

JUSTIN F. SHAFFER

Associate Dean of Undergraduate Studies and Teaching Professor at the Colorado School of Mines

Founder, Recombinant Education

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PROFESSIONAL EXPERIENCE

Associate Dean of Undergraduate Studies Colorado School of Mines	2024 - present
Ben L. Fryrear Chair for Innovation and Excellence Colorado School of Mines	2024 - present
Teaching Professor Department of Chemical and Biological Engineering Quantitative Biosciences and Engineering Program Colorado School of Mines	2023 - present
Founder, Recombinant Education (www.recombinanteducation.com) Higher education workshops and consulting business	2022 - present
Teaching Associate Professor Department of Chemical and Biological Engineering Colorado School of Mines	2018 - 2023
Course Director, Anatomy and Physiology Codon Learning (www.codonlearning.com)	2020 - present
Assistant Teaching Professor Department of Developmental and Cell Biology University of California, Irvine Earned tenure and promotion to Associate Teaching Professor in May 2018	2013 - 2018
Visiting Lecturer, Department of Biology, University of North Carolina	2013
Adjunct Professor, Department of Biology, North Carolina A&T State University	2012

EDUCATION and TRAINING

SPIRE Postdoctoral Fellow, University of North Carolina	2010 - 2013
Ph.D., Bioengineering, University of Washington	2005 - 2010
B.S., Chemical Engineering, Pennsylvania State University	2001 - 2005

AWARDS, HONORS, AND FELLOWSHIPS

Ben L. Fryrear Chair for Innovation and Excellence	2023 - 2026
Colorado School of Mines Alfred E. Jenni Fellowship	2022 - 2023
Colorado School of Mines Diversity, Inclusion, and Access Fellow	2021 - 2022
UCI Ayala School Golden Apple Award for Excellence in Teaching	2016
Honorary Membership Award, UCI National Society of Leadership and Success	2015
New Case Fellow, Science Case Network	2014
Postdoctoral Scholar Award for Excellence in Mentoring Undergraduates, UNC	2011
Postdoctoral Scholar Award for Excellence in Service, UNC	2011

SPIRE Postdoctoral Fellowship, UNC (NIGMS K12GM000678)	2010 - 2013
Dean's Circle Mentorship Award, UC Davis College of Biological Sciences	2009
Young Investigator Prize, European Muscle Conference, Lille, France	2009
Biophysical Society Annual Meeting Student Travel Award, Boston, MA	2009
Graduate Student Travel Award, University of Washington Graduate School	2008
National Science Foundation Graduate Research Fellowship	2007 - 2010
NSF Graduate Research Fellowship Program, Honorable Mention	2005, 2006
First place, MindBend Symposium (Undergraduate Research), Penn State	2005
First place, Undergraduate Research Symposium, Penn State	2005

FUNDING

Ben L. Fryrear Chair for Innovation and Excellence (\$75,000)	2023 - 2026
Award to promote discipline-based education research at CO School of Mines	
Colorado School of Mines Tech Fee Grant (\$9,083)	2023
Award of funds to purchase equipment for molecular biology courses	
Department of Education Upward Bound Math Science (\$1,437,685)	2022
Program to support college readiness for Alameda High School students	
Colorado School of Mines Alfred E Jenni Fellowship (\$9656)	2022
Funded to promote high structure course design practices on campus	
Colorado School of Mines Diversity, Inclusion, and Access Fellowship (\$10,000)	2021
Funded to lead development of Upward Bound proposal	
Colorado School of Mines Tech Fee Grant (\$14,912)	2021
Award of funds to purchase equipment for biology courses	
Colorado School of Mines Innovation Grant – PI (\$58,642)	2020
Award to develop cohort programs to improve first year student success	
Colorado School of Mines Tech Fee Grant (\$14,292)	2020
Award of funds to purchase molecular biology tools for biology courses	
Colorado School of Mines Tech Fee Grant (\$2240)	2019
Award of funds to purchase health monitoring equipment for an A&P course	
Colorado School of Mines Open Educational Resources Grant – PI (\$2000)	2019
Award to develop OER materials for anatomy and physiology course	
Colorado School of Mines Open Educational Resources Grant – Co-PI (\$2000)	2019
Award to develop OER materials for thermodynamics course	
Colorado School of Mines Innovation Grant – PI (\$17,687)	2019
Award to study achievement gaps in first year courses at Mines	
Colorado School of Mines Tech Fee Grant (\$765)	2018
Award of funds to purchase a Catchbox throwable microphone for biology course	
UCI eTech Mini Grant (\$500)	2017
Award of funds to purchase a Catchbox throwable microphone for large lectures	
UCI Innovative Learning & Technology Initiative Grant – PI (\$35,000)	2017
Development of an Online Bio Sci 9B (Bio and Chem of Food and Cooking) Course	
UCI Freshman Seminar Development Grant (\$1500)	2017
Grant to develop a freshman seminar (Amazing Adventures in Anatomy)	
UCI Bio Sci Faculty Research Travel Grant (\$1364)	2017
Travel award to give a poster presentation at the 2017 Experimental Biology Meeting	
American Association of Anatomists Education Outreach Grant – PI (\$3000)	2016
Funding for high school outreach event (Amazing Anatomy with the Anteaters!)	
UCI Education Innovation Mini Grant – PI (\$4000)	2016
Implementation and assessment of Kahoot! in Biological Sciences Courses	

UCI Bio Sci Faculty Computer Award (\$1800) Award of funds to purchase a new laptop computer	2016
UCI Bio Sci Faculty Research Travel Grant (\$1023) Travel award to give an oral presentation at the 2016 HAPS Annual Meeting	2016
UCI eTech Initiative – PI (\$5024) Integration and assessment of iPads in the undergraduate A&P lab courses	2016
UCI ADVANCE Spirit Grant – PI (\$5000) Closing the Achievement Gap in Introductory Biology at UC Irvine	2015
UCI Innovative Learning & Technology Initiative Grant – PI (\$10,000) Development of an Online Bio Sci D136 (Human Anatomy) Course	2015
UCI Assessment Grant – PI (\$10,000) Assessment of general education student learning outcomes in science courses	2014
UCI Assessment Grant – PI (\$9347) Assessment of student scientific literacy skills in non-majors science courses	2013

TEACHING EXPERIENCE

Colorado School of Mines	
Introduction to Biomedical Engineering (lecture, 60 students)	2024 - present
Quantitative Biosciences and Engineering field session lab (40)	2023 - present
Unit operations field session lab (lab, team-taught, 96)	2020 - present
Material and Energy Balances (lecture, 85)	2019 - present
Anatomy and Physiology (lecture, 45)	2019 - present
Fundamentals of Biology (lecture + lab, 63)	2018 - present
Introduction to Thermodynamics (lecture, 120)	2018 - present
University of California, Irvine	
Amazing Adventures in Anatomy (freshman seminar, 15)	2017
Human Anatomy (lecture (online and face-to-face, >70)	2015 - 2018
Applied Human Anatomy (lecture + lab, >130)	2014 - 2018
Biology and Chemistry of Food and Cooking (lecture, >300)	2014 - 2018
Introductory Biology: DNA to Organisms (lecture, >430)	2014 - 2017
Scientific Writing (lecture, 297)	Winter 2015
From Conception to Birth (lecture, 47)	Winter 2014
Comparative Anatomy (lecture, 24)	Summer 2013
University of North Carolina at Chapel Hill	
Principles of Biology (lecture, 396)	Spring 2013
North Carolina A&T State University	
Designer Proteins and Society (lecture + lab, 16)	Spring 2012
Biological Sciences for non-majors (lecture, 71)	Fall 2012
University of California, Davis	
Introduction to Biology (TA; 23)	Spring 2010
Major Discoveries in Muscle: Myofilament Proteins (lecture, 12)	Fall 2009
University of Washington	
Bioengineering Design Principles (TA; 56)	Spring 2007

RESEARCH EXPERIENCE

Current Research Summary	2013 - present
My research program focuses on investigating the efficacy of high structure pedagogical practices in college science and engineering courses. Specifically, I am interested in the extents that pre-class assignments, in-class activities, and after-class assignments contribute to student learning, retention, and attitudes. I am specifically interested in designing and assessing the impacts of cohort programs and pedagogical changes to reduce achievement gaps in first-year science and engineering courses.	
SPIRE Postdoctoral Research	2010 - 2013
Department of Biology, University of North Carolina at Chapel Hill Advisor: William Kier, PhD, Chair and Professor of Biology Topic: Diversity of myosin gene expression in cephalopods	
Ph.D. Doctoral Research	2006 - 2010
Department of Bioengineering, University of Washington Department of Neurobiology, Physiology, and Behavior, University of California, Davis Advisor: Samantha Harris, PhD, Asst. Professor of Neurobiology, Physiology, & Behavior Thesis: Interactions between myosin binding protein-C and F-actin contribute to the regulation of muscle contraction	
Undergraduate Honors Research	2003 - 2005
Department of Chemical Engineering, Penn State University Advisor: Andrew Zydney, PhD, Chair and Professor of Chemical Engineering	
Engineering Internship	2005
Bristol-Myers Squibb Company, Syracuse, NY	
Scientist Internship	2004
Kimberly-Clark Corporation - Safeskin R&D, Roswell, GA	

SERVICE

Colorado School of Mines Committee Service	
QBE Undergraduate Curriculum Committee, Chair	2021 - present
Task Force for the Evaluation of Instructor Effectiveness (Co-chair)	2018 - present
Department of Chemical and Biological Engineering DI&A Committee	2022 - 2023
University Survey Committee	2019 - 2022
University Assessment Committee	2018 - 2022
Department of Chemical and Biological Engineering Research Affairs	2018 - 2022
Other Colorado School of Mines Service	
Member: CBE Department Head Search Committee	2023 - 2024
Host: Minds @ Mines recruiting events	2020 - present
Member: QBE Teaching Faculty Search Committee	2022 - 2023
Member: Trefny Center Director Search Committee	2021
Speaker: Trefny Teaching Center panels	2021
Judge: Mines Undergraduate Research Symposium	2020, 2021
Speaker: Mines Teacher Education Alliance	2019
Speaker: Beta Beta Beta Biology Honors Society	2018
University of California, Irvine Committee Service	
School of Biological Sciences Undergraduate Cabinet	2017 - 2018
School of Biological Sciences Undergraduate Curriculum Committee	2014 - 2018

Department of Developmental and Cell Biology Teaching Committee	2014 - 2018
Served on review and hiring committees	2014 - 2018
UC Irvine Senate Assessment Committee (Chair 2016 - 2017)	2014 - 2017
Other University of California, Irvine Service	
Speaker: UCI Biological Sciences International Student Orientation	2017
Speaker: UCI New Student Parent Orientation Program	2016, 2017
Panelist: Biological Sciences Student Council Path to Professorhood panel	2016
Panelist: UCI Graduate Student Career Conference	2016
Guest lecture: UCI I-STEPS International student freshman seminar	2015, 2016
Panelist: UCI New Faculty Orientation Panel	2015
Speaker: UCI New Biological Sciences Student Orientation	2015
Panelist: Teaching career panel, Developmental and Cell Biology retreat	2015
Guest lecture: Biological sciences peer tutors weekly meeting	2015, 2018
Guest lecture: Biological sciences 2A freshman seminar	2014, 2015, 2016, 2017
Guest lecture: UCI I-STEPS International student freshman seminar	2014
Panelist: GAANN Graduate Student Professional Development Day	2014
Director: Becoming an Effective Mentor Workshop	2013 - present
Judge: Developmental and Cell Biology scientific photo contest	2013
Professional Service	
Editor for anatomy and physiology for the <i>CourseSource</i> journal	2019 - 2024
Center for Physiology Education, Education Research working group	2022 - 2023
Guest Editor for <i>Journal of Microbiology and Biology Education</i>	2022 - 2023
Assistant editor for the <i>Chemical Engineering Education</i> journal	2020 - 2023
Editorial board member for the <i>HAPS Educator</i> journal	2018 - 2022
Member of the Committee for Early-Career Anatomists	2017 - 2018
Committee of the American Association of Anatomists	
Reviewer for journals and conferences	2014 - present
Chemical Engineering Education, American Society for Engineering Education annual conference, CBE Life Sciences Education, Anatomical Sciences Education, Advances in Physiology Education, HAPS Educator, National Center for Case Study Teaching in the Sciences, CourseSource, Society for the Advancement of Biology Education Research (SABER) annual conference	
Consultant/reviewer/testbank author for textbook publishers	2012 - present
Professional Meetings Organized	
HAPS Western Regional Conference	2024
ASEE Rocky Mountain Section Regional Conference	2023
Society for the Advancement of Biology Education Research (SABER) West	
Co-creator and co-host for 2017, 2018, 2019, and 2020 meetings in Irvine, CA	
SoCal Project Kaleidoscope Regional Meeting (AACU STEM)	2016
Regional Association for Biology Laboratory Education Conference	2015
Community Outreach	
Judge: Front Range Community College engineering design expo	2023
Mentored Mines QBE student community outreach program	2023 - present
Judged elementary school science fair, Golden, CO	2020
Taught human anatomy with elementary students, Golden, CO	2019, 2022
Faculty mentor for Reach Out, Teach Out outreach program	2017 - 2018
UCI Nursing Camp in Summer (NCIS), Irvine, CA	2017
Taught human anatomy with elementary students, Irvine, CA	2017, 2018

Amazing Anatomy with the Anteaters (high school students), Irvine, CA	2017
Future Health Champions Program (6 th grade), Irvine, CA	2016, 2017
Taught human anatomy with Montessori School (pre-K to 5), Newport Beach, CA	2016
UNC Office of Graduate Education, Science Outreach Program	2010 - 2013

PROFESSIONAL ACTIVITIES

Training workshops and seminars

CREATE/STS Workshop Series, Colorado School of Mines	2022 - 2023
Engineering and Facilitating Online Learning course, Colorado School of Mines	2020
Certificate in Engaged Learning, UC Irvine	2017
Data Science courses (x7, Johns Hopkins University via Coursera)	2017
Identifying Medical Education Funding, American Association of Anatomists	2017
Linear Regression Statistics Short Course, UC Irvine	2015
New Faculty Teaching Academy, UC Irvine	2013
Becoming an Effective Mentor Workshop (Facilitator), UNC Pembroke	2013
Becoming an Effective Mentor Workshop (Facilitator), UNC	2012
SPIRE Seminar on College Teaching, UNC	2011
College Science Teaching, UNC Biology	2011
Advanced Communication Skills, UNC	2011
Effective College Teaching, UNC	2010, 2012
Scientific Teaching, UC Davis	2009
Thinking Before you Teach, UC Davis	2009
Entering Mentoring Program, UC Davis	2008 - 2009

Professional Society Memberships

POD Network	2023 - present
American Institute for Chemical Engineers	2020 - 2022
American Association for Engineering Education	2018 - present
Human Anatomy and Physiology Society	2016 - present
Society for the Advancement of Biology Education Research	2012 - present
American Association for the Advancement of Science	2017 - 2019
American Association of Anatomists	2016 - 2019
Association for Biology Laboratory Education	2012 - 2015
Society for Integrative and Comparative Biology	2010 - 2013
European Society for Muscle Research	2008 - 2010
Biophysical Society	2006 - 2010
UC Davis Biomedical Engineering Student Association (BESA)	2009 - 2010
UW chapter of the Biomedical Engineering Society (BMES)	2005 - 2010

WORKSHOPS AND CONSULTING SERVICES (as RECOMBINANT EDUCATION)

11. April 2024 – Workshop at Brigham Young University on high structure course design, backward design, and active learning
10. January 2024 – Consulting work for the McNeil Entrepreneurship and Innovation Center at the Colorado School of Mines for syllabus and course design
9. January 2024 – Workshop at the University of Colorado Boulder on best practices for using iClickers to engage students in the classroom (in partnership with Macmillan)

8. January 2024 – Workshop for Colorado State University (virtual) on best practices for using iClickers to engage students in the classroom (in partnership with Macmillan)
7. October 2024 – Workshop for the University of Business and Technology in Jeddah, Saudi Arabia (virtual) for STEM faculty on high structure course design
6. October 2024 – Workshop for the University of California, Irvine on peer observation protocols for improvement and evaluation of teaching
5. August 2024 – Workshop for College of the Mainland in Texas (virtual) on best practices for using iClickers to engage students in the classroom (in partnership with Macmillan)
4. August 2023 to May 2024 – Consulting with University of Texas Rio Grande Valley Biology Department to add structure to and revise mid-level biology curricula
3. August 2023 – Workshops for University of Texas Rio Grande Valley Biology Department on high structure course design, active learning, and assessment
2. Summer and Fall 2023 – Teaching mentor for postdoc Angel Navarro at University of Colorado Boulder who taught anatomy and physiology (BMEN 4117) in Fall 2023
1. January 2023 – Workshop at Colorado State University on best practices for using iClickers to engage students in the classroom (in partnership with Macmillan)

PUBLICATIONS

39. Kelp, NC, McCartney M, Savary MA, Shaffer JF, Wolyniak MJ. 2023. Developing Science Literacy in Students and Society: Theory, Research, and Practice. *Journal of Microbiology and Biology Education*. 24: 2. <https://doi.org/10.1128/jmbe.00058-23>.
38. Roemmich AJ, Mauzy-Melitz D, Shaffer JF. Show and tell: Using graduate teaching assistant research to engage undergraduates. *CourseSource*, *in review*.
37. Ringsby A, Shaffer JF. Student advice for success in high structure science and engineering courses. *Journal of College Science Teaching*, DOI: 10.1080/0047231X.2024.2316380
36. Lopez J, Shaffer JF. 2022. How chemical engineering students feel about biology. *Chemical Engineering Education*. 57: 7-13.
35. Umarjii O, McPartlan P, Moeller J, Li Q, Shaffer JF, Eccles J. 2021. The Motivational System of Task Values and Anticipated Emotions in Daily Academic Behavior. *Motivation and Emotion*. <https://doi.org/10.1007/s11031-021-09898-y>.
34. Adkins S, Shaffer JF, Morris J, England B, Raut S. 2021. The influence of Kahoot!, a gamified student response system, on student anxiety in large enrollment biology classrooms. *CBE Life Sciences Education* 20: ar19, DOI:10.1187/cbe.20-08-0187.

33. McPartlan P, Rutherford T, Rodriguez F, Shaffer JF, Holton A. 2021. Modality Motivation: Selection Effects and Motivational Differences in Students Who Choose to Take Courses Online. *The Internet and Higher Education*. 49: 100793. <https://doi.org/10.1016/j.iheduc.2021.100793>.
32. Tarapore E, Shaffer JF, Atwood SX. 2021. Online engagement in an undergraduate cell biology course. *Journal of College Science Teaching*. 54: 27-34.
31. Lopez J and Shaffer JF. 2021. To pre-req or co-req: An assessment of why chemical engineering students elect to take a course as a prerequisite or as a corequisite. *Chemical Engineering Education*. 55: 86-94.
30. Shaffer JF. 2021. Teaching tip: What is the Re in a whale's aorta? *Chemical Engineering Education*, 55: 63.
29. Shaffer JF. 2020. Student performance in and perceptions of collaborative two-stage exams in a materials and energy balances course. *Chemical Engineering Education*, 54: 52-58.
28. Shaffer JF, Ferguson J, Denaro, K. 2019. Use of the Test of Scientific Literacy Skills Reveals that Fundamental Literacy is an Important Contributor to Scientific Literacy. 18:ar31; doi:10.1187/cbe.18-12-0238.
27. Yabuno K, Luong E, Shaffer JF. 2019. Comparison of traditional and gamified student response systems in an undergraduate human anatomy course. *HAPS Educator*, 23: 302-309.
26. Shaffer JF, Schriener SE, Loudon C, Decanay S, Alam U, Dang J, Aguilar-Roca N, Kadandale P, Sato BK. 2018. Impacts of physiology prerequisites on future anatomy and physiology courses. *HAPS Educator*, 22: 199-207.
25. Shaffer JF. Scorpion versus mouse: A tale of venom and action potentials. 2018. National Center for Case Study Teaching in Science. http://sciencecases.lib.buffalo.edu/cs/collection/detail.asp?case_id=1000&id=1000.
24. Lieu RM, Gutierrez A, Shaffer JF. 2018. Student perceived difficulties in learning organ systems in an undergraduate human anatomy course. *HAPS Educator*, 22: 84-92.
23. Lieu RM, Wong A, Asefirad A, Shaffer JF. 2017. Improving exam performance in introductory biology through the use of pre-class reading guides. *CBE-Life Sciences Education*, 16:ar46; doi:10.1187/cbe.16-11-0320.
22. Shaffer JF. 2017. Boning up on active learning exercises for teaching skeletal system anatomy: Pre-class accountability is key. *HAPS Educator* 21: 44-47.
21. Shaffer JF, Sun S. 2017. Anencephaly in Yakima: Lots of questions, no answers. National Center for Case Study Teaching in Science. http://sciencecases.lib.buffalo.edu/cs/collection/detail.asp?case_id=896&id=896.
20. Shaffer JF. 2016. Student performance in and perceptions of a high structure undergraduate human anatomy course. *Anat Sci Ed* 9: 516-528. doi: 10.1002/ase.1608

19. Shaffer JF, Dang JV, Lee AK, Dacanay SJ, Alam U, Wong HY, Richards GJ, Kadandale P, Sato BK. 2016. A familiar(ity) problem: Assessing the impact of prerequisites and content familiarity on student learning. *PLOS One* 11: e0148051.
18. Shaffer JF, Kier WM. 2016. Tuning of shortening speed in coleoid cephalopod muscle: no evidence for tissue-specific muscle myosin heavy chain isoforms. *Invert Biol* 135: 3-12.
17. Sato BK, Alam U, Dacanay SJ, Lee AK, Shaffer JF. 2015. Brewing for students: An inquiry-based microbiology lab. *J Microbiol Biol Educ* 16: 223–229.
16. Shaffer JF. 2014. Plotting cranial and spinal nerve pathways in a human anatomy lab. *Course Source*. <http://coursesource.org/courses/plotting-cranial-and-spinal-nerve-pathways-in-a-human-anatomy-lab>.
15. Chow ML, Shaffer JF, Harris SP, Dawson JF. 2014. Altered interactions between cardiac myosin binding protein-C and alpha-actin variants associated with cardiomyopathies. *Arch Biochem Biophys*. 550-551: 28-32.
14. Shaffer JF. 2014. The sad but true case of Earl Washington. National Center for Case Study Teaching in Science. http://sciencecases.lib.buffalo.edu/cs/collection/detail.asp?case_id=725&id=725.
13. Shaffer JF. 2013. "Recombinant protein of the day": using daily student presentations to add real-world aspects to a biotechnology course. *Biochem Mol Biol Educ*. 41: 269-272. doi: 10.1002/bmb.20697.
12. Shaffer JF. 2013. From cow juice to a billion dollar drug, with some breakthroughs in between. National Center for Case Study Teaching in Science. http://sciencecases.lib.buffalo.edu/cs/collection/detail.asp?case_id=684&id=684.
11. Bezold KL, Shaffer JF, Khosa JK, Hoyer ER, Harris SP. 2013. A gain of function mutation in the M-domain of cardiac myosin binding protein-C increases binding to actin. *J Biol Chem*. 288: 21496-21505.
10. Shaffer JF, Kier WM. 2012. Muscular tissues of the squid *Doryteuthis pealeii* express identical myosin heavy chain isoforms: An alternative mechanism for tuning contractile speed. *J Exp Biol*. 215: 239-246.
9. Kensler RW, Shaffer JF, Harris SP. 2011. Binding of the N-terminal fragment C0-C2 of cardiac MyBP-C to cardiac F-actin. *J Struct Biol*. 174: 44-51.
8. Shaffer JF, Gillis TE. 2010. Evolution of the regulatory control in vertebrate muscle: The roles of troponin I and myosin binding protein-C. *Physiol Genomics*. 42: 406-419.
7. Jia W, Shaffer JF, Leary JA, Harris SP. 2010. Identification of novel PKA phosphorylation sites in the M-domain of murine and human myosin binding protein-C. *J Proteome Res*. 9: 1843-1853.
6. Shaffer JF, Wong P, Bezold KL, Harris SP. 2010. Functional differences between the N-terminal domains of mouse and human cardiac myosin binding protein-C. *J Biotechnology and Biomedicine*. 2010: Article ID 789798.

5. Shaffer JF, Harris SP. 2009. Species-specific differences in the Pro-Ala rich region of cardiac myosin binding protein-C. *J Mus Res Cell Motil*, 30: 303-306.
4. Shaffer JF, Kensler RW, Harris SP. 2009. The Myosin binding protein-C motif binds actin in a phosphorylation sensitive manner, *J Biol Chem*. 284: 12318-12327.
3. Shaffer JF, Razumova MV, Tu AY, Regnier M, Harris SP. 2007. Myosin S2 is not required for effects of MyBP-C on motility, *FEBS Letters*. 581: 1501-1504.
2. Razumova MV, Shaffer JF, Tu A, Flint GV, Regnier M, Harris SP. 2006. Effects of the N-terminal domains of myosin binding protein-C in an in vitro motility assay: Evidence for long-lived crossbridges. *J Biol Chem*. 281: 35846-35854.
1. Shaffer JF, Zydney AL. 2005. Phosphate clearance for bleach reprocessed polysulfone hemodialyzers: Effects of electrostatic interactions, *ASAIO J*. 51: 748-753.

INVITED PRESENTATIONS

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| Brigham Young University Biology Department Seminar
Talk: The impact of high structure course design across universities and students | April 2024 |
| James Madison University Biology Department Seminar
Talk: The impact of high structure course design across universities and students | April 2024 |
| Anatomy and Physiology Teaching and Learning Group
Talk: Student difficulties in learning anatomical organ systems | December 2023 |
| Society for Portuguese Physiology Seminar on Teaching and Learning
Talk: High structure course design to improve student engagement and learning | November 2023 |
| University of California, Irvine Developmental and Cell Biology Seminar
Talk: The impact of high structure course design across courses, disciplines, and universities | October 2023 |
| Purdue University Biology Education Research Seminar
Talk: The impact of high structure course design across courses, disciplines, and universities | October 2023 |
| Codon Learning Convo, Virtual
Talk: Student advice for success in high structure courses | April 2023 |
| American Physiology Society Summit, Long Beach, CA
Talk: Advantages of using high structure course design
Mentor: Publishing your work session for the Center for Physiology Education | April 2023 |
| University of California, Irvine Graduate Education course
Talk: Finding and starting an academic teaching position | April 2022 |
| University of Wyoming Department of Chemical Engineering
Talk: Efficacy of components of high structure chemical engineering and biology courses | Nov 2021 |

	Shaffer 11
SPIRE Postdoctoral Program Panel Discussion Panel: How to succeed as an academic faculty member	May 2021
University of California, Irvine Graduate Education course Talk: Finding and starting an academic teaching position	April 2021
Cal State University Long Beach Tech Tuesday Talk: Active Learning with Polling Software	December 2020
American Association for Anatomy Virtual Webinar Panelist: Teaching undergraduate human anatomy for the first time	August 2020
CINVESTAV, Mexico City, Mexico Colloquium: Teaching with high structure in science and engineering courses: what, why, and how Workshop: Getting started with discipline-based education research (DBER) in your classroom	December 2019
University of Alabama Birmingham ROSE Seminar Series Talk: Insights from using high structure course design in biology and engineering courses	March 2019
UCI Division of Teaching Excellence and Innovation Faculty Discussion Group Talk: Engaging Students in Large Classes	April 2018
UCI Division of Teaching Excellence and Innovation Talk: Engaged Learning Institute: Course Design	November 2017
UCI Department of Developmental and Cell Biology Seminar, Irvine, CA Talk: Assessment of high structure teaching practices: Using research to inform instruction (and vice versa)	October 2017
Pearson Education This is Digital Learning Webinar Series (Online) Talk: Design and assessment of an online human anatomy course	October 2017
UC Irvine Center for Instructional Design Faculty Showcase, Irvine, CA Talk: Designing courses with high structure	July 2017
University of California, Riverside Instructional Design Center, Riverside, CA Talk: Comparison of traditional and gamified student response systems: Does more fun come at a cost?	May 2017
UC Irvine Biological Sciences Dean's Leadership Council, Irvine, CA Talk: Active learning at UCI Bio Sci: Engaging students in and out of the classroom	May 2017
University of California Los Angeles Life Sciences Core, Los Angeles, CA Talk: Teaching with high structure: what, why, and why not?	May 2017
UC Irvine Assessment Forum, Irvine, CA Talk: What are UCI students learning about science? Assessment of general education student learning outcomes in science courses	February 2016

- UC Irvine Foundations of Teaching Program, Graduate School, Irvine, CA May 2015
Workshop: Active learning and student centered instruction
- Academy for Innovation in Medical Education, UC Irvine Medical School April 2015
Workshop: Transformational teaching – strategies to get your students involved in classroom sessions
- UCI Department of Developmental and Cell Biology Retreat, Dana Point, CA April 2015
Talk: High structure in introductory biology: what, how, why... and why not?
- Western Regional Society for Developmental Biology Meeting, Yosemite, CA March 2015
Talk: Assessment of student scientific literacy skills in high structure majors and non-majors biology courses
- UC Irvine Assessment Forum, Irvine, CA November 2014
Talk: Assessment of student scientific literacy skills in non-majors science courses
- The Society for Developmental Biology Annual Meeting, Seattle, WA July 2014
Workshop: Active learning in undergraduate biology classrooms
- Graduate Professional Development Seminar Series UC Irvine, Irvine, CA May 2014
Becoming an effective mentor: A crash course
- University of California, Davis, Davis, CA November 2013
Talk: The Lecturer PSOE series at UC Irvine
- University of California, Davis, Davis, CA November 2013
Talk: From chemical engineering to teaching human anatomy
- Fayetteville State University, Fayetteville, NC March 2011
Talk: Diversity of muscle myosin motors in cephalopods
- North Carolina Central University, Durham, NC February 2011
Talk: Diversity of muscle myosin motors in cephalopods
- University of North Carolina – Pembroke, Pembroke, NC February 2011
Talk: Diversity of muscle myosin motors in cephalopods
- Johnson C. Smith University, Charlotte, NC February 2011
Talk: Diversity of muscle myosin motors in cephalopods
- North Carolina A&T State University, Greensboro, NC February 2011
Talk: Diversity of muscle myosin motors in cephalopods
- University of North Carolina, Chapel Hill, NC April 2010
Talk: Interactions between cardiac myosin binding protein-C and actin contribute to the regulation of muscle contraction
- University of Guelph, Guelph, Ontario, Canada December 2009
Talk: Interactions between cardiac myosin binding protein-C and actin contribute to the regulation of muscle contraction

University of Arizona, Tucson, AZ November 2009
 Talk: Interactions between cardiac myosin binding protein-C and actin contribute to the regulation of muscle contraction

University of Muenster, Muenster, Germany September 2009
 Talk: Interactions between cardiac myosin binding protein-C and actin contribute to the regulation of muscle contraction

PRESENTATIONS

OER@TWU Conference, Virtual April 2024
 Talk: Using reading guides to help students read the textbook and improve exam scores

Open Education Talks 2024, University of Calgary, Virtual March 2024
 Talk: Using reading guides to help students read the textbook and improve exam scores

Fryrear Chair workshop series, Golden, CO Feb – Apr 2024
 Three-part workshop: Getting started with DBER

POD SoTL Special Interest Group, Virtual February 2024
 Talk: Incorporating Undergraduate students in SoTL and DBER projects

Institute for Alternative Assessment: Science and Engineering, Virtual January 2024
 Talk: Adding Authentic Assessment to Traditional STEM Courses

POD Network Annual Conference, Pittsburgh, PA November 2023
 Workshop: The impact of high structure course design across courses, disciplines, and universities

Society for the Advancement of Biology Education Research, Minneapolis, MN July 2023
 Long talk: The impact of high structure course design across courses, disciplines, and universities

Human Anatomy and Physiology Society Annual Meeting, Albuquerque, NM May 2023
 Talk: Developing effective study habits for A&P students
 Talk: Maximizing student engagement with modern clicker questions and peer instruction

ASEE Rocky Mountain Section Regional Conference, Golden CO May 2023
 Workshop: Getting started with engineering education research

X-DBER Conference, Virtual April 2023
 Poster: High Structure Design for STEM Courses

Society for Integrative and Comparative Biology Conference, Austin, TX January 2023
 Workshop: High Structure Design for STEM Courses

AIChE Chemical Engineering Summer School, Golden CO July 2022
 Workshop: High structure course design: what, why, and how

- Human Anatomy and Physiology Society Annual Meeting, Fort Lauderdale, FL May 2022
 Talk: Getting started with discipline-based education research in your A&P classroom
 Talk: Teaching with high structure in your A&P course: what, why, and how
- Society for the Advancement of Biology Education Research, Virtual July 2021
 Roundtable: Student advice for success in high structure biological sciences courses
- American Society for Engineering Education Annual Conference, Virtual July 2021
 Talk: Work-in-progress: What kinds of advice do chemical engineering students' give to future students for success in high structure courses?
- ASEE Rocky Mountain Section Unconference, Virtual June 2021
 Talk: What advice do students give for high structure course success?
- Human Anatomy and Physiology Society Annual Meeting, Virtual May 2021
 Talk: Student advice for succeeding in high structure A&P courses
- X-DBER Conference, Virtual March 2021
 Talk: What advice do students give for high structure course success?
- Society for the Advancement of Biology Education Research West, Virtual January 2021
 Roundtable: Person-thing orientation alignment with student emotions towards biology
- American Institute for Chemical Engineers Annual Conference, Virtual November 2020
 Talk: To Pre-Req or Not? Students' Explanations for Why They Choose to Enroll (or not) in Chemical Engineering Courses
- Society for the Advancement of Biology Education Research, Virtual July 2020
 Poster: Chemical engineering students' emotions towards biology
- American Society for Engineering Education Annual Conference, Virtual June 2020
 Talk: Work-in-progress: Chemical engineering students' emotions towards biology
- CO School of Mines Teaching Faculty Luncheon, Golden, CO February 2020
 Talk: Using two-stage collaborative exams in engineering and biology courses
- CO School of Mines Open Education Research Conference, Golden, CO February 2020
 Talk: Developing OER reading guides for anatomy and physiology
- CO School of Mines Quantitative Biology Seminar, Golden, CO January 2020
 Talk: Insights from using high structure course design in biology & engineering courses
- CO School of Mines Engineering Learning Conference, Golden, CO August 2019
 Talk: Investigating achievements gaps in first year courses at Mines
 Workshop: Active learning with clickers
 Workshop: Faculty Senate taskforce on evaluation of instructor effectiveness
- Human Anatomy and Physiology Society Annual Meeting, Portland, OR May 2019
 Talk: Getting started with discipline-based education research in your A&P classroom

Society for the Advancement of Biology Education Research West, Irvine, CA January 2019
Talk: Engineering students attitudes and emotions towards biology and math
Workshop: Designing educational research studies for college science classrooms

American Association of Anatomists Annual Meeting, San Diego, CA April 2018
Poster: Comparison of traditional and gamified student response systems: does more fun come at a cost?

Society for the Advancement of Biology Education Research West, Irvine, CA January 2018
Talk: Student success in an online human anatomy course: does motivation matter?
Poster: Coloring Books as Supplemental Learning Tools in Undergraduate Anatomy Courses

Society for the Advancement of Biology Education Research, Minneapolis, MN July 2017
Talk: Comparison of traditional and gamified student response systems: does more fun come at a cost?
Poster: Student perceived difficulties in learning organ systems in an undergraduate human anatomy course

UC Irvine Center for Engaged Instruction, Irvine, CA June 2017
Talk: The Power of the Story: Teaching STEM Courses with Case Studies

Human Anatomy and Physiology Society Annual Meeting, Salt Lake City, UT May 2017
Talk: Student performance in an online human anatomy course: does motivation matter?

American Association of Anatomists Annual Meeting, Chicago, IL April 2017
Poster: Student perceived difficulties in learning organ systems in an undergraduate human anatomy course

HHMI – UC Faculty Learning Community Program Meeting, Riverside, CA Sept 2016
Poster: Assessment of student content knowledge and scientific literacy skills in majors and non-majors science courses

Society for the Advancement of Biology Education Research, Minneapolis, MN July 2016
Keynote talk: A familiar(ity) problem: A novel system for assessing the impact of prerequisite courses
Talk: Using pre-class reading guides to improve student performance in introductory biology
Poster: Differential student motivation on low stakes, online pre- and post-assessment tests

Human Anatomy and Physiology Society Annual Meeting, Atlanta, GA May 2016
Talk: Design, implementation, and assessment of a high structure undergraduate human anatomy course

SoCal Project Kaleidoscope Meeting, Irvine, CA February 2016
Workshop: Hands-on design of an education research study in your classroom: From start to finish
Poster: Assessment of student content knowledge and scientific literacy skills in majors and non-majors science courses

- UC STEM-LEC Conference, Paso Robles, CA September 2015
Talk: Whaddya mean I need to read the book? Using reading guides to improve student performance in college biology classes
- Society for the Advancement of Biology Education Research, Minneapolis, MN July 2015
Poster: Pre-post test administration and performance in DBER assessments
Poster: Assessment of student content knowledge and scientific literacy skills in majors and non-majors science courses
- SoCal Project Kaleidoscope Meeting, Fullerton, CA February 2015
Workshop: Designing educational research studies for college science classrooms
- Regional Association for Biology Education Meeting, Irvine, CA February 2015
Workshop: Insights and activities from a human anatomy lab without cadavers
- Society for the Advancement of Biology Education Research, Minneapolis, MN July 2014
Poster: Assessment of student scientific literacy skills in non-majors science courses
- Association for Biology Laboratory Education, Eugene, OR June 2014
Poster: Assessment of course design, student learning outcomes, and student attitudes in a combined human anatomy lecture and lab course
- UC STEM-LEC Conference, Irvine, CA June 2014
Talk: Assessment of student scientific literacy skills in non-majors science courses
- Annual IRACDA Conference, Atlanta, GA June 2013
Poster: The First Recombinant Drug – Development and Assessment of a Novel Biotechnology Case Study
- Bridging the Gap NC, Raleigh, NC October 2012
Poster: The First Recombinant Drug – Development and Assessment of a Novel Biotechnology Case Study
- Society of Integrative and Comparative Biology Meeting, Charleston, SC January 2012
Talk: Muscular tissues of the squid *Doryteuthis pealeii* express identical myosin heavy chain isoforms
- Annual IRACDA Conference, Houston, TX June 2011
Poster: Muscular tissues of the squid *Doryteuthis pealeii* express identical myosin heavy chain isoforms
- Biophysical Society 54th Annual Meeting, San Francisco, CA February 2010
Talk: Identification of amino acid residues in the myosin binding protein-C motif important for actin binding
Poster: Comparative effects of the Pro-Ala rich regions of human and murine myosin binding protein-C
- European Muscle Conference, Lille, France September 2009
Talk: Comparative effects of the N-terminal domains of human and murine cardiac myosin binding protein-C

- Biophysical Society 53rd Annual Meeting, Boston, MA March 2009
 Talk: The N-terminus of cardiac myosin binding protein-C contains multiple binding sites for F-actin
 Poster: PKA phosphorylates serine 307 of murine cardiac myosin binding protein-C
- European Muscle Conference, Oxford, England September 2008
 Poster: Interactions of the N-terminus of cardiac myosin binding protein-C with F-actin
- Biophysical Society 52nd Annual Meeting, Long Beach, CA February 2008
 Poster: The cardiac myosin binding protein-C motif and C1 domain activate actomyosin motility independent of Ca²⁺
- Biophysical Society 51st Annual Meeting, Baltimore, MD March 2007
 Poster: The C1C2 domains of myosin binding protein C inhibit acto-S1 movement in an in vitro motility assay

UNDERGRADUATE RESEARCH STUDENTS

- Colorado School of Mines
- | | |
|---|-------------|
| Alex Montoya, Chemistry | 2022 - 2024 |
| Coleman Dusavage, Chemical Engineering | 2022 - 2023 |
| Sidney Wilson, Quantitative Biosciences and Engineering | 2022 - 2023 |
| Roberto Valenzuela, Biochemistry | 2022 |
| Abdullah Al-Salmi, Chemical Engineering | 2021 |
| Sonny Nguyen, Chemical Engineering | 2021 - 2022 |
| Kevin Huang, Chemical Engineering | 2020 - 2022 |
| Arik Ringsby, Chemical Engineering | 2020 - 2021 |
| Jordan Lopez, Mechanical Engineering | 2019 - 2020 |
| Alex Ellis, Chemical Engineering | 2019 |
- University of California, Irvine
- | | |
|---------------------------------------|-------------|
| Kristen Yabuno, Biological Sciences | 2015 - 2018 |
| Jimmy To, Biological Sciences | 2016 |
| Rebekah Lieu, Nursing Science | 2015 - 2017 |
| Ethan Luong, Exercise Science | 2015 - 2017 |
| Andrew Gutierrez, Human Biology | 2016 |
| Anahita Asefirad, Biological Sciences | 2015 - 2016 |
| Ashley Wong, Human Biology | 2015 - 2016 |
| Koreena Yu, Public Health | 2015 |
| George Richards, Biological Sciences | 2014 - 2015 |
| Hollie Wong, Biological Sciences | 2014 - 2015 |
- University of North Carolina at Chapel Hill
- | | |
|--|-------------|
| Dylan Catlett, Biology | 2013 |
| Carlos de Castro, Biology | 2011 - 2012 |
| Alli Sarfati, Biology Senior, HHMI-Future Teachers Program | 2011 - 2012 |
| Alex Holland, Biology | 2011 |
- University of California, Davis
- | | |
|--|-------------|
| Camelia Dumitras, Neurobiology, Physiology, and Behavior | 2008 - 2010 |
| Peony Wong, Biochemistry | 2008 - 2009 |

University of Washington
Jordan Kuester, Bioengineering

2006 - 2007