

Current Address:
10 Magazine Street
Cambridge, MA 02139

Michael R. Buchman

mbuchman@mit.edu
(650)-704-6437
mbuchman.scripts.mit.edu

Permanent Address:
710 Josina Avenue
Palo Alto, CA 94306

EDUCATION

- 6/2015 – Present** **MIT, Mechanical Engineering Ph.D. Candidate** *Cambridge, MA*
• **PhD GPA:** 4.8, **Major :** Energy Sciences, **Minor:** Design
• Member of Global Engineering and Research (GEAR) Lab
• Teaching Assistant - Global Engineering (Fall 2014, 2015, and 2016)
- 8/2013 – 6/2015** **MIT, S.M. in Mechanical Engineering** *Cambridge, MA*
• GPA: 4.7
• Member of Global Engineering and Research (GEAR) Lab
- 8/2009 – 6/2013** **MIT, Sc.B. in Mechanical Engineering with a minor in Economics** *Cambridge, MA*
• Teaching Assistant - Thermal Fluids Engineering 2, first undergraduate to TA the course (fall 2011, junior year).
• Major GPA: 4.8

EXPERIENCE

- 9/2013 – Present** **MIT Global Engineering and Research (GEAR) Lab – Research Assistant** *Cambridge, MA*
• Modeled and designed a manifold system that would enable the turbocharging of single-cylinder engines.
• Results demonstrate that power can be increased by 40% and emissions can be reduced by 5%.
• The goal is to create lower cost, more powerful and more efficient engines for agriculture and transportation.
• Built analytical models, computational models, and a dynamometer to ascertain the feasibility of using a modified manifold to turbocharge a single-cylinder four-stroke internal combustion engine.
• Designed and built experimental setups that validate the model and demonstrate that turbocharging single-cylinder engines is a viable method to increase power and reduce emissions.
- 3/2014 – Present** **MIT Maker Workshop - Founder, Mentor, President** *Cambridge, MA*
• Worked with the Mechanical Engineering Department administration to create a volunteer student-run machine shop space for members of the ME community to implement their projects.
• Defined user and safety policies that have since been adopted in machine shops campus-wide.
• Manage a staff of 50 student volunteers, manage the space, train students, and oversee external outreach.
• Oversee a user base of 1000+ students, faculty, and staff.
• Fundraised over \$25,000 in order to operate the space and its programs.
• Started a partnership with the MIT Library System and created a program that allows students, faculty and staff to borrow tools, electronics, and equipment from the MIT libraries.
- Summer 2012** **Infinium – Intern** *Natick, MA*
• Designed and built a system for condensing magnesium vapor into a liquid and then pouring it into ingots. This system was used on Infinium's prototype magnesium production system.
• Work contributed to patents.
- 1/2012 – 5/2013** **MIT Robotic Mobility Group – Undergraduate Researcher** *Cambridge, MA*
• Designed and built hand and feet pads to enable a person to climb walls using magnetic fluids.
• Designed and built a tank-style robot that can climb vertically using magnetic fluids.
- 9/2009 – 1/2014** **MIT Solar Electric Vehicle Team – Design Lead and Mechanical Lead** *Cambridge, MA*
• Led a team of six undergraduates in rebuilding the solar electric vehicle after a crash. Successfully rebuilt the vehicle in 15 weeks to meet the deadline of the 2011 World Solar Challenge in Australia.
• Redesigned and manufactured key components, including a full body carbon fiber composite layup, body to chassis attachments and steering system.

9/2010 – 5/2011

MIT Media Lab, City Car Team – Undergraduate Researcher

Cambridge, MA

- Designed and built half and full scale ergonomic prototypes of an electric foldable two-seat car to test car's comfort, ingress, and egress in folded and unfolded positions.

Summer 2010

Stanford University, Gravitational Wave Detection Team –Intern

Stanford, CA

- Wrote controls code for the Laser Interferometer Gravitational Wave Observatory (LIGO) telescope.
- Successfully designed and prototyped a mount for a satellite's optical bench, enabling it to withstand a 20g launch while remaining thermally isolated.

Summer 2009

Weizmann Institute of Science, Int'l Summer Science Institute - Research Scholarship Rehovot, Israel

- Awarded full scholarship to design and run a successful experiment to test the diffusion and production of green fluorescent protein (GFP) on a genetic chip in a wet lab.
- Programmed state of the art optical microscopes using Matlab.

Summer 2008

NASA Ames Robotics Academy –Intern

Mountain View, CA

- Worked on a project to design and build a lunar micro rover, an all-terrain robot.

PATENTS

Apparatus and Method for Condensing Metal Vapor, U.S. Patent 8617457

AWARDS

2014-2017 NSF Fellow (three years of full stipend and partial tuition)

2014-2018 Tata Fellow focusing on agriculture (two years of stipend, tuition, and \$50K research grant)

2014 MIT Mechanical Engineering Research Exhibition grand prize winner (\$2K prize)

SKILLS

Software: Solid Works, HSM Works, Master Cam, Ricardo Wave, Adobe Photoshop, Adobe Primer

Programming: Matlab (advanced), Python (basic), HTML (intermediate)

Prototyping: Mill (Manual and CNC), Lathe (Manual and CNC), Welding, Basic Shop Equipment, Laser Cutter, 3D printer, Water Jet

Other Skills: Machine Shop Management, Machine Shop Training, Composite Materials, Woodworking, Metal Working

PUBLICATIONS

Buchman, Michael R., and Winter, Amos. "Investigating the Effect of Intake Manifold Size on the Transient Response of Single Cylinder Turbocharged Engines." SAE Technical Paper Series, Apr. 2017.

Buchman, Michael R., and Dorsch, Daniel. "Building Strategic Partnerships with Non-Maker Entities to Foster a Maker Culture." International Symposium on Academic Makerspaces (2017)

Buchman, Michael R., and Winter, Amos. "Validating a Method for Turbocharging Single Cylinder Fourstroke Engines." 18th International Conference on Advanced Vehicle Technologies ASME IDETC/CIE, Aug. 2016.

Buchman, Michael R., and Winter, Amos. "Method for Turbocharging Single Cylinder Four Stroke Engines." 18th International Conference on Advanced Vehicle Technologies ASME IDETC/CIE, Aug. 2014.

THESES

Buchman, Michael R., "A Methodology for Turbocharging Single Cylinder Four Stroke Internal Combustion Engines." MIT Master's Thesis, June 2015

Buchman, Michael R., "Using a Ferro-Fluid Pad to Climb Walls." MIT Bachelors' Thesis, June 2013