

## Curriculum Vitae

Daniel R. Bolton

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Instructor  
Department of Physics  
University of Colorado

390 UCB  
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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

**Instructor**, University of Colorado Boulder, 1/15 – present

- *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)**

- Lead the department's Learning Assistant program
- Lead the Undergraduate Research Info Session (Fall) and Poster session (Spring) that I created
- Serve as an Engineering Physics faculty advisor
- Lead the physics department's "teaching circles" program that I created
- Manage the department's course webpage server

### **Department service activities (past)**

- Co-led the Experimental Physics I redesign project

- Chaired the Instructor Search committee
- Mentored three students in undergraduate research
- Designed many new lecture demonstrations, labs, tutorials, and homework assignments
- Facilitated the replacement of CAPA with MasteringPhysics for PHYS 1110 and 1120
- Facilitated the implementation of Microsoft Surface tablets in department lecture instruction
- Served on two Comps-II committees

### **University service activities**

- Serve as a Faculty Mentor for the Learning Assistant Alliance
- Served on the Carlson renovation committee

### **Service to the physics community**

- 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**

- Co-created and performed a new CU Wizard show on electricity and magnetism
- Served meals to the homeless in Longmont as a member of the H.O.P.E. organization

## **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  $np \rightarrow d\pi^0$
- Calculated the cross-section of the  $np \rightarrow d\pi^0$  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**

- 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”, in preparation for submission to Phys. Rev. PER
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  $np \rightarrow d\pi^0$  reexamined”, Phys. Rev. C 82, 024001 (2010).
11. **Daniel R. Bolton** and Gerald A. Miller, “Charge symmetry breaking in the  $np \rightarrow d\pi^0$  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).

## Recent Seminars and Posters

- “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

### **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