

RAPHAEL ISAAC ELSPAS

EDUCATION

Bachelor of Science in Computer Engineering
University of Maryland, College Park, MD

Graduated: December 2017
GPA: 3.8, Dean's List every semester of college

Masters of Science in Computer Science
Georgia Institute of Technology, OMSCS

Projected Graduation: Spring 2022
GPA: 4.0

WORK EXPERIENCE

Northrop Grumman, Linthicum, MD

June 2018 – Present

Rotation 1: Cyber Software Engineer

- Code distributed detection engine in C++ to use machine learning to classify attacks on imbedded systems.
- Develop full-stack application with frontend in Python and backend in C to launch attacks from local computer onto multiple remote target airborne systems simultaneously.
- Code feature to inject generic attack into address space of another generic program to hide malicious activity.
- Write Docker configurations and Jenkins pipelines to deliver production rpms (for CentOS).
- Use of git and JIRA for code review and resolving merge conflicts.

Rotation 2: FPGA Designer

- Design system architecture of beam-forming FPGA.
- Develop and Debug intercommunication between Altera SerialLite3 and Xilinx Interlaken Serial Protocol in System Verilog and VHDL with Questasim and Vivado.
- Perform throughput analysis to determine max bandwidth and subband count for FPGA BlockRAM and DDR4.

Northrop Grumman, Annapolis Junction, MD

June 2017 – August 2017

Cyber Software Engineering Intern:

- Analyze rootkit behaviors and develop rootkit detection methods for the Linux kernel v3.6-v4.12.
- Design kernel-level rootkit that hides processes and code rootkit detector LKM that looks for syscall table hooks.
- Plan and coordinated off-site events for 50+ interns as intern social coordinator.

CourseHunter, Startup at the University of Maryland, College Park, MD

May 2016 – February 2017

Co-Founder:

- Develop LAMP web application across 24 universities that notifies students when classes become available.
- Write much of PHP backend that interacted with SQL DB, optimize PHP webscraping by analyzing heuristics of user traffic, and add Braintree API integration.
- Incorporate the company as an LLC, and with two cofounders organize team of 5 software developers.
- Attract 1000+ users and 600+ successful enrollments in less than a year.
- Win 1st place in University Shark Tank competition and received \$3,500 from UMD's incubator, Tech Startup.
- Win 2nd place and \$7,500 in Pitch Dingman, UMD entrepreneurship competition.

Computer Engineering Dept., University of Maryland, College Park, MD

February 2016 – December 2016

Laboratory Teaching Fellow (TA), ENES100, Introduction to Engineering Design, Spring 2016

- Instruct students in lab session with best practice electrical and software design choices.
- Create 3 part video series used in course material to teach effective methods of debugging Arduino code.
- Maintain and organize inventory in lab, restock when necessary, fix 3D printers.

Undergraduate Teaching Fellow (TA), ENEE140, C for Electrical Engineering, Fall 2016

- Create ENEE140 lesson plans for two 1 hour class periods a week to teach C syntax, logic, and applications.
- Teach C control-flow, IO, data structures, and sorting algorithms in classroom for 16 weeks, twice a week.

Northrop Grumman, McLean, VA

June 2016 – August 2016

Operations Management/Software Engineering Intern:

- Innovate process to reduce cost and time in software development by using automation. Process presented to president of company and corporate board and will spawn research in the next business quarter.
- Design and build SharePoint (collaboration websites) for 3 program managers and 1 operations manager.
- Present three 1 hour long presentations regarding SharePoint template I designed for the company sector.

NASA Goddard Space Flight Center, Greenbelt, MD

June 2015 – August 2015

Signals Engineering Intern:

- Configure software defined radio (GNU Radio) for weather radar in Global Precipitation Measurement mission.
- Manually boot-load Linux and wrote shell scripts on imbedded system.
- Code Python script to transmit and receive commands from temperature sampling I/O module.

RESEARCH EXPERIENCE

REU Transportation Electrification, University of Maryland, College Park, MD June 2014 – August 2014

Mechanical/Electrical Engineering Research Intern:

- Research solder replacement (TLPS) for transportation power electronic systems that can withstand high temperatures and high power densities.
- Analyze structural properties of TLPS by building, thermally cycling, and inspecting modules with the material.
- Model high power rectification circuit with SolidWorks and use Ansys to simulate thermal cycling.
- Write 7 page technical report detailing findings formatted according to IEEE standards.
- Present poster and slides to CEO and CTO of Genovation Cars.

Department of Materials Science and Engineering, University of Maryland February 2014 – August 2014

Material Science Energy Researcher:

- Publish paper in Nature journal regarding the construction of transparent dissolvable conductive batteries.
- Investigate microwave synthesized multipurpose carbon nanotubes derived from ferrocene.
- Compose presentation slides and research papers investigating 1) ALD alumina nano-glue for sulfur batteries, 2) manufacture process of ALD reactivation layer for sulfur batteries and 3) synthesis of printable conductive ink.

High School Science Research Program, (HSSRP), Department of Nanotechnology, UCLA June 2011 – August 2011

Summer Research Intern:

- Conduct research in the production and application of graphene (nanomaterial) for use in transistors.
- Utilize Chemical Vapor Deposition Machine, Transmission Electron Microscope, and Raman Spectroscopy.
- Collaborate with research team to create research poster and presented findings to sponsors of program.

PUBLICATIONS

Chen, Jinbo, Xiaogang Han, Zhiqiang Fang, Fan Cheng, Bin Zhao, Pengbo Lu, Jun Li, Jiaqi Dai, Steven Lacey, Raphael Elspas, Yuhao Jiang, Detao Liu, und Liangbing Hu. "Rapid Dissolving-Debonding Strategy for Optically Transparent Paper Production," *Scientific Reports* 5, no. 17703 (2015). 11 December 2015.
<https://www.nature.com/articles/srep17703>.

PROJECT EXPERIENCE

JHacks Hackathon, MLH, University of Maryland, College Park, MD February 2017

Software and Electrical Engineer:

- In 24 hours, design and build wearable technology that reduces injury and improves technique while exercising.
- Interface Arduino with Android app over Bluetooth to collect and manage data from onboard sensors.
- Win 1st place in overall competition and Booz Allen "Game Changing" Award with \$250 prize.

Solenoise, Player Piano Project, www.raphaelelspas.com/solenoise June 2016 – August 2016

Software and Electrical Engineer:

- Design mechanism that can be placed on top of a piano to robotically play any MIDI formatted song.
- Develop translation software and compression algorithm to store songs on hardware with minimal memory.
- Solder and assemble circuit containing an array of transistors and sixty solenoids "fingers".

Network and Web Vulnerabilities, Dpt. of IT, University of Maryland, College Park, MD March 2016 – April 2016

Security Engineer:

- Exploit SQL injection vulnerability to expose and report usernames and vending funds in UMD database.
- Discover 50+ unsecured webcams on buildings, hallways, and classrooms on University of Maryland campus.
- Build a GUI with the Google Maps API to interact with all unsecured cameras on campus to present findings.

Over Sand Vehicle Project, University of Maryland, College Park, MD January 2015 – May 2015

Group Project Leader:

- Design and build autonomous vehicle that could navigate a sandy terrain, find, lift and weigh magnetic rock.
- Follow tight design constraints and specifications while staying within a \$350 budget.
- Win 1st place in end of semester competition.

- Schedule agendas for 8 person weekly group meetings and assign tasks to 4 subgroups and each individual.

Multithreaded File Server & Distributed File System, CS6200, Georgia Tech September 2019 – November 2019

Software Engineer:

- Design & Code multithreaded file server and multithreaded client in C using pthreads, mutexes and signaling.
- Included caching layer in separate client process that shared cached files cross-process via shared memory.
- Design & Code multithreaded distributed file system in C++ that updates and shares remote files via gRPC.

SKILLS

Languages: Bash, C, C++, Cmake, Java, Javascript, Makefile, OCaml, PHP, Prolog, Python, Ruby, SQL, VHDL, Verilog, x86 Assembly

Command Line Tools: git, Docker, yum/rpm, tmux, vim, apache webserver

GUI Tools: Bitbucket, Eclipse, IDA Pro, Jenkins, JIRA, PSpice, QuestaSim, Vivado, SolidWorks

Coursework: Algorithms; AI; Computer Systems Security; Reverse Engineering; Operating Systems; Object Oriented Programming 1, 2; Organization of Program Languages; Discrete Structures; Signal and System Theory 1, 2; Computer Architecture 1, 2; Hardware Security; Digital Logic Design and Lab; Analog Circuit Analysis and Lab; Calculus 1-3; Differential Equations; Linear Algebra; Physics 1, 2.

ACTIVITIES

Host at Moishe House Without Walls—facilitate Jewish event planning/programming	December 2018-Present
Education committee of Keshet Georgetown Synagogue	June 2018-Present
Member of Tau Beta Pi—Engineering Honor Society	May 2017
Tutor and Tutor Manager for Math (up to calculus 3), CS (programming, algorithms)	January 2017-Present
Lead Prison Jewish High Holiday Services at Morgantown, WV and Allenwood, PA	October 2015-October 2017
Volunteer Robotics Educator at MLK middle school	February 2016-June 2016
Manager of Shabbat Crew (Sodexo)—University of Maryland Hillel	February 2016-May 2016
Waiter for Shabbat Crew (Sodexo)—University of Maryland Hillel	February 2015-May 2016
Varsity Rower on Maryland Crew team (Ranked 3 rd on team of 30 rowers)	September 2014-March 2015
Member of Terps Racing—Baja Powertrain Team (SAE car manufacturing)	February 2014-June 2014
Member of Phi Theta Kappa Honor Society	August 2013