

# Charles Z. Guan

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## Personal Statement

Skilled in practical mechanical and electronics engineering and design with years of self-directed engineering practice supplementary to coursework. Experienced in multi-discipline engineering projects and working individually or with small and medium sized teams focusing on the prototyping and iteration stage of the design process.

## Recent Experience

- **Lab Manager, MIT-SUTD Collaboration** May 2013 - Present, Cambridge, MA  
Responsible for training, purchasing, and daily operation of a metal shop and a electronics & rapid prototyping lab, acting as a design adviser for student and research projects therein.
- **Instructor, MIT Dept. of Mech. Engineering** January 2013 - May 2013, Cambridge, MA  
Teaching an electric vehicle design and build course for MIT Mechanical Engineering undergraduates focusing on modern rapid prototyping techniques and parts sourcing skills.
- **Research Affiliate, MIT Robust Design Group** August 2011 - January 2013, Cambridge, MA  
Creating an electric vehicle design and build course for MIT Mechanical Engineering undergraduates focusing on modern rapid prototyping techniques and parts sourcing skills. (S.M. Thesis)
- **MIT Media Laboratory, Undergraduate Research Assistant** Sept. 2007 - August. 2011, Cambridge, MA  
Designing, engineering, and fabricating in-wheel propulsion modules and control systems for a series of modular electric vehicles.
- **BPG Werks: Engineering Intern** June – August 2011, Somerville, MA  
Design and manufacture of a lithium ion battery pack for an electric transforming motorcycle. Design and fabrication of a more robust electric folding mechanism for the same.
- **iRobot Corporation: Mechanical Engineering Intern** June - August 2009, Bedford, MA
- **Necessary, Useful, Beautiful, LLC: Engineering Intern** May – August 2008, Somerville, MA
- **Personal Engineering Projects**  
Electric go-kart with custom regenerative DC motor control, electric scooters with custom in-wheel BLDC motors, combat robots (e.g. *BattleBots*), custom balancing vehicle (e.g. *Segway*) with analog electronics, motorized electric inline skates with wireless control and in-wheel BLDC motors.

## Skills

- Design-for-manufacturing and design-for-assembly techniques for rapid production of prototypes
- Fabrication: Manual machining, 2- and 3-axis CNC machining, abrasive waterjet, LASER cutting, 3-dimensional printing, "Design-for-available-tools" methodologies.
- Parametric CAD software: Solidworks, Autodesk Inventor
- Electronic design: CadSoft EAGLE, power electronic systems, printed circuit board design.
- Embedded Systems: Atmel microcontrollers, Arduino & Open Source electronics development platforms
- Engineering and CAE software: MATLAB (incl. *Simulink*), MasterCAM, NI LabView, HSMWorks

## Education

- **Massachusetts Institute of Technology.** S.B. Mechanical Engineering (Course II-A), Cambridge, MA
  - 3.9 GPA
  - **Relevant coursework:** Microcomputer Project Laboratory, Power Electronics Laboratory, Circuits and Electronics, Design and Manufacturing I, Design and Analysis of Feedback Control Systems, Introduction to Robotics, Product Engineering Processes, Mechatronics
- **Massachusetts Institute of Technology.** S.M Mechanical Engineering (Course II), Cambridge, MA
  - **Currently on Leave**
  - Design of a electric vehicle systems class for Mechanical Engineering sophomores, Teaching Assistant for MIT 2.007 Design and Manufacturing class.

## Publications

- Colton S., **Guan, C.**, Storey, J. (2011) A Compact In-Wheel Propulsion System for Personal Electric Vehicles. *Ecologic Vehicles and Renewable Energies*. Monaco. 31 March - 2 April 2011.