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# Brokk Toggerson

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## Education

- 2008-2012 **Ph.D.**, *Department of Physics, University of California, Irvine, Irvine, California.*  
Advisor: Anyes Taffard
- 2007-2008 **M.S.**, *Department of Physics, University of California, Irvine, Irvine, California.*
- 2002-2006 **B.S.**, *Department of Physics and Honors College, Cum Laude, University of Arizona, Tucson, Arizona.*

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## Professional Appointments

- Sept 2015 - **Lecturer**, *University of Massachusetts, Amherst, Physics Department.*  
Present Leading an effort to transition algebra-based introductory physics (P131) from a traditional lecture to a team-based-learning environment with integrated laboratory experience using a flipped model. As part of this effort, I am developing an experimental course for physics majors interested in education including both theoretical knowledge as well as practical experience.
- Jan 2013 - **Lecturer**, *University of Arizona, Physics Department.*
- May 2015 Instructor of record for several different courses including calculus based courses for physics, engineering, and life science majors. Also responsible for supervising up to nine graduate student teaching assistants each semester.

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## Awards

- Spring 2018 **Distinguished Teaching Award Nominee**, *University of Massachusetts, Amherst, Campus-wide.*  
Nominated by students for exceptional teaching
- Fall 2017 **Distinguished Teaching Award Nominee**, *University of Massachusetts, Amherst, Campus-wide.*  
Nominated by students for exceptional teaching
- September 2017 **UMass-Amherst Campus “Of the Month” Award**, *University of Massachusetts, Amherst, National Residence Hall Honorary.*  
Awarded for passion for teaching and supporting student mental health
- Fall 2016 **Distinguished Teaching Award Nominee**, *University of Massachusetts, Amherst, Campus-wide.*  
Nominated by students for exceptional teaching
- Spring 2015 **Award for Exceptional Undergraduate Teaching**, *University of Arizona, Physics Department.*  
Selected by students and faculty for distinguished undergraduate teaching.
- Fall 2014 **Inaugural Recipient of Undergraduate STEM Teaching Excellence Award**, *University of Arizona, AAU STEM Education Initiative, \$1000.*  
Campus-wide award given each semester to acknowledge STEM faculty who have implemented active learning instructional strategies.

Spring 2014 **Award for Exceptional Undergraduate Teaching**, *University of Arizona*, Physics Department.  
Selected by students and faculty for distinguished undergraduate teaching.

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## Professional Development

March 2017 **Open Classroom Days**, *University of Massachusetts, Amherst*, Institute for Teaching and Faculty Development.

Participated in an inaugural extended version of the open classroom days. Through this process faculty open their course for visits by other faculty. Such an exchange provides an opportunity to observe how different faculty address similar instructional challenges as well as an opportunity to get feedback on one's own class.

Fall 2017 - **Teaching for Inclusiveness, Equity and Diversity Ambassador**, *University of Massachusetts, Amherst*, Institute for Teaching and Faculty Development, \$1500.  
Spring 2018

Throughout the program year, participants explore how they can enhance students' learning and academic success across cultural, social, and learning differences by adopting a strength-based, inclusive approach to teaching and learning grounded in the value of diversity. As Ambassadors, participants take what they learn from their experiences with the fellowship program and develop a project through which they will share their growing expertise and contribute to the dialogue about and practice of teaching for inclusiveness, diversity and equity at the departmental, school/college, or campus-wide levels.

June 2017 **Cottrell Scholars Collaborative National Graduate Teaching Assistant Workshop**, *Georgia Institute of Technology*, Cottrell Scholars Collaborative.

The workshop, "Mobilizing the Forgotten Army: Preparing TAs for Leadership in STEM Education" (sponsored by the National Science Foundation and the Research Corporation for Science Advancement) offers the opportunity for a small group of departmental teams to interact together with colleagues who have expertise in supporting physics and chemistry GTAs. The workshop is designed for departmental teams consisting of one "mentor/master" TA and one faculty member.

March 2017 **Open Classroom Days**, *University of Massachusetts, Amherst*, Institute for Teaching and Faculty Development.

One of twenty-two faculty who volunteered to open their classrooms to visits from other faculty from across the campus in this program.

Fall 2016 **@Innovate UMass Symposium**, *University of Massachusetts, Amherst*, Institute for Teaching and Faculty Development.

Participated in the third symposium designed to put new technologies in the hands of faculty as we explored as a group how to push the limits of the traditional classroom through instructional innovations

March 2016 **Open Classroom Days Pilot**, *University of Massachusetts, Amherst*, Institute for Teaching and Faculty Development.

One of twenty faculty who volunteered to open their classrooms to visits from other faculty from across the campus in this pilot program.

Fall 2015 - **Student Centered Teaching and Learning Fellow**, *University of Massachusetts, Amherst*, Institute of Teaching and Faculty Development, \$1500.  
Spring 2016

A fellowship focusing on active, collaborative, and innovative pedagogies. Fellows engage in a variety of initiatives to assist with course design, technology familiarity, and assignment development. Upon completion, fellows receive a certificate of Team-Based Learning qualification.

October 2014 **Collaborative Learning Space Pilot**, *University of Arizona*, AAU STEM Education Initiative.

Invited by the Senior Vice Provost for Academic Affairs to participate in a two-week pilot program to investigate new, collaborative classrooms for teaching large classes.

- Fall 2013 - **Faculty Learning Community**, *University of Arizona*,  
 Spring 2015 AAU STEM Education Initiative.  
 A community for discussing readings about learning and teaching. Exploring evidence-based instructional strategies, developing teaching resources for trying new strategies, and designing teaching projects.
- Spring 2013 - **Teaching peer review pilot**, *University of Arizona*,  
 Fall 2013 Office of Instruction and Assessment.  
 Met with experts in physics education to improve teaching quality.
- Spring 2013 - **Supplemental Instruction pilot**, *University of Arizona*, Think Tank.  
 Spring 2015 Spring 2013 was the first physics course for this program which sets up sessions run by successful undergraduates where students can receive additional small group instruction to supplement the large lecture. Responsibilities include guiding two undergraduate instructors, receiving feedback on topics with which students are having trouble, and providing feedback to the UA Think Tank on effectiveness of program for physics courses.

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## Grants

- Summer 2018 **Open Education Initiative**, *University of Massachusetts, Amherst*,  
 W.E.B. du Bois Libraries, \$2500.  
 To develop a free-to-students textbook for Physics 132.
- Spring 2018 **Mutual Mentoring Team Grant**, *Institute for Teaching Excellence and Faculty Development UMass-Amherst*, \$6000.  
 To develop a mutual mentoring network to connect the, predominantly junior, faculty who are responsible for teaching the introductory sequence of courses for life-science majors. This collaboration would be truly interdisciplinary connecting faculty from biology, chemistry, physics, math, and kinesiology. The mentoring network will strive to develop a curriculum that is aligned both in content and skills, thereby helping students develop the tools of knowledge transfer and interdisciplinary thinking critical for a modern workforce. In addition, the network will also share pedagogical best practices particular to large-enrollment STEM courses.
- Fall 2017 **Professional Development Grant**, *UMass-Amherst College of Natural Sciences Lecturer's Professional Development Fund*, \$1550.  
 To present our work on the development of P131 and P132 at the Summer 2018 AAPT Meeting.
- Fall 2017 **MSP Research Support Fund**, *Massachusetts Society of Professors*, \$1000.  
 To pay for Jake Shecter's travel to the AAPT Summer 2018 Meeting in Washington D.C. to present our work in developing a first-year graduate-student seminar on professional development and TA training.
- Fall 2017 **MSP Flex Grant**, *Massachusetts Society of Professors*, \$500.  
 For equipment necessary to create the needed videos to flip P132
- Summer 2016 **MSP Flex Grant**, *Massachusetts Society of Professors*, \$500.  
 To assist funding an undergraduate student working on analysis of P131 results.
- Summer 2016 **Open Education Initiative**, *University of Massachusetts, Amherst*,  
 W.E.B. du Bois Libraries, \$2500.  
 To develop free-to-students course materials for P131 and to assess their impact.

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## Students Advised

- Summer 2018 **Emily Hansen**, *Analysis of student self-efficacy data from the Fall 2017 semester and development of the Physics 132 textbook*, University of Massachusetts, Amherst, Undergraduate.
- Summer 2017 **David Nguyen**, *Conversion of P131 Materials into a free-to-use textbook.*, University of Massachusetts, Amherst, M.Ed. student.
- Summer 2016 - Fall 2016 **Chasya Church**, *Development of free-to-student course materials and the analysis of student performance data for P131*, University of Massachusetts, Amherst, Undergraduate.

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## Service and Outreach

- Fall 2015 - Present **Service Courses Committee**, *University of Massachusetts, Amherst*, Physics Department.
- Spring 2016 - Present **Diversity Committee**, *University of Massachusetts, Amherst*, Physics Department.
- Summer 2016 **Summer College Particle Physics Program**, *University of Massachusetts, Amherst*, Commonwealth Honors College.  
A two-week program for talented high school students using real data events from the CMS experiment at CERN
- Fall 2013 - Spring 2015 **Women in Physics Faculty Advisor**, *University of Arizona*, Physics Department.
- Fall 2013 - Spring 2015 **Department Teaching Evaluation and Innovation Committee**, *University of Arizona*, Physics Department.
- March 2014 **Guest Teacher**, *Arts for All, Inc.*, Tucson, Arizona.
- March 2013 **Judge**, *Arizona Junior Science and Humanities Symposium*, Tempe, Arizona.
- May 2013 **Judge**, *Intel International Science and Engineering Fair*, Phoenix, Arizona.
- March 2013 **Judge**, *Arizona Junior Science and Humanities Symposium*, Tempe, Arizona.
- September 2012 **CERN representative**, *United Nations Open Day*, Geneva, Switzerland.
- Summer 2012 **Official guide**, *CERN*, Geneva, Switzerland.  
Tours of the ATLAS Experiment and *Universe of Particles* exhibit.
- February 2012 **French Swiss Semifinalist**, *FAMELab Science outreach event*, Geneva, Switzerland.  
Public talk: *Quantum Mechanics and the Slinky*

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## Presentations and Posters

- July 2018 B. Toggerson. *Exposing Physics Majors to Education while Supporting Studio Style Courses*. AAPT Summer Meeting. Washington, DC. Contributed talk.
- July 2018 J. Shechter, B. Toggerson. *Development and Implementation of a Graduate Teaching Assistant Training Program*. AAPT Summer Meeting. Washington, DC. Contributed talk.
- July 2018 B. Toggerson. *Transitioning a 300-person IPLS Course to Team-Based Learning, Physics 132: What is Light? What is an Electron?* AAPT Summer Meeting. Washington, DC. Contributed poster.

- July 2018 B. Toggerson, H. Hatch, P. Bourgeois, C. Ertl, C. Church. *Application of Team-Based Learning to a First-Semester IPLS Course, Physics 131: Forces, Energy, Entropy*. AAPT Summer Meeting. Washington, DC. Contributed poster.
- May 2018 B. Toggerson. *A Survey of Various Teaching Technology Tools for Active Learning in Large Enrollment Courses*. @Innovate UMass Symposium. Amherst, MA. Invited talk
- January 2018 B. Toggerson. *Teaching Technologies Used in P13X*. @Innovate UMass Symposium. Amherst, MA. Invited talk.
- July 2017 B. Toggerson, H. Hatch, P. Bourgeois, C. Ertl, C. Church. *Application of Team-Based Learning to a First-Semester IPLS Course*. AAPT Summer Meeting. Cincinnati, OH. Contributed talk.
- February 2017 B. Toggerson. *Using Twitter for Formative Assessment in Large Lecture Courses*. @Innovate UMass Symposium. Amherst, MA. Invited talk.
- October 2016 B. Toggerson, H. Hatch, P. Bourgeois, C. Ertl. *Physics 131 - Reflections on Transition to Team-Based Learning*. University of Massachusetts - Amherst STEM-Ed Institute. Amherst, MA. Invited talk.
- February 2012 B. Toggerson. *Search for Direct Gaugino Production Decaying to Two Leptons and Missing Transverse Momentum at ATLAS with  $\sqrt{s} = 7$  TeV*. University of Arizona HEP Lunch Seminar. Tucson, AZ. Invited talk.
- June 2012 B. Toggerson on behalf of the ATLAS Collaboration. *Searches for direct gaugino production and RPV SUSY with leptons at  $\sqrt{s} = 7$  TeV*. CIPANP 2012. Tampa, FL. Invited talk.
- May 2012 B. Toggerson on behalf of the ATLAS Collaboration. *Leptons+X (direct gaugino) - ATLAS*. BNL Workshop on SUSY with  $5 \text{ fb}^{-1}$  at the LHC. Brookhaven, NY. Invited talk.
- April 2011 B. Toggerson. *Search for supersymmetry in same-sign dilepton channel at  $\sqrt{s} = 7$  TeV with  $35 \text{ pb}^{-1}$* . APS April Meeting. Anaheim, CA. Contributed talk.

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## Publications

This is a partial list, including only papers with significant contributions.

### Books

Editors: Brokk Toggerson, David Nguyen. *Physics 131: Forces, Energy Entropy*. University of Massachusetts Amherst Libraries, August 2017.

### Journal Articles

The ATLAS Collaboration. Search for direct slepton and gaugino production in final states with two leptons and missing transverse momentum with the ATLAS detector in pp collisions at  $\sqrt{s} = 7$  TeV. *Phys.Lett.*, B718:879–901, 2013.

The ATLAS Collaboration. Searches for supersymmetry with the ATLAS detector using final states with two leptons and missing transverse momentum in proton–proton collisions. *Physics Letters B*, 709(3):137 – 157, 2012.

The ATLAS Collaboration. Search for supersymmetric particles in events with lepton pairs and large missing transverse momentum in  $\sqrt{s} = 7$  TeV proton-proton collisions with the ATLAS experiment. *EPJC*, 71:1682, 2011.

The ATLAS Collaboration. Measurement of the top quark-pair production cross section with ATLAS in pp collisions at  $\sqrt{s} = 7$  TeV,. *EPJC*, 71:1577, 2011.

T. Argyropoulos et al. Cathode Strip Chambers in ATLAS: Installation, Commissioning and in Situ Performance. *IEEE Transactions on Nuclear Science*, 56(3), June 2011.

B. Toggerson et al. Onset of space charge effects in liquid argon ionization chambers. *Nuclear Inst. and Methods A*, 608(2), September 2009.

#### Conference Papers

The ATLAS Collaboration. Interpretation of same-sign dilepton events at ATLAS with a simplified SUSY model. ATLAS CONF Note ATL-COM-PHYS-2011-294, CERN, Geneva, Mar 2011.

#### Dissertations

Brokk Toggerson. *Search for Direct Gaugino Production Decaying to Two Leptons and Missing Transverse Momentum at ATLAS with  $\sqrt{s} = 7$  TeV*. PhD thesis, University of California, Irvine, 2012.

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## Courses Taught

This is a simple listings of courses. More information on each course can be found on my web-page.

- Spring 2018 **PHYS 132**, *Algebra-Based Introductory Physics II*,  
University of Massachusetts, Amherst, Two sections 250 students.
- Spring 2018 **PHYS 390T**, *An Introduction to Principles of Active Learning in Physics Education*,  
University of Massachusetts, Amherst, 9 physics majors.
- Spring 2018 **PHYS 131**, *Algebra-Based Introductory Physics I*,  
University of Massachusetts, Amherst, One section of 100 students.
- Fall 2017 **PHYS 131**, *Algebra-Based Introductory Physics I*,  
University of Massachusetts, Amherst, Three sections of 100 students.
- Spring 2017 **PHYS 132**, *Algebra-Based Introductory Physics II*,  
University of Massachusetts, Amherst, Two sections 250 students.
- Spring 2017 **PHYS 131**, *Algebra-Based Introductory Physics I*,  
University of Massachusetts, Amherst, One section of 100 students.
- Fall 2016 **PHYS 390T**, *An Introduction to Principles of Active Learning in Physics Education*,  
University of Massachusetts, Amherst, 9 physics majors.
- Fall 2016 **PHYS 131**, *Algebra-Based Introductory Physics I*,  
University of Massachusetts, Amherst, Three sections of 100 students.
- Spring 2016 **PHYS 296 & 496**, *An Independent Study on Physics Education Theory and Practice*,  
University of Massachusetts, Amherst, 9 physics majors.
- Spring 2016 **PHYS 131**, *Algebra-Based Introductory Physics I*,  
University of Massachusetts, Amherst, Four sections of 100 students.
- Fall 2015 **PHYS 131**, *Algebra-Based Introductory Physics I*,  
University of Massachusetts, Amherst, Three sections of 100 students.
- Spring 2015 **PHYS 331**, *Electrodynamics I*, University of Arizona, 23 physics majors.
- Spring 2015 **PHYS 241**, *Calculus-Based Introduction to Electricity and Magnetism*,  
University of Arizona, 262 students.
- Fall 2014 **PHYS 102**, *Algebra-Based Introductory Physics I*, University of Arizona,  
Three sections of 100 students.
- Fall 2014 **PHYS 162H**, *Calculus-Based Introduction to Thermodynamics, Wave Motion, and Optics*, University of Arizona, 25 physics majors.
- Summer 2014 **PHYS 241**, *Calculus-Based Introduction to Electricity and Magnetism*,  
University of Arizona, 50 students.
- Spring 2014 **PHYS 103**, *Algebra-Based Introductory Physics II*, University of Arizona, 300 students.
- Spring 2014 **PHYS 142**, *Calculus-Based Introduction to Thermodynamics, Wave Motion, and Optics*, University of Arizona, 100 students.
- Fall 2013 **PHYS 241**, *Calculus-Based Introduction to Electricity and Magnetism*,  
University of Arizona, 250 students.
- Fall 2013 **PHYS 162H**, *Calculus-Based Introduction to Thermodynamics, Wave Motion, and Optics*, University of Arizona, 27 physics majors.
- Summer 2013 **PHYS 241**, *Calculus-Based Introduction to Electricity and Magnetism*,  
University of Arizona, 40 students.

Spring 2013 **PHYS 261H**, *Calculus-Based Introduction to Electricity and Magnetism*,  
University of Arizona, 29 physics majors.

Spring 2013 **PHYS 141**, *Calculus-Based Introduction to Mechanics*, University of Arizona,  
250 students.