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BACKGROUND

Education

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- May 2020 **Ph.D. Physics**, focus in Health Physics
Worcester Polytechnic Institute (WPI)
“Environmental Resuspension and Health Impacts of Radioactive Particulate Matter”
<https://digital.wpi.edu/pdfviewer/m900nw99j>
- May 2016 **M.Sc. Physics**, focus in Medical Physics
Worcester Polytechnic Institute
Completed Comprehensive Written Examination (PH 798)
- May 2013 **B.Sc. Physics** with distinction, Minor in Mathematics
Worcester Polytechnic Institute
“Experimental Studies of Protein and Liquid Crystal Interactions”
<https://digital.wpi.edu/pdfviewer/0c483k85m>

Academic Appointments

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- Fall 2023 - Present** **Visiting Assistant Professor**
Mount Holyoke College, Department of Physics
- Fall 2017 - Spring 2020 **Adjunct Faculty**
Becker College, Department of Natural Sciences
- Spring 2018 - Fall 2018 **Adjunct Instructor**
Worcester Polytechnic Institute, Department of Physics
- Fall 2013 - Spring 2015 **Teaching Assistant (TA)**
Worcester Polytechnic Institute, Department of Physics
- Fall 2011 - Spring 2013 **Math And Science Help (MASH) Tutor**
Worcester Polytechnic Institute, Academic Resources Center
- Spring 2010 - Spring 2013 **Peer-Learning Assistant (PLA)**
Worcester Polytechnic Institute, Department of Mathematics

Professional Experience

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- Mar 2020 - Feb 2024 **Senior Staff Radiation Scientist**
Geosyntec Consultants, Inc.
- May 2014 - May 2020 **Research Assistant (RA)**, Radiation Physics Lab
Worcester Polytechnic Institute, Department of Physics
- Aug 2010 - May 2013 **Laboratory Assistant (LA)**, Experimental Biophysics Lab
Worcester Polytechnic Institute, Department of Physics

ACADEMIC TEACHING

Courses Taught at Mount Holyoke College

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- Spring 2025 **PHYS-315: Analytical Mechanics**
Newton's great innovation was the description of the world by differential equations, the beginning of physics as we know it. This course studies Newtonian mechanics for a point particle in 1, 2, and 3 dimensions, systems of particles, rigid bodies, and the Lagrangian and Hamiltonian formulations.
- Spring 2025 **PHYS-110: Forces, Motion, and Energy**
This a calculus-based physics course designed for students intending to major in physics, astronomy, or another physical science, though all are welcome. It also fulfills pre-health requirements. Students will learn how to apply fundamental physics concepts such as force, energy, momentum to a variety of mechanical situations, including projectile motion, human movement, fluid motion, and planetary motion.
- Spring 2025,
Fall 2024,
Spring 2024,
Fall 2023 **PHYS-110L: Forces, Motion, and Energy Laboratory**
Topics include: Newton's laws, projectile motion, circular motion, momentum, kinetic and potential energy, angular momentum, gravitation, and oscillations. This course is appropriate for students intending to major in a physical science.
- Fall 2024 **PHYS-311: Computational Physics Laboratory**
Computers bring a new dimension to the mathematical theories of physics, including new methods of visualization and new ways to explore theory through computer experiments. This laboratory course will combine mathematics, physics, and computation in projects that make essential use of all three together. Topics from various subfields of physics will be packaged into self-contained modules for exploration through the use of high-level computational tools.
- Spring 2024 **PHYS-290/PHYS-390: Advanced Laboratory Practicum**
This course is a hands-on practicum, intended to introduce students to the practice of modern physics research. Depending on student interest, topics include external research seminars by practitioners in the field, training in oral and written scientific communication, presentation and interpretation of research results, scientific modeling, and hands-on experimental skills. Research projects are an integral part of this course; credit will be apportioned in relation to the intensity of the project.
- Spring 2024,
Fall 2023 **PHYS-201L: Electromagnetism Laboratory**
Topics include: electromagnetism, emphasizing fields and energy; electrostatics; electric circuits; magnetism; induction; and electromagnetic radiation. Additional topics chosen according to the interests of the class and instructor.

Evaluation of Teaching at Mount Holyoke College

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Fall 2024	PHYS-110L Instructor was prepared to teach: Instructor was easily approachable: Timely answers to questions asked outside of class:	24 students, 22 responses 4.86/5 \pm 0.35 4.95/5 \pm 0.21 4.55/5 \pm 0.74
Spring 2024	PHYS-201L Instructor was prepared to teach: Instructor was easily approachable: Timely answers to questions asked outside of class:	23 students, 19 responses 4.84/5 \pm 0.37 4.89/5 \pm 0.32 4.53/5 \pm 0.77
Spring 2024	PHYS-110L Instructor was prepared to teach: Instructor was easily approachable: Timely answers to questions asked outside of class:	21 students, 18 responses 4.83/5 \pm 0.38 5/5 \pm 0 4.50/5 \pm 0.92
Fall 2023	PHYS-201L Instructor was prepared to teach: Instructor was easily approachable: Timely answers to questions asked outside of class:	16 students, 8 responses 4.25/5 \pm 0.89 4.38/5 \pm 0.92 4.75/5 \pm 0.71
Fall 2023	PHYS-110L Instructor was prepared to teach: Instructor was easily approachable: Timely answers to questions asked outside of class:	38 students, 38 responses 4.63/5 \pm 0.67 4.79/5 \pm 0.58 4.82/5 \pm 0.51

Courses Taught at Worcester Polytechnic Institute

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Fall 2018	PH111X: Studio Physics - Mechanics <i>Introductory course in Newtonian mechanics taught in a blended studio format. Topics include: kinematics of motion, vectors, Newton's laws, friction, work-energy, impulse-momentum, for both translational and rotational motion.</i>
Spring 2018	PH1120: General Physics - Electricity and Magnetism <i>An introduction to the theory of electricity and magnetism. Topics include: Coulomb's law, electric and magnetic fields, capacitance, electrical current and resistance, and electromagnetic induction.</i>
Spring 2018	PH1110: General Physics - Mechanics <i>Introductory course in Newtonian mechanics. Topics include: kinematics of motion, vectors, Newton's laws, friction, work-energy, impulse-momentum, for both translational and rotational motion.</i>

Evaluation of Teaching at Worcester Polytechnic Institute [\[top\]](#)

Spring 2018	PH1120	78 students, 33 responses
	Overall rating of quality of course:	4.18/5 \pm 0.19
	Overall rating of instructor's teaching:	4.32/5 \pm 0.14
	Instructor treated students with respect:	4.84/5 \pm 0.05
Spring 2018	PH1110	51 students, 22 responses
	Overall rating of quality of course:	3.46/5 \pm 0.66
	Overall rating of instructor's teaching:	3.20/5 \pm 0.46
	Instructor treated students with respect:	4.58/5 \pm 0.28

Courses Taught at Becker College [\[top\]](#)

Spring 2020, Fall 2019, Spring 2019, Fall 2018, Fall 2017	PHYS2001: Physics I - Fundamentals of Classical Mechanics <i>This is an introductory algebra based course. The course introduces natural laws of physics which covers linear and circular motion, gravitational and frictional forces, rotational motion, work and energy, momentum, fluids, thermal physics, and wave motion.</i>	
Spring 2018	PHYS2002: Physics II - Electromagnetism & Modern Physics <i>Students will be introduced to the laws of physics which apply to electricity, magnetism, optics and nuclear energy. Special emphasis will placed on the relevance of other basic science material to such topics as nerve conduction, sensory transduction, diagnostic techniques (i.e. ultrasound, NMR, EKG, etc.), and nuclear medicine.</i>	

Evaluation of Teaching at Becker College [\[top\]](#)

Spring 2020	PHYS2001	17 students, 11 responses
	The course was well-designed:	3.45/4 \pm 0.69
	Instructor provided opportunities to answer questions:	3.82/4 \pm 0.40
	Instructor was available for help outside of class:	3.80/4 \pm 0.63
Fall 2019	PHYS2001	18 students, 29 responses
	The course was well-designed:	3.28/4 \pm 0.57
	Instructor provided opportunities to answer questions:	3.67/4 \pm 0.49
	Instructor was available for help outside of class:	3.67/4 \pm 0.59
Spring 2019	PHYS2001	15 students, 7 responses
	Presented materials in clear manner:	3.00/4 \pm 1.00
	Organized and prepared to teach class:	3.43/4 \pm 0.53
	Perceptive to expression of student views:	3.29/4 \pm 0.95
Fall 2018	PHYS2001	24 students, 13 responses
	Presented materials in clear manner:	2.69/4 \pm 0.85
	Organized and prepared to teach class:	3.15/4 \pm 0.69
	Perceptive to expression of student views:	3.46/4 \pm 0.52
Spring 2018	PHYS2002	44 students, 34 responses
	Presented materials in clear manner:	2.21/4 \pm 0.91
	Organized and prepared to teach class:	2.68/4 \pm 0.84
	Perceptive to expression of student views:	2.69/4 \pm 0.97
Fall 2017	PHYS2001	29 students, 19 responses
	Presented materials in clear manner:	2.53/4 \pm 0.84
	Organized and prepared to teach class:	2.79/4 \pm 0.79
	Perceptive to expression of student views:	3.50/4 \pm 0.51

- 2017 **Outstanding Undergraduate Mentor**
Worcester Polytechnic Institute, Department of Physics
- 2016 **Outstanding Teaching Assistant**
Worcester Polytechnic Institute, Department of Physics
- 2015 **Outstanding Teaching Assistant**
Worcester Polytechnic Institute, Department of Physics
- 2013 **Teaching Assistantship**
Worcester Polytechnic Institute, Department of Physics

ACADEMIC SCHOLARSHIP AND RESEARCH

Research Interests

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Health physics, radiation safety, radiological materials, environmental physics, computational physics

Student Mentorship at Worcester Polytechnic Institute

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|-------------|---|
| 2017 - 2020 | Mykalin Jones (Masters Project), <i>Monte Carlo Simulation of High Energy Neutrino Event Transport in Cerenkov Detectors</i> |
| 2018 - 2019 | Adam Ramram (Major Qualifying Project), <i>Programatic Thermal Neutron Flux Calibration for Neutron Generators</i> |
| 2018 - 2019 | Paula Silvestre (Major Qualifying Project), <i>Analysis of Am-241 Resuspension into the Atmosphere</i> |
| 2016 - 2017 | Mykalin Jones (Major Qualifying Project) <i>Simulating Tau Neutrino Events in the IceCube Array</i> |

Peer-Reviewed Publications

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| May 2018 | S. Marshall, C. Potter, D.C. Medich. <i>Reassessment of Resuspension Factor Following Radionuclide Dispersal: Towards a General-Purpose Rate Constant</i> . Health Physics, 103(5):500-506. Available at https://doi.org/10.1097/HP.0000000000000802 . |
| June 2015 | S. Marshall, A. Hodgdon, B. Currier. <i>Computational Evaluations of Proton-Induced Gain in a Portable Faraday Cup</i> . Medical Physics. 42(6):3383. Available at https://doi.org/10.1118/1.4924582 . |

Other Academic Publications

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| Apr 2013 | S. Marshall. <i>Experimental Studies of Protein and Liquid Crystal Interactions</i> . Worcester Polytechnic Institute. Available at https://digital.wpi.edu/pdfviewer/0c483k85m . |
| Feb 2012 | K. Beovich, J. DeCelle, S. Marshall, W. Ramos. <i>Creating a High Speed Rail for Australia</i> . Worcester Polytechnic Institute. Available at https://digital.wpi.edu/pdfviewer/rf55z805q . |

Invited Talks and Presentations

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- Mar 2024 *Health Physics and Environmental Resuspension of Radioactivity*
Physics Department Seminar Speaker Series, Mount Holyoke College
- Apr 2023 *Introduction to Health Physics and the Radiological Focus Group (RFG)*
Geosyntec Consultants, Internal presentation
- Dec 2022 *Brownfield Radiological Remediation - Projects and People*
Geosyntec Consultants, Internal presentation
- Jul 2020 *Sayreville - Advancing FSSR Templating*
Geosyntec Consultants, Internal presentation
- 9 Jul 2019 *On Sampling the Indoor Background Particulate Resuspension Factor*
64th Annual Meeting, Health Physics Society, Orlando, FL
- 6 Jun 2018 *Kinetic Transport Models and Minimum Detection Limits of Atmospheric Particulate Resuspension*
New England Chapter of the Health Physics Society Annual Meeting, Westford, MA
- Apr 2018 *Experimental Studies of the Short Term Resuspension Factor Following Particulate Release*
13th Graduate Research Innovation Exchange, Worcester Polytechnic Institute
- 10 Jul 2017 *Quantifying Electrostatic Resuspension of Radionuclide Following Surface Contamination*
62nd Annual Meeting, Health Physics Society, Raleigh, NC
- 7 Jun 2017 *Quantifying Electrostatic Resuspension of Radioparticulates Following Surface Contamination*
New England Chapter of the Health Physics Society Annual Meeting, Westford, MA
- Feb 2017 *Reassessment of Empirical Resuspension Factors Following Radionuclide Release*
12th Graduate Research Innovation Exchange, Worcester Polytechnic Institute
- 23 Aug 2016 *Progress on Americium-241 Resuspension Study*
Office of Sandia National Laboratories, Washington, D.C.
- 18 Jul 2016 *Reassessment of Empirical Resuspension Factors Following Radionuclide Release*
61st Annual Meeting, Health Physics Society, Spokane, WA
- Feb 2016 *Computational Evaluations of Proton Induced Gain in a Portable Faraday Cup*
11th Graduate Research Innovation Exchange, Worcester Polytechnic Institute
- 14 Jul 2015 *Computational Evaluations of Proton Induced Gain in a Portable Faraday Cup*
57th Annual Meeting, American Association of Physicists in Medicine, Anaheim, CA
- Dec 2014 *Deciphering the Interactions Between Model Phospholipid Membranes and Human or Rat Amyloid Precursors: A Neutron Reflectometry Study*
10th Graduate Research Innovation Exchange, Worcester Polytechnic Institute
- Dec 2013 *Dielectric Relaxation Spectroscopy of Amyloid and non-Amyloid A β Proteins*
9th Graduate Research Innovation Exchange, Worcester Polytechnic Institute
- 20 Sep 2013 *Experimental Studies of Liquid Crystal and Protein Interactions*
56th New England Complex Fluids Workgroup, Worcester, MA
- 9 Apr 2013 *Experimental Studies of Liquid Crystal and Protein Interactions*
Worcester Polytechnic Institute, Department of Physics, Worcester, MA

- 6 Aug 2012 *Studies of the Collective Dynamics of A β 1-42 Amyloid Precursors Using DRS*
26th Annual Symposium of the Protein Society, San Diego, CA
- 6 Mar 2011 *Dielectric Relaxation Spectroscopy of Amyloid and non-Amyloid A β Proteins*
3rd Annual Northeast Undergraduate Research and Development Symposium,
University of New England Biddeford

Scholarly Referee Activities

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- 2019 - Present **Journal Manuscript Reviewer**, Health Physics Journal
- 2019 - Present **Reviewer**, International Organization for Standardization [ISO]
Radiological Standards Division
- 2019 **Proposal Reviewer (Non-Federal)**, Nuclear Regulatory Commission
Scholarship and Fellowship Education Grant

Scholarship Honors, Awards, and Recognition

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- May 2016 **Research Assistantship**
Worcester Polytechnic Institute, Department of Physics
- Apr 2016 **2nd Place - Arts & Sciences PhD Division**
Worcester Polytechnic Institute, 11th Graduate Research Innovation Exchange
- Dec 2013 **2nd Place - Arts & Sciences PhD Division**
Worcester Polytechnic Institute, 9th Graduate Research Innovation Exchange
- May 2013 **Graduate Summer Research Assistantship**
Worcester Polytechnic Institute, Department of Physics
- Apr 2013 **Major Qualifying Project Provost Award**
Worcester Polytechnic Institute, Department of Physics
- May 2011 **Summer Undergraduate Research Fellowship**
Worcester Polytechnic Institute, Department of Physics
- Mar 2011 **Best Poster Presentation**
University of New England, 3rd Northeastern Undergraduate Research and
Development Symposium

PROFESSIONAL DEVELOPMENT

Project Work at Geosyntec Consultants

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2020 - 2023

Riverton Redevelopment Site

Sayreville Seaport Associates Urban Renewal, L.P., Sayreville, NJ.

This site is 400-acre former titanium dioxide manufacturing facility slated for a multi-billion-dollar mixed use redevelopment. Responsible for data analyses and preparation of Final Status Survey reports (FSSRs) for areas of concern with soils impacted with uranium-238 and thorium-232 decay series radionuclides. This reporting is a regulatory requirement to release radiologically impacted areas of the site for re-use. Work includes (i) evaluating radiological data quality against project and regulatory standards, (ii) working with survey data in ArcGIS, (iii) assessing of radiological impacts based on professional judgement, (iv) performing retrospective analyses on the completeness of sampled areas using the Visual Sample Plan software, (v) performing WRS statistical tests to determine if soils met criteria for use-classification, (vi) drafting FSSRs.

2020 - 2023

Hamilton Redevelopment Site

Hilco Redevelopment Partners, Trenton, NJ.

This site is a former coal combustion power generating station slated for industrial use redevelopment. Responsible for data analyses and preparation of documentation on Remedial Investigation (RI), Remedial Action (RA), and Final Status Survey Reports (FSSRs) for areas of concern with soils impacted with uranium-238 and thorium-232 decay series radionuclides. This reporting is a regulatory requirement to release radiologically impacted areas of the site for re-use. Work includes (i) evaluating radiological measurement data quality against project and regulatory standards, (ii) working with survey data in ArcGIS, (iii) assessing of radiological impacts based on professional judgement, (iv) developing sampling and excavation work plans based on preliminary surveys, (v) drafting FSSRs.

2020 - 2023

Hudson Redevelopment Site

Hilco Redevelopment Partners, Trenton, NJ.

This site is a former coal combustion power generating station slated for industrial use redevelopment. Responsible for data analyses and preparation of Final Status Survey reports (FSSRs) for areas of concern with soils impacted with uranium-238 and thorium-232 decay series radionuclides. This reporting is a regulatory requirement to release radiologically impacted areas of the site for re-use. Work includes (i) evaluating radiological measurement data quality against project and regulatory standards, (ii) extracting survey data from ArcGIS platforms, and (iii) assessing of radiological impacts based on professional judgement, (iv) applying site-specific parameters to create Derived Concentration Guidance Limits (DCGLs) in accordance with the NJ Radioactive Soil Remediation Standards (RaSoRS), (v) drafting FSSRs.

2021 - 2023

Confidential Client

Bridgeton, MO

Provided subject matter expertise in radiation detection calculations, sampling design, health physics, data usability and remedial investigation strategies for a former landfill impacted with radiological waste.

2021

X-Ray Device Regulatory Compliance Review

World Oil Corp., Compton, CA

Provided subject matter expertise in health physics and demonstrated state/federal radiological regulatory compliance for the operation of an industrial radiographic x-ray tube. Verified dosimetry calculations and assessed occupational exposure to determine regulatory exemption eligibility.

2021 - 2023

ESTCP Database

Department of Defense

Created data-mining scripts in Python for iterative characterization of technical report database through custom search parameters. Search implementation includes basic logic of key terms to tally instances and indicate category by results. Assisted with JavaScript GUI implementation of data-mining and tabular data recognition.

Technical Proficiencies

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Scientific Instruments

Ludlum GM Detector and Digital Neutron Detector Survey Meters
Adelphi Technology DD110M Thermal Neutron Generator
Canberra High-Purity Broad Energy Germanium Detector

Scientific Applications

Visual Sample Plan (PNNL)
RESRAD-ONSITE/OFFSITE/BUILD (ANL)
Prospect/GENIE Gamma Acquisition and Analysis (Mirion Technologies, Inc.)
Geant4 Particle Transport Code (CERN)

Data Analysis

MATLAB, Mathematica, RStudio, Igor Pro, WinDETA/WinFit, ROOT, Origin

Programming and Markup Languages and Other Software

L^AT_EX, Microsoft Office Utilities (Word, Excel, Outlook), VBScript, C/C++, Linux Bash, Python, Java, Javascript, Android SDK, HTML/PHP/CSS, Git

Certifications, Training, and Continuing Education

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Nov 2024	Physics and Astronomy Faculty Teaching Institute American Association of Physics Teachers
Jul 2022	Associate Health Physicist (Part 1 of Certified Health Physicist [CHP] Exam) American Board of Health Physics
Oct 2021	RESRAD-ONSITE, RESRAD-OFFSITE, RESRAD-BUILD Training Workshop Argonne National Laboratory
Oct 2020	40HR OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Safety Unlimited, Inc.
Apr 2020	IS-042: Social Media in Emergency Management
Mar 2020	IS-005: Introduction to Hazardous Materials
	IS-393: Introduction to Hazard Mitigation
Aug 2019	IS-003: Radiological Emergency Management IS-303: Radiological Accident Assessment Concepts IS-454: Fundamentals of Risk Management Federal Emergency Management Agency, Emergency Management Institute
Aug 2018	Fundamentals of Scientific Teaching and Pedagogy
Feb 2016	Certified Radioisotope Worker Worcester Polytechnic Institute
May 2015	Geant4 Tutorial Course Stanford Linear Acceleration Center
Feb 2011	Lean Six Sigma Green Belt Institute of Industrial and Systems Engineers

Professional Societies

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American Academy of Health Physicists	Associate Member
Health Physics Society	Member
Health Physics Society - New England Chapter	Member
American Association of Physics Teachers	Member
American Physical Society	Member

Other Affiliations

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Sigma Xi (National Scientific Research Society)	Doctoral Member
Sigma Pi Sigma (National Physics Honor Society)	Life Member
Pi Mu Epsilon (National Mathematics Honor Society)	Member
Alpha Phi Omega (National Community Service Fraternity)	Life Member
Massachusetts Audubon Society	Member
Electronic Frontier Foundation	Member

SERVICE

Departmental Service

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Mount Holyoke College, Department of Physics

- 2023 - Present **Member, Radiation Safety Committee**
Collaborated with the Radiation Safety Officer and other department representatives on strategies to minimize radiation exposure the classrooms and laboratories.

Worcester Polytechnic Institute, Department of Physics

- 2016 - 2018 **Co-chair, Graduate Lunch Seminar**
Organized weekly seminar series for graduate student research topical briefings.
- 2016 **Co-chair, Graduate Lab Improvement Committee**
Hosted graduate student discussions to critique and improve lab course instruction. Compiled lab experiment instruction rewrites in a portable and accessible format.

Community Service

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Boy Scouts of America

- 2024 - Present **Merit Badge Counselor, Western Massachusetts Council**
 - Environmental Science, Nuclear Science, Energy, Electronics, Programming, Digital Technologies
- 2011 **Merit Badge Counselor, Mohegan Council (now Heart of New England)**
Instructed/certified 30 scouts for Merit Badge University with $A\Phi\Omega$ at WPI.
 - Environmental Science
- 2000 - 2008 **Boy Scout, Daniel Webster Council**
Awarded Eagle Scout Rank in Troop 410 in September 2008.
 - Eagle project delivered reproducible high school charity food drive
 - Project involved the contribution of hundreds of man-hours.
 - Resulted in local soup kitchen capacity increasing by 30% in 2007.Served as Patrol Leader in 2005 and Historian in 2006.
 - Over 100 hours serving, cleaning and organizing at Nashua Soup Kitchen & Shelter.
 - Assisted with outreach and donation drives for Humane Society for Greater Nashua.
 - Assisted in construction and renovation activities through Habitat for Humanity.
 - Cheffed and served at annual community pancake breakfasts.
 - Distributed/retired flag markers to local military graves for holiday observances.
 - Maintained local hiking trails through brush and litter removal.

Alpha Phi Omega ($A\Phi\Omega$), Omicron Iota Chapter (WPI)

- 2010 - 2013 **Active member**
- 2012 **Red Cross Blood Drive Liason**
- 2011 **Treasurer**
Community Service Fraternity; outreach, recruitment, fund-raising, and service
 - Annual WPI campus service events including freshman move-in day
 - Stockroom maintenance and record-keeping for Worcester ReStore.
 - Dinner service and cleanup at Worcester Stone Soup Community Center.
 - Construction and renovation activities through Habitat for Humanity.