Curriculum Vitae — Daniel R. Bolton

Associate Teaching Professor
Department of Physics
University of Colorado

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Education

Ph.D., Nuclear Theory, University of Washington, Seattle, WA, 6/11
Thesis: Charge symmetry breaking and nuclear pion production reactions
Advisor: Gerald A. Miller

M.S., Physics, University of Washington, Seattle, WA, 12/07

B.S., Engineering Physics, Colorado School of Mines, Golden, CO, 5/06
Minor: Mathematics
GPA: 4.00, High Honors

Teaching

Associate Teaching Professor, University of Colorado Boulder, 2/20 – present
Instructor, University of Colorado Boulder, 1/15 – 2/20

- *General Physics I (both algebra- and calculus-based)*
- *General Physics II (both algebra- and calculus-based)*
- *Quantum Mechanics I*

Lecturer, Baylor University, 8/11 – 12/14

- *General Physics for Natural and Behavioral Sciences I and II* (16 sections total)
- *Basic Electronics Laboratory* (1 time)
- *Modern Physics* (3 times)
- *Mathematical and Computational Physics* (3 times)
- *Classical Mechanics* (1 time)
- *Intermediate Physics Laboratory II* (1 time)

Graduate Teaching Assistant, University of Washington, 9/06 – 6/09

- Taught various undergraduate laboratory and recitation sections

Service

Department service activities (current)

- Learning Assistant Department Coordinator
- Physics mentoring committee
- Teaching evaluation committee
- Manage the department's helproom site
- Manage the department's tutor list
- Serve on Comps II committees
- Assist faculty with teaching technology

Department service activities (past highlights)

- Facilitated the implementation of two-stage exams in large intro courses.
- Created PHYS 1120 workgroups
- Created the department's Teaching Circles program
- Created an online version of PHYS 1120 that can be used by other instructors
- Created reusable videos of PHYS 1120 tutorial experiments
- Co-led the Experimental Physics I redesign project
- Chaired Instructor Search resulting in Hodby, West hires
- Created the department's Undergraduate Research Info (Fall) and Poster (Spring) Sessions
- Mentored three students in undergraduate research
- Designed many new lecture demonstrations, labs, tutorials, and homework assignments
- Helped with new TA training workshops
- Managed the department's course webpage server
- Facilitated the replacement of CAPA with MasteringPhysics for PHYS 1110 and 1120
- Facilitated the implementation of tablets in department lecture instruction
- Undergraduate curriculum and research committee

University service activities (current)

- Serve on OIT's Academic Technology Advisory Group
- Serve as a Faculty Mentor and Department Coordinator for the Learning Assistant Alliance
- Serve on CTL panels
- Serve on COEN faculty panels

University service activities (past highlights)

- Served on Canvas course template committee
- Served on Canvas grading best practices committee
- Served on OIT's Video Delivery vendor selection committee
- Served on the Carlson renovation committee

Broader physics activites

- Paid consultant for a local engineering company
- Peer Reviewer for The Physics Teacher journal
- Paid consultant for implementing "Tutorials in Introductory Physics" curriculum
- Served as a "GFO Champion" promoting High School physics teaching
- Contributed a set of new homework problems to the AAPT's new Living Physics Portal
- Created a repository of my clicker questions on CU Physics' public department course webpage
- Served as a reviewer for AAPT's PERC Conference Proceedings
- Paid consultant for both Pearson's and Macmillan's online homework system design

Community service activities

- Serve at car care clinics for Pearl Longmont
- Serve meals to the homeless in Longmont as a member of the H.O.P.E. organization
- Co-created and performed a new CU Wizard show on electricity and magnetism

Research

Principal Investigator, Baylor University and University of Colorado, 8/12 – 5/17

- Extracted parameters of chiral perturbation theory using lattice quantum chromodynamics

- Collaborated with scientists at Jefferson National Laboratory
- Mentored undergraduate students in research projects

Graduate Research Assistant, University of Washington, 6/07 – 6/11
- Corrected the impulse approximation to nuclear pion production reactions
- Extracted the light quark mass difference from the forward-backward asymmetry of $np \to d\pi^0$
- Calculated the cross-section of the $np \to d\pi^0$ reaction near threshold to one-loop order
- Learned to use the *Chroma* software package for hadronic spectroscopy calculations
- Learned to program in *Mathematica*

Senior Design, Colorado School of Mines, 8/05 – 5/06
- Modeled stationary states of a trapped Bose-Einstein Condensate

Research Experience for Undergraduates, Indiana University, Bloomington, IN, 6/05 – 8/05
- Performed benchmark analyses of IRPSS (Indiana RF Photocathode Source Simulator)
- Learned to program in *Fortran*

Awards and Affiliations

- Nominee for Excellence in Teaching with Technology Award, 8/23
- Nominee for Peebles Award, 8/21
- Promoted to Senior Instructor, 2/20
- Outstanding Physics Teacher of the Year Award, 4/19
- Became member of the graduate faculty at CU, 12/18
- ASSETT Award of Student Appreciation for Teaching with Technology, 2/16
- Professor of the Month, Pi Beta Phi, 3/12
- Graduate Fellowship, University of Washington, 8/06 – 6/07
- Outstanding Physics Student of the Year, Colorado School of Mines, 5/06
- President's Scholarship, Colorado School of Mines, 8/02 – 5/06
- Travel Award, Conference Experience for Undergraduates, 10/05

Funded Grants

- College of Engineering and College of A&S for 1140 project ($40,000 each = $80,000) – 11/16
- TRESTLE Course Transformation Award ($10,000) – 10/16
- UROP with Isaac Kim ($800) – 10/16
- Arts and Sciences Fund for Excellence ($700) – 7/15
- Undergraduate Research & Scholarly Achievement Grant ($5000) – 3/14
- University Teaching Grant ($1000) – 1/14

Publications

1. Bethany R. Wilcox, Steven J. Pollock, and **Daniel R. Bolton**, "Retention of conceptual learning after an interactive introductory physics course", Phys. Rev. Phys. Educ. Res. 16, 010140 (2020).
2. H. J. Lewandowski, **Daniel R. Bolton**, and Benjamin Pollard, "Initial Impacts of the transformation of a large introductory lab course focused on developing experimental skills and expert epistemology", 2018 PERC proceedings.

3. **Daniel R. Bolton**, Raul A. Briceno, and David J. Wilson, "Connecting Physical Resonant Amplitudes and Lattice QCD", Phys. Lett. B757 50-56 (2016).
4. **Daniel R. Bolton**, Raul A. Briceno, and David J. Wilson, "From QCD to Physical Resonances", AIP Conf. Proc. 1735, 030011 (2016).
5. Raul A. Briceno, Huey-Wen Lin, and **Daniel R. Bolton, "**Charmed Baryon Spectroscopy from Lattice QCD with N_f=2+1+1 flavors", Phys. Rev. D 86, 094504 (2012).
6. Lincoln D. Carr, Rachel R. Miller, **Daniel R. Bolton**, and Scott A. Strong**,** "Nonlinear Scattering of a Bose-Einstein Condensate on a Rectangular Barrier", Phys. Rev. A 86, 023621 (2012).
7. Raul A. Briceno, **Daniel Bolton,** and Huey-Wen Lin, "Charmed Baryon Spectroscopy from Lattice QCD with N_f=2+1+1 flavors", PoS LATTICE2011, 116 (2011).
8. **Daniel R. Bolton, "**Charge Symmetry Breaking and Nuclear Pion Production Reactions", PhD thesis, arXiv:1108.1217 (2011).
9. **Daniel R. Bolton** and Gerald A. Miller, "Impulse approximation in nuclear pion production reactions: absence of a one-body operator", Phys. Rev. C 83 064003 (2011).
10. **Daniel R. Bolton** and Gerald A. Miller, "Impulse approximation in $np \to d\pi^0$ reexamined", Phys. Rev. C 82, 024001 (2010).
11. **Daniel R. Bolton** and Gerald A. Miller, "Charge symmetry breaking in the $np \to d\pi^0$ reaction", Phys. Rev. C, 81, 014001 (2010).
12. Mark Hess, Chong Shik Park, and **Daniel Bolton**, "Green's Function Based Space-Charge Field Solver for Electron Source Simulations", Phys. Rev. ST Accel. Beams, 10 054201 (2007).

Presentations

- Invited Panelist at CTL Symposium on Equitable & Inclusive Engagement Practices for Learner Success, 9/24.
- Invited Panelist at Student Engagement with Technology Symposium, 1/24.
- Invited Panelist at Quality Teaching Initiative event, Denver University, 9/22.
- "PHYS 1120 workgroups", CU PER group meeting, 12/21.
- "Busting Myths About the Teaching Profession", CU PER group meeting, 9/21.
- "Introductory Physics at CU Boulder", invited talk at AAPT summer meeting, remote, 7/20.
- "Transformation of Experimental Physics I at CU Boulder", contributed talk at AAPT summer meeting, Washington D.C., 7/18.
- "Transformation of Experimental Physics I", invited talk at TRESTLE annual meeting, Bloomington, IN, 9/17.
- "Ditch the chalk", invited session for Faculty Teaching Excellence Program, University of Colorado, 1/17.
- "From QCD to Physical Resonances", Nuclear/Particle Physics Seminar (Host: Ethan Neil), University of Colorado, 9/15
- "From QCD to Physical Resonances", Contributed talk at HADRON 2015 in the Meson Spectroscopy Session, Jefferson National Lab, 9/15
- "Using Lattice QCD to Constrain Chiral Perturbation Theory", High Energy Group Seminar (Host: Ken Hatakeyama), Baylor, 3/14
- "The strong force on supercomputers", REU Lunch Bunch Seminar (Host: Lorin Matthews), Baylor, 7/12
- "The impulse approximation and nuclear pion production", High Energy Group Seminar (Host: Ken Hatakeyama), Baylor, 10/11
- "Charge symmetry breaking in QCD", Networking Day Seminar (Host: Ian Derrington), University of Washington, 11/10

- "Charge symmetry breaking in effective field theory", National Nuclear Physics Summer School Poster Session (Host: Achim Schwenk), TRIUMF, 7/10

Workshops

Tutorials in Introductory Physics Expert Implementers Workshop, Seattle, WA, 3/24
- Participated in a two day workshop to give feedback and help plan curriculum.

Online Teaching Academy, Boulder, CO, 2/21
- Participated in a month-long course for faculty focused on improving online courses.

Learning Assistant Alliance Regional Workshop, Boulder, CO, 3/19
- Led a session focused on implementation of LAs in physics courses

TRESTLE ShInDiG, Boulder, CO, approx. once each month from 2017-2019
- Shared Innovation Discussion Group focused on teaching theory and practice

Flipped Classroom Workshop, Boulder, CO, 1/16
- Faculty development workshop on re-designing a course to use the flipped model

Teaching Large Classes Workshop, Boulder, CO, 11/15
- Faculty development workshop on strategies for teaching large classes

Physics Pedagogy Workshops, Orland, FL, 1/14
- *Implementation: Physics for Life and Health Sciences* (4 hours)
- *Using Invention to promote Mathematical thinking* (4 hours)
- *Electrostatics from Gilbert to Volta, Tutorial* (2 hours)

Summer Faculty Institute, Waco, TX, 5/13 – 6/13
- Faculty development program on research, teaching, service, and collegiality
- Full time (30 hrs/wk) for five weeks

Science Faculty Collaborative Regional Workshop, Waco, TX, 10/12

Physical Science by Inquiry, University of Washington, 9/10 – 12/10
- Research-based teaching methods for physics at the secondary and introductory college levels

National Nuclear Physics Summer School, TRIUMF, Vancouver, BC, Canada, 6/10 – 7/10
- Participated in short courses on topics in modern nuclear physics

Academic Mentoring Practicum in Higher Education, University of Washington 3/10 – 6/10
- Mentored a freshman (2 hrs/wk for 8 wks) as part of a graduate-level practicum course

Tutorials in Teaching Physics, University of Washington, 9/06 – 6/07
- Preparation for teaching *Tutorials in Introductory Physics* curriculum