CURRICULUM VITAE

Name: Melanie Margaret Cooper

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Current Position Lappan-Phillips Professor of Science Education
Professor of Chemistry
Chemistry Department
Michigan State University
East Lansing, MI 48824

Education

B.Sc. Chemistry, First Class Honors;
University of Manchester, England, 1975,
M.Sc. Organic Chemistry, University of Manchester, 1976
Ph.D. Organic Chemistry, University of Manchester, 1978

Professional Experience

Lappan-Phillips Professor of Science Education and Professor of Chemistry, Michigan State University, 2013 - present
Interim Chair, Engineering and Science Education, Clemson University, 2008 - 2011
Alumni Distinguished Professor of Chemistry:, Clemson University, 2002 – 2012.
Professor of Education, Clemson University, 2002-2012
Professor of Chemistry: Clemson University, 1997 - 2001.
Associate Professor: Clemson University, 1993-97.
Assistant Professor, Director of Undergraduate Laboratories: Clemson University, 1987-1993,
Visiting Instructor: Clemson University, 1984-87
Visiting Assistant Professor: Furman University, 1981-84
Visiting Instructor: Clemson University, 1980-81
Postdoctoral Research Associate: Clemson University, 1978-80

Honors and Awards:

- Elected member of the National Academy of Education 2024
- Outstanding Faculty Award; College of Natural Sciences, MSU 2023
- Postdoctoral Mentoring Award; College of Natural Sciences, MSU 2021

- Michigan Professor of the Year: Finalist (MSU nominee) 2020
- Royal Society of Chemistry, Chemistry Education Award, 2020
- Fellow of the Royal Society of Chemistry, 2017
- Undergraduate Teaching Award: College of Natural Sciences MSU 2017
- Honorary Doctor of Science, University of South Florida, December 2016
- The 2015 Michigan State University AT&T Faculty-Staff Instructional Technology Award for Best Technology Enhancement.
- The ACS Award for Achievement in Research on Teaching and Learning in Chemistry, 2014
- The James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry. 2013
- Outstanding Undergraduate Science Teacher Award, Society of College Science Teachers/National Science Teachers Association, 2010-11
- Class of '39 Award for Excellence, Clemson University, 2010
- Fellow of the American Chemical Society 2009,
- Robert S. Campbell Award for Communication Across the Curriculum, 2009.
- South Carolina Governor's Distinguished Professor Award finalist 2008
- Fellow of the American Association for the Advancement of Science 2007
- Distinguished Alumni Professor, Clemson University, 2002 – 2012
- Clemson University Outstanding Woman Faculty, 2004
- Award of Excellence for Teaching in the Sciences, College of Engineering and Sciences, 1997

Professional Service:

- Chair Succession AAAS Section Q 2020-23 (Chair^2, 2021)
- Report Coordinator for NASEM report on Equitable and Effective Teaching (2024)
- Member NRC committee on Undergraduate Research Experiences (2015-2017)
- Member of the National Research Council Board on Science Education (BOSE) (2013 – 2019)
- Councilor for the ACS Division of Chemical Education (2013-2016)
- Leadership Committee: Next Generation Science Standards (2011-2013)
- Member NRC committee on Discipline-Based Education Research (2010-12)
- Member of the Editorial Board Journal of Chemical Education BOSE) (2012- 2020)
- Member of the Editorial Board, Journal of Research in Science Teaching (2011- 2016)
- Co-Chair, College Board Science Standards Committee, (2007-9)
- AP Chemistry Redesign Team (2009-2010s
- Chair ACS Division of Chemical Education 2007
- Chair, Western Carolinas Local Section ACS 2007
- Chair Gordon Research Conference on Innovations in College Chemistry Teaching" June 2002
- Councilor for the ACS Division of Chemical Education 2001-2004
- Member of the American Chemical Society Committee on Education, (SOCED) 1997-9, 2004 – 2012

- Reviewer for Science, J. Chem. Educ, The Chemical Educator. Journal of College Science Teaching. International Journal of Science Education, Journal of Research in Science Teaching, PLoS One, Science, Science Advances, Journal of the Learning Sciences.
- Editor for chemical education research feature in *J Chem Educ* (2004-9)
- Panel reviewer for the National Science Foundation for numerous panels

External Funding:

As PI (unless otherwise stated)

- *"Supporting Student Mechanistic Reasoning Through Scaffolded Task Design and Generative AI Feedback*" NSF DUE, 8/15/24-8/14/27, $399,432.
- "*Developing Open Response Assessments to Evaluate How Undergraduates Engage in Mathematical Sensemaking in Biology, Chemistry, and Physics* " 3/15/23 -02/28/2027, $699,918. (Co-PI)
- "*Faculty Reflection as a Mechanism to Improve Teaching and Learning" 8/15/22-12/31/24, (Co-PI) American Association of Universities, $100,000.*
- *"Green Chemistry Design Principles" NSF DUE, $300,000, 9/1/20-8/31/24*
- *"Developing Learning Environments that Support Molecular-level Sensemaking" NSF DR-K12, $1,200,000. Original PI, now Co-PI 2020-2025*
- *"Collaborative Research: Extending A Coherent Gateway to STEM Teaching and Learning," NSF DUE $1,323,499 9/1/17 – 8/31/23*
- *"Studying Students' Mechanistic Explanations across Undergraduate Chemistry and Biology Courses," (Co-PI) $ 598,925 9/1/17 – 8/31-23*
- *Collaborative Research: Developing Items to Assess Students' Understanding of Scientific Practices in Chemistry Laboratory Settings" NSF DUE $244,539 9/1/17 – 8/31-22*
- *Organic Chemistry, Life, the Universe and Everything (OCLUE) (NSF DUE, $201,000 Aug 2015 – July 2018*
- *LEVERS: Leveraging Engagement and Vision to Encourage Retention in STEM* (Co-PI) HHMI $1,500,000. 2014-2021
- *CREATing a Coherent STEM Gateway for Teaching and Learning in STEM at MSU, AAU, $500,000, (PI) Aug 2013 – 2017*
- *Automated Assessment of Created Student Responses (AACR) (co-PI) NSF TUES $3,279,43*
- *BeSocratic: A Free-form, Interactive System to Investigate the Development of Representational Competence: NSF TUES 10/1/11 9/30/16 - $550,000*
- *uRespond: NSF TUES (Co-PI), $200,000, 6/31/11 – 7/1/14*
- *SocraticGraphs: NSF TUES. $200,000. 6/31/11 – 7/1/15*
- *Chemistry and the Logic of Life*: NSF-CCLI $500,000 (8/15/08 -12/31/14)
- *OrganicPad workshops*: Dreyfus Foundation, $25,000.
- *Data Driven Education Reform*: NSF-CCLI $525,000 8/15/08 -2/28/12) (Co-PI)
- *OrganicPad: A Tablet Based Interactivity Tool for Organic Chemistry*. NSF-REESE, $300, 000 (1/1/08 – 12/31/12). (PI)

- *Noyce Scholarships:TigersTeach NSF (Co-PI): $1,200,000. 8/31/11 – 9/1/16*
- *Using Cognitive Load Theory to Design and Assess Questions and Problem Solving Strategies*, 09.15.2006 – 08/31.2010, NSF-CCLI $481,686 (co-PI)
- *Collaborative Research: Adapting IMMEX to provide problem solving assessment materials from the ACS Exams Institute* 9/1/2005 – 11/30/2009 NSF –ASA $500,000
- Improving the Problem Solving of Science Students" NSF-ROLE, Jan 2006 – Dec 2009, $500,000 (Co-PI)
- "Improving the Problem Solving of Science Students" NSF-ROLE, Jan 2003 – Dec 2005, $1,500,000 (Co-PI)
- "Research on Gender in Science and Engineering" (Co-PI NSF GSE/RES) Co-PI 11/1/2004 -10/31/2005 $500,000
- "Development of Technology based Assessments in Chemistry" NSF-CCLI March 2002 – March 2007 $500,000 (PI)
- "EnviroChemLibrary: Resources for Teaching and Learning in Science" National Science Foundation 3/1/00 to 2/28/03 $175,713 (Co-PI)
- "Cooperative Organic Laboratories" NSF-CCD May 1995 to June 2000 $160,000 (PI)
- "Development of Environmental Laboratory Projects" Sustainable Universities Initiative, July 1999 – July 2000, $3,000
- Cooperative Chemistry Laboratories: Faculty Enhancement, NSF-UFE, May 1995 to May 1999, $42,619 (PI)
- FT-IR in the General and Organic Laboratories, NSF - ILI $ 27,040, August 1995 to July 1996 (PI)
- "Cooperative Chemistry Laboratories", National Science Foundation. August 1992 to January 1995. $80,401.(PI)"Cooperative Chemistry Laboratories", FIPSE, Sept. 1992 to June 1995, $70,434. (PI)
- "Preparing for Science in the 90's" South Carolina Commission on Higher Education. 1989-90, $37,000 (Co-PI)
- Cottrell Research Grant of Research Corporation for "Reactions of Phthalide Ion with Electron Deficient Arenes", April, 1984 to March, 1986 $ 13,500 (PI)

Publications

1. Scammahorn, V.; Houchlei, S.; Williams, H.; Cooper, M. M. Investigation into the Impact of Online Learning and the Pandemic on Student Use of Mechanistic Arrows. *J. Chem. Educ.* **2025**. https://doi.org/10.1021/acs.jchemed.4c01274
2. Cooper, M. M.; Klymkowsky, M. W. Let Us Not Squander the Affordances of LLMs for the Sake of Expedience: Using Retrieval Augmented Generative AI Chatbots to Support and Evaluate Student Reasoning. *J. Chem. Educ.* **2024**. https://doi.org/10.1021/acs.jchemed.4c00765.
3. Megan Shiroda, Clare G-C Franovic, Joelyn de Lima, Keenan Noyes, Devin Babi, Estefany Beltran-Flores, Jenna Kesh, Robert L McKay, Elijah Persson-Gordon, Melanie M Cooper, Tammy M Long, Christina V Schwarz, Jon R Stoltzfus. *Examining and Supporting Mechanistic Explanations Across Chemistry and Biology Courses*. CBE—Life Sciences Education 23 (3), ar38
4. Cooper, M. M.; Caballero, M. D.; Carmel, J. H.; Duffy, E. M.; Ebert-May, D.; Fata-Hartley, C. L.; Herrington, D. G.; Laverty, J. T.; Nelson, P. C.; Posey, L. A.;

Stoltzfus, J. R.; Stowe, R. L.; Sweeder, R. D.; Tessmer, S.; Underwood, S. M. Beyond Active Learning: Using 3-Dimensional Learning to Create Scientifically Authentic, Student-Centered Classrooms. *PLOS ONE* **2024**, *19* (5), e0295887. https://doi.org/10.1371/journal.pone.0295887

5. Day, E. L.; Petritis, S. J.; McFall-Boegeman, H.; Starkie, J.; Zhang, M.; Cooper, M. M. A Framework for the Integration of Green and Sustainable Chemistry into the Undergraduate Curriculum: Greening Our Practice with Scientific and Engineering Practices. *J. Chem. Educ.* **2024**. https://doi.org/10.1021/acs.jchemed.3c00737.
6. Nelson, P. C., Matz, R. L., Bain, K., Fata-Hartley, C. L., & Cooper, M. M. (2023). Characterizing faculty motivation to implement three-dimensional learning. *Disciplinary and Interdisciplinary Science Education Research*, *5*(1), 1-21.
7. Franovic, C. G.-C.; Williams, N. R.; Noyes, K.; Klymkowsky, M. W.; Cooper, M. M. How Do Instructors Explain The Mechanism by Which ATP Drives Unfavorable Processes? *LSE* **2023**, *22* (4), ar50. https://doi.org/10.1187/cbe.23-05-0071.
8. Houchlei, S. K.; Crandell, O. M.; Cooper, M. M. "What About the Students Who Switched Course Type?": An Investigation of Inconsistent Course Experience. *J. Chem. Educ.* **2023**. https://doi.org/10.1021/acs.jchemed.3c00345.
9. Underwood, S. M.; Kararo, A. T.; Posey, L. A.; Pollock, A. M.; Herrington, D. G.; Stowe, R. L.; Carmel, J. H.; Klymkowsky, M. W.; Cooper, M. M. Components Critical to Successful Adoption and Adaptation of CLUE, a Transformed General Chemistry Curriculum. *J. Chem. Educ.* **2023**. https://doi.org/10.1021/acs.jchemed.3c00190.
10. Franovic, C.G.C.: Noyes, K.; Stoltzfus, J.R.; Schwarz, C.V.; Long, T.M.; Cooper, M.M. Undergraduate Chemistry and Biology Students' Use of Causal Mechanistic Reasoning to Explain and Predict Preferential Protein–Ligand Binding Activity. *J. Chem. Educ.* 2023, 100, 5, 1716–1727
11. Zhang, M. Day, E.L.; McFall-Boegeman, H.; Petritis, s.j.; Cooper. M.M. Incorporation of green chemistry into undergraduate organic laboratory using cooperative project-based experiments and case studies. *Green Chemistry Letters and Reviews*, **2023**, 16 (1), 2183781
12. Crandell, O. M.; Cooper, M. M. Fostering Causal Mechanistic Reasoning as a Means of Modelling in Organic Chemistry. *Student Reasoning in Organic Chemistry: Research Advances and Evidence-based Instructional Practices* **2022**, *10*, 59
13. Fata-Hartley, C. L.; Nelson, P. C.; Matz, R. L.; Cooper, M. M. CHANGING HOW STEM FACULTY TEACH BY CHANGING WHAT THEY TEACH. *Handbook of STEM Faculty Development* **2022**, 181
14. Cooper, M. M.; Klymkowsky, M. W. Aligning Assessment Goals with the Current and Future Technologies Needed to Achieve Them. In *Technologies in Biomedical and Life Sciences Education: Approaches and Evidence of Efficacy for Learning*; Springer, 2022; pp 241–257
15. Bowen, R.; A. Flaherty, A.; M. Cooper, M. Investigating Student Perceptions of Transformational Intent and Classroom Culture in Organic Chemistry Courses.

Chemistry Education Research and Practice **2022**. https://doi.org/10.1039/D2RP00010E.
16. Noyes, K.; Carlson, C. G.; Stoltzfus, J. R.; Schwarz, C. V.; Long, T. M.; Cooper, M. M. A Deep Look into Designing a Task and Coding Scheme through the Lens of Causal Mechanistic Reasoning. *J. Chem. Educ.* **2022**, *99* (2), 874–885. https://doi.org/10.1021/acs.jchemed.1c00959
17. Roche Allred Z. D.; Caobi, l.; \Pardinas, B.; Echarri-Gonzalez, A.; Kohn, K. p.; Kararo, A. T.; Cooper, M.M.; Underwood. S.M. *"Big Ideas" of Introductory Chemistry and Biology Courses and the Connections between Them* CBE—Life Sciences Education 21 (2), ar35
18. Cooper, M.M. Klymkowsky. M.W. *Aligning Assessment Goals with the Current and Future Technologies Needed to Achieve Them*. Technologies in Biomedical and Life Sciences Education, 2022, 241-257
19. Houchlei, S. K.; Bloch, R. R.; Cooper, M. M. Mechanisms, Models, and Explanations: Analyzing the Mechanistic Paths Students Take to Reach a Product for Familiar and Unfamiliar Organic Reactions. *J. Chem. Educ.* **2021**. https://doi.org/10.1021/acs.jchemed.1c00099.
20. Bowen, R. S.; Cooper, M. M. Grading on a Curve as a Systemic Issue of Equity in Chemistry Education. *J. Chem. Educ.* **2021**.: 10.1021/acs.jchemed.1c00369 https://doi.org/10.1021/acs.jchemed.1c00369.
21. Stowe, R. L.; Scharlott, L. J.; Ralph, V. R.; Becker, N. M.; Cooper, M. M. You Are What You Assess: The Case for Emphasizing Chemistry on Chemistry Assessments. *J. Chem. Educ.* **2021**, *98* (8), 2490–2495. https://doi.org/10.1021/acs.jchemed.1c00532
22. Noyes, K.; McKay, R. L.; Neumann, M.; Haudek, K. C.; Cooper, M. M. Developing Computer Resources to Automate Analysis of Students' Explanations of London Dispersion Forces. *J. Chem. Educ.* **2020**, *97* (11), 3923–3936. https://doi.org/10.1021/acs.jchemed.0c00445
23. Cooper et. al Characterizing college science instruction: The Three-Dimensional Learning Observation Protocol. PLOS one 2020, https://doi.org/10.1371/journal.pone.0234640
24. The curious construct of active learning. *Psychological Science in the Public Interest, 2021, Vol. 22(1) 8–43, DOI: 10.1177/1529100620973974*
25. *Cooper & Klymkowsky, 2020. Curbing the malpractice of curved grades and high-stakes exams. ASBMB Today, December (opinion)*
26. Schwarz, C., Cooper, M., Long, T., Trujillo, C., Noyes, K., de Lima, J., Kesh, J., & Stoltzfus, J. Mechanistic Explanations Across Undergraduate Chemistry and Biology Courses. International Conference of the Learning Sciences, virtual conference. https://repository.isls.org//handle/1/6712. June 2020 (refereed conference proceeding)
27. Crandell, O. M.; Lockhart, M. A.; Cooper, M. M. Arrows on the Page Are Not a Good Gauge: Evidence for the Importance of Causal Mechanistic Explanations about Nucleophilic Substitution in Organic Chemistry. *J. Chem. Educ.* **2020**, *97* (2), 313–327. https://doi.org/10.1021/acs.jchemed.9b00815.
28. Stephenson, N. S.; Duffy, E. M.; Day, E. L.; Padilla, K.; Herrington, D. G.; Cooper, M. M.; Carmel, J. H. Development and Validation of Scientific Practices

Assessment Tasks for the General Chemistry Laboratory. *J. Chem. Educ.* **2020**, *97* (4), 884–893. https://doi.org/10.1021/acs.jchemed.9b00897.

29. Cooper, M. M. The Crosscutting Concepts: Critical Component or "Third Wheel" of Three-Dimensional Learning? *Journal of Chemical Education* **2020**. https://doi.org/10.1021/acs.jchemed.9b01134.
30. Cooper, M. M.; Klymkowsky, M. W. Comment on "Should Organic Chemistry Be Taught as Science?" *J. Chem. Educ.* **2020**, *97* (4), 1213–1214.
31. Cooper, M. M.; Stowe, R. L.; Crandell, O. M.; Klymkowsky, M. W. Organic Chemistry, Life, the Universe and Everything (OCLUE): A Transformed Organic Chemistry Curriculum. *J. Chem. Educ*. **2019**, *96* (9), 1858–1872. https://doi.org/10.1021/acs.jchemed.9b00401. **ACS Editors Choice**
32. Stowe, R. L.; Cooper, M. M. Arguing from Spectroscopic Evidence. *J. Chem. Educ*. 2019. https://doi.org/10.1021/acs.jchemed.9b00550. **ACS Editors Choice**
33. Noyes, K.; Cooper, M. M. Investigating Student Understanding of London Dispersion Forces: A Longitudinal Study. *J. Chem. Educ*. **2019**, 96 (9), 1821–1832. https://doi.org/10.1021/acs.jchemed.9b00455.
34. Stowe, R. L.; Herrington, D. G.; McKay, R. L.; Cooper, M. M. Adapting a Core-Idea Centered Undergraduate General Chemistry Curriculum for Use in High School. *J. Chem. Educ*. **2019**, 96 (7), 1318–1326. https://doi.org/10.1021/acs.jchemed.9b00071.
35. Stowe, R. L.; Herrington, D. G.; McKay, R. L.; Cooper, M. M. The Impact of Core-Idea Centered Instruction on High School Students' Understanding of Structure–Property Relationships. *J. Chem. Educ*. **2019**, 96 (7), 1327–1340. https://doi.org/10.1021/acs.jchemed.9b00111.
36. Carmel, J. H.; Herrington, D. G.; Posey, L. A.; Ward, J. S.; Pollock, A. M.; Cooper, M. M. Helping Students to "Do Science": Characterizing Scientific Practices in General Chemistry Laboratory Curricula. J*ournal of Chemical Education* **2019**, 96 (3), 423–434. https://doi.org/10.1021/acs.jchemed.8b00912.
37. M. Duffy, E.; M. Cooper, M. Assessing TA Buy-in to Expectations and Alignment of Actual Teaching Practices in a Transformed General Chemistry Laboratory Course. *Chemistry Education Research and Practice* **2019**. https://doi.org/10.1039/C9RP00088G.
38. Stowe, R. L.; Cooper, M. M. Assessment in Chemistry Education. *Israel Journal of Chemistry 59* (5-7). 598-607. https://doi.org/10.1002/ijch.201900024.
39. Crandell, O. M.; Kouyoumdjian, H.; Underwood, S. M.; Cooper, M. M. Reasoning about Reactions in Organic Chemistry: Starting It in General Chemistry. *J. Chem. Educ.* **2018**. https://doi.org/10.1021/acs.jchemed.8b00784.
40. Making Predictions and Constructing Explanations: An investigation into introductory chemistry students' understanding of structure-property relationships. Kararo, Colvin, Cooper & Underwood. Chemistry Education Research and Practice (2018) DOI: 10.1039/C8RP00195B
41. Evaluating the extent of a large-scale transformation in gateway science courses. Rebecca L. Matz, Cori L. Fata-Hartley, Lynmarie A. Posey, James T. Laverty Sonia M. Underwood, Justin H. Carme, Deborah G. Herrington, Ryan L. Stowe, Marcos D. Caballero, Diane Ebert-May, Melanie M. Cooper. *Science Advances* (2018) DOI: 10.1126/sciadv.aau0554

42. Chemistry Education Research—From Personal Empiricism to Evidence, Theory, and Informed Practice. Melanie Cooper and Ryan Stowe: Chem. Rev. 2018, 118, 12, 6053-6087: DOI: 10.1021/acs.chemrev.8b00020. **ACS Editors Choice**
43. Connecting Structure-Property and Structure-Function Relationships across the Disciplines of Chemistry and Biology: Exploring Student Perceptions. Kathryn P. Kohn; Sonia M. Underwood; Melanie M. Cooper 2018, https://doi.org/10.1187/cbe.18-01-0004
44. Energy Connections and Misconnections Across Chemistry and Biology". Kathryn Kohn, Sonia Underwood, and Melanie Cooper. 2018, doi: 10.1187/cbe.17-08-0169, CBE Life Sci Educ vol. 17 no. 1 ar3
45. Adapting Assessment Tasks To Support Three-Dimensional Learning" Sonia M. Underwood , Lynmarie A. Posey, Deborah G. Herrington, Justin H. Carmel, and Melanie M. Cooper J. Chem. Educ., 2018, 95 (2), pp 207–217, DOI: 10.1021/acs.jchemed.7b00645 (**ACS Editors Choice**)
46. Cooper, M. M. "Evidence-Based Approaches to Curriculum Reform and Assessment" Educacio Quimica. 2018
47. Stowe, R.; Cooper M. M. "Practicing What We Preach: Defining and Assessing "Critical Thinking" in Organic Chemistry". J. Chem. Educ., 2017, 94 (12), pp 1852–1859. DOI: 10.1021/acs.jchemed.7b00335
48. Cooper, M. M.; Steiff, M. Sketching the invisible to predict the visible: from drawing to modeling in chemistry. **2017**, Topics in Cognitive Science, DOI:10.1111/tops.12285
49. Cooper, M. M.; Posey, L. A.; Underwood, S. M.; Core Ideas and Topics: Building Up or Drilling Down? *J Chem Educ* **2017**, DOI: 10.1021/acs.jchemed.6b00900: **ACS Editors Choice.**
50. Carmel, J. H., Ward, J. W., Cooper, M. M. A Glowing Recommendation: A Project-Based Cooperative Laboratory Activity To Promote Use of the Scientific and Engineering Practices *J. Chem. Educ.*, **2017**, *94* (5), pp 626–631, **DOI:** 10.1021/acs.jchemed.6b00628 **(Cover Illustration)**
51. Laverty, J. T.; Underwood, S. M.; Matz, R. L.; Posey, L. A.; Carmel, J. H.; Caballero, M. D.; Fata-Hartley, C. L.; Ebert-May, D.; Jardeleza, S. E.; Cooper, M. M. Characterizing College Science Assessments: The Three-Dimensional Learning Assessment Protocol. *PLOS ONE* **2016**, *11* (9), e0162333.
52. Klymkowsky, M. W.; Rentsch, J. D.; Begovic, E,; & Cooper, M. M. The Design and Transformation of Biofundamentals: A Nonsurvey Introductory Evolutionary and Molecular Biology Course. CBE—Life Sciences Education, 15:ar70, Winter 2016.
53. Becker, N. Noyes, K. Cooper, M. M. Characterizing Students' Mechanistic Reasoning about London Dispersion Forces. *J. Chem. Educ., **2016**, 93 (10), pp 1713–1724*
54. Cooper, M. M. Kouyoumdjian, H. Underwood, S. M. Investigating Students' Reasoning about Acid−Base Reactions. *J. Chem Educ,* **2016** DOI: 10.1021/acs.jchemed.6b00417. **ACS Editors Choice.**
55. Cooper, M. M. It is time to say what we mean. *J. Chem. Educ*, **2016**. http://dx.doi.org/10.1021/acs.jchemed.6b00227

56. Cooper, M. M., Reyes-Gastelum, D., Underwood, S, M., When do students recognize relationships between molecular structure and properties? A longitudinal comparison of the impact of traditional and transformed curricula. *Chemistry Education Research and Practice.* **2016,** 17, 365-380, **DOI:** 10.1039/C5RP00217F
57. Cooper, M. M. What can the learning sciences tell us about chemistry education? ACS symposium series **2015**, 10.1021/bk-2015-1208.ch006
58. Cooper, M. M., Caballero, M. D., Ebert-May, D., Fata-Hartley, C. L., Jardeleza, S. E., Krajcik, J. S., … Underwood, S. M. (**2015**). Challenge faculty to transform STEM learning. Science, 350(6258), 281–282. http://doi.org/10.1126/science.aab0933
59. Williams, Leah, C., Underwood, Sonia, M., Klymkowsky, M. W,. Cooper, M. M., Are Noncovalent Interactions an Achilles Heel in Chemistry Education? A Comparison of Instructional Approaches. J. Chem Educ. 2015, DOI: 10.1021/acs.jchemed.5b00619
60. Cooper, M. M. Why ask Why. *J. Chem. Educ.*, **2015**, *92* (8), pp 1273–1279, http://dx.doi.org/10.1021/acs.jchemed.5b00203
61. Cooper, M. M., Reyes-Gastelum, D., Underwood, S, M., "Answering the questions of whether and when learning occurs: Using discrete-time survival analysis to investigate the ways in which college chemistry students' ideas about structure-property relationships evolve" Science Education. 2015 DOI: 10.1002/sce.21183.
62. Cooper, M. M., Williams, Leah, C., Underwood, Sonia, M., "Student Understanding of Intermolecular Forces: A Multimodal Study" *J. Chem. Educ.*, **2015**, *92* (8), pp 1288–1298, DOI: 10.1021/acs.jchemed.5b00169. **ACS Editors Choice.**
63. Cooper. M. M. & Becker, N. M. "College chemistry students' understanding of potential energy in the context of atomic-molecular interactions" J. Res. Sci Teach. 2014, 51. 6, 789-808, DOI 10.1002/tea.21159
64. Cooper, M. M., Klymkowsky, M. W., & Becker, N. M. (2014). Energy in chemical systems: An integrated approach. In *Teaching and learning of energy in K–12 education* (pp. 301-316). Springer International Publishing.
65. Samuel P. Bryfczynski, Rebecca Brown, Josiah Hester, Andrew Herrmann, Danielle L. Koch, Melanie M. Cooper, and Nathaniel P. Grove. uRespond: iPad as Interactive, Personal Response System. *Journal of Chemical Education* **DOI:** 10.1021/ed4006453
66. Cooper, M. M.; Underwood, S. M.; Bryfczynski, S., Klymkowsky, M. W. Using Technology to collect and analyze data for research. Tools of Chemistry Education Research; Bunce, D., et al.; ACS Symposium Series; American Chemical Society: Washington, DC, 2014. DOI. 10.1021/bk-2014-1166.ch012
67. Cooper, M. M. "Evidence-based reform of teaching and learning" Analytical and Bioanalytical Chemistry. 11/2013; DOI:10.1007/s00216-013-7438-4
68. Cooper. M.M. Klymkowsky, M.W. "Chemistry, Life, the Universe and Everything (CLUE): A new approach to general chemistry, and a model for curriculum reform" J Chem Educ, **2013**, *90,* 1116-1122; **DOI:** 10.1021/ed300456y.

69. Cooper. M.M. Corley, L; Underwood, S.M. "An Investigation of College Chemistry Students Understanding of Structure-Property Relationships" J. Res. Sci. Teach. 2013, 50 (6), 699–721.
70. Cooper. M.M.; Sandi-Urena, "Cooperative Chemistry Laboratories, a 20 year study" ACS symposium proceedings, pubs.acs.org/doi/pdf/.../bk-2013-1145.ch004 (2014)
71. Cooper, M.M. The New MCAT: An Incentive for Reform or a Lost Opportunity?, *J. Chem. Educ.*, **2013**, *90* (7), pp 820–822, **DOI:** 10.1021/ed400351v
72. Cooper, M. M. Chemistry and the Next Generation Science Standards. *J. Chem. Educ.*, **2013**, *90* (6), pp 679–680, **DOI:** 10.1021/ed400284c
73. Cooper. M.M. Klymkowsky, M.W. The Trouble with Chemical Energy" CBE Life Sci Educ. 2013, 12(2):306-12. doi: 10.1187/cbe.12-10-0170.
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