Cari F. Herrmann Abell

Education:

2001 – Ph.D. (Physical Chemistry / Materials Science) University of North Carolina, Chapel Hill, NC
G.P.A 3.7 (pass/fail grading system)
Dissertation Title: *A Scanning Tunneling Microscopy Study of Halogen Adsorption, Patterning, Dynamics and Etching of the Si(100) Surface*
Principal Investigator: Dr. John J. Boland

1996 – B.S., Magna Cum Laude (Chemistry / Mathematics) Muhlenberg College, Allentown, PA
G.P.A. 3.7 (cumulative), 3.9 (Chemistry), 4.0 (Mathematics)

Research Experience:

Research Scientist, BSCS Science Learning, Colorado Springs, CO; Dec. 2018 to present

- Assessing Students' Progress on the Energy Concept using Three-Dimensional Items (ASPECt-3D): Serve as the Principal Investigator for an IES-funded project to develop assessment tasks that measure students' ability to use the three dimensions outlined by the *Next Generation Science Standards* – science and engineering practices, crosscutting concepts, and disciplinary core ideas - to make sense of energy-related phenomena.
- Provide assessment support to projects investigating the impact of the high school model-based educational resource (MBER) and online instructional materials designed to enhance students' skills and abilities in understanding human health (HLIT)
- Participate in a project to develop a high school biology curriculum that is aligned with the *Next Generation Science Standards*.

Senior Research Associate, American Association for the Advancement of Science (AAAS)/ Project 2061, Washington, DC; Feb. 2012 to Dec. 2018

- Assessing Students' Progress on the Energy Concept using Three-Dimensional Items (ASPECt-3D): Serve as the Principal Investigator for an IES-funded project to develop assessment tasks that measure students' ability to use the three dimensions outlined by the *Next Generation Science Standards* – science and engineering practices, crosscutting concepts, and disciplinary core ideas - to make sense of energy-related phenomena.
- Assessing Students' Progress on the Energy Concept using Multiple-Choice Items (ASPECt-MC): Serve as the Principal Investigator for an IES-funded project to develop three vertically equated assessment instruments to measure students' progress in understanding ideas about energy from elementary through high school. Used Rasch modeling to validate a learning progression for energy from fourth through twelfth grade. Conducted a randomized control trial (RCT) to evaluate the equivalence of the online and paper-based versions of the instruments. Developed support materials to help users administer the instruments and interpret the results.
- Matter and Energy for Growth and Activity: Work with the University of Utah to develop a curriculum unit focusing on energy ideas in high school biology. Led the construction of the student pre- and post-tests. Designed a randomized control trial (RCT) of the unit in two school districts. Designed lesson logs to measure fidelity of implementation. Used Rasch Modeling and Hierarchical Linear Modeling to analyze the change in students' understanding.
- Language Factors and Student Performance: Work with WestEd to analyze the linguistic and cognitive complexity of multiple-choice assessment items in an effort to uncover factors in the items that may be related to the performance difference between native English speakers and English language learners. Part of a team that developed a rubric for coding the cognitive complexity of items.
- Toward High School Biology: Worked with BSCS to develop a 6-week curriculum unit addressing chemistry and biochemistry ideas necessary for understanding high school biology. Created assessment items to investigate the improvement of student and teacher content knowledge. Oversaw a small randomized control trial (RCT) to evaluate the promise of the unit. Used Rasch Modeling and Hierarchical Linear Modeling to analyze the change in students' understanding.

- Provided assessment support for the Building High School Students' Understanding of Evolution--Both Common Ancestry and Natural Selection—Through Mathematical Arguments, Evidence-Based Explanations, and an Understanding of Heredity Project funded by NSF.
- Worked with WestEd on the Foundations of 21st Century Assessments project. Conducted a literature search on online testing design principles. Used Rasch modeling to analyze field test data. Conducted an exploratory factor analysis of field test data.
- Worked with WestEd on the SimScientist project. Reviewed the content of two assessment modules on the topic of atoms and molecules. Evaluated the alignment of the modules with learning goals and science practices. Reviewed draft assessment module on the topic of human body systems.
- Reviewed and provided feedback on drafts of the *Next Generation Science Standards*. Attended the Board on Testing and Assessment (BOTA) *Workshop on Developing Assessments of Science Proficiency in K-12* on September 13, 2012 at the National Academy of Sciences in Washington, DC. Attended various briefings and committee meetings organized by the Board on Science Education during the development of *A Framework for K-12 Science Education* in 2010 through 2011. Attended the Invitational Research Symposium on Science Assessment sponsored by the K–12 Center at ETS, the Council of Chief State School Officers (CCSSO) and the College Board in Washington, DC on September 24-25, 2013.
- Supervise a research associate and participate in the hiring of new research staff members.

Research Associate, American Association for the Advancement of Science (AAAS)/ Project 2061, Washington, DC; Aug. 2005 to Feb. 2012

- Led the development of distractor-driven multiple-choice assessment items aligned to physical science ideas as part of the NSF-funded IMD Assessment project. Wrote clarification statements for the targeted science ideas in the grades 6-8 chemistry and energy benchmarks/standards. Performed a literature review of the research on student learning and summarized student misconceptions about physical science topics. Developed multiple choice assessment items and identified phenomena and representations aligned to these benchmarks and standards. Conducted student interviews and pilot tested items. Contributed to the development of the AAAS on-line item analysis tool.
- Contributed to the development of the AAAS Science Assessment Website (http://assessment.aaas.org/).
- Participated in the analysis of assessment items for a variety of topics including Flow of Matter and Energy, Cells, Atoms and Molecules, Force and Motion, Weathering and Erosion, Weather and Climate, and Plate Tectonics.
- Provided assessment support for the Resources for Climate Literacy Instruction Project funded by NOAA.
- Worked with WestEd on the Calipers II project. Reviewed the content of two assessment modules on the topic of atoms and molecules. Evaluated the alignment of the modules with the learning goals and science practices.
- Reviewed curriculum units on topics of chemistry and energy for the Investigating and Questioning our World through Science and Technology (IQWST) project.
- Assisted in the development of interactive Atlas maps for a project funded by the AAAS Golden Fund.
- Served as the postdoctoral fellow for the Center for Curriculum Materials in Science at Project 2061. Attended and served as the recorder at CCMS Communications and Leadership teams meetings. Assisted in the organization of the 2006 and 2007 CCMS Knowledge Sharing Institutes. Co-organized and helped lead sessions at the KSI about assessment and about science education policy.
- Participated in the Energy and Climate Literacy Stakeholders' Meeting on November 1, 2010 at AAAS in Washington, DC organized by the Department of Energy.
- Supervised a summer intern and mentored new research associates and research assistants.

Postdoctoral Research Associate, University of Colorado, Department of Mechanical Engineering and Department of Chemistry and Biochemistry, Boulder, CO; June 2002 to July 2005

- Constructed a viscous flow atomic layer deposition (ALD) reactor. Monitored ALD growth using a quartz crystal microbalance (QCM). Analyzed ALD thin films using atomic force microscopy (AFM), surface profilometry, and ellipsometry.
- Deposited ALD films on various microelectromechanical systems (MEMS). Developed an ALD procedure to deposit hydrophobic coatings with a contact angle of 108º on MEMS devices to prevent moisture-induced stiction.

- Designed and evaluated MEMS test structures constructed by the MUMPs process and released using HF and a CO_2 critical point dryer (CPD).
- Integrated ALD processes into the DARPA MEMS Exchange program.
- Served as a mentor for chemistry and mechanical engineering graduate students.
- Authored successful DARPA research proposal Grant #NBCH1040003. Assisted in the writing and submittal of other proposals to NSF using Fastlane.

Graduate Research Assistant, University of North Carolina, Department of Chemistry, Chapel Hill, NC; September 1996 to May 2002

- Investigated the vacancy dynamics on and surface roughening of bromine-passivated Si(100) surfaces using an ultra-high vacuum (UHV) Variable Temperature Scanning Tunneling Microscope (VT-STM).
- Used VT-STM to explore the repulsive interactions between halogens on Si(100) surfaces.
- Identified surface structure using Low Energy Electron Diffraction (LEED).
- Characterized tungsten probe tips using Scanning Electron Microscopy (SEM).

Salazar Undergraduate Research Assistant, Muhlenberg College, Department of Chemistry, Allentown, PA; Summer 1995

- Synthesized intermediate molecules required for the construction of a lead-complexing coumarocryptan.
- Characterized products using Nuclear Magnetic Resonance (NMR) and Infrared (IR) Spectroscopy.

Teaching Experience:

Professional Development Workshop Leader, AAAS Project 2061, Aug. 2010-present

- Served as co-instructor during professional development workshops for Project 2061 curriculum materials including workshops at the AAAS Annual Meeting in 2017 and 2018, a short course at the NSTA Annual Meeting in 2017, and school district professional development days in Mid-Atlantic states.
- Co-developed and led the three-day workshop titled "Developing and Using Assessments Aligned to Science Learning Goals" which was held twice a year at AAAS from 2010 to 2015. Guide 20 to 30 participants through the selection and clarification of learning goals and the development and evaluation of assessment items.
- Served as co-instructor during workshops on using the *Atlas of Science Literacy* and other Project 2061 tools which were held across the U.S. from 2006 to 2010.

Girl Scout Troop Leader, Girl Scout Council of the Nation's Capital, Sept. 2010 - present

- Lead a Daisy troop of kindergarteners and 1st graders and a Junior troop of 5th graders and a Cadette troop of 6th – 8th graders. Help girls earn patches by doing activities aligned to the Girl Scout Law and Promise. Support the troop in developing and carrying out community service projects.
- Serve as the troop money manager and represented the troop at service unit and association meetings.
- Serve as troop organizer for Island Creek Elementary School. Recruit new troop leaders and facilitate the formation of new troops.

Aerobics instructor, Aerobic and Fitness Association of America certified, Jan. 1999 - Jan. 2007; Zumba certified, August 2017-present

- Lead participants through a wide range of aerobic classes including floor, step, water, kickboxing, Zumba, and toning.
- Taught at a variety of locations including the LA Fitness, UNC Student Recreation Center, UNC Hospitals, IBM, and The Club for Women Only.

Teaching Assistant, UNC-CH Department of Chemistry; August 1996 - December 1997

- Instructed and supervised various general chemistry experiments.
- Developed and administered lectures and tests.
- Reviewed scientific writing style of undergraduate students.

Academic Tutor, Muhlenberg College Academic Support Services, Fall 1993 - Spring 1996

- Tutored undergraduate students in mathematics and chemistry.
- Led a Calculus recitation for students in Calculus I and II.

Other Experience:

Item Reviewer, Collage Board; (2015 – present)

- Review draft assessment items for the SAT. Identify reading passages with science contexts. Attended in person review panel in NY.

Frontline Leadership Development Program, AAAS (Winter 2017-2018)

- Learned employment laws and HR processes as a manager
- Participated in LinkedIn Learning's Become a Manager Learning Path

Introduction to Structural Equation Modeling (SEM) Short Course, University of Maryland College Park (January 2016)

- Studied path analysis among measured variables, confirmatory factor models, and structural models involving latent causality using Mplus software.

Introduction to Multilevel Analysis: Hierarchical Linear Modeling (HLM) Short Course, University of Maryland College Park (March 2014)

- Studied the theory and purpose of multilevel modeling.
- Discussed the design of multilevel research problems and the analyses of data with HLM.
- Learned how to interpret findings and draw conclusions from HLM results.

Summer Research Training Institute on Cluster-Randomized Trials, Northwestern University (July 2013)

- Received training on planning and implementing, and analyzing data for cluster-randomized trials

Assessment Specialist, BSCS (2013)

- Review learning goals and suggest items that align to the learning goals.
- Provide a content validity review on assessment items developed by BSCS.
- Provide feedback on plan for pilot testing assessment items.

Item Reviewer, Pearson Assessment; (2005 – 2011)

- Reviewed general chemistry and organic chemistry items for the Pharmacy College Admission Test (PCAT) and analogies for Miller Analogies Test (MAT).

Item Reviewer, Concord Consortium; Sept 2009

- Reviewed biology, chemistry, and physics molecular concept inventories.

Learning Progressions in Science (LeaPS) Conference, Iowa City, IA; June 2009

- Participated in discussions about the development and assessment of learning progressions in k-12 education.

Item Reviewer, NAEP Education Statistics Services Institute (NESSI); June 2008

- Reviewed physical science and life science items for grades 4, 8, and 12 for the 2009 National Assessment of Educational Progress.

CSMC Education Policy Conference, Phoenix, AZ; February 2006

- Learned about science education policy and participated in discussions about how science education research relates to science education policy.

Recently Funded Research Grants:

- *Assessing Students' Progress on the Energy Concept Using Three-Dimensional Items.* Grant # R305A170282. Funded by the US Department of Education, Institute of Education Sciences. (2017-2021). Principle Investigator.
- *Building Students' Understanding of Energy in High School Biology*. Grant # R305A150310. Funded by the US Department of Education, Institute of Education Sciences. (2015-2019). Co-Investigator.
- *Identifying Linguistic Factors Associated with Differential Student Performance on Middle School Science Assessments*. Grant#1348622. Funded by the National Science Foundation. (2014-2019). Project Manager.
- *The Development and Validation of an Assessment Instrument to Study the Progression of Understanding of Ideas about Energy from Elementary School through High School.* Grant # R305A120138. Funded by the US Department of Education, Institute of Education Sciences. (2012-2018). Principle Investigator.

Patent:

- George, S.M and Herrmann, C.F, The Regents of the University of Colorado (2009) "Al_2O_3 Atomic Layer Deposition to Enhance the Deposition of Hydrophobic or Hydrophilic Coatings on Micro-Electro-Mechanical Devices," U.S Patent No. 7,553,686.

Recent Peer Reviewed Publications:

- Herrmann Abell, C.F. & DeBoer, G.E. (2018). Investigating a Learning Progression for Energy Ideas from Upper Elementary Through High School. *Journal of Research in Science Teaching, 55*(1), 68-93 DOI: 10.1002/tea.21411.
- Roseman, J.E., Herrmann-Abell, C.F., & Koppal, M. (2017). Designing for the Next Generation Science Standards: Educative Curriculum Materials and Measures of Teacher Knowledge. *Journal of Science Teacher Education*, 28(1), 111-141. DOI: 10.1080/1046560X.2016.1277598.
- Herrmann Abell, C.F., Koppal, M., & Roseman, J.E. (2016). Toward High School Biology: Helping Middle School Students Understand Chemical Reactions and Conservation of Mass in Non-Living and Living Systems. *CBE-Life Science Education.* 15(4), ar74. DOI: 10.1187/cbe.16-03-0112.
- DeBoer, G. E., Quellmalz, E. S., Davenport, J. L., Timms, M. J., Herrmann-Abell, C. F., Buckley, B. C., Jordan, K. A., Huang, C.-W., and Flanagan, J. C. (2014), Comparing three online testing modalities: Using static, active, and interactive online testing modalities to assess middle school students' understanding of fundamental ideas and use of inquiry skills related to ecosystems. *Journal of Research in Science Teaching.* 51(4) 523-554 DOI: 10.1002/tea.21145
- C.F. Herrmann Abell and G.E. DeBoer, "Using distractor-driven standards-based multiple-choice assessments and Rasch modeling to investigate hierarchies of chemistry misconceptions and detect structural problems with individual items," *Chemical Education Research and Practice*, 12 (2011) 184-192. DOI: 10.1039/C1RP90023D

Book Chapters:

- Herrmann-Abell, C., & DeBoer, G. (2014). Developing and Using Distractor-Driven Multiple-Choice Assessments Aligned to Ideas About Energy Forms, Transformation, Transfer, and Conservation. In R. F. Chen, A. Eisenkraft, D. Fortus, J. Krajcik, K. Neumann, J. Nordine & A. Scheff (Eds.), Teaching and Learning of Energy in K – 12 Education (pp. 103-133): Springer International Publishing.
- G.E. DeBoer, C.F. Herrmann Abell, A. Gogos, A. Michiels, T.J. Regan, P. Wilson "Assessment Linked to Science Learning Goals: Probing Student Thinking Through Assessment," Assessing Science Learning: Perspectives from research and practice, Eds. J. Coffey, R. Douglas, and C. Stearns, 2008, pg. 231-252.

Recent Conference Proceedings:

- Herrmann-Abell, C.F., Hardcastle, J., & DeBoer, G.E. (2019, April). "Investigating the Comparability of Multiple-Choice and Constructed-Response Science Assessments." Paper presented at the AERA Annual Conference, Toronto, Canada.
- Herrmann-Abell, C.F., Hardcastle, J., & Roseman, J.E. (2019, April). "Evaluating a Unit Aimed at Helping Students Understand Matter and Energy for Growth and Activity." Paper presented at the AERA Annual Conference, Toronto, Canada.
- Trumbull, E., Nelson-Barber, S., Sexton, U.M., Herrmann-Abell, C.F., & DeBoer, G.E. (2019, April). "Language Factors Affecting Achievement on Standardized Science Assessments." Paper presented at the AERA Annual Conference, Toronto, Canada.
- Hardcastle, J., Herrmann-Abell, C.F., & DeBoer, G.E. (2019, March-April). "Assessing Students' Ability to Create and Use Models to Explain Energy-Related Phenomena." Paper presented at the NARST Annual Conference, Baltimore, MD.
- Herrmann-Abell, C.F., DeBoer, G.E., Trumbull, E., Sexton, U.M., Glassman, S., Huang, C.W., & Nelson-Barber, S. (2019, March-April). "Investigating Two Linguistic Factors Associated with Differential Performance of English Language Learners." Paper presented at the NARST Annual Conference, Baltimore, MD.

- Herrmann-Abell, C.F., Hardcastle, J., & DeBoer, G.E. (2018, April). "Using Rasch to Develop and Validate an Assessment of Students' Progress on the Energy Concept." Paper presented at the AERA Annual Conference, New York, NY.
- Herrmann-Abell, C.F., Hardcastle, J., & DeBoer, G.E. (2018, March). "Comparability of Computer-Based and Paper-Based Science Assessments." Paper presented at the NARST Annual Conference, Atlanta, GA.
- Hardcastle, J., Herrmann-Abell, C.F., & DeBoer, G.E. (2017, April). "Validating an Assessment for Tracking Students' Growth in Understanding of Energy from Elementary School to High School." Paper presented at the NARST Annual Conference, San Antonio, TX.
- Hardcastle, J., Herrmann-Abell, C.F., & DeBoer, G.E. (2017, April). "Comparing Student Performance on Paper-and-Pencil and Computer-Based-Tests." Paper presented at the AERA Annual Conference, San Antonio, TX.
- Roseman, J. E., Kruse, R., & Herrmann-Abell, C. F. (2016, April). "Integrating NGSS Core Ideas and Practices: Supporting and Studying Teachers' Implementation." Paper presented at the AERA Annual Conference, Washington, DC.
- Herrmann-Abell, C.F. & DeBoer, G.E. (2016, April). "Using Rasch Modeling and Option Probability Curves to Diagnose Students' Misconceptions." Paper presented at the AERA Annual Conference, Washington, DC.
- Herrmann-Abell, C.F. & DeBoer, G.E. (2016, April). "Using Rasch Modeling to Investigate a Learning Progression for Energy Ideas." Paper presented at the NARST Annual Conference, Baltimore, MD.
- DeBoer, G.E., Herrmann-Abell, C.F., & Glassman, S. (2016, April). "Differential Performance of English Learners on Science Assessments: The Role of Cognitive Complexity." Paper presented at the NARST Annual Conference, Baltimore, MD.
- DeBoer, G.E., Herrmann-Abell, C.F., & Glassman, S. (2016, April). "Identifying Factors Associated with English Language Learners' Differential Performance on Science Assessments: Investigating the role of cognitive complexity." Paper presented at the AERA Annual Conference, Washington, DC.
- Herrmann-Abell, C. F. & DeBoer, G. E. (2015, April). Using Rasch Modeling to Explore Students Understanding of Elementary School Ideas About Energy. Paper presented at the NARST Annual Conference, Chicago, IL.
- Herrmann Abell, C.F., Flanagan, J.C., & Roseman, J.E. (2014, March-April). Evaluating the Promise of an Intervention that Helps Students Understand Chemical Reactions in Living Systems. Paper presented at the NARST Annual Conference, Pittsburgh, PA.
- Roseman, J.E., Herrmann Abell, C.F., & Flanagan, J.C., Kruse, R., Howes, E., Carlson, J., Roth, K., & Bourdelat-Parks, B. (2013, April). Developing and Evaluating an Eighth Grade Curriculum Unit that Links Foundational Chemistry to Biological Growth: Selecting Core Ideas and Practices – An Iterative Process. Paper presented at the NARST Annual Conference, Rio Grande, Puerto Rico.
- Kruse, R., Howes, E., Carlson, J., Roth, K., & Bourdelat-Parks, B., Roseman, J.E., Herrmann Abell, C.F., & Flanagan, J.C. (2013, April). Developing and Evaluating an Eighth Grade Curriculum Unit that Links Foundational Chemistry to Biological Growth: Changing the Research-based Curriculum. Paper presented at the NARST Annual Conference, Rio Grande, Puerto Rico.
- Herrmann Abell, C.F., Flanagan, J.C., & Roseman, J.E. (2013, April). Developing and Evaluating an Eighth Grade Curriculum Unit that Links Foundational Chemistry to Biological Growth: Using Student Measures to Evaluate the Promise of the Intervention. Paper presented at the NARST Annual Conference, Rio Grande, Puerto Rico.
- Flanagan, J.C., Herrmann Abell, C.F., & Roseman, J.E. (2013, April). Developing and Evaluating an Eighth Grade Curriculum Unit that Links Foundational Chemistry to Biological Growth: Using teacher measures to evaluate the promise of the intervention. Paper presented at the NARST Annual Conference, Rio Grande, Puerto Rico.
- Herrmann Abell, C. F., Flanagan, J.C., & Roseman, J.E. (2012, March). Results from a Pilot Study of a Curriculum Unit Designed to Help Middle School Students Understand Chemical Reactions in Living Systems. Paper presented at the NARST Annual Conference, Indianapolis, IN.

- Herrmann-Abell, C. F. & DeBoer, G. E. (2011, April). Investigating Students' Understanding of Energy Transformation, Energy Transfer, and Conservation of Energy Using Standards-Based Assessment Items. Paper presented at the NARST Annual Conference, Orlando, FL.
- DeBoer, G. E., Herrmann-Abell, C. F., & Wertheim, J. A. (2010, March). Testing the validity of an approach for developing high quality assessment items in middle school science. Paper presented at the NARST Annual Conference, Philadelphia, PA.
- Herrmann-Abell, C. F., & DeBoer, G. E. (2010, March). Probing middle and high school students' understanding of energy transformation, energy transfer, and conservation of energy using content-aligned assessment items. Paper presented at the NARST Annual Conference, Philadelphia, PA.
- Molina, F., DeBoer, G. E., Herrmann-Abell, C. F., & Sweeney, B. (2010, March). A system for high-throughput capture of assessment data from pilot tests. Paper presented at the NARST Annual Conference, Philadelphia, PA.

Recent Presentations:

- Conference Symposium: Herrmann-Abell, C.F., Hardcastle, J., & DeBoer, G.E. (2019, April). "Assessing Students' Progress on the Energy Concept Using Three-Dimensional Assessments." Presentation was part of the symposium *Overcoming Challenges in Developing and Implementing NGSS-Aligned Instructional Materials and Assessments* organized by J. Davenport and presented at the AERA Annual Conference, Toronto, Canada.
- Round table presentation: Herrmann-Abell, C.F., Hardcastle, J., & DeBoer, G.E. (2019, April). "Investigating the Comparability of Multiple-Choice and Constructed-Response Science Assessments." Paper presented at the AERA Annual Conference, Toronto, Canada.
- Round table presentation: Herrmann-Abell, C.F., Hardcastle, J., & Roseman, J.E. (2019, April). "Evaluating a Unit Aimed at Helping Students Understand Matter and Energy for Growth and Activity." Paper presented at the AERA Annual Conference, Toronto, Canada.
- Oral presentation: Trumbull, E., Nelson-Barber, S., Sexton, U.M., Herrmann-Abell, C.F., & DeBoer, G.E. (2019, April). "Language Factors Affecting Achievement on Standardized Science Assessments." Paper presented at the AERA Annual Conference, Toronto, Canada.
- Conference Symposium: Roseman, J.E., Stark, L.A., Herrmann-Abell, C.F., Bass, K.M., DeBoer, G.E., Drits, D., Hardcastle, J., Homburger, S.A., Malone, M., Nehm, R. (2019, March-April). "Developing High School Biology Curriculum Materials that Support NGSS Teaching and Learning: Opportunities and Challenges." Symposium presented at the NARST Annual Conference, Baltimore, MD.
- Oral presentation: Herrmann-Abell, C.F., DeBoer, G.E., Trumbull, E., Sexton, U.M., Glassman, S., Huang, C.W., & Nelson-Barber, S. (2019, March-April). "Investigating Two Linguistic Factors Associated with Differential Performance of English Language Learners." Paper presented at the NARST Annual Conference, Baltimore, MD.
- Round table presentation: Herrmann-Abell, C.F., Hardcastle, J., & DeBoer, G.E. (2018, April). "Using Rasch to Develop and Validate an Assessment of Students' Progress on the Energy Concept." Paper presented at the AERA Annual Conference, New York, NY.
- Oral presentation: Herrmann-Abell, C.F., Hardcastle, J., & DeBoer, G.E. (2018, March). "Comparability of Computer-Based and Paper-Based Science Assessments." Paper presented at the NARST Annual Conference, Atlanta, GA.
- Poster presentation: Herrmann-Abell, C.F., Hardcastle, J., & DeBoer, G.E. (2018, January). Comparability of Computer-Based and Paper-Based Science Assessments." Paper presented at the IES Annual Principal Investigators Meeting, Arlington, VA.
- Oral presentation: Herrmann-Abell, C.F. & DeBoer, G.E. (2016, April). "Using Rasch Modeling and Option Probability Curves to Diagnose Students' Misconceptions." Paper presented at the AERA Annual Conference, Washington, DC.
- Oral presentation: Herrmann-Abell, C.F. & DeBoer, G.E. (2016, April). "Using Rasch Modeling to Investigate a Learning Progression for Energy Ideas." Paper presented at the NARST Annual Conference,

Baltimore, MD.

- Oral presentation: Herrmann-Abell, C. F. & DeBoer, G. E. (2015, April). Using Rasch Modeling to Explore Students Understanding of Elementary School Ideas About Energy. Paper presented at the NARST Annual Conference, Chicago, IL.
- Invited Oral presentation: "Using Rasch Modeling to Explore Students' Understanding of Elementary School Ideas About Energy" TERC, Boston, MA, February 3, 2105.
- Oral presentation: Herrmann Abell, C. F., Flanagan, J.C., & Roseman, J.E. (2014, March-April). *Evaluating the Promise of an Intervention that Helps Students Understand Chemical Reactions in Living Systems*. Paper presented at the NARST Annual Conference, Pittsburgh, PA.
- Laptop presentation, Herrmann Abell, C.F. & Roseman J.E. (2013, September). "Studying the Efficacy of the Toward High School Biology Curriculum Intervention," *IES PI Meeting*, Washington, DC.
- Oral presentation, Herrmann Abell, C.F. (2013, August). "AAAS Assessment Resources," *Howard County Public School System Secondary Science Professional Learning Day*, Marriottsville, MD.
- Oral presentation, Herrmann Abell, C.F. (2013, April). "An Introduction to Project 2061's Science Assessment Resources," *Howard County Public School System Spring Professional Learning Day*, Marriottsville, MD.
- Oral presentation, Herrmann Abell, C. F., Flanagan, J.C., & Roseman, J.E. (2013, April). "Toward High School Biology: Evaluating student understanding," Paper presented at the *National Association of Research in Science Teaching (NARST) Annual Conference*, Indianapolis, IN.
- Oral presentation: Herrmann Abell, C. F., Flanagan, J.C., & Roseman, J.E. (2013, April). *Developing and Evaluating an Eighth Grade Curriculum Unit That Links Foundational Chemistry to Biological Growth: Using Student Measures to Evaluate the Promise of the Intervention*. Paper presented at the National Association of Research in Science Teaching (NARST) Annual Conference, Rio Grande, Puerto Rico.
- Oral presentation, "Finding Out What Middle & High School Students Know About Energy." *Energy Summit: Developing a Framework for the Teaching and Learning of Energy*, East Lansing, MI. December15-17, 2012.
- Oral presentation: Herrmann Abell, C. F., Flanagan, J.C., & Roseman, J.E. (2012, March). *Results from a Pilot Study of a Curriculum Unit Designed to Help Middle School Students Understand Chemical Reactions in Living Systems*. Paper presented at the National Association of Research in Science Teaching (NARST) Annual Conference, Indianapolis, IN.
- Conference symposium: Herrmann Abell, C.F., Flanagan, J.C., & Roseman, J.E. (2012, July). *Toward High School Biology: Evaluating student understanding*. Paper was part of the symposium *Toward High School Biology: Advancing the Teaching and Learning of Biological Processes through Foundational Chemistry* organized by R. Kruse, C.F. Herrmann Abell, & E. Howes and presented at the Biannual Conference on Chemical Education (BCCE) in University Park, PA.
- Short Course: *Aligning Science Assessment Items to Content Standards* at the 2012 National Conference of the National Science Teachers Association (NSTA), Indianapolis, IN.
- Workshop presentation: *AAAS Project 2061 Science Assessment Items & Resources* part of NSELA's Tools and Ideas for Leaders workshop during the 2012 National Conference of the National Science Teachers Association (NSTA), Indianapolis, IN.
- Webinar, "Getting at Effective Assessment Aligned to Science Learning Goals," *National Science Digital Library (NSDL) Brown Bag,* September 2011.
- Oral presentation, "Investigating Students' Understanding of Energy Transformation, Energy Transfer, and Conservation of Energy Using Standards-Based Assessment Items," *The National Association for Research in Science Teaching Annual Conference*, Orlando, FL, April 2011.
- Oral presentation, "Developing and Using Assessments Aligned to Science Learning Goals" and "An Introduction to Project 2061's Science Assessment Resources," *Howard County Public School System Spring Professional Development Day*, Clarksville, MD, March 2011.

- Oral presentation, “Aligning Science Assessment Items to Content Standards” part of NSELA’s Tools and Ideas for Leaders workshop during the *National Science Teachers Association (NSTA) National Conference*, Baltimore, MD, Nov. 2010.
- Oral presentation, “Investigating students’ ideas about chemistry using standards-based assessment items.” *The Biannual Conference on Chemical Education (BCCE 2010)*, Denton, TX, August 1-5, 2010
- Poster presentation, “Uncovering middle and high school students' understanding of the forms of energy.” *The American Association of Physics Teachers (AAPT) Winter Meeting*, Washington, DC., February 14-17, 2010
- Oral presentation, “Uncovering high school students' ideas about energy.” *The American Association of Physics Teachers (AAPT) Winter Meeting*, Washington, DC., February 14-17, 2010

Recent Research Recognition in Popular Press:

- “Navigation of Computer-Based Tests Matters for Young Students, Study Finds,” *Education Week*, April 30, 2017, http://blogs.edweek.org/edweek/DigitalEducation/2017/04/computer_based_tests_young_students_research.html
- “Curriculum Bridges Biology, Chemistry Basics to Prepare Students for High School,” *Education Week*, February 16, 2016, http://blogs.edweek.org/edweek/curriculum/2016/02/curriculum_bridges_biology_chemistry_basic_prepare_students_for_high_school.html?qs=toward+high+school+biology.
- “DNA? Atoms? What Science Students Know, and Don’t Know,” *Education Week*, April 8, 2011, http://blogs.edweek.org/edweek/curriculum/2011/04/new_site_shows_what_students_d.html?qs=science

Recent Awards and Honors:

- Girl Scouts Nation's Capital Jan Verhage Spirit of Leadership Award, Spring 2019

Current Professional Society Memberships:

- Member of the American Educational Research Association (AERA); Division D Measurement & Research Methodology; SIG #83 Rasch Measurement (2012 - present)
- Member of the National Association for Research in Science Teaching (NARST); Contemporary Methods for Science Education Research RIG (2007 - present)

Service to the profession:

- Member of the Editorial Board of the Journal of Research in Science Teaching (2018-2021)
- Secretary of the Rasch Measurement SIG #83 of AERA (2018-2020)
- Reviewer of proposals submitted to National Science Foundation programs including Research and Evaluation on Education in Science and Engineering (REESE), Faculty Early Career Development Program (CAREER), Discovery Research PreK-12 (DRK-12) (2012 - 2018)
- Program Committee member, Curriculum, Evaluation, and Assessment (Strand 10) Co-coordinator for NARST Annual Conferences (2012-2014)
- Presider for NARST Annual Conferences, Strand 10 (2012 - present)
- Assessor for NARST Annual Conferences, Strand 10 (2009 - present)
- Reviewer for the journal “Journal of Engineering Education” (2015 - present)
- Reviewer for the journal “SAGE Open” (2015 - present)
- Reviewer for the journal “Journal of Research in Science Teaching” (2012 - present)
- Reviewer for the journal “Chemical Education Research and Practice” (2011 - present)
- Reviewer for the journal “Science Education” (2010 - present)
- Reviewer for the IEEE journal “Transactions on Advanced Packaging” (2003 - 2005)