ALISON J. CROWE

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EDUCATION

State University of New York at Stony Brook	Stony Brook, NY	1993	Ph.D.	Microbiology
University of California at Santa Barbara	Santa Barbara, CA	1987	B.A.	Biology
		1987	B.A.	French

RESEARCH AND WORK EXPERIENCE

Teaching Professor	University of Washington	Dept. Biology	2020-present
Principal Lecturer	University of Washington	Dept. Biology	2013-2020
Senior Lecturer	University of Washington	Dept. Biology	2007-2012
Assessment Consultant	Stanford University	New Genetics Project	2010 (Dec-Oct)
Senior Consultant	University of Washington	Center for Instructional Development	2009 (Jan-Apr)
Lecturer	University of Washington	Dept. Biology	2004-2007
Acting Assistant Professor	University of Washington	Dept. Zoology	2000-2004
Postdoctoral Fellow	University of Cincinnati	Dept. Molec. Gen.	1995-2000
Postdoctoral Fellow	University of Calgary	Dept. Biol. Sci.	1993-1995

EXTRAMURAL AND INTERNAL FUNDING

- National Science Foundation. BioSkills: A roadmap to Institutional Transformation of Core Competencies Teaching. $299,997 (5/15/2017- 4/30/2022) **Role: P.I.**
- Inclusive Environments and Metrics in Biology Education and Research (iEMBER) Idea Award. Piloting a Simple Intervention to Promote Student Self-Identification as Scientists. $4,000 (7/1/2017-7/1/2018) **Role: Collaborator**.
- National Science Foundation. Collaborative Research: Navigating from Vision to Change with Bio-MAPS. $155,251 (9/15/2013-8/31/2017) **Role: P.I.**
- National Science Foundation. Comparison of Active Learning Strategies in Cell Biology Education: Is All Active Learning Equally Effective? $180,672 (5/1/2013-4/30/2017) **Role: P.I.**
- National Science Foundation. Guided Group Activities to Enhance Ways of Learning in Biology: GATEWAY Learning in Biology. $199,834 (3/15/2010-2/28/2013), **Role: P.I.**
- University of Washington College of Arts & Sciences, Learning Initiative Award. Development of Curricular Assessment Tools. $9,352 (12/2007-6/2008), **Role: Co-P.I.**
- University of Washington 4x4 Writing-Integrated Course Design Initiative. Step-wise integration of writing into biology laboratory courses from the introductory to the 400 level. $1,500 (9/2006-6/2007), **Role: P.I.**
- University of Washington College of Arts & Sciences, Learning Initiative Award. Learning in the Major - Development of a curricular map for Biology majors. $35,000 (10/2006-12/2007), **Role: Co-P.I.**
- March of Dimes. Distinct Roles for the Forkhead Transcription Factors Foxa1 and Foxa2 during Embryonic Development. $221,441 (6/2002-12/2005), **Role: P.I.**
- National Science Foundation. Development of an in vitro Chromatin Assembly and Transcription System for Plant Genes. $91,790 (2/2001-10/2003), **Role: P.I.**
  REU supplement. $5,000 (6/2002-9/2003), **Role: P.I.**

SCIENCE EDUCATION ACTIVITIES

Teaching Workshops Developed and Taught

- Teaching inclusively with evidence-based strategies. AAAS, Seattle WA 2020
- Creating Inclusive Biology Education Environments, ASCB, San Diego CA 2018
- Faculty Fellows Program. Teaching Reflections Workshop, Seattle WA 2016, 2017, 2019
- Inclusive Active Learning: Designing Active STEM Class Sessions for All Students. AACU Conference: Crossing Boundaries: Transforming STEM Education. Seattle WA, 2015
- Align Your Curriculum to Vision and Change Using the BioCore Guide and BioMaps Programmatic Assessment. AACU Conference: Crossing Boundaries: Transforming STEM Education. Seattle WA, 2015
- Using Bloom's Taxonomy to Create Assessments that Measure Meaningful Learning. ASBMB Special Symposium: Student-Centered Education in the Molecular and Life Sciences, Seattle University, 2013
- Assessment: Designing Your Classes for Meaningful Learning, Pacific Northwest Regional Summer Institute, The Evergreen State College, 2011
- Teaching as Scholarly Work: Conducting and Presenting Research on Your Pedagogy, U.W. Teaching Academy, 2011
- Designing Assignments and Tests that are Engaging Within the Constraints of a Large Class Environment, co-facilitated with Laura Little (Psychology), U.W. Teaching Academy's Collegium on Large Class Instruction, 2009
- Getting the Most out of Your Exams and Course Assignments, U.W. Teaching Academy, 2009
- Teaching as Scholarly Work: Conducting and Presenting Research on Your Pedagogy, U.W. Teaching Academy, 2009
- Using Bloom's Taxonomy to Get the Most Out of Your Exams, U.W. Teaching Academy, 2009
- How to efficiently and effectively integrate writing into your classes, U.W. Dept of Biology, 2007

Additional Science Education Activities

- Biology Learning and Teaching Community, Organizer 2016-present
- Invited Seminar: Creating Community in a Large Classroom, UCSD, San Diego CA 2023
- Development and Implementation of nonbinary sex determination module for Biol 401 2022
- Panel member, Making the transition: From Graduate Student to Postdoc in Discipline based Education Research organized by SABER DBER SiT Scholars in Training 2022
- Development and Implementation of anti-racist modules for introductory biology (Biol 200) 2021
- TriBeta Honor Society Winter Seminar, How can we create more effective and inclusive learning experiences for biology majors? University of Washington, 2019
- Panelist, ASCB Career Enhancement Workshop: Data Driven Approaches to Improving Teaching and Mentoring, San Diego 2018
- Judge for Imagine Tomorrow science projects at Ballard High School 2018
- Invited to attend founding meeting of iEMBER research coordination network 2017
- Active Learning Classroom Orientation, active learning outreach for UW 2015-17
- Annual Scholarship of Teaching and Learning Symposiums (1^{st}-13^{th}), poster presentations 2017
- KUOW The Record interview: gender bias in the biology classroom 2016
- Active Day of Learning at UW, active learning outreach for UW and community 2015
- Assessment consultant, Stanford University Center for Biomedical Ethics 2011
- 5^{th} Annual Scholarship of Teaching and Learning Symposium, co-organizer 2009
- Project CAT: Critical Thinking Assessment Test – CAT scoring workshop, College of Ed., UW 2006
- Founding member of Biology Learning and Teaching group (BLT) formerly **BERG** 2005
  a Community of Practice for faculty, postdocs, grads and undergrads interested in education

COMMITTEES/SERVICE

University of Washington

Teaching Scholar for the Waseda Faculty Development program, University of Washington	2025-2026
Member, Faculty Council on Teaching and Learning (FCTL)	2023-present
Co-chair, FCTL Evaluation Subcommittee	2023-present
Member, Future of Teaching & Learning Provost Advisory Council	2023-2024
Member, Search Committee, Assistant Prof in Plant Systematics & Burke Curator, Dept of Biol	2022-2023
Liaison/coordinator for MCB TAships in Biology	2022-present
Ad hoc member, Research Committee, future hiring process	2022-2023
Member, Graduate & Postdoc Program Committee, Dept of Biology	2021-2022
Chair, Intro Biol Textbook Committee, Dept of Biology	2020-2021
Member, Undergraduate Program Committee, Dept of Biology	2020-2021
Co-chair DBER Faculty Search Committee, Dept of Biology	2019-2020
Chair Undergraduate Program Committee, Dept of Biology	2018-2020
College of Arts and Sciences Curriculum Committee (member)	2013- 2018
Undergraduate Curriculum Committee, Dept of Biology (member)	2002 – 2008; 2011-2015; 2017-2018
Animal Use Committee, Dept of Biology (member)	2009 - 2010
University Radiation Safety Committee, Univ of Washington (member)	2005 - 2007
Faculty Mentor – U.W. Center for Workforce Development Graduate Student Mentor Program	2002 - 2009
Biology Internship Program Coordinator	2005 - 2009

National

Advisory Board, NSF IUSE Developing Instructional Materials to Promote Transfer of Biology Core Concept Knowledge Across Scales and Subdisciplines	2024-present
CBE-Life Science Education (Reviewer)	2011-present
Mentor, American Society of Cell Biology Mentoring in Active Learning and Teaching	2015-2020
CBE-Life Science Education (Reviewer)	2011-present
Journal Microbiology and Biology Education (Reviewer)	2024-present
Journal of the Scholarship of Teaching and Learning (Reviewer)	2011-2020
Abstract review committee, Society for Advancement of Biology Education Research	2013- 2022
Science, served as judge for Prize for Inquiry-Based Instruction	2011
NSF, Genes and Genomes Systems Cluster Review Panel (Ad Hoc Member)	2006
USDA, Developmental Processes of Crop Plants Program Review Panel (Ad Hoc Member)	2006
NSF, Biochemistry of Gene Expression Review Panel (Ad Hoc Member)	2002-2005
Journal of Biological Chemistry (Ad Hoc Reviewer)	2002
Plant Journal Review Panel (Ad Hoc Reviewer)	2002
USDA, Plant Genetic Mechanisms Program Review Panel (Ad Hoc Member)	2001-2002

Community

Ballard High School Biotech Program Steering Committee	2018-2021

Awards

Distinguished Teaching Award, University of Washington	2024
Dissemination of Arabidopsis Knowledge Award, N. American Arabidopsis Steering Committee	2024

COURSES TAUGHT

Cancer Biology Senior Seminar (Biol 464)*	University of Washington	2012 - present
Introductory Biology (Biol 200)**	University of Washington	2011 - present
Experiments in Cell & Molec. Biol (Biol 400)*	University of Washington	2011 - present
Foundations in Cell and Molec. Biology (Biol 355)	University of Washington	2007
Cell Biology Laboratory (Biol 402)*	University of Washington	2006 - 2011
Internship Seminar (Biol 390)*	University of Washington	2005 - 2011
Internship Research (Biol 399)*	University of Washington	2005 - 2008
General Biology (Biol 161)	University of Washington	2003 - 2004
Advanced Cell Biology (Biol 401)**	University of Washington	2001 - present
Biology Instruction (Biol 501)	University of Washington	2022 - present

*Developed course
** Significantly revised course

MENTORING ACTIVITIES

Faculty

- Collaborative Teaching mentor: Dr. Matt Akamatsu Biol 401, Winter 2023; Dr. Adam Steinbrenner Biol 400, Spring 2020; Dr. Brian Buchwitz Biol 200, Fall 2020
- Mentor, American Society of Cell Biology Mentoring in Active Learning and Teaching (2015-2020)

Postdoctoral Fellows

- Mentor, Dr. Alexa Clemmons (2019-2022), currently Director of Product, Codon Learning Inc.
- Mentor, Dr. Elli Theobald (2016-2017), currently Assoc Teaching Prof, Dept Biology, UW
- Mentor, Dr. Sarah Eddy (2014-2015), currently Assoc Prof, Biology Teaching and Learning, UMN
- Mentor, Dr. Sara Brownell (2012-2013), currently Professor, School of Life Sciences, ASU

Graduate students

- Molecular Cell Biology Program Academic Teaching Assistant information session (2022-present)
- Graduate Teaching Assistant mentoring: 3-10 per year in Biol 200, Biol 400 and Biol 401(2006-present)
- Faculty advisor, Biology Instruction (Biol 501, 2022-present)
- Committee Member, Janet Solano-Sanchez, Nemhauser lab, UW Dept Biology, Spring 2023
- Chair, General Exam, David Cuban, Rico-Guevara lab, UW Dept Biology, Spring 2022
- Committee Member, Melissa Conerly, Henikoff lab, UW Molecular Cell Biology Program, 2005-2009
- Committee Member, Caroline Josefsson, Comai lab, UW Dept Biology, 2001-2005
- Mentor, Women in Science and Engineering Graduate Student Mentoring Program, 2001-2006
- Graduate student rotation projects supervised: Cristina Walcher, Biology, Spring, 2006; Ryan Miller, Biology, Fall 2004; Jeff Shaver, Biology, Summer 2003; Caroline Josefsson, Biology, Spring 2001

Undergraduate students

- Faculty advisor, UW Association Femmes in STEM (2021-present)
- Faculty mentor, Hollomon Health Innovation Challenge – developing a low-cost alternative to mammograms (2022)
- Peer Facilitator mentoring: 2-3 per year in Biol 400 (2007-present)
- Faculty mentor, Biology Honors projects (3-4 per year in Biol 400 and Biol 401; 2010-present)
- Faculty mentor for Biology Internship Program (~40 students, 2005-2010)
- Undergraduate research mentor (17 students, 2001-2020)

PEER-REVIEWED ARTICLES (*BIOLOGY EDUCATION RESEARCH-RELATED)*

Rowland-Schaefer, E., Edwards, B., Crowe, A.J., Brownell, S. and E. Barnes (2025). Challenges to Evolution as a Core Concept in College Biology: Silence on Religion and Conflicting Goals for Acceptance. ***BioScience,*** *Submitted*.

Donovan, D., Clemmons, A., and **A.J. Crowe**. (2022) Data Driven Approach to Analyze Competency Teaching in an Undergraduate Biology Program: A Case Study. *JSoTL* 22 (4): 50-71. doi: 10.14434/josotl.v22i4.33192

Clemmons, A., Donovan, D., Theobald, E. and **A.J. Crowe**. (2021). Using the Intended-Enacted-Experienced Curriculum Model to Map the Vision and Change Core Competencies in Undergraduate Biology Programs and Courses. ***CBE-LSE*** 21:ar6, 1–18. https://doi-org.offcampus.lib.washington.edu/10.1187/cbe.21-02-0054

Clemmons, A., Timbrook, J., Heron, J. and **A.J. Crowe**. (2020) BioSkills Guide: Development and National Validation of a Tool for Interpreting the Vision and Change Core Competencies. *CBE-LSE,*19:ar53, 1-19. doi:10.1187/cbe.19-11-0259. Field Citation ratio 32.5 (7/2022) https://www.lifescied.org/doi/full/10.1187/cbe.19-11-0259

Editor's choice 10.30.2020 in Science magazine: https://science.sciencemag.org/content/370/6516/twil

Alexa Clemmons, Jerry Timbrook, Jon Herron, Alison Crowe (2020). BioSkills Guide. Core Competencies for Undergraduate Biology, (Version 5.0). QUBES Educational Resources. doi:10.25334/156H-T617

Branchaw, J.L., Pape-Lindstrom, P.A., Tanner, K.D., Bissonnette, S.A., Cary, T.L., Couch, B.A., **Crowe, A.J.**, Knight, J., Semsar, K., Smith, J.I., Smith, M.K., Summers, M.M., Wienhold, C.J., Wright, C.D., and S.E. Brownell (2020). Resources for Teaching and Assessing the Vision and Change Biology Core Concepts. *CBE-LSE, 19:es1, 1-9.* https://doi.org/10.1187/cbe.19-11-0243

Couch, B.A., Brownell, S.E., **Crowe, A.J.**, Holmes, N.G., Knight, J., Semsar, K., Smith, M.K., Summers, M.M., Walsh, C., Wright, C.D., and M.K. Smith. (2019) Tools for change: Introducing Bio-MAPS assessments designed to measure student conceptual understanding across undergraduate biology programs. *J. Microbiol and Biol Educ,20(2)***:** 20.2.41. doi: 10.1128/jmbe.v20i2.1787

Moorleghen, D.M., Oli, N., **Crowe, A.J.**, Liepkalns, J.S., Self, C.J. and J.H. Doherty. (2019) Impact of Automated Response Systems on In-Class Cell Phone Use. *Biochem Mol Biol Educ*, 47(5):538-546. https://doi.org/10.1002/bmb.21257

Couch, B.A., Wright, C.D., Freeman, S., Knight, J., Semsar, K., Smith, M.K., Summers, M.M., **Crowe, A.J.** and S.E. Brownell. (2019) GenBio-MAPS: A programmatic assessment to measure student understanding of Vision and Change core concepts across general biology programs. *CBE-LSE*, *18(2)*: ar1, 1-14. https://doi.org/10.1187/cbe.18-07-0117

Semsar, K., Brownell, S.E., Couch, B.A., **Crowe, A.J.,** Smith, M.K., Summers, M.M., Wright, C.D., and J. Knight. (2018) Phys-MAPS: A programmatic physiology assessment for introductory and advanced undergraduates. *Adv Physiol Educ*, 43: 15-27. doi:10.1152/advan.00128.2018.

Summers, M.M., Brownell, S.E., Couch, B.A., **Crowe, A.J.,** Knight, J., Semsar, K., Wright, C.D. and M.K. Smith. (2018) EcoEvo-MAPS: an ecology and evolution assessment for introductory through advanced undergraduates. *CBE-LSE 17(2)*: ar18, 1-12. https://doi.org/10.1187/cbe.17-02-0037

Theobald E.J., Eddy S.L., Grunspan D.E., Wiggins B.L., and **A.J. Crowe.** (2017) Group experience impacts individual performance. *PLoS ONE* 12(7): e0181336. https://doi.org/10.1371/journal.pone.0181336.

Wiggins, B.L., Eddy, S.L., Grunspan, D.E., and **A.J. Crowe.** (2017) The ICAP active learning framework predicts the learning gains observed in intensely active classroom experiences. *AERA Open 3: 1-14.*

Wiggins, B.L., Eddy, S.L., Wener-Fligner, L.S., Grunspan, D.E., Timbrook, J.P., Freisem, K. and **A.J. Crowe**. (2017) ASPECT: a survey to assess student perspective of engagement in an active-learning classroom. *CBE-LSE 16:ar32.*

Freeman, S., Theobald, R., **Crowe A.J**., and M.P. Wenderoth. (2017) Likes attract: Students self-sort in a classroom by gender, demography, and academic characteristics. *Active Learning Higher Ed. (2017)* https://doi.org/10.1177/1469787417707614

Grunspan, D.E.*, Eddy, S.L.*, Brownell, S.E., Wiggins, B., **Crowe, A.J.,** and S. M. Goudreau. (2016) Males under-estimate academic performance of their female peers in undergraduate biology classrooms. PLoS ONE 11(2): e0148405. doi: 10.1371/journal.pone.0148405 (>29,000 views; Editors' Choice Science 18 March 2016; top 1% most downloaded PLoS ONE article in 2016). **authors contributed equally to this work.*

Theobald, E.J., **Crowe, A.J.,** HilleRisLambers, J., Wenderoth, M.P. and S. Freeman. (2015) Women learn more from local than global examples of the biological impacts of climate change. *Front Ecol Environ, 13: 132-137.*

Brownell, S.E., Freeman, S., Wenderoth, M.P., and **A.J. Crowe**. (2014) BioCore Guide: A tool for interpreting the core concepts of Vision and Change for biology majors. *CBE Life Sci Educ*, **13**: 200-211. https://www.lifescied.org/doi/full/10.1187/cbe.13-12-0233.

Brownell, S.E., Wenderoth, M.P., Theobald, R., Okoroafor, O., Koval. M., Freeman, S., Walcher, C., and **A.J. Crowe**. (2014) How student think about experimental design: Novel conceptions revealed by in-class activities. *BioScience,* **64**: 125–137.

Eddy, S.L., **Crowe, A.J.**, Wenderoth, M.P. and S. Freeman. *(2013)* How should we teach tree thinking? An experimental test of two hypotheses. *Evolution: Education and Outreach* **6**: 13-24.

Crowe, A.J.*, Dirks, C*. and M.P. Wenderoth*. (2008) Biology in Bloom: Implementing Bloom's Taxonomy to Enhance Student Learning in Biology. *CBE Life Sci Educ, 7:* 368-381.
*All authors contributed equally to this work.

PEER-REVIEWED ARTICLES (*BIOLOGY RESEARCH-RELATED)*

Grace, M., Chandrasekharan, M., Hall, T. and **A.J. Crowe.** (2004) Sequence and spacing of TATA box elements are critical for accurate initiation from the β–phaseolin promoter. *J. Biol. Chem., **279***: 8102-8110.

Crowe, A.J., Abenes, L., Plant, A. and M.M. Moloney. (2000). ABI3 transactivates oleosin gene expression. *Plant Science*, 151: 171-181.

Crowe, A.J., Piechan, J.L., Sang, L. and M.C. Barton. (2000). S-phase progression mediates activation of a silenced gene in synthetic nuclei. *Mol. Cell. Biol.*, **20:** 4169-4180.

Lee, K.C., **Crowe, A.J.** and M.C. Barton. (1999). P53 mediated repression of alpha-fetoprotein gene expression by site-specific DNA-binding. *Mol. Cell. Biol*., **19**: 1279-1288.

Crowe, A.J., Sang, L., Lee, K.C., Li, K.K., Spear, B.T. and M.C. Barton. (1999). HNF3 relieves chromatin-mediated repression of the alpha-fetoprotein gene. *J. Biol. Chem.*, **274**: 25113-25120.

Crowe, A.J., McGlade, J., Pawson, T. and M.J. Hayman. (1994). Phosphorylation of the *shc* proteins on tyrosine correlates with the transformation of fibroblasts and erythroblasts by the v-*sea* tyrosine kinase. *Oncogene*, **9**: 537-544.

Crowe, A.J. and M.J. Hayman. (1993). Post translational modifications of the *env-sea* oncoprotein: The role of proteolytic processing in transformation. *Oncogene*, **8**: 181-189.

Crowe, A.J. and M.J. Hayman. (1993). Altered glycosylation of *env-sea* inhibits intracellular transport and transformation. *Cell Growth and Differentiation*, **4**: 403-410.

Crowe, A.J. and M.J. Hayman. (1991). A myristylated form of the *sea* oncoprotein can transform chicken embryo fibroblasts. *J. Virol.,* **65**: 2533-2538.

CONFERENCE ABSTRACTS *(BIOLOGY EDUCATION RESEARCH-RELATED)*

Crowe, A.J., Noyes, K. and J. H. Doherty. Teaching Mechanistic Reasoning about Structure and Function. Society for Advancement of Biology Education Research, University of Minnesota, MN, 2025.

Clemmons, A., Donovan, D., Theobald, E. and **A.J. Crowe**. Using the Intended-Enacted-Experienced Curriculum Model to Map the Vision and Change Core Competencies in Undergraduate Biology Programs and Courses. Society for Advancement of Biology Education Research, University of Minnesota, MN, 2022.

Crowe, A.J. and J.L. Nemhauser. Using a core concept framework to inform course organization. UW Scholarship of Teaching and Learning Symposium, Seattle, WA April, 2021.

Crowe, A.J., Dawson, S., and B.J. Buchwitz. Teaching inclusively with evidence-based strategies. American Association for the Advancement of Science, Seattle, WA 2020.

Clemmons, A., Timbrook, J., Heron, J. and **A.J. Crowe**. Development and National Validation of the BioSkills Guide: A Tool for Interpreting and Teaching Core Competencies. Society for Advancement of Biology Education Research, University of Minnesota, MN, 2019.

Walsh, C., Couch, B.A., Brownell, S.E., **Crowe, A.J**., Holmes, N.G., Knight, J., Semsar, K., Smith, M.K., Summers, M.M., Wright, C.D., and M.K. Smith. Tools for Change: Bio-MAPS Assessments Measure Student Conceptual Understanding Across Different Undergraduate Biology Programs. Society for Advancement of Biology Education Research, University of Minnesota, MN, 2019.

Crowe, A.J., Couch B, Brownell, S, Wright, C. GenBio-MAPS: A programmatic assessment to measure student progress in understanding *Vision and Change* core concepts across a general biology curriculum. American Society for Cell Biology, San Diego, CA, 2018

Crowe, A.J., Cline, E., Heinz, H., Marcette, J., Martinez, L., Moore, M. Reid, J., Tennial, R., Weigel, E. Bridging Worlds for Diversity and Inclusion: The Inclusion of Social Science with Biology Education Research Through the iEMBER Network. Society for Advancement of Biology Education Research, University of Minnesota, MN, 2018.

Clemmons, A. and **A.J. Crowe**. Sharing and Collecting Community Feedback on Core Competencies Learning Outcomes (BioSkills Guide). Society for Advancement of Biology Education Research, University of Minnesota, MN, 2018.

Wright C*, Couch B*, **Crowe A.J.**, Freeman S, Smith M, Knight J, Summers M, Semsar K, and S Brownell. GenBio-MAPS: A programmatic assessment designed to measure student's conceptual understanding of core

biology concepts across a curriculum. Society for Advancement of Biology Education Research, University of Minnesota, MN, 2017. * equal contribution.

Clemmons, A. and **A.J. Crowe**. Defining core competency goals for teaching the interdisciplinary nature of science. Society for Advancement of Biology Education Research, University of Minnesota, MN, 2017.

Theobald E.J., Eddy S.L., Grunspan D.E., Wiggins B.L., and **A.J. Crowe.** Group experience impacts individual performance. Society for Advancement Biology Education Research, Univ Minn, MN, 2017.

Crowe, A.J., Wiggins, B.L., Eddy, S.L., Grunspan, D.E., Freisem, K. and **A.J. Crowe**. Testing the ICAP hypothesis in a large lecture environment: Interactive activities lead to greater student learning gains than constructive activities. Society for Advancement of Biology Education Research, University of Minnesota, MN, 2016.

Wiggins, B.L., Eddy, S.L., Wener-Fligner, L.S., Grunspan, D.E., Timbrook, J.P., Freisem, K. and **A.J. Crowe**. Development and validation of a grounded survey instrument to measure student engagement in large active-learning classrooms. 12th Annual UW Teaching and Learning Symposium. University of Washington, Seattle, Washington, 2016.

Brownell, S., Wright, C. E., Couch, B., **Crowe, AJ**, Freeman, S., & Wenderoth, M. P. (2016). Navigating from Vision to Change: Tools to help biology departments align curriculum with the core concepts of biology. *The FASEB Journal 30* (1 Supplement), 553-19.

Brownell, S.E., M.P. Wenderoth and **A.J. Crowe**. Align your curriculum with Vision and Change using the BioCore guide and BioMaps programmatic assessment. Association of American Colleges and Universities, Westin Hotel, Seattle, WA 2015.

Wiggins, B., **A.J. Crowe** and S. Eddy. Inclusive active learning: Designing active STEM class sessions for all students. Association of American Colleges and Universities, Westin Hotel, Seattle, WA 2015.

Wiggins, B.L., Eddy, S.L., Wener-Fligner, L.S., Grunspan, D.E., Timbrook, J.P., Freisem, K. and **A.J. Crowe**. Development and validation of a grounded survey instrument to measure student engagement in large active-learning classrooms. Society for Advancement of Biology Education Research, University of Minnesota, MN, 2015.
Brownell, S.E., S. Freeman, M.P. Wenderoth and **A.J. Crowe**. BioCore Guide: A tool to interpret the core concepts of Vision and Change for general biology majors. Society for Advancement of Biology Education Research, University of Minnesota, MN, 2014.

Wiggins, B., D. Grunspan, S. Eddyy, L. Wener-Fligner and **A. J. Crowe**. Experimental analysis of active learning strategies: Why does active learning work, and how can we use this information to guide classroom design? Society for Advancement of Biology Education Research, University of Minnesota, MN, 2014.

Eddy, S., Grunspan, D., **Crowe, A.J.** and M.P. Wenderoth. Gendered Experiences: Illuminating Hidden Inequities in Introductory Biology. Society for Advancement of Biology Education Research, University of Minnesota, MN, 2014.

Brownell, S.E., M.P. Wenderoth and **A.J. Crowe**. Building a learning progression of undergraduate students' conceptions of two important aspects of experimental design: sample size and repetition of experiments. Experimental Biology, San Diego, CA, 2014

Brownell, S.E., S. Freeman, M.P. Wenderoth and **A.J. Crowe**. BioMap: An interpretation of the core concepts of Vision and Change for general biology majors. Experimental Biology, San Diego, CA, 2014.

Brownell, S.E., Freeman, S. Wenderoth, M.P. and **A.J. Crowe**. 10th Annual UW Teaching and Learning Symposium. University of Washington, Seattle, Washington, 2014.

Crowe, A.J., Freeman, S., Okoroafor, D., Koval, M., Theobald, R. and MP Wenderoth. How should we teach experimental design? An in-class activity that promotes understanding of experimental design. 9th Annual UW Teaching and Learning Symposium. University of Washington, Seattle, Washington, 2013.

Crowe, A.J., Freeman, S. and M.P. Wenderoth. Guided group activities to enhance ways of learning in biology, Transforming Undergraduate Education in the Sciences, Washington DC, January 2013.

Crowe, A.J., Freeman, S., Okoroafor, D., Koval, M., Theobald, R. and MP Wenderoth. An in-class activity that promotes understanding of experimental design for undergraduates. American Society of Cell Biology, San Francisco, CA, 2012.

Crowe, A.J., Freeman, S. and M.P. Wenderoth. A GATEWAY to introductory biology: Hypothesis-driven testing of in-class activities on difficult concepts, Society for the Advancement of Biology Education Research, University of Minnesota, Twin Cities, MN, 2012.

Crowe, A.J., Freeman, S., Walcher, C., and M.P. Wenderoth. Development and Assessment of Guided Group Activities to Enhance Ways of Learning in Biology (GATEWAY learning in Biology): Focus on Principles of Experimental Design, Society for the Advancement of Biology Education Research, University of Minnesota, Twin Cities, MN, 2011.

Crowe, A.J., Freeman, S., Walcher, C., and M.P. Wenderoth. Development and Assessment of Guided Group Activities to Enhance Ways of Learning in Biology (GATEWAY learning in Biology): Focus on Principles of Experimental Design, International Society for the Scholarship of Teaching and Learning. Milwaukee, WI, 2011.

Walcher, C., Sopher, K., Fleming, M., Hays, D., Freeman, S., Wenderoth, M.P. and **A.J. Crowe**. How can we teach students to think like scientists? 7th Annual UW Teaching and Learning Symposium. University of Washington, Seattle, Washington, 2011.

Wenderoth, M.P., **Crowe, A.J.** and J. McFarland. Biology Education Research Group (BERG): A community of practice. Experimental Biology. Washington D.C., 2011.

Montano, P. and **A.J. Crowe**. Development of Learning Modules to Enhance Students' Higher-Order Cognitive Skills. International Society for the Scholarship of Teaching and Learning. University of Indiana, Bloomington, Indiana, 2009

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