

# Michael I. Gosselin

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CONTACT INFORMATION      4043 19th Avenue West  
Vancouver, BC, V6S1E2  
Canada

Mobile: +1-604-314-1751  
E-mail: [michael.gosselin@seas.upenn.edu](mailto:michael.gosselin@seas.upenn.edu)  
Portfolio webpage: <http://mgosselin.github.io>

SKILLS      Computer Skills:

- Git, MATLAB, Python/Numpy, Embedded C, SolidWorks, Simulink, L<sup>A</sup>T<sub>E</sub>X, LTSpice, Cadsoft Eagle, LabVIEW, Mac OSX, Microsoft Windows, AVR Studio

Electronics Skills:

- 2-layer PCB design, prototyping & fabrication (through hole & surface mount), PCB re-work, Test equipment (i.e. storage oscilloscope), Mixed-signal design, Analog filters & signal conditioning, Power amplification,  $I^2C$ ,  $I^2S$ , MAEVARM M2 (Atmel 32u4)

Machine Skills:

- Waterjet cutter, Laser cutter, Vertical mill, Lathe, MIG welder, Drill press, Band saw

RELEVANT PROJECTS & COURSEWORK      **University of Pennsylvania**, Philadelphia, PA

*Open-Source DAC Project*: Hardware Developer      **January 2013 - Present**

- Conceptualized, prototyped and tested first iteration of a high-performance stereo audio DAC; second iteration currently in progress (see portfolio, URL above).
- Designed and selected components for digital side of DAC circuit to comply with Philips  $I^2S$  bus standard for PCM audio.
- Used Spice simulation and physical prototyping (solderless breadboards and fast-PCB-fabrication) to design and validate a 3rd order analog active low pass filter.
- Manufactured and populated prototype PCBs with surface mount components, executed testing to confirm design requirements were met.

*PennApps Hackathon*: Student Hacker      **January 2013**

- Collaborated with 3 engineering students (ME, EE, CS) to create 2 mobile robots controllable over the internet, designed to shoot darts at one another.
- Over a 48-hour period: conceptualized, designed, tested and debugged motor drive electronics and microcontroller hardware.
- Integrated electronic systems with chassis and dart-shooting mechanical hardware.
- Advanced to the finalist group of the top 20 teams (out of 500 competitors).

**University of British Columbia**, Vancouver, BC, Canada

*Senior Mechanical Design Project*      **September 2011 to April 2012**

- Collaborated with 4 engineering students (ME, BE) to conceptualize, prototype and refine (3 iterations) a surgical retractor for minimally invasive surgeries.
- Manufactured and tested focused and comprehensive physical prototypes of near-micro scale linkages for deployment and actuation of retractor concepts.
- Interviewed experts and stakeholders (surgeons, administrators, biomedical engineers, reprocessing personnel) to develop a broader understanding of current surgical retraction needs.
- Validated tool performance quantitatively in laparoscopic ‘trainer’ apparatus and animal lab (porcine) trials, with participation of urology residents and physicians.

PROFESSIONAL EXPERIENCE	<b>Lazer Zentrum Hannover e.V.</b> , Hannover, Niedersachsen, Germany <i>Laser Microtechnology Group</i> <b>September 2009 to December 2009</b> Manufacturing Intern <ul style="list-style-type: none"> <li>Experimentally determined optimal laser marking parameters for batch-fabrication of novel thin metal film resistive strain gauges. [1]</li> <li>Selected range and scope of experiments to permit sufficient statistical power in analysis of laser marked samples.</li> <li>Used nonlinear regression and error analysis of surface measurements of laser markings to build an energy model for marking behavior thin metal films.</li> <li>Collaborated with a thin-film deposition company, a professor and a PhD student to apply the thin metal film strain gauge technology to a diesel engine connecting rod for further validation.</li> </ul>	
RESEARCH EXPERIENCE	<b>University of Pennsylvania</b> , Philadelphia, PA <i>GRASP Laboratory - Haptics Research Group</i> <b>September 2012 to Present</b> Research Assistant <ul style="list-style-type: none"> <li>Trained 4th-year medical students on SAGES curriculum for peg transfer training task on an Intuitive Surgical daVinci robotic surgery system.</li> <li>Implemented automatic capture of force, vibration, and time data using DAC hardware and MATLAB to determine quantitative skills metrics for test subjects.</li> <li>Analysed data for 16 subjects, plotted key relationships for surgical skill between groups of subjects.</li> <li>Contributed to draft sections of journal article, containing key outcomes from comparisons between groups of subjects.</li> </ul>	
COMMUNITY CONTRIBUTIONS	<b>Association de Voluntarios para el Servicio en Areas Protegidas (ASVO)</b> <i>Volunteer</i> <b>May 2012</b> <ul style="list-style-type: none"> <li>Worked with a team of 20 UBC undergraduates through UBC GoGlobal International Service Learning (ISL) Program. Work included relocating leatherback sea turtle eggs along Costa Rica's Caribbean coast, and construction of demonstration farms for introducing novel farming methods to a developing community.</li> </ul>	
EDUCATION	<b>University of Pennsylvania</b> , Philadelphia, PA, USA Master of Science in Engineering, Mechanical Engineering and Applied Mechanics <i>Specialization in Mechatronics</i> <b>December 2013</b>  <b>University of British Columbia</b> , Vancouver, BC, Canada Bachelor of Applied Science, Mechanical Engineering Engineering Co-op Program <b>May 2011</b>	
PEER- REVIEWED PAPERS	[1] Oliver Suttman, Michael Gosselin, Ulrich Klug and Rainer Kling, "Picosecond laser patterning of NiCr thin film strain gages", Proc. SPIE 7589, 758914 (2010); doi:10.1117/12.840842	
AWARDS & RECOGNITION	<b>SF Maker Startup Weekend: 2nd Place</b> <b>June 2014</b> <b>PennApps Hackathon: Top 20 Finalist</b> <b>January 2013</b> <b>GoGlobal International Service Learning Award</b> <b>March 2012</b>	