University

- Developed an optimization-based shape sensing strategy for soft robots that used radio-frequency ID tags
- Collected and analyzed data from un-actuated soft robot models that I designed and built

Undergraduate Researcher June 2016 - May 2019
Profs. Sean & Natasha Banerjee, Clarkson University

- Used computer vision and statistical methods to analyze musicians' technique
- Created and analyzed thermally-textured point clouds to understand cookware warming patterns
- Improved a retrofit kit to synchronize multiple XBox Kinects for low-cost 3D motion capture

WORK EXPERIENCE

Intern May 2019 - August 2019
Computer Vision Group, Phantom AI

- Tested and debugged open source code for extrinsic calibration of multiple-camera rigs while driving
- Developed vehicle tracking algorithms for autonomous driving using cheap object detection features
- Created visualization and assessment scripts and implemented the most successful methods in C++

Research and Development Intern January 2018 - May 2018
Computer Vision Group, Kitware

- Trained classification and detection models in PyTorch and TensorFlow and analyzed the results
- Wrote Python scripts to understand annotated satellite imagery and create partitions for low-shot detection
- Tested an in-house structure from motion (SfM) program and compared it to competing methods

Teaching Assistant, Introduction to Programming Sept. 2017 - Dec. 2017 & Jan. 2019 - Present
Clarkson University

- Revise and deliver lectures on programming fundamentals and MATLAB usage
- Assist students in office hours and individually
- Grade homework and projects

Makerspace Mentor March 2019 - Present
Clarkson University
- Assist students and staff with projects using a variety of hand- and computer-aided tools
- Help develop best practices and determine which equipment to purchase

Tutor September 2016 - December 2017
Clarkson University
- Held group tutoring sessions for Calculus I, and Physics I & II

Shop Assistant June 2015 - August 2015
Dartmouth Thayer School of Engineering Machine Shop
- Worked with graduate students to teach material science labs for ENGs 3: Substances of Civilization
- Kept the shop clean, safe, and productive

PROJECTS

Computer Vision Developer September 2019 - Present
Autonomous Path Mapping Robot
- Conceptualizing and implementing the perception system to facilitate path following and map building
- Writing Python nodes within a ROS environment on an NVIDIA Xavier embedded GPU platform

Team Lead November 2018 - April 2019
Winner, Clarkson Internet of Things President's Challenge
- Organized a team of four to conceptualize and implement a system for understanding makerspace utilization
- Used keypoint detection on an embedded platform to infer and visualize people's location in the space
- Gave the final presentation and won out of 16 teams to obtain the grand prize of $7,000

TECHNICAL SKILLS

- Computer Vision
- Machine Learning
- Optimization
- Robotics
- Data Science
- Embedded Computing
- Python
- C++
- MATLAB
- C
- Java
- Haskell
- OpenCV
- ROS
- PyTorch
- Keras
- TensorFlow
- SciPy
- Linux
- GPU Stack
- Git
- Scripting

ACTIVITIES

Co-Assistant Managing Editor June 2018 - September 2018
RISS Working Papers Journal
- Orchestrated the peer review process for the Robotics Institute Summer Scholars Working Papers Journal
- Organized events for students to get writing assistance from peers, graduate students, and the writing center
- Developed guidelines for timelines, requirements, and best practices for future journal teams

Journal Team Member June 2017 - August 2017
RISS Working Papers Journal
- Helped organize events and determine timelines in addition to serving as a peer reviewer

Volunteer July 14th - 16th 2018
Robotics Science and Systems (RSS) Conference
- Checked in attendees, provided assistance to participants, and helped the conference run smoothly

Rower January 2019 - Present
Clarkson University Crew Team
- Elected men's team co-captain for the 2020 spring semester

Co-Webmaster Jan. 2017 - Dec. 2017 & Jan. 2019 - Present
Clarkson Honors Program
- Maintained and improved the Clarkson Honors Program website using PHP, MySQL, and security protocols

Student Ambassador January 2017 - May 2019
Clarkson Honors Program

- Led campus tours and conducted interviews with prospective Honors Program students

AWARDS & SCHOLARSHIPS

Barry Goldwater Scholarship — National undergraduate research award, 2018
James Lynch/Jan Searleman Sophomore Award for Computer Science — Clarkson University, 2018
Presidential Scholar — Clarkson University, All semesters
Clarkson School Award: Early college achievement award — Clarkson University, 2017
The Clarkson School Scholars Award — Clarkson University, 2017
Clarkson Merit Scholarship — Clarkson University, 2016
Honors Scholarship — Clarkson University, 2016

PUBLICATIONS

Y. Jiang, **D. Russell**, T. Godisart, N. K. Banerjee, and S. Banerjee (2018). "Hardware Synchronization of Multiple Kinects and Microphones for 3D Audiovisual Spatiotemporal Data Capture." International Conference on Multimedia and Expo (ICME).

M. Leotta, E. Smith, and **D. Russell** (2018). "TeleSculptor: Dense 3D Models from Uncalibrated FMV." Proceedings of the Military Sensing Symposium National Symposium on Passive Sensors. (Classified)

V. Roy, **D. Russell**, S. Chakrobarti, M. Hebert (2018). "Using Convolutional Neural Networks on Optical Flow for Visual Object Tracking." Robotics Institute Summer Scholars Working Papers Journal.

D. Russell, J. Bern, S. Coros (2017). "Generalizable Pose Estimation for Soft Robots Using RFID Sensing." Robotics Institute Summer Scholars Working Papers Journal.

PRESENTATIONS

"Hardware Synchronization of Multiple Kinects and Microphones for 3D Audiovisual Spatiotemporal Data Capture." Oral presentation delivered at IEEE International Conference on Multimedia and Expo (ICME). San Diego, CA. 2018.

"Using Optical Flows and a CNN for Visual Object Tracking." Poster co-presented at the Robotics Institute Summer Scholars program concluding presentation. Carnegie Mellon University. 2018.

"Generalizable Pose Estimation for Plush Robots Using RFID Sensing." Poster presented at the Robotics Institute Summer Scholars program concluding presentation. Carnegie Mellon University. 2017.

"Kintient: A Hardware Synchronized Multi-Sensor Capture Facility." Oral presentation delivered at Research and Project Showcase. Clarkson University. 2017.

"Synchronizing Xbox Kinects to Capture Human Motion and Other 3D Temporal Changes in Form." Oral presentation delivered at the Symposium for Undergraduate Research Experience. Clarkson University. 2016