JOSEPH W. CRANDALL
Email: josephcrandall@me.com
GitHub ID: jwcrandall | Website: josephcrandall.com
LinkedIn: www.linkedin.com/in/joseph-crandall-67003570 | ORCid: 0000-0002-9684-9214
Google Scholar: https://scholar.google.com/citations?user=gUec2noAAAAJ&hl=en

---

EDUCATION

The George Washington University, Washington, DC
Master of Science, Electrical Engineering — May 2019
Thesis*: Investigating Accuracy of the Reconfigurable Optical Computer (ROC) in Metatronics for Solving Partial Differential Equations*
Bachelor of Science, Computer Science and Physics — May 2017
Washington–Lee High School, Arlington, Virginia
International Baccalaureate Full Diploma — May 2012

PROFESSIONAL WORK EXPERIENCES

US Department of Defense, Data Scientist — April 2019 – Present
Clearance: Top Secret (TS) Accesses: Special Intelligence (SI) and Talent Keyhole (TK)

GW OPEN Lab Research Assistant, Washington D.C. — September 2017 – April 2019
http://sorger.seas.gwu.edu/
https://github.com/openhpclgw
Contacts: Dr. Sorger – sorger@gwu.edu

- Currently working on an optical array meant to improve upon a traditional all electric resistor array that is used to solve partial differential equations through analogue computation faster than with software by building fundamental physics equations into optical hardware. The initial problem we are trying to solve with ROC (Reconfigurable Optical Computer) is a Poisson heat transfer problem.

Result: Ongoing (Look at Publications)

ARUP Electrical Engineer Intern, Washington D.C. — June 2018 – August 2018
Contacts: Leyla Sadigh – leyla.sadigh@arup.com

- Over the course of the summer I worked on 11 different projects as well as spent time doing training activities. I was able to see and work on a majority of the steps associated with a wework project from site visit to completion of sheets. Through that work I spent a great deal of time working on floor plans and reflected ceiling plans. I helped to build a load calculation excel sheet that can be used with exported Revit data to benchmark the accuracy of initial load approximations.

Result: End of summer presentation https://www.youtube.com/watch?v=Q8VchT2CjtY

ITER External Contractor, Saint-Paul-les-Durance France — June 2017– July 2017
Nuclear fusion research and engineering summer internship
Contacts: Mr. Afzali – Lionel.Afzali@iter.org Dr. Moteleb – Moustafa.Moteleb@iter.org

- Worked in the Tokamak Cooling Water System Division (TCWS) at ITER, utilizing AFT Fathom software to simulate fluid flow and heat exchange in the Primary Heat Transfer System (PHTS) prior to and after exiting the Vacuum Vessel (VV) with the goal of achieving desired temperatures and pressures at different points in the PHTS.

Result: Submitted heat transfer report for TCWS to ITER central database.

Additive Manufacturing Research Assistant, Knoxville TN — July 2016 – August 2016
Higher Education Research Experience (HERE) at Oak Ridge National Laboratory
Contacts: Dr. List – listfaii@ornl.gov, Dr. LeBlanc – sleblanc@gwu.edu

- Milled stainless steel Bi_2Te_3 powder distribution system, accurate up to 100 micrometer powder layers, in order to validate the powder spreading component of an in development additive manufacturing selective laser melting system in order to manufacture more efficient Bi_2Te_3 based thermal electric converters.

Result: Developed powder bed system for selective laser melting

Nano-Technology Fellowship, Washington DC — May 2016 – July 2016
The George Washington University, paid through National Science Foundation
Contacts: Dr. LeBlanc – sleblanc@gwu.edu, Dr. Sorger – sorger@gwu.edu

- Etched microfluidic channels through soft lithography process
- Manufactured nanoscale electronic lattice through electron beam lithography and liftoff process on silicon wafers.
- Imaged electronic lattice with SEM and AFM

Result: Acquired a proficiency in clean room and imaging machinery

Robotics & Computer Vision Research Assistant, Washington DC September 2015 – May 2017
The George Washington University
Contacts: Dr. Simha – simha@gwu.edu, Dr. Choi - hchoi@gwu.edu

- Developing robotic arm and hand system to pair with automated turn table to manipulate plant growth over time to better image plant development point cloud sensory data.
- Funded through NSF to attend Internet of Things (IOT) security conference in, Seoul, South Korea January 2016

Result: Added robotic biological manipulation capability through Robotic Operating System (ROS)

TECHNICAL SKILLS

Programming/Markup Languages & Operating Systems

- Proficient with General Purpose Languages: Arduino, C, C++, Java, Mathematica, MATLAB, Python, and LaTex
- Proficient with Web Languages: CSS, HTML, JS, PHP
- Proficient with Operation Systems: Linux, Mac OS, ROS

Engineering Software

- Proficient with: Applied Flow Solutions (Fathom), AutoDesk (Revit), Cadence (Virtuoso), COMSOL (Multiphysics), Lumerical (Device, FDTD, Interconnect, Mode)

Imaging/Clean Room

- Proficient with tools in https://nic.gwu.edu/
    - Contacts: Yigal Lilach – yigall@gwu.edu

Robots Used

- Schuck LWA 4P
    - Contacts: Dr. Simha – simha@gwu.edu

PERSONAL PROJECTS

BRIEF (Biological Robotics Imaging and Experimentation Framework), Washington D.C. @ GW September 2016 – 2017
https://github.com/briefgw
Contacts: Joseph Crandall – jwcrandall@gwu.edu

- Currently working on a ROS based robot with a Gazebo simulation that is capable of imaging a sample via a point cloud from an Xbox Kinetic camera and then transforming it into a mesh with the goal of perceiving a plant sample and then manipulating it with a Schuck Light Weight Arm over an extended period of time as the plant grows.

Result: Ongoing https://github.com/briefgw

LEADERSHIP

Founder/Developer of Assistance.net, Arlington, Virginia February 2013 - December 2014
18-month Start Up

- Built a LAMP stack site using laravel framework (source code on GitHub)
- Developed business model for individual service provider market place website
- Organized team of developers; leased office space; incorporated in Delaware; negotiated contracts; set up physical server in Ashburn, Virginia; utilized AWS; produced promotional videos

Result: Weathered the challenges and life cycle of an internet startup

JOURNAL PUBLICATIONS

- Shuai Sun, Vikram K. Narayana, Ibrahim Sarpkaya, Joseph Crandall, Richard A. Soref, Tarek Ei-Ghazawi, Volker J. Sorger, "Hybrid Photonic-Plasmonic Non-blocking Broadband 5x5 Router for Optical Networks", IEEE Photonics Journal 2017.

CONFERENCE TRASACTIONS/PROCEEDINGS

- Tarek El-Ghazawi, Volker Sorger, Vikram K. Narayana, Jeff Anderson, Engin Kayraklioglu, Shuai Sun, Joseph Crandall, Yousra Alkabani, "Reconfigurable Optical Computer for Simulation of Physical Processes" April 6th 2018, 51st International Symposium on Microarchitecture
- N. Batista, A. El Desouky, J. Crandall, S. Wang, J. Yang, S. LeBlanc, "Powder metallurgy characterization of thermoelectric materials for selective laser melting" March 2017 TechConnect World Innovation Conference

CONFERENCES/WORKSHOPS/PRESENTATIONS

2019 Laboratory for Physical Sciences (LPS) High Performance Computing and Data Analytics Workshop September 10-11, 2019
Maryland, US

- Topics, Tensor Analytics, Graph Analytics, Tensor + Graph Analytics, Architecture Trends, Programming & Productivity Trends, Runtime Systems

2018 PIC International Conference April 10-11th 2018
Brussels, Belgium

Creating and strengthening links between chipmakers and network builders for the photonic integrated circuit industry.

2018 AIM Photonics Winter Academy January 16-18th 2018
MIT Cambridge Massachusetts

- A three day program with intensive short courses on integrated photonics: materials, devices, photonic integrated circuit layout, and chip fabrication.

2017 GW Research Days Showcase April 4th 2017
Washington, D.C.

- Presented poster titled "Particle Morphology Characterization of Bismuth Telluride (Bi_2Te_3) Powder for Additive Manufacturing"

2017 GW SEAS R&D Showcase February 22 2017
Washington, D.C.

- Presented poster titled "Particle Morphology Characterization of Bismuth Telluride (Bi_2Te_3) Powder for Additive Manufacturing"

2016 Quadrennial Physics Congress November 3 – 5 2016
San Francisco, California

- Presented poster titled "Particle Morphology Characterization of Bismuth Telluride (Bi_2Te_3) Powder for Additive Manufacturing"
- Toured Stanford Linear Accelerator Center

KISA-George Washington Univ. Joint Seminar on IoT Security January 7 – 9 2016
Seoul, Korea

- Assisted in presentation on Authentication on Internet of Things (IoT) covering low complexity scalable authentication framework suitable for low power IoT environments and applications.
- Toured Korean Internet & Security Agency

TEACHING

Teaching Assistant CSCI 3313 Foundations of Computing Fall 2018 & Fall 2017
The George Washington University
Professor: Hyeong-Ah Choi hchoi@gwu.edu
Students: 49(18), 45(17)
https://github.com/jwcrandall/csci3313

- Theoretical: Automata Theory, Computability (solvable vs unsolvable problems), Complexity (computational easy vs. hard problems), Formal language theory, Chomsky Hierarchy (Regular languages, Context-free languages, Context-sensitive languages, Recursively enumerable languages)
- Laboratory: Write a mini-pascal compiler using Flex and Bison, and C

Teaching Assistant CSCI 1121.10 Introduction to C Programming Spring 2018
The George Washington University
Professor: Anrieta Draganova anri@gwmail.gwu.edu
Students: Total - 101 My Lab – 23
https://github.com/jwcrandall/GA_CSCI_1121_Intro_C_Prog

- Theoretical: Structured programming with the C language. Control structures. Data types. Upe of pointers. Matrix manipulation to solve simultaneous equations. External subroutines for mathematical and graphical applications. Introduction to C complex number representation.

GRADUATE MERIT AWARDS

$6,000 GW Electrical Engineering Graduate Research Assistantship	February 2019 - April 2019
$11,520 GW Graduate Assistantship Stipend Fellowship	September 2018 - May 2019
$2,400 GW Graduate Assistantship Tuition Fellowship	September 2018 – December 2018
$4,200 GW Electrical Engineering, Stipend Research Fellowship	June 2018 - December 2018
$4,200 GW Electrical Engineering, Stipend Research Fellowship	November 2017-May 2018
$12,000 GW Computer Science, Stipend Fellowship	September 2017 – May 2018
$4,000 GW Computer Science, Graduate Assistantship	September 2017 – May 2018
$1,500 GW Electrical Engineering, Stipend Fellowship	June 2017 – August 2017
$1,500 GW ECE, Stipend Fellowship	June 2017 – August 2017

LANGUAGE SKILLS

English – native speaker
Spanish – intermediate (reading and speaking) basic (writing)

ACTIVITIES

- Rower and Member, Potomac Boat Club July 2015 - Present