**Eric W. Burkholder**

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**EXPERIENCE**

Assistant Professor of Physics, Adjunct Assistant Professor of Chemical Engineering *August 2021 - Present*  
**Auburn University**

Postdoctoral Scholar, Department of Physics *September 2018 – July 2021*  
**Stanford University**

**EDUCATION**

Ph. D., Chemical Engineering (2018); M. S. Chemical Engineering (2016)  
**California Institute of Technology**

B. S. *Magna cum laude*, Chemical Engineering(2014)

**Cornell University**

**PUBLICATIONS**

1. **E. W. Burkholder,** N. K. Mohamed-Hinds, & C. E. Wieman, Evidence-based principles for good worksheet design, *accepted to Phys. Teach.*
2. A. M. Price, C. Kim, **E. W. Burkholder**, A. V. Fritz & C. E. Wieman, A detailed characterization of the expert problem-solving process in science and engineering: Guidance for teaching and assessment, CBE Life Sci. Educ. **20**(3), (2021).
3. **E. W. Burkholder** & C. E. Wieman, Supporting authentic problem-solving through a cornerstone design course in chemical engineering, Chem. Eng. Educ. **55**(3), 1-12 (2021).
4. **E. W. Burkholder** & C. E. Wieman, Impact of decision-making in capstone design courses on students’ ability to solve authentic problems,Intl. J. Eng. Educ, **37** (3), 650-662 (2021).
5. **E. W. Burkholder,** K. D. Wang & C. E. Wieman, A validated diagnostic test for introductory physics course placement, Phys. Rev. Phys. Educ. Res. **17**, 010127 (2021).
6. **E. W. Burkholder*,*** S. Salehi, C. E. Wieman, Mixed results from a multiple regression analysis of supplemental instruction courses in introductory physics, PLOS One **16**(4). E0249086 (2021).
7. **E. W. Burkholder,** AP Physics: A closer look, Phys. Rev. Phys. Educ. Res. **17**, 013101 (2021).
8. **E. W. Burkholder,** G. Murillo-Gonzalez & C. E. Wieman, The importance of math prerequisites for performance in introductory physics, Phys*.* Rev. Phys. Educ. Res. **17**, 010108 (2021).
9. **E. W. Burkholder**, L. Y. Hwang, E. Sattely, & N. G. Holmes, Supporting decision making in upper-level chemical engineering laboratories,Educ. For Chem. Eng. **35**, 69-80 (2021).
10. **E. W. Burkholder**, L. F. Blackmon, & C. E. Wieman, Hidden variables: predicting student performance in introductory physics, PLOS One, **15**(12), e0244146 (2020).
11. **E. W. Burkholder,** L. Y. Hwang, and C. E. Wieman, Evaluating the Problem-Solving Skills of Graduating Chemical Engineering Students, Educ. For Chem. Eng. **34**, 68-77 (2020).
12. **E. W. Burkholder**, L. F. Blackmon, & C. E. Wieman, Characterizing the problem-solving strategies of transitioning novice physics students, Phys. Rev. Phys. Educ. Res. **16**, 020134 (2020).
13. **E. W. Burkholder**, C. J. Walsh, & N. G. Holmes, Examination of quantitative methods for analyzing data from concept inventories, Phys. Rev. Phys. Educ. Res., **16**, 010141 (2020).
14. **E. W. Burkholder,** J. K. Miles, T. J. Layden, K. D. Wang, A. V. Fritz, & C. E. Wieman, A template for teaching and assessment of problem solving in introductory physics, Phys. Rev. Phys. Educ. Res., **16**, 010123 (2020).
15. **E. W. Burkholder** & J. F. Brady, Nonlinear microrheology of active Brownian suspensions, Soft Matter, **16**, 1034-46 (2020).
16. **E. W. Burkholder** & C. E. Wieman, What do AP physics courses teach and the AP physics exam measure?, Phys. Rev. Phys. Educ. Res. **15**, 020117 (2019).
17. S. Salehi, **E. W. Burkholder**, G. P. Lepage, S. Pollock & C. E. Wieman, Demographic gaps or preparation gaps?: The large impact of incoming preparation on performance of students in introductory physics, Phys. Rev. Phys. Educ. Res. **15**, 020114 (2019) [Editor’s Suggestion].
18. **E. W. Burkholder** & J. F. Brady, Fluctuation-dissipation in active matter, J. Chem. Phys, **150**, 184901 (2019).
19. **E. W. Burkholder** & J. F. Brady, Do hydrodynamic interactions affect the swim pressure?, Soft Matter, **14**, 3581-3589 (2018).
20. **E. W. Burkholder** & J. F. Brady, Tracer diffusion in active suspensions, Phys. Rev. E **95**, 052605 (2017).
21. J. S. Luterbacher, J. M. Moran-Mirabal, **E. W. Burkholder,** & L. P. Walker, Modeling enzymatic hydrolysis of lignocellulosic substrates using ﬂuorescent confocal microscopy II: pretreated biomass, Biotechnol. Bioeng. **112,** 32-42 (2014).
22. J. S. Luterbacher, J. M. Moran-Mirabal, **E. W. Burkholder,** & L. P. Walker, Modeling enzymatic hydrolysis of lignocellulosic substrates using ﬂuorescent confocal microscopy I: Filter paper cellulose, Biotechnol. Bioeng. **112,** 21-31 (2014).

**CONFERENCE PUBLICATIONS:**

1. **E. W. Burkholder**, Student and expert conceptions of the word “efficiency”, *in FIE Conference Proceedings* (2021).
2. **E. W. Burkholder**, F. Ledesma, & J. Forniciari, Work in Progress: Transforming a chemical reaction engineering course to teach expert problem-solving, *in ASEE Annual Conference Proceedings* (2021).
3. S. Salehi\* & **E. W. Burkholder\***, Implicit and unchecked assumptions interfere with problem-solving in physics, *in AERA Annual Meeting Proceedings* (2021).
4. **E. W. Burkholder** & C. E. Wieman, Comparing problem-solving across capstone design courses in chemical engineering, *in FIE Proceedings* (2020).
5. **E. W. Burkholder** & C. E. Wieman, Testing an assessment of problem-solving in introductory chemical process design courses (WIP), *in ASEE Annual Conference Proceedings* (2020).
6. **E. W. Burkholder**, A. M. Price, M. P. Flynn,& C. E. Wieman, Assessing problem solving in undergraduate engineering programs, *in Physics Education Research Conference Proceedings* (2019).

*\*Authors contributed equally to this submission.*

**PUBLICATIONS (IN PREPARATION):**

1. **E. W. Burkholder**, How to become an expert engineer, *for submission to ASEE Prism.*
2. A. M. Price, **E. W. Burkholder**, C. Kim, S. Salehi, V. Isava, & C. E. Wieman, An accurate and practical method for measuring science and engineering problem-solving expertise.
3. G. Murillo-Gonzalez & **E. W. Burkholder**, A scientific framework to define back-of-the-envelope problems: guidance for teaching, *for submission to Am. J. Phys.*
4. **E. W. Burkholder**, G. Murillo-Gonzalez, & C.E. Wieman, How and why engineers use back of the envelope calculations, *for submission to J. Eng. Educ.*

**FUNDING:**

1. Co-PI: Teaching problem solving to create accessible and equitable introductory STEM learning environments, **NSF – EHR, IUSE**, pending (2021)
2. Senior Personnel: Assessing the effects of virtual instruction on student discourse in science courses, **Spencer Foundation**, not funded (2020).

**TEACHING:**

1. Physics 1600: Engineering Physics I (Auburn, Fall 2021)
2. Physics 41E: Mechanics, Calculations, and Concepts (Stanford, Winter 2019, 2020)

**MENTORING:**

1. Jiamin Zhang, postdoctoral scholar in physics, Auburn
2. Erin Ball, M. S. student in biology, Auburn
3. Michael Robbins, Ph. D. student in physics, Auburn
4. Sarah Sackefiyo, undergraduate student in Physics, Stanford
5. Gabriel Murillo-Gonzalez, undergraduate student in Physics, Stanford
6. Anna Widder, master’s student in Mechanical Engineering, Stanford
7. Nicel Mohamed-Hinds, post-baccalaureate student in Physics, Stanford
8. Kate Miles, undergraduate student, Stanford
9. Lena Blackmon, master’s student in Applied Physics, Stanford

**INVITED TALKS**

1. **E. W. Burkholder,** An evidence-based approach to chemical engineering education, *Chemical Engineering Seminar, University of Michigan,* April 1, 2021.
2. **E. W. Burkholder,** An evidence-based approach to chemical engineering education, *Chemical Engineering Seminar, Auburn University,* March 17, 2021.
3. **E. W. Burkholder,** An evidence-based approach to chemical engineering education, *Chemical Engineering Seminar, Clarkson University,* March 2, 2021.
4. **E. W. Burkholder,** An evidence-based approach to physics education, *Physics Seminar, Auburn University,* February 18, 2021.
5. **E. W. Burkholder,** Template for teaching and assessing problem-solving in introductory physics, *PHASER Group, Department of Physics and Astronomy, University of British Columbia*. February 16, 2021.
6. **E. W. Burkholder,** The “secret” to becoming an expert scientist, Los Altos High School Physics Club, November 4, 2020.
7. **E. W. Burkholder,** The “secret” to becoming an expert scientist, Bristol Eastern High School, October 5, 2020.
8. **E. W. Burkholder**, What are students learning in AP physics?, *AAPT Summer Meeting,* July 18-22, 2020.
9. **E. W. Burkholder,** An evidence-based approach to chemical engineering education, *Chemical Engineering Seminar, Tufts University,* February 18, 2020.
10. **E. W. Burkholder**, A scientific approach to chemical engineering education, *CBE Seminar, Smith School of Chemical & Biomolecular Engineering, Cornell University.* June 7, 2019.
11. **E. W. Burkholder** & M. Wong, Effective recitations: helping your students learn, *2017 Caltech Teaching Conference,* September 20, 2017.
12. **E. W. Burkholder** & J. F. Brady, Rheology of active matter systems, *Thomases/Guy Group Meeting, Dept. of Applied Mathematics, University of California – Davis.* April 18, 2017.
13. **E. W. Burkholder** & J. F. Brady, Rheology of active matter systems, *Phillips/Dungan Group Meeting, Dept. of Chemical Engineering & Dept. of Food Science and Technology, University of California – Davis.* December 2, 2016.

**CONFERENCE PRESENTATIONS**

1. **E. W. Burkholder**, Student and expert conceptions of the word “efficiency”, *FIE Conference,* October X, 2021.
2. **E. W. Burkholder,** F. Ledesma, & J. Forniciari, Designing a chemical reaction engineering course to teach expert problem-solving, *ASEE Exposition and Convention,* July 28, 2021.
3. **E. W. Burkholder** & C. E. Wieman, Comparing problem-solving across two capstone design courses, *AIChE National Meeting*, November 18, 2020.
4. **E. W. Burkholder** & C. E. Wieman, Comparing problem-solving across capstone design courses in chemical engineering¸ *FIE Conference, Virtual Meeting,* October 23, 2020.
5. **E. W. Burkholder** & C. E. Wieman, Testing an assessment of problem-solving in introductory chemical process design courses (WIP), *ASEE Exposition and Convention, Virtual Meeting,* June 24, 2020.
6. **E. W. Burkholder**, A. M. Price, M. P. Flynn, & C. E. Wieman, Assessing problem solving in undergraduate science and engineering programs, *Talk symposium on problem-solving, PERC, Provo, UT,* July 25, 2019 [Symposium organizer].
7. **E. W. Burkholder** & J. F. Brady, Do hydrodynamic interactions affect the swim pressure? *APS March Meeting, Los Angeles, CA.* March 8, 2018.
8. **E. W. Burkholder** & J. F. Brady, Not so fast! Single particle motion in active suspensions, *89th Annual Meeting of the Society of Rheology, Denver, CO.* October 10, 2017.
9. **E. W. Burkholder** & J. F. Brady, Tracer diffusion in active suspensions, *Southern California Flow Physics Symposium XI, University of California – San Diego.* April 22, 2017.
10. **E. W. Burkholder** & J. F. Brady, Tracer diffusion in active suspensions, *69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR.* November 22, 2016.
11. **E. W. Burkholder** & J. F. Brady, Linear microrheology in active Brownian suspensions, *Southern California Flow Physics Symposium X, University of California - Irvine.* April 9, 2016.

**POSTER PRESENTATIONS**

1. **E. W. Burkholder,** A. M. Price, M. P. Flynn, & C. E. Wieman, Assessing problem-solving in science and engineering programs, *XDBER Conference,* March 3, 2021.
2. **E. W. Burkholder,** L. Blackmon, & C. E. Wieman, Hidden variables: explaining performance in introductory physics, *PERC Virtual Meeting,* July 25, 2020.
3. **E. W. Burkholder** & J. F. Brady, The structure of active fluids, *Gallery of Rheology, 89th Annual Meeting of the Society of Rheology, Denver, CO.* October 11, 2017.
4. **E. W. Burkholder** & J. F. Brady, Effective diffusivity in active Brownian suspensions, *Department of Chemical Engineering Graduate Recruitment, Pasadena, CA.* March 12, 2017.
5. **E. W. Burkholder** & J. F. Brady, Effective diffusivity in active Brownian suspensions, *Summer School on Active and Complex Matter, Cargèse, Corsica, France.* July 12, 2016.
6. **E. W. Burkholder** & R. N. Zia, Nonlinear microrheology of attractive colloidal suspensions, *85th Annual Meeting of the Society of Rheology, Montreal, Quebec, Canada.* October 17, 2013.

**CONSULTING & WORKSHOPS**

* Active Learning India Workshop (2021)
* AP Physics Re-articulation Committee, The College Board (2020)

**HONORS & AWARDS**

* Honorable Mention for Teaching Award (graduate TA), Caltech Graduate Student Council (2016)
* Honorable Mention, National Science Foundation Graduate Research Fellowship Program (2016)
* Outstanding Research in Chemical Engineering, Cornell University (2014)
* George Scheele Outstanding Junior Award, Cornell University (2012)
* Simmons Prize, Cornell University (2012)

**OUTREACH & SERVICE**

* Volunteer, UC Berkeley Food Pantry (2020)
* Chair, Committee on Diversity and Student Health, Cornell University Glee Club Alumni Board (2020-present)
* Ad-hoc referee, International Journal of STEM Education (2020-present)
* Ad-hoc referee, Journal of Engineering Education (2020-present)
* Ad-hoc referee, Soft Matter (2020-present)
* Ad-hoc referee, IEEE Advances (2019-present)
* Ad-hoc referee, Physical Review Physics Education Research (2019-present)
* Equity & Inclusion Committee, Stanford Department of Physics (2019-present)
* Cornell Cares Day (2017, 2018): Annual alumni volunteer outing
* Sacramento GLBT Community Center (2016-2017): Youth Spot & Community Resources
* Veterans Tutoring Center, Pasadena City College (2015-2016): Tutored military veterans in physics, chemistry, and math
* Dean's Advisory Council, Caltech (2016): Graduate student body organized to discuss issues of student-faculty relations at Caltech
* Cornell Alumni Admissions Ambassadors Network (2014-present)