

# Jonathan Mash

## contact

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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.  
*2<sup>nd</sup>/45 in Elec. Eng.  
5<sup>th</sup>/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

#### ▼ Product Developer

- present*
- 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.

#### Lead Product Developer

- 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.

### 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.

## 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)

## affiliations

Professional Engineers Ontario (PEO), Ontario Society of Professional Engineers (OSPE), Institute of Electrical and Electronics Engineers (IEEE)