

**JOSEPH W. CRANDALL**

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Google Scholar: <https://scholar.google.com/citations?user=gUec2noAAAAJ&hl=en>

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**CURRENT EMPLOYER**

**United States Department of Defense, Data Scientist**

April 2019 – Present

Clearance: Active Top Secret / Sensitive Compartmented Information (TS/ SCI) with full-scope polygraph (FSP) and Special Intelligence (SI) and Talent Keyhole (TK) access

**EDUCATION**

**The George Washington University**, Washington, DC

Master of Science, Electrical Engineering (Thesis: Investigating Accuracy of the Reconfigurable Optical Computer (ROC) in Metatronics for Solving Partial Differential Equations)

May 2019

Bachelor of Science, Computer Science and Physics

May 2017

**Washington–Lee High School**, Arlington, Virginia

International Baccalaureate Full Diploma

May 2012

**TECHNICAL SKILLS**

**Programming/Markup Languages & Operating Systems**

- Proficient with General Purpose Languages Arduino, C, C++, Java, Python, LaTeX, Wolfram Language
- Proficient with Web Languages CSS, HTML, JS, PHP | Proficient with Operation Systems Linux, Mac OS, ROS
- Beginner with MATLAB

**Engineering Software**

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

**Robots Used**

- Schuck LWA 4P

**PRIOR PROFESSIONAL AND INTERNSHIP EXPERIENCE**

**GW OPEN Lab Research Assistant**, Washington D.C.

September 2017- April 2019

<http://sorger.seas.gwu.edu/>

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

**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– August 2017

Nuclear fusion research and engineering summer internship

Contacts: Mr. Afzali – [Lionel.Afzali@iter.org](mailto:Lionel.Afzali@iter.org) Dr. Moteleb – [Moustafa.Moteleb@iter.org](mailto:Moustafa.Moteleb@iter.org)

- Worked in the Tokamak Cooling Water System Division (TCWS), 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 – [lstfaii@ornl.gov](mailto:lstfaii@ornl.gov), Dr. LeBlanc – [sleblanc@gwu.edu](mailto:sleblanc@gwu.edu)

- Milled stainless steel Bi<sub>2</sub>Te<sub>3</sub> 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<sub>2</sub>Te<sub>3</sub> 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](mailto:sleblanc@gwu.edu), Dr. Sorger – [sorger@gwu.edu](mailto: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 - Present

The George Washington University

Contacts: Dr. Simha – [simha@gwu.edu](mailto:simha@gwu.edu), Dr. Choi - [hchoi@gwu.edu](mailto: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)

## PERSONAL PROJECTS

**BRIEF (Biological Robotics Imaging and Experimentation Framework)**, Washington D.C. @ GW

September 2016–May 2017

<https://github.com/briefgw>

Contacts: Joseph Crandall – [jwcrandall@gwu.edu](mailto: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 (Look at GitHub)

## PUBLICATIONS

### The Sorger Group, OPEN Lab

- 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 (accepted October 2017).

### The Leblanc Lab

- 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

## TEACHING

### Teaching Assistant CSCI 3313 Foundations of Computing

Fall 2018 & Fall 2017

The George Washington University, Professor: Hyeong-Ah Choi [hchoi@gwu.edu](mailto: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](mailto:anri@gwmail.gwu.edu), Students: Total - 101 My Lab – 23

[https://github.com/jwcrandall/GA\\_CSCI\\_1121\\_Intro\\_C\\_Prog](https://github.com/jwcrandall/GA_CSCI_1121_Intro_C_Prog)

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

## ACTIVITIES

- Rower and Member, Potomac Boat Club

July 2015 - Present