

## Paul A. Nakroshis

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CONTACT INFORMATION	<p>Department of Physics University of Southern Maine 252 Science 96 Falmouth Street Portland, ME 04104-9300</p>	<p>Voice: (207) 780.4158 Fax: (207) 228-8288 E-mail: <a href="mailto:pauln@maine.edu">pauln@maine.edu</a> Web: <a href="http://portlandphysics.me">portlandphysics.me</a></p>
EDUCATION	<p><b>University of Illinois at Urbana-Champaign</b>, B.S., Physics, June 1986</p> <p><b>University of Massachusetts at Amherst</b>, Ph.D., Physics, Feb. 1994 <i>Experimental Gravitational Physics</i>, Advisor: Robert V. Krotkov</p>	
RESEARCH EXPERIENCE	<p><b>University of Southern Maine</b>, Portland, ME</p> <p><i>Associate Professor of Physics</i> <span style="float: right;"><b>2003 to present</b></span></p> <ul style="list-style-type: none"> <li>• Granular materials, Computational Physics, Torsion Pendulum Physics</li> </ul> <p><i>Assistant Professor of Physics</i> <span style="float: right;"><b>1997 to 2003</b></span></p> <ul style="list-style-type: none"> <li>• Stick-slip in granular arrays, video microscopy of Brownian Motion</li> </ul> <p><b>Clark University</b>, Worcester, MA</p> <p><i>NSF Postdoctoral Fellow and Instructor</i> <span style="float: right;"><b>1993 to 1995</b></span></p> <ul style="list-style-type: none"> <li>• Complete responsibility for design and construction of a new laboratory-based course on non-linear and chaotic systems. Use of video microscopy, and computer interfacing, Fortran and C programming languages.</li> </ul> <p><b>University of Massachusetts</b>, Amherst, MA</p> <p><i>Graduate Student</i> <span style="float: right;"><b>1986 to 1993</b></span></p> <ul style="list-style-type: none"> <li>• Experimental gravitational physics. Design, construction, and operation of a sensitive torsion pendulum to determine if the gravitational force is composition dependent. Experience in high vacuum work, machining, temperature control, diode laser and fiber optics, electronic design and construction.</li> <li>• Theoretical Nuclear Physics: T and S matrix scattering (1987)</li> <li>• Brookhaven National Laboratory: Graduate research assistant (1986)</li> </ul> <p><b>University of Illinois</b>, Champaign-Urbana, IL <span style="float: right;"><b>1982 to 1986</b></span></p> <ul style="list-style-type: none"> <li>• Fermi National Accelerator Laboratory: Summer research assistant (1985)</li> </ul>	
ADMINISTRATIVE EXPERIENCE	<p><b>University of Southern Maine</b>, Portland, ME</p> <p><i>Chair, Department of Physics</i> <span style="float: right;"><b>2016-2018</b></span></p> <ul style="list-style-type: none"> <li>• Restructured, expanded &amp; streamlined entire physics major</li> <li>• Chair of Search Committee for Visiting Assistant Professor</li> <li>• Integrated Learning Assistant program into the Physics Curriculum.</li> <li>• Member of the USM Learning Assistant Leadership Team</li> <li>• Presenter to President and Provost about using Learning Assistants to Improve Learning and Retention</li> </ul>	

*Chair, Department of Physics*

**2012-2014**

- Author: 2012 Department of Physics Self Study
- Course Scheduling as Chair
- Hiring and evaluation of part time instructors

TEACHING  
EXPERIENCE

**University of Southern Maine**, Portland, ME

*Associate Professor of Physics*

**2003 to present**

- Introductory Algebra-Based Physics I and II (Physics 111k and 112)
- Introductory Physics Laboratory (Physics 114 and 116)
- Introductory Calculus-Based Physics I and II using classroom response system (Physics 121k and 123)
- Non-Classical Physics I and II (Physics 211 and 213)
- Mechanics I & II (Physics 321, 323)
- Electromagnetism I & II (Physics 331, 333)
- Intermediate Physics Laboratory I/II (Physics 240/242)
- Computational Physics (Physics 261)
- Optics (Physics 375)
- Statistical and Thermal Physics (Physics 314)
- Quantum Mechanics (Physics 341)

*Assistant Professor of Physics*

**1997 to 2003**

- Introductory Algebra-Based Physics I and II (Physics 111k and 112)
- Introductory Physics Laboratory (Physics 114 and 116)
- Introductory Calculus-Based Physics I and II (Physics 121k and 123)
- Modern Physics Laboratory (Physics 212)
- Intermediate Physics Laboratory (Physics 240)
- Computational Physics (Physics 261 and 299)

**CUREA**, Mt. Wilson Observatory, CA

*Consortium for Undergraduate REsearch in Astronomy*

**1997 to 1998**

- One of four instructors at the Mt. Wilson Observatory summer program for Undergraduates. Topics included visual and photographic use of research telescopes, digital photometry of variable stars, and observation of solar spectra.

**Souhegan High School**, Amherst, NH

*Physics Teacher*

**1995 to 1997**

- AP Physics
- General Physics
- General Science

**Clark University**, Worcester, MA

*NSF Postdoctoral Fellow and Instructor*

**1993 to 1995**

- Discovering Physics: Complexity in Nature
- Science workshops for k-8 teachers

AWARDS

2000 Faculty Senate Honors: Excellence in Teaching (Univ. of Southern Maine)  
1992 Distinguished Teaching Assistant Award (Univ. of Massachusetts)  
1986 Graduation with Distinction (University of Illinois)

LEARNING ASSISTANT PROGRAM	<p>Member of Learning Assistant Leadership Team, 2016 - present.</p> <p>Co-instructor (with Prof. Lucy Benedict) for first Learning Assistant Pedagogy course, 2016.</p> <p>Hired and supervised over a dozen undergraduate LA's in Physics 114, 121, 123, and 261. (2015-present)</p>
PUBLICATIONS	<p>Benjamin Montgomery and Paul Nakroshis, <a href="#">Labjack-controller: Robust and Easy Data Collection with Labjack T-Series DAQs in Python</a>, Journal of Open Source Software, <b>4</b>(38):1448, 18 June, 2019.</p> <p>Julie Ziffer, William Morse, Tyler Nelson, Paul Nakroshis, et al, <a href="#">Practicing Spatial Relationship Skills Using an Asteroid 3-D Tool</a> , in The Physics Teacher, <b>57</b>(1):14-16, January 2019.</p> <p>Cody A. Goolsby and Paul A. Nakroshis, <a href="#">Vector Plot of Helmholtz Coil in Earth's Magnetic Field</a>, from the Wolfram Demonstrations Project, (<b>28</b>) November, 2011 (<a href="http://demonstrations.wolfram.com/VectorPlotOfHelmholtzCoilInEarthsMagneticField">http://demonstrations.wolfram.com/VectorPlotOfHelmholtzCoilInEarthsMagneticField</a>).</p> <p>P. Nakroshis, <a href="#">The Headlight Effect</a>, from The Wolfram Demonstrations Project, (<b>25</b>) October 2007 ( <a href="http://demonstrations.wolfram.com/TheHeadlightEffect">http://demonstrations.wolfram.com/TheHeadlightEffect</a>).</p> <p>P. Nakroshis, M. Amoroso, J. Legere, and C. Smith, <a href="#">Measuring Boltzmann's constant using video microscopy of Brownian motion.</a>, Am. J. Phys. <b>71</b> (6), June 2003.</p> <p>P. Nakroshis and C. Smith, <a href="#">Force Fluctuations in a Driven 2D Granular Array</a>, Bulletin of the American Physical Society, March 2001.</p> <p>P. Nakroshis and C. Smith, <a href="#">Rotational dynamics of a driven two dimensional granular array</a>, Bulletin of the American Physical Society, March 2001.</p> <p>P. Nakroshis, S. L. Blatt, C. Landee, and H. Gould, <a href="#">Order, Disorder, and Chaos: a New Course for Non-Science Majors</a>, Bull. Am. Phys. Soc. 40, 967 [1995].)</p> <p>S. L. Blatt, H. Gould, M. Gould, P. Nakroshis, C. Barton, and C. Landee. <a href="#">The discovering physics project: New approaches to science teaching</a>, Bull. Am. Phys. Soc. 39, 1171 [1994].</p> <p>P. Nakroshis, C. Barton, and S. Leslie Blatt, <a href="#">Science Workshops for Teachers: Building Background and Confidence</a>, Bull. Am. Phys. Soc. 39, 1171 [1994].</p> <p>P. Nakroshis, <a href="#">A search for a composition dependent gravitational force</a>, Ph.D. Dissertation, Smithsonian/NASA Astrophysics Data System, 1994.</p>
ELECTRONIC PUBLICATIONS	<p>Nakroshis, P. A. <a href="#">Scientific Python Script Repository</a>; a website devoted to computational code useful to scientists. 10 posts; 2012-present.</p> <p>Nakroshis, P. A. <a href="#">Physics Thoughts</a>; an electronic laboratory notebook and science blog. 16 posts; 2011-present.</p>
BOOKS IN PREPARATION	<p>Nakroshis, P. A. <a href="#">Introductory Computational Physics with Python</a>. Draft version already cited in Proceeding of the 13th Python in Science Conference. 2014.</p>

## GRANTS

Urop Grant for MacKenzie Libby: "Measuring the time-dilated decay of Atmospheric  $\mu$ -mesons.", 2018.

Faculty Senate Grant: "Rotational Dynamics of a Rotating Conductor Ring in a Uniform Magnetic Field.", 2018

Maine Economic Improvement Fund, \$15k of Summer Research funds to support 3 students. May 2017

UROP grant for Katherine Hendrick (Physics Major) in her project: "Electromagnetic Damping of a Rotating Conducting Ring. ", 2016.

UROP grant for Alexander Knight (Physics Major) in his project: "Computer control of a magnetic Torsion Pendulum", 2016.

UROP grant for Alexander Knight (Physics Major) in his project: "Construction and Characterization of a sensitive magnetic Torsion Pendulum", 2014.

UROP grant for Nicholas Anna (Physics Major) in his project: "Design and Construction of a 3-axis Helmholtz coil system", Spring 2014.

USM Faculty Senate Grant: With physics major Thomas Harvell: "Modeling asteroid light curves in the advanced laboratory". Spring 2011.

Surf Grant to fund Cody Goolsby (Physics Major) in his project: "Designing and building a sensitive torsion pendulum magnetometer to monitor terrestrial magnetic field fluctuations", 2010.

Maine Space Grant Consortium: awarded (with Jerry LaSala, PI) \$3500 to develop and integrate astrophysics experiments into the introductory and advanced undergraduate laboratories, 2006.

Dean of the College of Arts and Sciences â Awarded \$ 4000 for research equipment. March 2001.

USM Faculty Senate Grant: Stick-Slip dynamics of a 2D array of particles with Simultaneous Imaging, funded through Brian Hodgkin and Julie Ellis, awarded \$3000, February 2001.

USM Faculty Senate Grant: Stick-slip dynamics of a two dimensional array of particlesâ awarded \$3000 in February 2000.

Maine Space Grant Consortium â Awarded \$2500 to help fund my student, Christopher Smith, in his imaging studies of granular particles. Fall 2000

CONFERENCES  
AND TALKS

Ben Montgomery and P. Nakroshis, Effective Realtime Data Processing using Lab-Jack T-Series DAQs", talk at American Physical Society March Meeting, 2019.

P. Nakroshis, "Subtleties in the use of a quadrant cell photodiode in an optical lever", talk at the American Physical Society March Meeting, 2019).

P. Nakroshis, participant in International Learning Assistant Conference, Boulder, Co, Oct. 2016

P. Nakroshis, participant in *Building a Thriving Undergraduate Physics Program Workshop*, PhysTEC Physics Education Coalition Conference in Seattle, WA; Feb. 2015.

P. Nakroshis, participant in *Learning Assistants Workshop*, PhysTEC Physics Education Coalition Conference in Seattle, WA; Feb. 2015.

Trevor Hamer and Paul Nakroshis, *The Physics of a Space Elevator*, Thinking Matters, 2014.

P. Nakroshis *STEM as a Branch of Democracy Institute*, Hosted by Campus Compact, Portland, ME, May 22-24, 2006.

P. Nakroshis, C. Smith, *Force fluctuations and Angular Rotations in a Driven Granular Array*, Invited Colloquium speaker at the Department of Physics and Astronomy, University of Maine at Orono, Feb. 2002

P. Nakroshis, C. Smith, and M. Amoroso, *Dynamics of a two dimensional granular medium*, University of Southern Maine Poster Session, April 2002.

C. Smith and P. Nakroshis, *Rotational dynamics of a Driven 2D Granular Array*, March Meeting of the American Physical Society, Seattle, WA, March 2001.

P. Nakroshis, C. Smith, and M. Amoroso, *Force Fluctuations in a Driven 2D Granular Array*, March Meeting of the American Physical Society, Seattle, WA, March 2001.

P. Nakroshis, *Using a Structured Feedback Protocol to Improve Student Learning and Raise Standards*, New England Section Spring Meeting of the APS, April 2000.

P. Nakroshis, C. Smith and M. Amaroso, *Stick-Slip dynamics of one and two dimensional arrays of cylinders*, New England Section Spring Meeting of the APS, April 2000.

P. Nakroshis, *Incorporating writing into the science curriculum*, First Annual USM summer seminar on the theory and practice of writing, Stone House Conference Center, USM, June 1999.

P. Nakroshis, *Measuring Boltzmann's constant via Brownian Motion*, New England Section Spring Meeting of the APS/AAPT, April 1998.

P. Nakroshis, C. Barton, S. L. Blatt, *Order, Disorder, and Chaos: A new course for non-science majors*, Joint Meeting of the APS/AAPT, April, 1995.

P. Nakroshis, *Student Centered education in the college classroom*, Clark University, February, 1995.

S. L. Blatt, H. Gould, M. Gould, P. Nakroshis, C. Barton, and C. Landee. *The discovering physics project: New approaches to science teaching*, Fifteenth Annual Ethnography in Education Research Forum, U. of Penn, February 1994.

P. Nakroshis, C. Barton, and S. Leslie Blatt, *Science Workshops for Teachers: Building Background and Confidence*, Fifteenth Annual Ethnography in Education Research Forum, U. of Penn, February 1994.

UNIVERSITY AND  
PROFESSIONAL  
SERVICE

Pilot of a new introductory Physics Laboratory section using Jupyter Notebooks to engage in reproducible research; this work made possible with two physics LA's; Fall 2018.

Member of Focus Group for the American Physical Society and American Association of Physics teachers: Effective Practices for Physics Programs (EP3) Guide, Nov. 2018.

Member: USM committee to redesign Ricci Lecture Hall., 2018.

Referee for American Journal of Physics. Reviewed articles at the request of the editor. 2007-present)

Public Science Talk at the University of Southern Maine: “High Fat/Low Carb Ketogenic Diets: Fighting obesity by eating fat.”. (16 Oct. 2014)

Member of Committee (with Prof. Flynn Ross, Ed.D, USM) to develop outreach & collaboration with Baxter Academy, Portland, ME. March, 2015

Author of Physics Department Self Study. (Fall 2012)

Student advising in Physics Department (15 students at this time)

Faculty Advisor for the USM Chapter of the Society of Physics Students. 2008-present.

Presenter at the USM Focus the Nation. Fall 2008.

Member, Project 100 Faculty 1998-present

Member, MMSTEC (Maine Mathematics-Science Teachers Excellence Collaborative), and NSF funded project to improve the quality of math and science teachers preparation. Richard Stebbins, PI.

NSF Science Bowl judge, Spring 2001.

Workshop Presenter (with Hank Tracy and Ann Dean) at USM Provost’s Writing Seminar (Giving and Receiving Structured Feedback), 1999, 2000 and 2001.

Member, Provost’s Writing Committee, 1999-2001 (Nancy Gish, Chair).

Center for Teaching Workshop: Authentic Assessment as a way to gauge student learning. (Nov. 1998)

Co-Chairperson, Faculty Awards Program (1999-2000)

Member, Teacher Education Science Committee, 1997-98. Worked on setting science outcome standards for the teacher education program at USM.

#### PUBLIC SERVICE

Co-Author with Mark Battle and Madeleine Msall of Bowdoin College of the USM-Bowdoin Letter on Climate Change; 706 physics and astronomy scientists from 45 states signed this letter which was sent to Pres. Elect Trump in Jan, 2016. See <https://usm.maine.edu/publicaffairs/physics-professor-paul-nakroshis-and-maine-professors-recruit-700-colleagues-sign> for more info.

Mentor for a student project utilizing a torsion pendulum for Sam Wood, a Mt. Ararat High School student. (2014)

Weekly physics and mathematics tutoring at George Stevens Academy, Blue Hill, ME. Fall 2010-Spring 2011.

Supervise student teaching of introductory physics for The New School in Kennebunk (private high school started by Maryln Wentworth). One of our physics majors was interviewed and hired to teach.

Consultant for Poland Regional High School: helped create a new interdisciplinary math/physics course, summer 2000.

Outside Evaluator for 2 Marlboro College Physics students senior projects. (May 1999)

Grant reviewer for Maine Space Grant Consortium (fall 1999) Consultation with David Burke (Science/Math Chair) for Poland Regional High School, spring 1999.

Coordinator for Souhegan High School / USM College Physics Credit Agreement. Agreement was created through my initiation with USM Administration. Fall 1998-present.

CONSULTING	<p>Chuck Blakeman, BECC, Yarmouth, ME. Helped employee write custom Python Code to analyze Hydrophone Data, 2016.</p> <p>Mark Randall, Randall Law Office, Portland, ME, Expert witness for client injured at Portland Jetport; 2014. (He won his case with my testimony)</p>
OTHER EXPERIENCE	<p>Trail Running. Over 4000 km distance and 60,000 m of vertical since May 2012. Pacer for Vermont 50 mile ultramarathon.</p> <p>Classical Piano studies: Clark Univerity, 1995-1997; generally okay at playing J.S. Bach.</p> <p>Photographer and Sole Proprietor: <a href="#">Paul Andrew Photography</a></p> <p>Photography Shows for Appalachian Mountain Club, UMass Environmental Institute, various public libraries and businesses in Maine.</p>
PROFESSIONAL SOCIETY MEMBERSHIPS	<p>American Physical Society  American Association of Physics Teachers  NumFOCUS, Supporting Member</p>
TECHNICAL SKILLS	<p>Programming languages: Python, Scipy, Numerical Python, Matplotlib, iPython, Jupyter Notebooks, Jupyter Lab, Julia, C, C++, Fortran.</p> <p><a href="#">IGOR PRO</a> Experience with 2d, 3d visualization, time series analysis, programming custom functions and interfaces in Igor Pro.</p> <p><a href="#">MATHEMATICA</a> experience with symbolic algebra, 2d, 3d visualization.</p> <p>Instrumentation and Control: <a href="#">LabVIEW</a> and other <a href="#">National Instruments</a> control and data acquisition hardware and software. Now moved on to Python-based DAQ using <a href="#">LabJack</a> hardware and custom Python code.</p> <p>Applications: <math>\text{\LaTeX}</math>, Open Office, Pages, iWork, Photoshop, Aperture, Lightroom, Textmate, Adobe Illustrator, Inkscape, and other common productivity packages for OS X and Linux platforms</p> <p>Operating Systems: Apple OSX, Linux. Have set up a working JupyterHub Server for the Physics Department.</p> <p>Digital Photography: Extensive experience in photography, post-processing of images, printing, matting, and framing.</p> <p>Web Site design: see my web presence at the <a href="#">University of Southern Maine</a>, at <a href="#">Paul Andrew Photography</a>, at <a href="#">MaineSight</a>, <a href="#">A New England Photographic Blog</a>, and most recently, a foray into scientific blogging at <a href="#">Physics Thoughts</a>, and <a href="#">Scientific Python Script Repository</a>. Familiar with Wordpress, Sandvox, and Freeway Pro web design.</p>