

# Brett Bethke

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## EDUCATION

**Massachusetts Institute of Technology**, Cambridge, MA

June 2005 - Present

*S.M./Ph.D. Candidate in Aeronautics & Astronautics*

*GPA: 5.0/5.0*

Relevant courses: Dynamic Systems & Control, Multivariable Control Systems, Nonlinear Programming, Techniques in Artificial Intelligence

**Massachusetts Institute of Technology**, Cambridge, MA

August 2001 - June 2005

*Majors: Aeronautics & Astronautics (S.B.), Physics (S.B.)*

*Minor: Mathematics*

*GPA: 4.9/5.0*

Relevant courses:

- Aeronautics & Astronautics: Introduction to Aerospace Engineering, Unified Engineering I, Unified Engineering II, Unified Engineering III, Unified Engineering IV, Thermal Energy, Principles of Automatic Control, Estimation & Control of Aerospace Systems, Feedback Control Systems, Space Systems Engineering, Space Systems Development I, Space Systems Development II, Digital Systems Laboratory, Real-Time Systems & Software
- Physics: Mechanics, Electricity & Magnetism, Vibrations & Waves, Relativity, Quantum Physics I, Quantum Physics II, Quantum Physics III, Statistical Physics I, Electromagnetism II
- Mathematics: Multivariable Calculus, Differential Equations, Mathematical Analysis I, Algebra I: Abstract Algebra & Group Theory, Nonlinear Dynamics I: Chaos, Nonlinear Dynamics II: Continuum Systems, Functions of a Complex Variable
- Other: Principles of Chemical Science, Probabilistic Systems Analysis, Principles of Microeconomics, Principles of Macroeconomics, Historical Economics, Introductory Biology, Mobile Autonomous Systems Laboratory

## HONORS AND AWARDS

Fannie and John Hertz Foundation Fellowship

National Defense Science and Engineering Graduate (NDSEG) Fellowship

Phi Beta Kappa Society

Tau Beta Pi National Engineering Honor Society

Sigma Gamma Tau National Aerospace Engineering Honor Society

Sigma Pi Sigma National Physics Honor Society

Henry Webb Salisbury Award for superior multidisciplinary academic achievements in the MIT aero/astro department

General James H. Doolittle Scholarship

Wings Club National Scholarship

First place in the MIT Mobile Autonomous Systems Lab robotics competition

Numerous letters of commendation from MIT Department of Aeronautics & Astronautics for outstanding achievement

Numerous letters of commendation from MIT professors for outstanding performance in individual classes (Digital Systems Laboratory, Probabilistic Systems Analysis, Estimation & Control of Aerospace Systems, Vibrations & Waves, Relativity)

## COMPUTER SKILLS

Expert Linux system administration (Gentoo, Slackware, Debian, Red Hat, others)

Expert Windows system administration

Network administration/security

C, C++, Java, Javascript, Perl, x86 Assembly, VHDL, Python, HTML, PHP, JSP, L<sup>A</sup>T<sub>E</sub>X

Robotics, microcontrollers, embedded application development

Mathematica, Matlab, Simulink, Maple

Real time application development

Microsoft Visual Studio, IBM WebSphere Studio, IBM VisualAge for Java, Sun ONE Studio

IBM DB2, Oracle, MySQL

Web page design, secure web site administration

## EXPERIENCE

**Aerospace Controls Laboratory, MIT**, Cambridge, MA

September 2004 - Present

**Research Associate**

Research project: *Autonomous multivehicle system design and implementation*

Working in a multidisciplinary research group to develop a system capable of controlling large (~100) numbers of airborne and ground-based robotic vehicles in a coordinated fashion in order to achieve an operator-specified goal, such as tracking a specified object or mapping an unknown territory. Specific tasks include miniature quad-rotor helicopter dynamics modeling and controller design, multivehicle path-planning algorithm development, distributed-processing computer architecture design, and sensor development.

**Space Systems Laboratory, MIT**, Cambridge, MA

February 2004 - May 2005

**Computer Systems Architect**

Computer systems architect for the MIT SWARM (Self-assembling Wirelessly Autonomously Reconfigurable Modules) project, a modular space system capable of self-assembly and reconfiguration. Tasks included embedded computer system design and programming, wireless data communication protocol design, and hardware/software integration and testing.

**Blue Origin, LLC**, Seattle, WA

May 2004 - August 2004

**Avionics Test Engineer**

Participated in Blue Origin's summer internship program. Blue Origin is a privately held company seeking to develop an economically viable, reusable suborbital spacecraft capable of carrying humans. Carried out testing and validation of avionics components for an advanced technology test-bed flight vehicle. Tasks included determining which aspects of avionics performance were important to characterize, creating and documenting test plans, designing data acquisition systems, machining necessary support equipment, performing the tests, and analyzing the test data. Avionics components that were tested included a Honeywell KRA-405B radar altimeter and an Athena Technologies GS-111m flight computer/Inertial Navigation System (INS).

**NASA Goddard Space Flight Center**, Greenbelt, MD

May 2003 - August 2003

**NASA Academy Research Associate**

Research project: *Flux Transformers for Magnetic Microcalorimeter X-Ray Detector Arrays*

Worked in the X-Ray Astrophysics branch of NASA GSFC. Research focused on characterizing the noise spectrum and energy resolution of magnetic microcalorimeter x-ray detector arrays for eventual use on Constellation-X, a space-based X-ray telescope mission. Also participated in extensive leadership and teamwork development activities, worked on a group project investigating formation flying satellites for long-baseline optical interferometry, and took part in discussions with NASA officials about space policy.

## HOBBIES & INTERESTS

Flying (private pilot)

Running, soccer, ice hockey, table tennis, rowing, ultimate frisbee

Music (piano, voice)

Volunteering, tutoring, mentoring

Robotics, computer systems