

John J. Cooley

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Education

Massachusetts Institute of Technology, Cambridge, MA.

Candidate for Ph.D. EE. Advisor: Steven B. Leeb

- Technical qualifying exam passed
- Research qualifying exam passed

Massachusetts Institute of Technology, Cambridge, MA.

M.Eng. EE, February 2007

B.S. EE, May 2005, GPA: 4.7/5.0

B.S. Physics, May 2005, GPA: 4.2/5.0

Loch Raven High School, Towson, MD.

Diploma, 2001, GPA: 4.0/4.0, Rank 4/273, SAT Math:770 Verbal:720

Coursework

- **Undergraduate EE:** Structure and Interpretation of Computer Programs, Computation Structures, Circuits and Electronics, Analog Electronics Laboratory¹, Microcomputer Projects Laboratory², Microelectronic Devices and Circuits, Communication Control and Signal Processing, Signals and Systems, Feedback Systems, Electromagnetics and Applications, Solid-State Circuits, Advanced Undergraduate Project³
- **Undergraduate Physics:** Electricity and Magnetism, Waves and Vibrations, Special Relativity, Statistical Physics, Quantum Physics, Classical Mechanics: A Computational Approach, Fluid Physics, "Einstein, Oppenheimer and Feynman: Physics in the 20th Century"
- **Undergraduate Math:** Multivariable Calculus, Differential Equations, Probabilistic Systems Analysis, Linear Algebra
- **Graduate Coursework:** Advanced Power Electronics⁴, Energy Ventures, Advanced Circuit Techniques (6.331), Low Power Analog VLSI, Power Electronics, Mathematical Methods for Engineers, Electromagnetics, CMOS Analog and Mixed-Signal Circuit Design⁵, Discrete-Time Signal Processing

Honors and Awards

- Martin Family Society for Sustainability Fellowship Award 2009-2010
- MIT \$100k Clean Energy Prize 2009: Member of Semifinalist Team
- MIT \$100k Executive Summary Competition 2009: Member of Winning Team
- David Adler Memorial Thesis prize: Best MIT EE Master's Thesis in 2007
- Morris Joseph Levin Award: Outstanding MIT EECS Master's Thesis Presentation
- 4-Year Letter Winner, MIT Varsity Heavyweight Crew 2005

¹Final Project: Compact Battery-Powered 40 kHz Ultrasonic Rangefinder(s)

²Final Project: Digital Music Recorder/Player with IR remote, LCD screen, analog spectrum analyzer

³Ultra-Low Cost Signal Generators. See "Research Experience."

⁴Final Project: Loss Modeling and Analysis of Marx DC/DC Converters

⁵Projects: 0.18 μm Low Power Configurable Op-Amp, 0.18 μm Power Configurable Pipelined Flash SA ADC

- Featured in MIT Spectrum Newsletter for Undergraduate achievements 2005
- MIT Jeannette J. and Henry A. White Jr. Scholarship recipient 2003-2005
- MIT Varsity Heavyweight Rowing Captain 2003-2005
- MIT Varsity Heavyweight Rowing MVP 2002-2003
- Massachusetts Institute of Technology Class of 1950 Scholarship recipient 2002-2005
- MIT Heavyweight Rowing “Most Inspirational” 2001-2002
- National Merit Scholar 2001
- Maryland Distinguished Scholar 2001

Papers, Thesis

- John J. Cooley, Eric Seger, Steven Leeb, Steven R. Shaw. *Characterization of a 5 kW Solid Oxide Fuel Cell Stack Using Power Electronic Excitation*. IEEE Applied Power Electronics Conference (APEC) 2010.
- Zachary Clifford, John J. Cooley, Al-Thaddeus Avestruz, Zack Remscrim, Dan Vickery, and Steven B. Leeb. *A Retrofit 60 Hz Current Sensor for Non-Intrusive Power Monitoring at the Circuit Breaker*. IEEE Applied Power Electronics Conference (APEC) 2010.
- John J. Cooley, Al-Thaddeus Avestruz, Dan Vickery, Amy Englehart, James Paris, and Steven B. Leeb. *Solid-State Lamp with Integral Occupancy Sensor*. IEEE Applied Power Electronics Conference (APEC) 2010.
- John J. Cooley, Al-Thaddeus Avestruz, Steven B. Leeb *An Autonomous Distributed Demand side Energy Management Network Using Fluorescent Lamp Sensors* IEEE Power Electronics Specialists Conference (PESC) 2008
- Tim Denison, Kelly Consoer, Wesley Santa, Al-Thaddeus Avestruz, John Cooley and Andy Kelly *A 2 W, 100nV/rtHz, Chopper-Stabilized Instrumentation Amplifier for Chronic Measurement of Neural Field Potentials* Journal of Solid State Circuits (JSSC '07), August 2007.
- Steven B. Leeb, Mariano Alvira, Robert W. Cox, John J. Cooley, James L. Kirtley Jr., Steven R. Shaw *Build to Win: A Hands-On Approach to Undergraduate Instruction in Power Electronics* Power Electronics Education Workshop (PEEW '07), April 2007.
- John J. Cooley *Capacitive Sensing with a Fluorescent Lamp* MIT Master of Engineering Thesis, Feb. 2007.
- John J. Cooley, Al-Thaddeus Avestruz, Steven B. Leeb, Les K. Norford *A Fluorescent Lamp with Integral Proximity Sensor for Building Energy Management* Power Electronics Society Conference (PESC '07), April 2007.
- John J. Cooley, Al-Thaddeus Avestruz, Steven B. Leeb *A Modified Fluorescent Lamp for Discreet Biometric Surveillance* 2007 IEEE Homeland Security Technology Conference, March 2007.
- John J. Cooley, Al-Thaddeus Avestruz, Steven B. Leeb *Proximity Detection and Ranging Using a Modified Fluorescent Lamp for Security Applications* 2006 International Carnahan Conference on Security Technology (ICCST '06), July 2006.

Research Experience

Graduate Research Assistant MIT
Cambridge, MA 2004-2005

Current Research: Efficient energy systems including research in smart home power monitors, demand-side energy management and hybrid power systems for grid-level and transport applications. Advisor: Steven B. Leeb.

Graduate Research Assistant MIT
Cambridge, MA 2004-2005

Master's Thesis: Retrofit demand-side energy management tool using a fluorescent lamp as a capacitive sensor for human occupant detection. Advisor: Steven B. Leeb.

Undergraduate Research Assistant MIT
Cambridge, MA 2004-2005

Undergraduate Thesis: Low-cost, high-bandwidth, multifunction signal generator with Sq. Wave Duty Cycle Adjust, and Amplitude Modulation (AM) functionality for Power Electronics Lab. Advisor: Steven B. Leeb.

Undergraduate Research Assistant MIT
Cambridge, MA 2003

3-dimensional analog microscope stage controller with joystick interface for accurate control of neurons and micropipettes under the microscope. Advisor: Sebastian Seung

Research Assistant Yale University
New Haven, CT Summer 1999

Studied the function of specific genes in Drosophila genome. Techniques- Polymerase Chain Reaction (PCR) DNA Amplification, Gel Electrophoresis, Polyachrylamide Gel Electrophoresis, Protein Purification, antibody harvesting, in vitro DNA splicing, restriction enzyme and plasmid design, etc. With Professor Lynn Cooley

Consulting

Teaching Experience

Teaching Assistant MIT
Cambridge, MA Fall '05, '06, '07

6.131: Power Electronics Laboratory. Professor Steven B. Leeb. Linear and switching power converters; Buck, Boost, Flyback converters; Audio amplifiers; H-bridges; motors and motor drives; Feedback control for power systems; Solar array maximum power point trackers.

Teaching Assistant MIT
Cambridge, MA Spring '06, '07

6.115: Microcomputer Projects Laboratory. Professor Steven. B. Leeb. Assisted students with embedded systems design and programming; Assembly and C; especially 8051 microprocessors, PICs, peripherals, interface devices, servomechanisms. Lab Assistant Spring 2005.

Tutor MIT
Cambridge, MA Spring '08

Tutored MIT Undergraduates in Electronics and Circuits, Electromagnetics, and Microelectronics Devices and Circuits course 6.002, 6.013 and 6.012 respectively.

Laboratory Assistant MIT
Cambridge, MA Fall'04

6.101: Analog Electronics Laboratory. Professor Ron Roscoe Audio Amplifiers, AM radio, FM radio,

Power supplies, oscillators, op-amps.

Other Employment

EE Intern

Medtronic Corporation

Minneapolis, MN

Jan. '07

Implemented a brain-machine interface to detect alpha-wave power with an EEG so that the user could turn a lantern on or off by opening or closing his eyes. Investigated a low-noise, micro-power, chopper-stabilized bio-potential amplifier. Studied the post-stimulation polarization of various brain electrode materials in electrolytic solution.

EE Intern

AAI Corporation

Baltimore, MD

Summer '04

Systems Engineering for Tactical Unmanned Aerial Vehicle group. Design, testing, debugging, and repair of Hardware systems for immediate deployment in Iraq, with focus on Ground Control Stations. Wrote report for Ground Control Station "Data Acquisition System" for US Army Aviation and Missile Command Redstone Arsenal, AL

Maintenance Manager, Staff

Appalachian Mountain Club (AMC)

Lake Winnepesaukee NH

Summer '00-'03

Responsible for maintenance of island buildings, plumbing, electrical, landscaping, and safety systems. Supervised crew of 18.

Memberships

Sigma Xi Scientific Research Society

IEEE Student Member

National Honor Society