

University of Massachusetts, Amherst
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Brokk Toggerson

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.

Professional Appointments

- Sept 2015 - **Lecturer**, *University of Massachusetts Amherst*, Physics Department.
Present
- Jan 2013 - **Lecturer**, *University of Arizona*, Physics Department.
May 2015

Students Advised

- Spring 2020 - **Cooper Wagner**, *Using natural language processing to understand student survey results about interdisciplinary connections*, University of Massachusetts Amherst, PhD student.
Present
- Spring 2019 - **Samyukta Krishnamurthy**, *Using logarithmic regression to measure the power of self-efficacy to predict student success.*, University of Massachusetts Amherst, PhD student.
Spring 2020
- Summer 2018 - **Emily Hansen**, *Analysis of student self-efficacy data from the Fall 2017 and 2018 semesters and development of the Physics 132 textbook*, University of Massachusetts Amherst, Undergraduate, class of 2020.
- Spring 2020
- Fall 2018 **Sara Feyzbakhsh**, *Further refinement of a one-credit physics graduate TA training program, and development of a workshop to facilitate other departments' creation of TA training programs.*, University of Massachusetts Amherst, PhD student.
- Summer 2017 - **Jake Shechter**, *Development and refinement of a one-credit physics graduate TA training program, and development of a workshop to facilitate other departments' creation of TA training programs.*, University of Massachusetts Amherst, PhD student to finish Spring 2020.
- Fall 2018

- Summer 2017 **David Nguyen**, *Conversion of P131 Materials into a free-to-use textbook.*, University of Massachusetts Amherst, M.Ed. student.
- Summer 2016 **Chasya Church**, *Development of free-to-student course materials and the analysis of student performance data for P131*, University of Massachusetts Amherst, Undergraduate, class of 2017.

Grants

- Fall 2018 **MSP Flex Grant**, *Massachusetts Society of Professors*, \$500.
Pay an undergraduate to help move the Physics 132 textbook from a static pdf to an interactive web page and move the homework from Pearsons *MasteringPhysics* to *Edfinity*.
- 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.

Awards

- 2019, 2020 **Manning Prize for Excellence in Teaching Nominee**, *University of Massachusetts, Amherst*, Physics Department Nominee.

- 2020 **Outstanding Teaching Award Nominee**, *University of Massachusetts, Amherst*, College of Natural Sciences, Physics Department Nominee.
- 2016, 2017, 2018 **Distinguished Teaching Award Nominee**, *University of Massachusetts, Amherst*, Campus-wide, On parental leave fall 2019.
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
- 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.
- Fall 2013 **Apple Polishers Award**, *Chi Omega Sorority*, University of Arizona Chapter.
Recognition of excellent teaching and mentoring.

Professional Development

- April 2018 - Present **Introductory Integrated Life Science Education Mutual Mentoring Group**, *Founder*, University of Massachusetts Amherst, Biology, Chemistry, Physics, and Math Departments.
A Mutual Mentoring Grant supported group to explore connections across the introductory life-science sequence including introductory biology, general chemistry, calculus for life-science students, organic chemistry, and physics for life-science students. Developing modules to promote transdisciplinary thinking. Also conducting surveys to explore student understanding of the connections across disciplines.
- October 2018 - Present **Five College Physics Education Research Lunch**, *Founder*, Amherst, Mount Holyoke, and Smith College, and University of Massachusetts Amherst, Physics Departments.
A network to discuss physics education literature and support physics education research in the 5-College consortium.
- January 2019 **Introductory Physics for Life Science Virtual Curriculum Swap**, *Invited Participant*, Facilitated by Chandra Turpen, University of Maryland College Park.
Met four times with faculty teaching introductory physics for life science to exchange curriculum and get feedback.

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

Explored how to 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**, *Sent as department representative*, Georgia Institute of Technology, Cottrell Scholars Collaborative.

NSF-Funded workshop allows 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.

Fall 2016 **@Innovate UMass Symposium**, *Participant*, 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 explore how to push the limits of the traditional classroom through instructional innovations

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.

Service and Outreach

Fall 2018 - **Teaching Evaluation Innovation Committee**, *University of Massachusetts Amherst*, Physics Department.
Present

Physics is one of the departments participating in the NSF funded A New Approach to the Evaluation of Teaching project.

Spring 2016 - **Physics Education Group Blog**, *Contributor and Manager*,
Present <https://physedgroup.umasscreate.net/blog/>.

Frequent poster on issues regarding teaching with a particular emphasis on using technology and open access courses to promote equity in large courses.

Spring 2016 - **Climate Committee**, *University of Massachusetts Amherst*, Physics
Present Department.

Committee responsible for addressing issues of diversity and inclusion within the department and developing initiatives to improve departmental climate.

Fall 2015 - **Service Courses Committee**, *University of Massachusetts Amherst*, Physics
Present Department.

Committee oversees quality of all introductory service courses and associated laboratories as well as approving major reforms

- Summer 2020 **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 2019 **Beta Tester**, *The Living Physics Portal*, AAPT.
A new platform to facilitate sharing and peer evaluation of curricular materials associated with physics for life-scientists courses.
- 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 - **Women in Physics Faculty Advisor**, *University of Arizona*, Physics
Spring 2015 Department.
Organization's mission is to provide education and awareness within the department to the issues facing women and other under-represented minorities. Also engages in significant outreach activities with local public schools.
- Fall 2013 - **Department Teaching Evaluation and Innovation Committee**, *Univer-*
Spring 2015 *sity of Arizona*, Physics Department.
Committee evaluates graduate student teaching assistants and implements new teaching evaluation of faculty procedures.

Summary of Courses Taught at University of Massachusetts Amherst

Summarizing those courses I have taught. More details on which semesters, how many students, and significant changes can be found on my website: <http://brokk.toggerson.com>

- Physics 131 **Introductory Physics for Life Science Students I**, *Forces, Energy, Entropy*, Fall 2015, Spring 2016, Fall 2016, Spring 2017, Fall 2017, Spring 2018, Fall 2018, Fall 2020 (planned), Two to three sections of 100 students..
Taught following a team-based learning pedagogy in a studio style classroom.
- Physics 132 **Introductory Physics for Life-Science Students II**, *What is an Electron? What is Light?*, Spring 2018, Spring 2019, Spring 2020, Two sections of 250.
Taught using a modified team-based learning pedagogy adapted to a large lecture-hall environment.
- Physics 390T/361 **Introduction to Principles of Active Learning in Physics Education**,
Fall 2016, Spring 2018, Typically about 12 students.
Theoretical and practical experience in teaching for those physics majors interested in pursuing teaching-based careers
- Physics 691G **Physics Graduate Professional Development Seminar**, Fall 2017, Fall 2018, Fall 2020 (planned), All first-year physics graduate students.
Using TA-training as a vehicle for constructing positive graduate-student self-identity and professional development skills

Presentations, Posters, and Workshops

Including only those related to teaching. Other presentations on supersymmetry searches with ATLAS are listed on my website: <http://brokk.toggerson.com>

- July 2020 (accepted) B. Zylich, A. Viola, B. Toggerson, L. Al-Hariri and A. Lan. *Exploring Automated Question Answering Methods for Teaching Assistance* AIED 2020. Ifrane, Morocco. Contributed Talk.
- February 2020 *Open Education Resources*. American Society for Biochemistry and Molecular Biology, Northeast Regional Catalyst Conversations. Amherst, MA. Invited Panel Member.
- October 2020 Editor: M. Billings. *Open Educational Resources Legislative Event*. W.E.B. du Bois Library. Amherst, MA. Invited contributor.
- March 2019 B. Toggerson, J. Shechter, S. Feyzbakhsh. *Developing a GTA/GTO Training Program*. Institute for Teaching Excellence and Faculty Development Diversity Lunch. Amherst, MA. Invited workshop.
- March 2019 B. Toggerson. *Building a Course: A Research-Based Overview* University of Massachusetts Amherst Physics Department Teaching Lunch. Amherst, MA. Workshop
- 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.

Publications

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

A complete list of publications with the ATLAS collaboration is available [here](#)

Books

B. Toggerson, E. Hansen. *Physics 132: What is an Electron? What is Light?* University of Massachusetts Amherst Libraries, January 2020.

B. Toggerson, D. Nguyen. *Physics 131: Forces, Energy Entropy.* University of Massachusetts Amherst Libraries, August 2017.

Journal Articles

B. Toggerson et al. Positive Impacts on Student Self-Efficacy from an Introductory Physics for Life Science Course Using the Team-Based Learning Pedagogy. *In submission to Physical Review - Physics Education Research.*

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.

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.