



Matthew Vernacchia

Graduate Research Assistant, MIT Aeronautics and Astronautics
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My core experience is in rocket propulsion, GNC, robotics, and software engineering.

Programming: python, C++, MATLAB, Java, HTML/CSS/js.

CAD: Solidworks.

Fabrication: 3-axis CNC mill, CNC lathe, composite layups, polymer casting.

Education

Massachusetts Institute of Technology Cambridge, MA

S.M. in Aeronautics and Astronautics Feb 2015 – Feb 2017

5.0/5.0 GPA. Thesis focus: solid rocket propulsion for small UAVs. Key classes: 2.28 combustion, 18.086 computational science and engineering, 16.322 stochastic estimation and control.

S.B. in Aeronautics and Astronautics with Information Tech. Aug 2011 - Feb 2015

4.9/5.0 GPA. Key classes: 16.512 rocket propulsion, 16.540 internal flows in turbomachinery, 6.832 underactuated robotics, 6.006 algorithms, 6.141 robotics science and systems.

Work Experience

MIT Aeronautics and Astronautics Cambridge, MA

Graduate Research Assistant Feb 2015 – Feb 2017

Develop a transonic rocket propelled UAV. Design, produce and test ultra-slow-burn solid rocket motors.
Manage a team of undergraduate research assistants.

Space Exploration Technologies Hawthorne, CA

Guidance, Navigation and Control Intern June - Aug 2015, 2014, 2013

Model uncertainty in spacecraft docking maneuvers. Simulate human interactions for control interface testing. Integrate a flight simulator in C++. Train NASA astronauts to fly a simulator and collect feedback on UI/UX and handling qualities. Simulate lighting conditions using ray tracing. Design and execute tests for a LiDAR sensor. Program and operate a large (400 kg) robot arm.

NASA Jet Propulsion Laboratory Advanced Robotics Controls Group Pasadena, CA

Robotics Intern June - Aug 2012

Develop a hand gesture UI for human-robot interaction in MATLAB and C. Decode hand gestures from muscle activity signals using machine learning in MATLAB. Publish report for IEEE International Conference on Robotics and Automation.

Projects

MIT Rocket Team Cambridge, MA

Lab Safety Manager Aug 2015 – Present

Plan lab renovation. Identify safety hazards and implement protection and mitigation.

Propulsion Lead May 2014 – June 2015

Design, manufacture and test-fire a 2 kN liquid bipropellant rocket engine with an aerospike nozzle. Win 1st place in Intercollegiate Rocket Engineering Competition.

President May 2013 – May 2014

Manage a team of classmates. Grow team membership from 3 to ~40. Educate team members about rocketry and help them to earn High Powered Rocketry certifications.

Mobile Autonomous Systems (MASLab) Robotics Contest Cambridge, MA

Sensing and Software Jan 2013

Navigate an arena and locate targets using computer vision in python. Win 2nd place.