Chris Gravel

chrisgravel@live.com
linkedin.com/in/cpagravel
chrisgravel.wixsite.com/portfolio

Education

BASc Mechatronics Engineering with AI Option, *University of Waterloo* 2014 - 2019

Skills

Software Languages	Python, C, C++, Bash, SQL, Matlab, Javascript
Software Tools	Microcontrollers, Linux, ROS, Git, OpenCV
Electrical Concepts	Motor Controllers, Schematic Capture, PCB Layout, Power Supplies, FPGA Design
Electrical Tools	Oscilloscope, DMM, LCR Meter, Soldering Iron, Signal Generator, Eagle PCB Software

Experience

Software Engineer (Nest), *Google LLC* Sept 2019 - Present

- Scoped infrastructure work for supporting test automation for new hardware products. Took ownership of design, and implementation while leading and providing guidance for junior SWEs. Infrastructure supported 20+ hardware devices, 1000+ automation tests, and impacts millions of users. (Python)
- Ideated and implemented a novel solution that applies statistical tools for detecting software regressions which reduced engineering effort to root cause latency issues from 4 hours to 1 min. (Python, SQL, Jenkins, Two sample T-test, DataStudio)
- Used optimization and ML techniques to create a flicker detection algorithm with a 96% recall rate. (Python, numpy, scipy, skimage)
- Worked with cross functional teams to design and implement infrastructure that analyzed power measurements and generated software regression signals. Test became the most productive test at Nest with over 50 actionable signals that drove product decisions. (Python, numpy)

Perception Team Engineer, *Avidbots Corp.* May 2018 - Aug 2018

- Developed mathematical model for optimal sensor layout for cliff detection using 1D sensors. (Python, Geometry, Numerical Methods)
- Automated collection and labelling of vision data using localization information and camera feeds on the robot. (OpenCV, Python, C++)

IoT & AI Developer, *IBM* Sept 2017 - Dec 2017

- Created real-time object recognition solution with 95% accuracy for POC contract using supervised learning on a FasterRCNN network. (Python, FasterRCNN)

Robotics Software Developer, *Avidbots Corp.* Jan 2017 - April 2017

- Developed numerical model in C++ and Matlab for simulating trajectory to determine traversal time. (C++, Python, ROS, Matlab, Numerical Methods)
- Improved performance by 10% by applying low pass filters to trajectory coordinates using OpenCV. (C++, ROS, OpenCV)
- Wrote unit tests for a robotics system on the ROS platform in C++ using the Google test framework. (C++, ROS)

Junior Hardware Designer, *Imagine Communications* May 2016 - Aug 2016

- Optimized FPGA Ethernet receiver by reducing CPU read operations by 8x.
- Automated testing using Python scripts to communicate with instruments

Mechatronics Prototyper, *Engineering Ideas Clinic* Sept 2015 - Dec 2015

- Created schematics, layouts, and soldered PCBs to create proof of concept prototypes
- Salvaged parts from E-waste bins for use in prototypes to save over $1,000 in resources
- Designed and built an AM Radio to be used as a teaching aid for 4th year electrical students.

Web App Developer, *Computer Science Computing Facility* Jan 2015 - April 2015

- Improved performance of a core web app by 2,000%, reducing page load time by 13 seconds.
- Indexed database by cardinality to improve lookup time in relational database.

Roughneck, *Nabors Drilling Ltd.* Jan 2013 - Dec 2013

- Applied mechanical knowledge to fix and maintain industrial pumps and hydraulic motors.
- Assisted mechanic with routine repairs to large megawatt diesel generator.

Infantryman, *Canadian Military* Jan 2004 - Dec 2009

- Exercised discipline and teamwork to perform coordinated large scale military operations in Afghanistan.
- Adapted to harsh environments and working conditions to achieve mission objectives.

Engineering Projects

Optimization of Vehicle Suspension using Enhanced Hillclimbing — Python, Matlab 2018
- Created a novel search algorithm that outperforms other state-of-the-art search algorithms in the field.

Autonomous Submarine Robot — Python, Bash, OpenCV, Electrical CAD 2018
- Designed an autonomous submarine that navigates an obstacle course.
- Designed software system to optimize for I/O sensor readings and maximize resource utilization.
- Implemented localization using OpenCV on webcam feed to find prominent features in the environment.

gst - (G)it (St)atus Tool — Python 2018
- Commandline tool for improving my own Git workflow. Compatible with Mac and Linux.

Asteroids Game built on ARM Cortex-M microcontroller — C 2016
- Re-created the game of Asteroids on an ARM Cortex-M microcontroller with RTOS.
- Used semaphores and mutexes to enable synchronous multitasking operations.
- Created Physics engine to model the original game physics.

Line Following Robot — C 2016
- Constructed circuitry for filtering signals from hall effect sensors and photodiodes.
- Programmed PIC microcontroller with logic necessary to follow line.
- Debugged hardware and software problems.

Real-Time Memory Management using Half-Fit Algorithm — C 2016
- Implemented the half-fit memory managing algorithm designed for a real-time system.

Linear Variable Differential Transformer — Schematic Capture, Breadboarding, Oscilloscope 2016
- Created a measuring sensor with a precision of 0.1 mm using magnetic coupling between transformers.
- Used an isolation transformer to prevent the change in load from affecting the measurement.

Amplitude Modulated Long Wave Radio Receiver — Schematic Capture, PCB Design, Oscilloscope 2015
- Tuned resonant frequency of tank circuit to receive signals in the range of 400-800 kHz with high Q.
- Biased BJT transistor to amplify incoming signal from 0.2V to 2V to overcome voltage drop in envelope detector.

High Speed Pickup Winder With LCD Interface — Schematic Capture, Arduino 2015
- Designed uni-polar motor controller circuit with heat sink and pulse width modulated power control.
- Used Arduino timer interrupts to achieve a rate of 3500 rpm, winding a pickup in 10 minutes—54x faster than prior design.

Medical Compactable Ergonomic Chair — CAD 2015
- Donated over 200 hours to design and build a special chair for a man with debilitating nerve pain.

Achievements

- Runner-up in an international IBM internal coding competition (CodeBlue 2017).
- Received multiple awards (4 spot bonuses, 2 peer bonuses) at Google due to impact of contributions.
- Received Python readability status at Google which provides the authority to approve Python changes.
- Campaign Medal from serving in Afghanistan in 2008 with the Canadian Military.
- Hosted a tour and travel TV show in Indonesia with over 1,000,000 viewers.

Internship Evaluations

"Chris performed beyond all our expectations and was instrumental in completing critical tasks for a client project. We were able to depend on him to complete his work in a timely manner with high quality and he was enthusiastic in his desire to learn and contribute to the team. Excellent work!"
- Asim Raoof, Senior Application Developer, *IBM*

"Superbly well-rounded, was able to keep up with and surpass the performance of veteran full-time employees on the team. He made many sound and informative suggestions, led and executed on ideas he resourcefully managed, and thoroughly educated the team on the rationale of all decisions. His technical capabilities and understanding of start-up business challenges help inform his conduct on all tasks. He was always passionate and intrigued by all aspects of work. He was capable of working autonomously with minimal supervision."
- Kenneth Lee, Coverage Planning Team Lead, *Avidbots*

"Chris' efforts throughout the term contributed greatly to the success of the both new, and existing, activities this semester. By the end of the term, the team of clinic co-ops were functioning as a well-oiled machine, rotating in and out of tasks as needed with minimal supervision. With very little supervision, when Chris had a question that needed answering, he tracked down the correct person to answer it. The quality of his work was exemplary throughout the term, with the guitar pickup winder being a notable example. Chris' enthusiasm for the work, and for learning, carried him through the term. Chris has a bright future ahead if he can just slow and enjoy the sights a little."
- Chris Rennick, Engineering Educational Developer, *Engineering Ideas Clinic*

"Christopher worked with us to develop lab equipment for engineering education. He was given a very challenging project and there was little direction from his supervisors. He was able to get the project finished to a degree that was beyond anyone's expectations. Furthermore, Christopher's work ethic was impeccable. He routinely sought out contacts and resources to help him get the job done, and was always there when needed for urgent projects."
- Mike Stachowski, Engineering Educational Developer, *Engineering Ideas Clinic*

"Christopher was all around an ideal employee, and a great fit for our group. He came in with good web developer habits, fit in with our group quite well, set the bar extremely high for his own work, and delivered more than what was asked- sometimes much more, within the amount of time we had budgeted. He left us having learned a number of things about web frameworks, git, and many other topics (ask him- there will probably be a story involved!)"
- Daniel Allen, Information Technology Specialist, *CSCF Web Development*