

# ChaoLiu

Robotics Researcher

## contact education

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Sept '15 - Now

Sept '12 - May '14

Sept '08 - June '12

**Ph.D Candidate** in Mechanical Engineering and Applied Mechanics(Robotics)  
*School of Engineering & Applied Science, University of Pennsylvania*

**Master** of Science in Engineering in Robotics  
*School of Engineering & Applied Science, University of Pennsylvania*

3.61/4.00

**Bachelor** of Science in Mechanical Engineering and Automation  
*School of Mechanical Engineering, Dalian Jiaotong University*  
Specialization in Mechatronics, Minor in Business Administration

89.5/100

## languages

Chinese (native)  
English (professional)

## courses

Learning in Robotics,  
Machine Learning,  
Digital Signal Processing,  
Embedded Systems,  
Control,  
Mechatronics

## strengths

Embedded Systems,  
PCB (Eagle, Altium),  
CAD (SolidWorks, Pro/E),  
C/C++, Python, Matlab,  
Control, Motors,  
Git, SVN

## Working Experiences

Oct '12 - June '14

**Research Assistant in ModLab (UPenn GRASP Laboratory)**  
Focus on Embedded Systems Design and Control

Robotics

### SMORES Robot

Embedded Systems and Control

- Designed main CPU board with STM32F303(Cortex-M4), including JTAG interface, IIC interface, SPI interface for a Wifi chip and motor drivers;
- Designed face board with ATmega88a, coil-driving circuit by MOSFETs, coil communication circuit with a RF Power Detector and 2 ADCs for encoders.
- Designed programming environment for AVR microcontrollers in Unix and Windows and designed all embedded codes and MATLAB interface.

### Persona Robot

Mechatronics and Control

- Designed infrared-based force sensor and associated PCB;
- Implemented servo controller for tablet-driven motor;
- Designed PID controllers for base motion and mast rotation.

### Low-cost Laser Range Finder

Embedded Systems

- Simulated SCCB protocol on STM32F373(Cortex-M4) and configured the camera(OV7670) in Raw RGB mode with VGA resolution;
- Designed the PCB including microcontroller, camera and laser;
- Transmitted the data to the master via SPI.

Aug '13 - Dec '13

**Teaching Assistant for Design of Mechatronics Systems (MEAM 510)**

Mechatronics

## projects

Apr '14 - Apr '14

### Cost Learning and Path Planning

Robotics and Machine Learning

- Built a route planner for the Penn campus;
- Selected features based on an aerial photograph and implemented reinforcement learning method to learn the cost associated with each feature;
- Used Dijkstra's algorithm to find the optimal path.

Mar '14 - Apr '14

### Localization and Mapping(SLAM)

Robotics and Machine Learning

- Leveraged mobile-robot-mounted IMU and LIDAR to map indoor environment;
- Constructed 2D map using a particle filter and occupancy grid algorithm.

Nov '13 - Dec '13

### PhanToM Robot Control System(Our Own Myo)

Mechatronics and Machine Learning

- Designed wearable device using IMU and EMG(read muscle signals) to measure muscle activation and motion to control robots;
- Designed mobile robot with Omni-wheels and holonomic control;
- Designed board with IMU, xBee and low-level PID controller for a quadrotor.