

Jonathan Mash

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programming

★Node.JS, Python
Javascript, HTML5,
CSS3, C/C++, C#,
★Git/GitHub

design tools

★Altium, Matlab, PSIM,
★Notepad++, Sketchup

interests

electronics, robotics,
multirotors, drones,
solar power,
microcontrollers,
single-board
computers, linux,
embedded systems,
IoT

education

Queen's University

2009 – 2013

M.Sc. in Electrical Eng.
*Queen's Centre for
Energy and Power
Electronics Research*
with Dr. Praveen Jain
Course Avg: 92%

2004 – 2009

B.Sc. in Electrical Eng.
*2nd/45 in Elec. Eng.
5th/576 in Eng.*
Final Year Avg: 93%

skills

core: problem solving, project management, product development, effective communication.

electronics: system design, embedded systems, prototyping, manufacturing.

hardware: specifications, pcb design, assembly & rework, testing & debugging, production.

software: specifications, design, programming, testing, deployment.

experience

2010 SPARQ Systems

Kingston, Ontario, Canada

▼ Lead Product Developer

- present*
- Given complete control over the design and implementation of an all-new monitoring platform developed in conjunction with new microinverter technology.
 - Developed an in-home embedded *Linux* device utilizing advanced *Zigbee* communication, USB, 802.11 *WiFi*, and a *Websocket* API to connect to our servers.
 - Built an Amazon *Cloud* based monitoring and control solution based on *Node.JS*, *CouchDB* NoSQL database, and modern *HTML5* web front end.
 - Actively involved in high-level market research, feature requirements derivation, and product requirements specifications.
 - Specified hardware components, designed PCBs, aided in mechanical design, produced & tested prototypes, and oversaw the designs through to manufacturing.
 - Led and supported the deployment of field trials at sites across North America.
 - Recruited and trained new employees to grow the group from just myself to a team of over six highly talented developers and engineers.
 - Managed external resources aiding the work on some key aspects of the product.

Product Developer

- Designed, prototyped, and manufactured an in-home *embedded device* for solar panel and inverter monitoring.
- Developed a novel protocol over Power Line Communication using Forward Error Correcting codes for robust communication with the microinverters.
- Developed the manufacturing, assembly, and testing procedures to ensure only high quality products are delivered to our customers.
- Trusted by senior management to provide independent engineering support to customers due to in-depth knowledge of the entire product line.

2009 Centre for Energy and Power Electronics Research

Kingston, Ontario, Canada

▼ Engineering Research Assistant

- 2013
- Researched and designed a medium-power front-end converter for telecommunications equipment using simulation tools.
 - Developed a wind turbine emulator using an induction motor connected to a permanent magnet synchronous generator for use in research activities.
 - Derived novel non-linear control schemes for a PMSG connected wind turbine.

2008 Ontario Power Generation

Pickering, Ontario, Canada

Student - Computers and Controls Division

- Developed and deployed an online portal to aid in knowledge retention at OPG.
- Identified project requirements, researched possible solutions, and implemented the chosen solution.

2004 Queen's University Solar Vehicle Team

Kingston, Ontario, Canada

▼ Project Manager

2008 Competitions: Panasonic World Solar Challenge & North American Solar Challenge

- Oversaw all aspects of a semi-professional racing team.
- Supervised the design, fabrication and testing of the vehicle.
- Directed efforts in: marketing, sponsorship, event planning, and PR.
- Managed financial planning, purchasing, cash flow, and budgeting.
- Led fund-raising efforts, raising over \$500,000 worth of cash and donations.
- Knowledge of all vehicle design incl.: electrical, mechanical, and software.
- Team's expert on power systems, lithium-based batteries, and solar cells.

select courses

- 2008 **Fundamentals of Power Electronics: Power Electronics I & II, Power Electronics (M.Sc.), Switching Power Converters (M.Sc.), Power System Design (M.Sc.), Electro-Magnetic Compatibility (M.Sc.)**
✓ Queen's University & Royal Military College of Canada
- 2010 Switching devices, switching converters (AC-to-DC, DC-to-DC, DC-to-AC), loss-less switching (zero-voltage switching, zero-current switching) resonant converters, soft-switching converters. Variable frequency control, phase-shift and hybrid control. Small signal models, large signal models, peak current mode and average current mode control, system stability issues, digital control techniques, fuzzy logic control, sliding mode control, and non-linear control strategies. Electro-magnetic interference, EM compatibility, crosstalk, HF circuits.
- 2008 **Robotics and Control: Introduction to Robotics, Control Systems (4th Year), Control of Mobile Robotics (2013)**
✓ Queen's University & Coursera
- 2013 Rigid body kinematics, manipulator kinematics, workspace, singularity, redundancy, manipulator dynamics, and trajectory generation. Herd navigation and cooperation, aerial multirotor control with disturbance mitigation, and bipedal locomotion. Linear systems and feedback control, time-domain specifications, PID control, steady-state error and disturbance rejection, and state-space analysis.

other experience

- 2007 **Faculty of Applied Science** Kingston, Ontario, Canada
✓ *Senior Teaching Assistant*
- 2011 **Project Manager** - Managed and taught six teams of four students the process of design, implementation, and prototyping in a team environment.
Lab Manager - Facilitated labs in four undergraduate ECE courses. Assisted in the development and execution of a new robotics project-based course for second year ECE students.

awards

- 2010 **Ontario Graduate Scholarship**
A merit-based research grant awarded by the Province of Ontario. Selection based on academic achievement and research potential.
- 2009 **NSERC - Alexander Graham Bell Canada Graduate Scholarships**
A merit-based research grant awarded by the Government of Canada. Selection based on academic achievement and research potential.
- 2009 **IEEE Eastern Ontario Student Paper Competition**
Represented Queen's University at a team-based project competition between universities across eastern Ontario. Selection was weighted heavily toward presentation skills and quality of work.

publications

- 2013 **Nonlinear Control of Wind Energy Conversion System Based on Control-Lyapunov Functions** Jonathan Mash, Majid Pahlevaninezhad, Praveen Jain
Presented at a major IEEE Conference (ECCE 2013, Denver, CO)
- 2013 **Advanced Nonlinear Control Techniques for Wind Energy Conversions Systems** Jonathan Mash
Thesis — Master, Electrical & Computer Engineering (Mar. 2013)
- 2014 **Adaptive Passivity-Based Nonlinear Controller for Wind Energy Conversion Systems** Jonathan Mash, Majid Pahlevaninezhad, Praveen Jain
Presented at a major IEEE Conference (APEC 2014, Ft. Worth, TX)
- 2014 **Port-Controlled Hamiltonian (PCH)-based control approach for wind energy conversion systems** Majid Pahlevaninezhad, Shangzhi Pan, Jonathan Mash, Praveen Jain
Presented at a major IEEE Conference (PEDG 2014, Galway, Ireland)