

Supplemental Material

CBE—Life Sciences Education

Schinske *et al.*

Supplemental Materials

Broadening Participation in Biology Education Research: Engaging Community College Students & Faculty

CBE-Life Sciences Education (2017)

Part A: List of Community College Biology Education Research (CC BER) Articles Identified in Sample (p. 1)

Part B: Methods for Our Evaluation of Existing CC BER (p. 5)

Part C: Sample CC BER Article Analysis Worksheet (p. 7)

Part D: Categories of Article Types Used in Characterizing CC BER Papers In Our Sample (p. 9)

Part E: Descriptions of Existing Networks Supporting CC BER (p. 10)

Supplemental Materials Part A
List of 57 Community College Biology Education Research Articles In Sample

Journal	Article Citation	Article Type (Table 3)	Main Article Topic	Total Number of Authors	Number of CC Authors
<i>Advances in Physiology Education</i>	Barfield, J. P., Cobler, D. C., Lam, E. T., Zhang, J., & Chitiyo, G. (2012). Differences between African-American and Caucasian students on enrollment influences and barriers in kinesiology-bAnatomical Sciences Educationd allied health education programs. <i>Advances in physiology education</i> , 36(2), 164-169.	Research	Equity/Diversity	5	0
<i>American Biology Teacher</i>	Baumgartner, E., Biga, L., Bledsoe, K., Dawson, J., Grammer, J., Howard, A., & Snyder, J. (2015). Exploring Phytoplankton Population Growth to Enhance Quantitative Literacy: Putting Vision & Change into Action. <i>The American Biology Teacher</i> , 77(4), 265-272.	Research	Curricula/Pedagogy	7	1
<i>American Biology Teacher</i>	Carter, B. E., Infanti, L. M., & Wiles, J. R. (2015). Boosting Students' Attitudes & Knowledge about Evolution Sets Them Up for College Success. <i>The American Biology Teacher</i> , 77(2), 113-116.	Research	Curricula/Pedagogy	3	1
<i>American Biology Teacher</i>	Collins, D. P. (2013). Termite Behavior: Measuring the Postanoxic Consumption Rates of LandscAdvances in Physiology Education Mulches by Eastern Subterranean Termites. <i>The American Biology Teacher</i> , 75(1), 41-45.	Teaching Tip	Curricula/Pedagogy	1	1
<i>American Biology Teacher</i>	Dorner, M. (2015). Position Posters: an Alternative Take on Science Posters. <i>The American Biology Teacher</i> , 77(1), 69-72.	Teaching Tip	Curricula/Pedagogy	1	1
<i>American Biology Teacher</i>	Eliyahu, D. (2014). Chromoseratops meiosus. <i>The American Biology Teacher</i> , 76(1), 53-56.	Teaching Tip	Curricula/Pedagogy	1	1
<i>American Biology Teacher</i>	Gusky, S. (2014). Students as Technicians. <i>The American Biology Teacher</i> , 76(4), 254-258.	Teaching Tip	Curricula/Pedagogy	1	1
<i>American Biology Teacher</i>	Ho, I. S., & Parmar, N. K. (2014). Using a Cyclical Diagram to Visualize the Events of the Ovulatory Menstrual Cycle. <i>The American Biology Teacher</i> , 76(1), 12-16.	Teaching Tip	Curricula/Pedagogy	2	2
<i>American Biology Teacher</i>	Lakrim, M. (2013). Classroom Techniques to Illustrate Water Transport in Plants. <i>The American Biology Teacher</i> , 75(8), 566-570.	Teaching Tip	Curricula/Pedagogy	1	1
<i>American Biology Teacher</i>	Priano, C. (2013). Shaping tRNA. <i>The American Biology Teacher</i> , 75(9), 708-709.	Teaching Tip	Curricula/Pedagogy	1	1
<i>American Biology Teacher</i>	Reddy, C. (2014). A New Species of Science Education. <i>The American Biology Teacher</i> , 76(1), 28-33.	Teaching Tip	Curricula/Pedagogy	1	0
<i>American Biology Teacher</i>	Reiser, F. (2012). An Antique Microscope Slide Brings the Thrill of Discovery into a Contemporary Biology Classroom. <i>The American Biology Teacher</i> , 74(5), 311-317.	Essay	Anecdote	1	1
<i>American Biology Teacher</i>	Rollinson, S. W. (2012). Growth of a pine tree. <i>The american biology Teacher</i> , 74(9), 620-627.	Research	Curricula/Pedagogy	1	1
<i>American Biology Teacher</i>	Romero, C., & Choun, J. (2014). The Electron Transport Chain: An Interactive Simulation. <i>The American Biology Teacher</i> , 76(7), 456-458.	Teaching Tip	Curricula/Pedagogy	2	2
<i>American Biology Teacher</i>	Saunders, C., & Taylor, A. (2014). Close the Textbook & Open "The Cell: An Image Library". <i>The American Biology Teacher</i> , 76(3), 201-207.	Teaching Tip	Curricula/Pedagogy	2	1
<i>Anatomical Sciences Education</i>	Haspel, C., Motoike, H. K., & Lenchner, E. (2014). The implementation of clay modeling and rat dissection into the human anatomy and physiology curriculum of a large urban community college. <i>Anatomical sciences education</i> , 7(1), 38-46.	Research	Curricula/Pedagogy	3	3
<i>BioScience</i>	Musante, S. (2012). Community colleges giving students a framework for STEM careers. <i>BioScience</i> , 62(7), 632-632.	Essay	Curricula/Pedagogy	1	0
<i>CBE-Life Sciences Education</i>	Bangera, G., & Brownell, S. E. (2014). Course-BAnatomical Sciences Educationd Undergraduate Research Experiences Can Make Scientific Research More Inclusive. <i>CBE-Life Sciences Education-Life Sciences Education</i> , 13(4), 602-606.	Essay	Equity/Diversity	2	1

Supplemental Materials Part A
List of 57 Community College Biology Education Research Articles In Sample

Journal	Article Citation	Article Type (Table 3)	Main Article Topic	Total Number of Authors	Number of CC Authors
<i>CBE-Life Sciences Education</i>	Donovan, D. A., Atkins, L. J., Salter, I. Y., Gallagher, D. J., Kratz, R. F., Rousseau, J. V., & Nelson, G. D. (2013). Advantages and challenges of using physics curricula as a model for reforming an undergraduate biology course. <i>CBE-Life Sciences Education-Life Sciences Education</i> , 12(2), 215-229.	Research	Curricula/Pedagogy	7	2
<i>CBE-Life Sciences Education</i>	Gregg, C. S., Ales, J.D., Pomarico, S. M., Wischusen, E.W., & Siebenaller, J. F. (2013). Scientific teaching targeting faculty from diverse institutions. <i>CBE-Life Sciences Education-Life Sciences Education</i> , 12(3), 383-393.	Research	Professional Development	5	1
<i>CBE-Life Sciences Education</i>	Orr, R., & Foster, S. (2013). Increasing student success using online quizzing in introductory (majors) biology. <i>CBE-Life Sciences Education-Life Sciences Education</i> , 12(3), 509-514.	Research	Curricula/Pedagogy	2	2
<i>CBE-Life Sciences Education</i>	Schinske, J., & Tanner, K. (2014). Teaching More by Grading Less (or Differently). <i>CBE-Life Sciences Education-Life Sciences Education</i> , 13(2), 159-166.	Essay	Grades	2	1
<i>CBE-Life Sciences Education</i>	Schinske, J., Cardenas, M., & Kaliangara, J. (2015). Uncovering scientist stereotypes and their relationships with student race and student success in a diverse, community college setting. <i>CBE-Life Sciences Education- Life Sciences Education</i> , 14, 1-16.	Research	Equity/Diversity	3	3
<i>CBE-Life Sciences Education</i>	Wolkow, T.D., Durrenberger, L.T., Maynard, M.A., Harrall, K.K., & Hines L.M. (2014). A comprehensive faculty, staff, and student training program enhances student perceptions of a course-bAnatomical Sciences Educationd research experience at a two-year institution. <i>CBE-Life Sciences Education-Life Sciences Education</i> , 13(4), 724-737.	Research	Service Learning	5	0
<i>Journal of College Science Teaching</i>	Bonney, K. M. (2014). From Gummy Bears to Celery Stalks: Diffusion and Osmosis. <i>Journal of College Science Teaching</i> , 43(6), 72.	Case Study	Curricula/Pedagogy	1	1
<i>Journal of College Science Teaching</i>	Bonney, K. M. (2014). Sick on a South American Sugarcane Plantation. <i>Journal of College Science Teaching</i> , 14(3), 67.	Case Study	Curricula/Pedagogy	1	1
<i>Journal of College Science Teaching</i>	Dewprashad, B., Vaz, G., & Vaz, S. (2013). A CAnatomical Sciences Education of Respiratory Distress. <i>Journal of College Science Teaching</i> , 42(3), 64.	Case Study	Curricula/Pedagogy	3	1
<i>Journal of College Science Teaching</i>	Gonzalez, B. Y. (2014). A Six-Year Review of Student Success in a Biology Course Using Lecture, Blended, and Hybrid Methods. <i>Journal of College Science Teaching</i> , 43(6), 14.	Research	Curricula/Pedagogy	1	1
<i>Journal of College Science Teaching</i>	Hirst, R. A., Bolduc, G., Liotta, L., & Packard, B. W. L. (2014). Cultivating the STEM Transfer Pathway and Capacity for Research: A Partnership Between a Community College and a 4-Year College. <i>Journal of College Science Teaching</i> , 43(4), 12.	Research	Transfer	4	1
<i>Journal of College Science Teaching</i>	Jensen, J. L., Kummer, T. A., & Banjoko, A. (2013). Assessing the Effects of Prior Conceptions on Learning Gene Expression. <i>Journal of College Science Teaching</i> , 42(4), 82.	Research	Curricula/Pedagogy	3	1
<i>Journal of College Science Teaching</i>	Kuyatt, B. L., & Baker, J. D. (2014). Human Anatomy Software Use in Traditional and Online Anatomy Laboratory Classes: Student-Perceived Learning Benefits. <i>Journal of College Science Teaching</i> , 43(5), 14.	Research	Curricula/Pedagogy	2	0
<i>Journal of College Science Teaching</i>	Leggett-Robinson, P. M., Mooring, S. R., & Villa, B. C. (2015). A 3+ 8 Model of Undergraduate Research for Community College STEM Majors. <i>Journal of College Science Teaching</i> , 44(4), 12.	Research	Transfer	3	1
<i>Journal of College Science Teaching</i>	Lysne, S. J., & Miller, B. G. (2015). Implementing Vision and Change in a Community College Classroom. <i>Journal of College Science Teaching</i> , 44(6), 11.	Research	Curricula/Pedagogy	2	1
<i>Journal of College Science Teaching</i>	Lysne, S. J., Miller, B. G., & Eitel, K. B. (2013). Exploring Student Engagement in an Introductory Biology Course. <i>Journal of College Science Teaching</i> , 43(2), 14.	Research	Curricula/Pedagogy	3	1

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<i>Journal of College Science Teaching</i>	Reinbold, S. L. (2014). Examination of the Effects of a Watershed Project. <i>Journal of College Science Teaching</i> , 43(3), 18.	Research	Curricula/Pedagogy	1	1
<i>Journal of College Science Teaching</i>	Romeo, P., & Posey, F. (2013). Assessment: Can It Lead to a Better Course Design?. <i>Journal of College Science Teaching</i> , 43(1), 30.	Research	Curricula/Pedagogy	2	0
<i>Journal of College Science Teaching</i>	Scharmann, L. C., & Butler Jr, W. (2015). The Use of Journaling to Assess Student Learning and Acceptance of Evolutionary Science. <i>Journal of College Science Teaching</i> , 45(1), 16.	Research	Curricula/Pedagogy	2	1
<i>Journal of College Science Teaching</i>	Siegel, M. A., Roberts, T. M., Freyermuth, S. K., Witzig, S. B., & Izci, K. (2015). Aligning Assessment to Instruction: Collaborative Group Testing in Large-Enrollment Science Classes. <i>Journal of College Science Teaching</i> , 44(6).	Research	Curricula/Pedagogy	5	0
<i>Journal of College Science Teaching</i>	Smith, B., Stumpff, L., & Cole, R. S. (2012). Engaging Students from Underrepresented Populations: The Enduring Legacies Native CAnatomical Sciences Educations Initiative. <i>Journal of College Science Teaching</i> , 41(4), 60-68.	Case Study	Equity/Diversity	3	0
<i>Journal of College Science Teaching</i>	Wolfe, B. A., & Martin, T. C. (2013). Design and Components of a Two-Year College Interdisciplinary Field-Study Course. <i>Journal of College Science Teaching</i> , 43(1), 16.	Essay	Curricula/Pedagogy	2	2
<i>Journal of College Science Teaching</i>	Yarnall, L., & Fusco, J. (2014). Applying the brakes: How practical classroom decisions affect the adoption of inquiry instruction. <i>Journal of College Science Teaching</i> , 43(6), 52.	Research	Curricula/Pedagogy	2	0
<i>Journal of Microbiology & Biology Education</i>	Bonney, K. M. (2013). An argument and plan for promoting the teaching and learning of neglected tropical disease. <i>Journal of Microbiology & Biology Education</i> : <i>Journal of Microbiology & Biology Education</i> , 14(2), 183.	Essay	Curricula/Pedagogy	1	1
<i>Journal of Microbiology & Biology Education</i>	Bonney, K. M. (2015). CAnatomical Sciences Education Study Teaching Method Improves Student Performance and Perceptions of Learning Gains. <i>Journal of microbiology & biology education</i> , 16(1), 21.	Research	Curricula/Pedagogy	1	1
<i>Journal of Microbiology & Biology Education</i>	Cain, D. M. (2013). Impact of a service-Learning Project on student success in Allied Health Microbiology course. <i>Journal of Microbiology & Biology Education: Journal of Microbiology & Biology Education</i> , 14(1), 129.	Research	Curricula/Pedagogy	1	1
<i>Journal of Microbiology & Biology Education</i>	Colon, C. P. (2012). Species Shout-Outs From Abdul to Zebra: Encouraging Nonmajors to Communicate in the Biology Classroom. <i>Journal of Microbiology & Biology Education: Journal of Microbiology & Biology Education</i> , 13(2), 170.	Teaching Tip	Curricula/Pedagogy	1	1
<i>Journal of Microbiology & Biology Education</i>	Davis, B. D., Flannery, M., & Payne, J. S. (2012). A webinar cAnatomical Sciences Education study by a clinical microbiologist to microbiology and physiology students: an integrative learning experience. <i>Journal of Microbiology & Biology Education: Journal of Microbiology & Biology Education</i> , 13(1), 91.	Case Study	Curricula/Pedagogy	3	3
<i>Journal of Microbiology & Biology Education</i>	Davis, B. D., Flannery, M., Lowe, M., & Payne, J. S. (2014). "Meet the Expert Interviews," an Integrative Learning Experience for Microbiology and Anatomy & Physiology Undergraduate Students. <i>Journal of microbiology & biology education</i> , 15(1), 33.	Research	Curricula/Pedagogy	4	4
<i>Journal of Microbiology & Biology Education</i>	Dykes, J. (2012). Task books as an assessment tool for demonstrating basic lab skills in a microbiology course. <i>Journal of Microbiology & Biology Education: Journal of Microbiology & Biology Education</i> , 13(1), 57.	Teaching Tip	Curricula/Pedagogy	1	1
<i>Journal of Microbiology & Biology Education</i>	Gasparich, G. E., & Wimmers, L. (2014). Integration of Ethics across the Curriculum: From First Year through Senior Seminar. <i>Journal of microbiology & biology education</i> , 15(2), 218.	Review	Value of Ethical Training	2	0

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<i>Journal of Microbiology & Biology Education</i>	Jensen, J. L., Dario-Becker, J., Hughes, L. E., Amburn, D. S. K., & Shaw, J. A. (2012). A Call for a Community of Practice to Assess the Impact of Emerging Technologies on Undergraduate Biology Education. <i>Journal of Microbiology & Biology Education: Journal of Microbiology & Biology Education</i> , 13(1), 21.	Editorial	Call for Research	5	1
<i>Journal of Microbiology & Biology Education</i>	Miranda Jr, D., & Sanchez, D. J. (2014). The Tuskegee Experiment: An Introduction in Ethics for Pre-Healthcare Professional Students. <i>Journal of microbiology & biology education</i> , 15(2), 232.	Teaching Tip	Curricula/Pedagogy	2	1
<i>Journal of Microbiology & Biology Education</i>	Mulligan, E. A. (2013). Use of a Modified POGIL Exercise to Teach Bacterial Transformation in a Microbiology Course. <i>Journal of microbiology & biology education</i> , 15(1).	Teaching Tip	Curricula/Pedagogy	1	1
<i>Journal of Microbiology & Biology Education</i>	Nguyen, A., & Tawde, M. (2014). Engaging Allied-Health Students with Virtual Learning Environment Using Course Management System Tutorial Site. <i>Journal of microbiology & biology education</i> , 15(1), 47.	Teaching Tip	Curricula/Pedagogy	2	2
<i>Journal of Microbiology & Biology Education</i>	Polizzotto, K., & Tamari, F. (2015). Using Lecture Demonstrations to Visualize Biological Concepts. <i>Journal of microbiology & biology education</i> , 16(1), 79.	Teaching Tip	Curricula/Pedagogy	2	2
<i>Journal of Microbiology & Biology Education</i>	Sanchez, D. J., & Miranda Jr, D. (2012). Using a Team Structure for Student-Assisted Facilitation of Laboratories in an Introductory Allied Health Microbiology Course. <i>Journal of Microbiology & Biology Education: Journal of Microbiology & Biology Education</i> , 13(1), 89.	Teaching Tip	Curricula/Pedagogy	2	2
<i>Journal of Microbiology & Biology Education</i>	Srougi, M. C., Thomas-Swanik, J., Chan, J. D., Marchant, J. S., & Carson, S. (2014). Making Heads or Tails: Planarian Stem Cells in the Classroom. <i>Journal of microbiology & biology education</i> , 15(1), 18.	Research	Curricula/Pedagogy	5	1
<i>Journal of Microbiology & Biology Education</i>	Tamari, F., Bonney, K. M., & Polizzotto, K. (2015). Prop Demonstrations in Biology Lectures Facilitate Student Learning and Performance. <i>Journal of microbiology & biology education</i> , 16(1), 6.	Research	Curricula/Pedagogy	3	3

Supplemental Materials Part B

Methods for Our Evaluation of Existing CC BER Articles

In order to evaluate the extent to which community college biology education research (CC BER) is underrepresented in the BER literature, we conducted a review of seven journals that regularly publish BER (Table 1). We included research articles, methods papers, features, and essays in our definition of BER. We limited our review to articles published between January 2012 and September 2015, since 2012 is the year a National Academies report (Olson and Labov, 2012) on the importance of CCs was highlighted in a journal that primarily publishes biology education research (Labov, 2012). As such, we felt CC BER might have received more attention in BER publications since then. We defined CC BER broadly to include 1) any papers by CC faculty or administrators that related directly to biology teaching and learning, or 2) any papers by any science faculty authors that specifically focused on CC biology teaching and learning contexts. Under this definition, CC BER could include research articles, methods papers, features, essays, or any other published article presenting new information to readers, so long as the paper included a CC author or a CC study context. We did not count publications on previously published work, such as book reviews or corrections. We also did not include articles that might have involved CC participants among other participants in a study (instructors or students), but did not answer questions within the CC context or include a CC author. For example, an article by Abraham and colleagues (2014) describes the development of a concept inventory and includes CC students among students from other institution types in its study population. This is excellent since it adds to the validity of the instrument, but it does not specifically investigate a question in a CC context. Therefore, this paper was not included. Our definition was broader than Offerdahl's (2011) so as to capture all BER contributions that include a CC context, but narrow enough to ensure the work is focused on CCs.

We divided up the 57 CC BER papers identified since 2012 among pairs of individuals, assigning five or six papers to each individual to review and categorize using a provided worksheet (Supplemental Materials Part C). For each paper, we determined the type of article (Supplemental Materials Part D) and main article topic from those discussed in the "Suggested Research" section of Olson and Labov (2012). Areas of suggested research in CCs included

Curricula and Teaching Methods (“evidence of what works...[research on] inquiry oriented introductory courses,” p. 46), *Equity and Diversity* (“closing achievement gaps and breaking down barriers within and between institutions...student equity and success tools” p. 46), and *Degrees and Transfer* (“having [students] successfully complete programs at the certificate level, the associate level, and beyond...research in conjunction with the new...stackable credentials,” p. 46) (Olson and Labov, 2012). We assigned each CC BER paper to one of these three topic areas, or “other.” We additionally recorded for each paper the total number of authors as well as the number of authors from CCs. Two individuals independently categorized each CC BER article according to the above procedures. On the first day of the meeting, these individuals met in pairs and discussed the articles they had both reviewed. Pairs of individuals worked to consensus to categorize papers into types of publications and identify main article topics.

Supplemental Materials Part C

	THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL		Building Capacity for Biology Education Research at Community Colleges Meeting
	The University of Texas at Austin College of Natural Sciences		

Sample Worksheet for Categorizing CC BER Articles

As part of the meeting report we publish together as co-authors, we will characterize the current state of community college discipline-based education research (CC BER) by categorizing CC BER articles from discipline-based education research journals since 2012. Please review the articles provided to you by email and listed below, and complete the following chart. We will discuss and compile our results at the meeting on October 16-17.

File Name	Author Names	Year	Number of Authors	Number of Authors that Appear to Be From CC's	Type of Article* (see next page)	Main Topic of Article** (see next page)
			Provide #	Provide # that appear to have community college institutions	Research Article Case Study Teaching Tip Review	Feature Essay Editorial Etc. Curricula/Pedagogical Methods Equity/Diversity CC Degrees/Transfer Other (Provide an Appropriate Topic)
413-4417-3-PB.pdf	Colon	2012				
692-6869-3-PB.pdf	Srougi, Thomas-Swanik, Chan, Marchant, and Carson	2014				
756-9243-2-PB.pdf	Tamari, Bonney, and Polizzotto	2015				
abt10.pdf	Gusky	2014				
abt2.pdf	Collins	2013				
CBE Life Sci Educ-2013-Donovan-215-29.pdf	Donovan, Atkins, Salter, Gallagher, Kratz, Rousseau, and Nelson	2013				



*Please indicate whether the paper reports on evidence/data collected by the authors (Research Article) or falls into one of the other categories of papers not reporting evidence/data collected by authors

**Please select just one main topic from this list derived from research needs identified in the 2012 National Academies report

- **Curricula/Pedagogical Methods** = Articles whose main theme is the evaluation or dissemination of new curricula/lessons/labs or the evaluation of pedagogical practices (e.g., active learning)
- **Equity/Diversity** = Articles whose main points involve disaggregated data highlighting differences between demographic groups of students, issues of identity, diversity, stereotype threat, affective environment
- **CC Degrees/Transfer** = Articles discussing innovative degree, transfer, or student support programs to speed up transfer and degree completion
- **Other (create your own description of the main topic)** = Articles whose main theme does not appear to fall into any of the above categories



Supplemental Materials Part D

Categories of Article Types Used in Characterizing CC BER Papers In Our Sample

Article Type	Definition
Research Article <ul style="list-style-type: none"> • SOTL • BER 	Any paper presenting novel data related to understanding biology teaching and learning, including: <ul style="list-style-type: none"> • Scholarship of Teaching and Learning (SOTL) efforts (i.e., the “use of assessment results to measure and enhance the effectiveness of [one’s] teaching” (Offerdahl <i>et al.</i>, 2011)), or • Biology Education Research (i.e., the “use of assessment tools to push beyond immediate practical application in [instructors’] own classrooms [to] link research on how students learn a specific discipline to results from education and cognitive sciences on how people learn in general” (Offerdahl <i>et al.</i>, 2011)).
Teaching Tip	Teaching tips are descriptive accounts of new teaching techniques or instructional recommendations for practitioners. They are primarily descriptive and do not include assessments or research on the practices they discuss.
Essay	Essays are papers which draw on other work, the authors’ personal experience, or the authors’ ideas. While they discuss research and may be synthetic, they do not present novel analyses of BER projects.
Case Study	Case study publications describe new case studies in biology and include information on how to effectively implement the specific case study in a classroom context.
Review Article	Review articles summarize the current state of understanding on a BER topic. They draw upon previously published studies, but do not report new results or analyses.
Editorial	Editorials are typically position pieces summarizing the views, understandings, or broadly held positions of the research community. They discuss important topics of interest to the community.

Supplemental Materials Part E

Networks for Community College Biology Education Researchers

Networks within biology education and biology education research that actively recruit and support CC educators:

- **Society for Advancement of Biology Education Research** (SABER, <https://saber-biologyeducationresearch.wikispaces.com/>) - SABER welcomes CC faculty participation in its annual meeting and includes an active listserv for sharing BER resources and ideas. Efforts are underway to create a more formal community of CC faculty at SABER meetings. SABER meetings would represent excellent venues for CC faculty to find 4-year partners with whom to write grants or collaborate on BER.
- **Partnership for Undergraduate Life Science Education** (PULSE, <http://www.pulsecommunity.org/>) - PULSE aims to implement initiatives in support of Vision and Change (AAAS, 2011). From its inception, PULSE has actively recruited CC members to serve as “PULSE Fellows” to spearhead department-level implementation of Vision and Change. Six of the original 40 PULSE fellows were from CCs and CC faculty were among the leadership in developing the Vision and Change rubrics to assess departmental progress toward Vision and Change goals.
- **Community College Undergraduate Research Initiative** (CCURI, <http://www.ccuri.org/content/home>) - CCURI includes a nationwide network of CC faculty working to bring authentic research experiences to students. CCURI has organized several reports in collaboration with course-based undergraduate research projects that have included CC authors, representing an excellent entryway to research and authorship at CCs.
- **Community College Biology Faculty Enhancement through Scientific Teaching** (CCB FEST, <http://www.sfsusepal.org/programs/ccb-fest/>) - CCB FEST engages CC biology faculty in communities of practices to explore evidence-based teaching strategies in active learning, assessment, equity, and diversity. CCB FEST faculty gain direct experience in the collection and analysis of classroom evidence and are presently contributing to CC BER projects as coauthors.
- **National Association of Biology Teachers** (NABT, <http://www.nabt.org/>) - NABT includes many CC faculty among its members and hosts meetings and publishes a journal to share BER efforts. The association also includes a special Two-Year College Section that CC faculty may join (<http://www.nabt.org/websites/institution/index.php?p=619>).
- **National Institute of Health (NIH) Bridges to the Baccalaureate** (<https://grants.nih.gov/grants/guide/pa-files/PAR-16-110.html>) - THE NIH Bridges to the Baccalaureate program supports involvement of CC students in research and skill development with the aim of supporting successful transfer and ultimately enhancing diversity in the biomedical, behavioral and clinical workforce. This program requires a PI

from all participating institutions and specifically encourages applications on which CC faculty serve as the lead.

- **Biology Scholars Program** (<http://www.facultyprograms.org/index.php/biology-scholars-hybrid-courses>) - The Biology Scholars Program through the American Society for Microbiology provides training in course assessment, education research, and publication, as well as an ongoing network of scholars with CC faculty welcomed to apply.
- **ASM Conference for Undergraduate Educators** (ASMCUE, <http://www.asmcue.org/>) - Also through the American Society of Microbiology, the ASMCUE brings together biology educators, including CC faculty, each year to share the latest findings from educational research.
- **Society for College Science Teachers** (SCST, <http://www.scst.org/>) - SCST is an interdisciplinary affiliate of the National Science Teachers Association that hosts conferences and a blog to share best practices for science classrooms. BER efforts are highly valued and CC faculty are welcome to join.
- **Human Anatomy and Physiology Society** (HAPS, <http://www.hapsweb.org/>) - HAPS includes a large population of CC faculty and provides venues for showcasing CC BER related to anatomy and physiology teaching and learning.
- **Physiology Educators Community of Practice** (PECOP, <http://www.the-aps.org/mm/Education/Undergraduate/Educational-Projects/Physiology-Education-Community-of-Practice-PECOP-Fellowship>) - PECOP grew out of the teaching section of the American Physiological Society to support the scholarship of teaching and learning, including education research. PECOP has previously funded CC faculty to attend the American Physiological Society Institute on Teaching and Learning conference and has featured CC faculty on the PCOP blog (<http://blog.lifescitrc.org/pecop/>).
- **Northwest Biology Instructor's Organization** (<http://www.nwbio.net/index.html>) - Online discussion list provides a venue for discussing and recruiting faculty and students to participate in CC BER.
- **Science Education for New Civic Engagements and Responsibilities** (SENCER, <http://www.sencercer.net/>) - SENCER works to connect science content to broad, civically important contexts. The SENCER community, which includes CC faculty, gathers online and in person for workshops and meetings.
- **Bio-Link** (<http://www.bio-link.org/home2/>) - Bio-Link provides professional development for biotechnology instructors, including many CC faculty, and connects instructors with resources to support biotechnology education.
- **Gordon Research Conference** (<https://www.grc.org/>) - In 2016 a Gordon Research Conference focused on undergraduate biology education research and included CC faculty speakers/participants. Another similar conference is planned for 2017.