Gary Garber
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EDUCATION

Sabbatical Year at Tufts University Center for Engineering and Education Outreach		2011-2012
Boston University	Master of Arts in Physics	May 1999
Haverford College	Bachelor of Science in Physics and Astronomy	May 1993

TEACHING EXPERIENCE

Boston University Academy, Instructor **1999 - Present**

Taught Physics, Calculus, Multivariable Calculus, Computer Aided Design, Photonics, Engineering, Astronomy, Robotics, Aeronautical Engineering and Rocketry
Liaison between Boston University and the Academy
Coach, Science Team
Coach, Robotics Team; Supervise undergraduate coaches
Supervise student research in university science laboratories
Supervisor of senior thesis program

DEILAB –Design Engineering Innovation Laboratory **2015 to present**

Curriculum developer, LEGO model developer, LEGO workshop presenter and outreach

Tufts University Center for Engineering Education Outreach **2011 to present**

Curriculum developer, software developer design team lead, educational research, LEGO workshop presenter and outreach

Melrose Math Circle **2010 to 2012**

Facilitated a Math Circle discussion for a group of elementary school students in Melrose.

College of Engineering U-Design Summer Camp, Instructor **2009 to present**

Taught Aviation and Rocketry to middle school students

Cambridge Physics Outlet Curriculum Development/ Writer **2000 –2002**

Wrote several chapters in introductory physics text

Academy of Natural Sciences of Philadelphia, Staff Astronomer and Teacher **1995-1996**

Presented planetarium shows to grade children at Safari Overnights.

Astronomy To Go, Instructor **1994-1997**

Traveled to schools and camps presenting planetarium shows in a portable planetarium.
Organized Star Parties for the general public.

Germantown Friends School, Instructor **1993-1997**

Taught Physics, AP Physics, Algebra 2, Calculus, Physics of Music
Student Council Advisor
Coach, Science Olympiad Team (Team District Champion 1997)
Hosted 1995 and 1997 Student Council Conference for Quaker Schools

Copernicus Planetarium, Central Connecticut State University, Intern **1987-1989**

Created, produced, and presented planetarium shows

AWARDS

American Institute of Aeronautics and Astronautics Foundation Educator Achievement Award	2015
Winner Vernier Engineering Contest	2014
NSTA/Vernier Technology Award	2014
Notable Entry in Vernier Engineering Contest	2013
Exemplary nominee for ASCD Outstanding Young Educator Award	2012
Suffolk Country Science Teacher of the Year Award, Mass Science Teachers Association	2011
NASA Reduced Gravity Education Flight Teaching From Space Grant	2011
Massachusetts Institute of Technology Inspirational Teacher Award	2011
Armed Forces Communications and Electronics Association Science Teaching Tools Grant	2010
National Science Teachers Association Toyota Tapestry Mini Grant	2009
Above and Beyond Best Teacher Award –Mass Technology Leadership Council	2008
Best Teacher Award –Massachusetts Junior Science and Humanities Symposium	2008
Above and Beyond Best Teacher Award –Mass Technology Leadership Council	2007

PROFESSIONAL AFFILIATIONS

National Science Teachers Association	1993 to present
American Association of Physics Teachers	1993 to present
Hosted Fall meeting and Demonstration Night of SEPS/AAPT	1994
President of Southeastern PA Section of APPT	1996-1997
Member of National Astronomy Committee of AAPT	1997- 2000
President of New England Section of AAPT	2011 to 2015
Director, Mass Physics Olympics	2011 to present
Co-chair AAPT Physics Day at NSTA Regional Conference	Fall 2011
Co-chair of New England Section AAPT Meeting at Thayer Academy	Spring 2012
Co-chair of New England Section AAPT Meeting at Milton Academy	Spring 2013
Co-chair of New England Section AAPT Meeting at Salem State Univ	Spring 2014
Co-chair of New England Section AAPT Meeting at Salem State Univ	Spring 2015
American Astronomical Society Teacher Resource Agent	1996-1998
American Institute of Aeronautics and Astronautics	2007 to present
American Society for Engineering Education	2012 to present

PUBLICATIONS

Garber, Gary. *Learning LEGO Mindstorm EV3*. London: Packt, 2015.

Garber, Gary. *Instant LEGO Mindstorm EV3*. London: Packt, 2013.

Hannon, D.; Danahy, E.; Schneider, L.; Coopey, E.; Garber, G.; "Encouraging teachers to adopt inquiry-based learning by engaging in participatory design," *Integrated STEM Education Conference (ISEC), 2012 IEEE 2nd* , vol., no., pp.1-4, 9-9 March 2012

Garber, G. (2008). I,robot. *IEEE Women In Engineering Magazine*, *1*(1), 35-37.

Chapter 18 to 21 of textbook Integrated Physics and Chemistry, Cambridge Physics Outlet 2003

Gaustad, Crawford, and Garber. Bulletin of the American Astronomical Society. 179th AAS Meeting Abstracts. "The Distribution of Interstellar Dust in the Solar Neighborhood." Vol.23, No.4, 1991. p.1365. Presented a poster paper at the meeting.

Garber and Crawford. Proceedings of the 1991 Keck Undergraduate Symposium on Research in Astronomy. "Infrared measurements of Interstellar Cirrus Clouds" pp.19-28.

Garber and Sudol. The Minor Planet Bulletin. "Astrometric Positions of Minor Planets." Vol.18, No.3, 1991 July-September. p.34.

Proceedings of the 1990 Keck Undergraduate Symposium on Research in Astronomy. "Hyper-sensitization of Photographic Plates and Tracking Asteroids." pp.3-4.

WORKSHOP PRESENTATIONS

Annual Meeting of Mass Science Teachers Association, Boxborough, MA — Fall 2014
Hands-on Workshop on Collaborative Learning with InterLACE Software

National Meeting of National Science Teachers Association, Boston — Spring 2014
InterLACE: Collaboration in the Classroom

Two Day Summer Workshop at Tufts CEEO — August 2013
InterLACE Professional Development Training

Annual Meeting of Mass Science Teachers Association, Boxborough, MA — Fall 2012
Hands-on Workshop on Collaborative Learning with InterLACE Software

Weeklong Summer Workshop at Tufts CEEO — August 2012
InterLACE Professional Development Training

Annual Meeting of Mass Science Teachers Association, Boxborough, MA — Fall 2011
Hands-on Workshop on Introduction to VEX and LEGO Tetrix Robotics

Annual Meeting of Mass Science Teachers Association, Boxborough, MA — Fall 2010
Hands-on Workshop on Introduction to VEX Robotics

*Boston University FIRST Robotics Laboratory — Winter 2009
Hands-on training workshop in VEX robotics Gave out $6000 in grants for robot kits to Boston teachers

* Annual Meeting of Mass Science Teachers Association, Boxborough, MA — Fall 2009
Hands-on Workshop on Introduction to VEX Robotics

Lowell Physics Alliance, UMASS Lowell — Spring 2009
Full Day hands-on workshop on "VEX Robotics"

* Annual Meeting of Mass Science Teachers Association — Fall 2008
Workshop on Introduction to LEGO Robotics with Steve Cremer of FIRST

*Boston University FIRST Robotics Laboratory — Fall 2008
Hands-on training workshop in VEX robotics

*Boston University Sargent Gymnasium — Winter 2008
Crate building workshop, participants walked away with free shipping crate for their robot

*Boston University FIRST Robotics Laboratory — Fall 2007
Coordinated and hosted a series of five Robotics workshops for Boston Public School teams, topics included programming, fund raising, Computer Aided Design, and Pneumatics

*Boston University FIRST Robotics Laboratory — Fall 2007
Workshop on "Fundraising for a FIRST Robotics Team"

*Boston University Sargent Gymnasium — Winter 2007
Crate building workshop, participants walked away with free shipping crate for their robot

*Boston University FIRST Robotics Laboratory — Fall 2006
Workshop on FIRST training for second year robotics teams

*Boston University FIRST Robotics Laboratory — Fall 2006
Workshop on FIRST training for first year robotics teams

National American Association of Physics Teachers meeting, Denver — Summer 1997
"Hands on Activities in Astronomy" presented with Jatilla Van der Deen, Sharon Snyder, Anne Young

Boston Public School's Campbell Resource Center — Spring 1997
"Fun Activities in Astronomy" for Elementary School teachers presented with Catalina Moreno

National American Association of Physics Teachers meeting, Phoenix — Winter 1997
"What is a comet?" for high school physics teachers.

Northeast Regional meeting of AAPT, Brookhaven National Laboratory — Fall 1996
"Hands on Tools in Astronomy" for high school physics teachers

Northeast Regional meeting of AAPT, Princeton University — Fall 1995
"Holography and Shoe-box Lasers for $60" presented with Prof. David McGee

NJ/DE/SEPS meeting of AAPT, Philadelphia College of Pharmacy and Science — Spring 1995
"Shoe-box Laser for $60" workshop presented with Prof. David McGee

Delaware Physics Day, University of Delaware — Fall 1994
"Holography and Experiments" presented with Elizabeth Chesick

Northeast Regional Meeting of AAPT, Penn State University — Fall 1994
"Shoe-box Laser for $60" presented with David McGee

*Co-presented with high school students from BU Academy and Undergraduates from BU

WEBINAR AND VIDEOS

O'Reilly Webcasts "LEGO EV3 vs. VEX IQ Robotics, a Comparison in Sensor Control Systems" Fall 2014
MIT BLOSSOMS Science Video Lessons for High School Classes "Mysteries of Magnetism" Winter 2015

ORAL PRESENTATIONS AND DEMONSTRATIONS

Assembled: Education Boston "Are You Ready for the Future?" Sponsored by General Assembly, LearnLaunch, and Pearson Fall 2014
Invited Panel Discussion "Robots and Learning: Today and Tomorrow"

New England Meeting of AAPT, Salem State University Spring 2014
"Rocket Launch Analysis and the Vernier Engineering Contest"

Massachusetts STEM Summit 2013, Gillette Stadium Fall 2013
Invited Panel Discussion "Research-Based STEM Resources: Closing the Gap between Researchers and Practitioners"

Northeast Regional Meeting of AAPT, Marist College Fall 2013
"InterLACE: Interactive Learning and Collaboration Environment"

Christa McAuliffe Technology Conference, Manchester, NH Fall 2012
"Visualizing Student Ideas to Drive Conversations Around Inquiry Science"

New England Meeting of AAPT, Williams College Fall 2012
"InterLACE: Interactive Learning and Collaboration Environment"

New England Meeting of AAPT, Thayer Academy, Braintree, MA Spring 2012
"Reduced Gravity Pendulum"

New England Meeting of AAPT, Thayer Academy, Braintree, MA Spring 2012
"InterLACE: Interactive Learning and Collaboration Environment"

Lowell Physics Alliance, UMASS Lowell Winter 2012
Invited Speaker "Zero Gravity Pendulum on a NASA Reduced Gravity Flight"

New England Meeting of AAPT, UMASS Amhest Fall 2011
"Zero Gravity Pendulum on a NASA Reduced Gravity Flight"

STEM Forum, Melrose Education Coalition, Invited Panel Speaker Fall 2011
"STEM Opportunities for students and teachers"

Regional NSTA, Hartford Convention Center Fall 2011
"Robobooks, an Interactive Digital Textbook"

Regional NSTA, Hartford Convention Center Fall 2011
"Zero Gravity Pendulum on a NASA Reduced Gravity Flight"

Regional NSTA, Hartford Convention Center Fall 2011
"Stop Action Animation used in the Classroom"

New England Meeting of AAPT, Brown University Fall 2010
"Junior Research Seminar at BU Academy"

New England Meeting of AAPT, University of New Hampshire Fall 2009
"Using Galileo's Owns Words in the Physics Classroom"

* New England Meeting of AAPT, Northeastern University Spring 2009
"Optical Integrating Sphere and measuring the intensity of light bulbs"

Lowell Physics Alliance, UMASS Lowell Winter 2009
Invited Panel Discussion "Teaching with Robots"

New England Meeting of AAPT, UMASS Boston Fall 2008
"VEX Robotics"

* National Meeting of NSTA, Boston Convention Center Spring 2008
"FIRST Robotics"

National Meeting of NSTA, Boston Convention Center Spring 2008
"Integrating High School Students into University Research"

New England Section Meeting of AAPT, University of Connecticut Fall 2007
"Podcasting in the Classroom"

* 30th Anniversary Dinner of Mass High Technology Council, Boston, MA Fall 2007
Invited Demonstration of F.I.R.S.T. Robot

* UK/US Transatlantic Conference on STEM Education, Boston, MA Summer 2007
Invited Demonstration of F.I.R.S.T. Robot

* National F.I.R.S.T. Conference, Atlanta, GA Spring 2007
"Outreach to Rookie Robotics Teams"

National AAPT meeting, Syracuse University — Summer 2006
"Integrating High School Students into University Research"
New England Section Meeting of AAPT, Boston University — Spring 2006
"Forming a F.I.R.S.T. Robotics Team"
New England Section Meeting of AAPT, University of Vermont — Fall 2005
"Integrating High School Students into University Research"
* National Meeting of National Society of Black Engineers, Boston — Spring 2005
Invited Demonstration of F.I.R.S.T. Robot
* New England Section Meeting of AAPT, Cambridge, MA — Spring 2005
Invited Demonstration of F.I.R.S.T. Robot
National AAPT meeting, College Park, MD — Summer 1996
"Building a Carbon Dioxide Laser with High School Students."
Northeast Regional meeting of APPT, Princeton University, NJ — October 1995
"How to Teach the Fourier Transform Conceptually."
National AAPT meeting in Notre Dame, IN — Summer 1994
"How to build a He-Ne laser for $60."
*Co-presented with high school students from BU Academy and Undergraduates from BU

ROBOTICS HIGHLIGHTS

Winner of the FIRST Reading District Event	2015
Winner of the VEXIQ New England Championship	2015
Motorola Quality Award, FIRST Reading District Event	2015
Xerox Creativity Award, FIRST Nashua District Event	2015
Xerox Creativity Award, FIRST Northeastern District Event	2014
New England VEX Championship Programming Skills Winner	2014
Chairman's Award, FIRST Boston Regional	2012
Tournament Champions, FIRST Boston Regional	2012
Chairman's Award, FIRST Boston Regional	2011
Engineering Inspiration Award, FIRST Boston Regional	2007
Johnson and Johnson Good Sportsmanship Award, FIRST Boston Regional	2006
Hosted Official FIRST Local Kickoff Events	2007, 2008
Host Annual Boston VEX Robotics Championship	2007 +
Host FIRST Boston Lego League Qualifying Tournament	2010 +
Host FIRST Boston Tech Challenge Qualifying Tournament	2010-2013

SCIENCE TEAM HIGHLIGHTS

Massachusetts Science Bowl 2nd Place	2010
Massachusetts Physics Olympiad Champions	2008
Hosted Massachusetts Physics Olympiad at Boston University	2006, 2007
Run "Astronomy" event at Massachusetts Science Olympiad	2001-2010
Western Suburban Science League 1st Place in League	2005
Western Suburban Science League 2nd Place in League	2006

Professional Development

BLOSSOMS At MIT	2013-2014
Sabbatical Year at Tufts Center for Engineering Education and Outreach	2011-2012
Teachers In Space with Space Frontier Foundation	Summer 2011
Teaching From Space NASA Reduced Gravity Flight	Summer 2011
PHOTON Problem Based Learning with New England Board of Higher Education	Summer 2008
Earthwatch Expedition, Spain, Search for Neanderthals	Summer 1997
American Astronomical Society Teacher Resource Agent Program	Summer 1996
Particle and Interactions Workshop with Stanford Linear Accelerator	Summer 1995
Teacher Research Associates Programs with Stanford Linear Accelerator	Summer 1995
Ticket to the Sky Aeronautical Engineering Workshop at Embry Riddle	Summer 1994
Nuclear Concepts and Technology Workshop at Penn State University	Summer 1994

RESEARCH EXPERIENCE

Tufts University CEEO Educational Research on using Touch Table technology in the classroom Fall 2012 +
Tufts University CEEO Using Image Analysis in the Classroom Fall 2011 +
Tufts University CEEO Technology development and Educational Research, Researching Collaborative inquiry based learning in the classroom Fall 2011 +
Johnson Space Center, NASA Spring-Summer 2011
Flew a simple pendulum experiment on a NASA Reduced Gravity Flight.
Boston University Robotics Laboratory Spring 2009-Spring 2010
Working with the BU Chapter of Engineers Without Borders to construct a prototype of a slow sand filter which can be used to purify water in rural villages.
Photonics Center, Boston University Fall 2008 to Spring 2010
Used an optical integrating sphere to compare the efficiency of Compact Fluorescent Light bulbs to traditional incandescent light bulbs
Boston University Academy, Supervisor of Senior Thesis project Fall 2007-present
All students at Boston University Academy write an 8000 word thesis paper based on a research project.
Boston University Academy, Supervisor of Student Science Research Fall 2000-present
Work with students to tour laboratories and train and place rising seniors in science laboratories
Photonics Center, Boston University Fall 2001-Spring 2002
Worked on a project to create an ultra-high sensitive biosensor based upon optical waveguides combined with array technology and tomographic algorithms
Boston University Medical Center and B.U. Photonics Center Fall 1997-Spring 1999
Applied infrared Near-field spectroscopy to the important problem of understanding the early steps in the formation of adipocytes (fat cells) for diabetes and obesity research.
Hanson Experimental Physics Laboratories at Stanford University Summer 1998
Designed calibration methods for infrared Near-field spectroscopy and microscopy.
Photonics Center, Boston University Fall 1998-Spring 1999
Worked on a project to create an ultra-high sensitive biosensor based upon optical waveguides whose optical fields interact with surface bound antigens for detection of E. Coli and other food contaminants.
Stanford Linear Accelerator, Palo Alto, CA Summer 1995
Designed and assembled electronics for the diagnostic system for accelerator beam.
Argonne National Laboratory, Division of Chemical Technologies, Argonne, IL Fall 1992
and Bryn Mawr College, Bryn Mawr, PA Spring 1993
Programmed Artificial Neural Nets to make predictions in chaotic time series.
Bryn Mawr College, Physics Dept., Bryn Mawr, PA Summer 1992 & Spring 1993
Analyzed chaotic patterns formed by transverse laser modes in a He-Ne laser.
Lawrence Livermore National Laboratory, Livermore, CA Summer 1992
Summer Institute for Applied Science, Performed diagnostic tests on the Kerr Cell for the NOVA upgrade.
Haverford College, Astronomy Dept. Haverford, PA Spring 1992
Programmed cosmological simulations of the early universe using N-Body Codes.
Swarthmore College Astronomy Dept. Swarthmore, PA Summer 1991
Analyzed and mapped the density of the interstellar medium with data from the IRAS satellite.
Wesleyan University, Astronomy Dept., Middletown, CT Summer 1990
Observed for the parallax program using the 20 " refractor and produced facilities to hyper-sensitize photographic plates at for the program