

North Carolina State University, Department of Chemistry, Campus Box 8204, Raleigh, NC 27695

EDUCATIONAL HISTORY

Ph.D. in Chemistry, Drexel University, Philadelphia, PA, June 1999
M.S. in Chemistry, Georgetown University, Washington D.C., June 1984
B.S. in Chemistry, University of Puerto Rico, Rio Piedras, PR, May 1981

PROFESSIONAL EXPERIENCE

2012 – present Full Professor of Chemistry, North Carolina State University, Raleigh, NC
2019 – 2022 Associate Dean for Academic Affairs, College of Sciences, NC State University
2012 – 2014 Program Director – EHR/DRL, National Science Foundation, Arlington, VA
2005 to 2012 Associate Professor of Chemistry, North Carolina State University, Raleigh, NC
1999 to 2005 Assistant Professor of Chemistry, North Carolina State University, Raleigh, NC
1995 to 1999 Graduate Teaching Assistant, Drexel University, Philadelphia, PA.

AWARDS AND RECOGNITION

ACS Award for Achievement in Research for the Teaching and Learning in Chemistry 2023
American Chemical Society Fellow 2021
Fulbright Scholar - Uruguay 2018-19
Board of Governors Award for Excellence in Teaching: North Carolina State University 2016
Board of Governors Award for Excellence in Teaching: Nomination from College of Sciences 2015
Chair Gordon Research Conference: Chemistry Education Research and Practice 2013
Alumni Distinguished Undergraduate Professor, NCSU 2011-2012
Visiting Scientist of the Western Connecticut Section of the American Chemical Society 2010
Most cited articles in Journal of Chemical Education (DOI:10.1021/ed086p1280A) 2009
Academy of Outstanding Teachers – Outstanding Teacher Award, NC State University 2008-2009
National Science Foundation CAREER Awardee 2004
The Leroy and Elva Martin Award for Teaching Excellence, NC State University 2001
Hewlett Fellow at NC State University 2000-2002

SYNERGISTIC PROFESSIONAL SERVICE

Appointed to the Board of Publications, Journal of Chemical Education, 2016-2020. Elected Chair 2021-24
Appointed Committee on Personnel and Nominations, ACS, Division of Chemistry Education 2008-2014
Member-at-Large - Division of Chemical Education: Elected 2007, Term 2008-2011
Board of Trustees ACS Examinations Institute, 2008-2011
Technical Program Chair 2010 Biennial Conference in Chemical Education
Technical Program Chair 2007 ACS Boston, Division of Chemical Education
Chair, Chemical Education Symposia: 2004 (South Eastern Regional, SERMACS), & 2009 SERMACS
Organizer Chemical Education Symposia: BCCE 2004 & 2008, ACS 2010 San Francisco & 2010 Boston
ACS Exam Committee for the Diagnostic of Undergraduate Chemical Knowledge Examination: 2006-2008.
Second appointment for DUCK 2012, 2010-2012.
ChemEd Task Force on the Hiring and Promotion/Tenure of Faculty in Chemical Education: 2005-2008
Discussant Leader – Gordon Research Conference: Chemistry Education Research and Practice: June 2007
Reviewer Journals: *JCE*, *JCST*, *CERP*, *JOTSE*, *Nano Education*, *International J Sci. Educ.*, *TCE*
Project Liaison, American Chemical Society (ACS) SEED Program: 2000-2007
Founding Board of Directors, The International Center for First-Year Undergraduate Chemistry: 2003-present; Elected Executive Board 2005, Term 2006-2010

PUBLICATIONS 55 refereed articles, 1 Lab Manual, 6 Book Chapters, 1 Educational Module

“Visual-Spatial Skills, Strategies, and Challenges to Extract, Represent and Predict Stereochemical Outcomes of Cycloadditions using a Hexagonal Prism Reference Frame”, Emmanuel Echeverri and Maria Oliver-Hoyo, *Journal of Chemical Education*, **2023**, 100(7), 2483-2494.

“Gaussian-2-Blender: An open-source program for conversion of computational chemistry structure files to 3D rendering and printing file formats”, Emmanuel Echeverri and Maria Oliver-Hoyo, *Journal of Chemical Education*, **2021**, 98(10), 3348-3355.

“Development and Evaluation of the H NMR MolecularAR Application”, Lyniesha C. Wright and Maria Oliver-Hoyo, *Journal of Chemical Education*, **2021**, 98(2), 478-488.

“The Design of Instructional Resources Aimed at Improving Visualization in Order to Promote Understanding of Chemical Phenomena”, Maria Oliver-Hoyo, *DARUNA: Scientific, Educational & Literary Journal*, Special Issue on “Reforms in the Teaching and Learning of Science”, **2020**, 47, 12-16. ISSN: 2312-6051

“Student Assumptions and Mental Models Encountered in IR Spectroscopy Instruction”, Lyniesha C. Wright and Maria T. Oliver-Hoyo, *Chemistry Education Research & Practice*, **2020**, 21(1), DOI 10.1039/C9RP00113A.

“Supporting the Teaching of IR Spectroscopy Concepts Using a Physical Model”, Lyniesha C. Wright and Maria T. Oliver-Hoyo, *Journal of Chemical Education*, **2019**, 96(5), 1015-1021.

“Supporting the growth and impact of the Chemistry Education Research community”, Herrington, D.G., Sweeder, R.D., Daubenmire, P.L., Bauer, C.T., Lowery Bretz, S., Bunce, D.M., Carmel, J.H., Cole, R., DeKorver, B.K., Kelly, R.M., Lewis, S.E., Oliver-Hoyo, M., Ryan, S.A.C.,¹ Stains, M., Towns, M.H., Yezierski, E.J. *Journal of Chemical Education*, **2019**, 96(3), 393-397. DOI 10.1021/acs.jchemed.8b00823

“Using 3D printed physical models to monitor knowledge integration in biochemistry”, Melissa Babilonia-Rosa, Kenny Kuo, & Maria Oliver-Hoyo, *Chemistry Education Research & Practice*, **2018**, 19, 1199-1215. DOI: 10.1039/c8rp00075a

“Creating 3-D physical models to probe student understanding of macromolecular structure”, A. Kat Cooper and Maria Oliver-Hoyo, *Biochemistry and Molecular Biology Education*, **2017**, 45(6), 491-500. DOI: 10.1002/bmb.21076

“The promotion of spatial skills in chemistry and biochemistry education at the college level”, M. T. Oliver-Hoyo and Melissa Babilonia-Rosa, *Journal of Chemical Education*, **2017**, 94(8), 996-1006. <http://dx.doi.org/10.1021/acs.jchemed.7b00094>

“Argument construction in understanding noncovalent interactions: A comparison of two argumentation frameworks”, A. Kat Cooper and M. T. Oliver-Hoyo, *Chemistry Education Research and Practice*, **2016**, 17, 1006-1018. DOI: 10.1039/c6rp00109b

“An Analogy Emphasizing the Importance of Available Surface Area in Dye Sensitized Solar Cells”, Marc Muniz and Maria T. Oliver-Hoyo, *Journal of Nano Education*, **2016**, 8, 37-46.

“On the use of analogy to connect core physical chemical concepts to those at the nanoscale”, Marc Muniz and Maria T. Oliver-Hoyo, *Chemistry Education Research and Practice*, **2014**, 15, 807-823. DOI: 10.1039/c4rp00097h

“Investigating Quantum Mechanical Tunneling at the Nanoscale via Analogy: Development and Assessment of a Teaching Tool for Upper-Division Chemistry”, Marc Muniz and Maria Oliver-Hoyo, *Journal of Chemical Education*, **2014**, 91(10), 1546-1556. DOI: 10.1021/ed400761q

“The Development of a Visual-Perceptual Chemistry Specific (VPCS) Assessment Tool”, Maria Oliver-Hoyo and Caroline Sloan, *Journal of Research in Science Teaching*, **2014**, 51(8), 963-981.

“Physical Models That Provide Guidance in Visualization Deconstruction in an Inorganic Context”, Holly K. Schiltz, Maria T. Oliver-Hoyo, *Journal of Chemical Education*, **2012**, 89(7), 873-877.

“Metodologías activas para el aprendizaje de la Física: un caso de hidrostática para su introducción en la práctica docente”, Maria T. Oliver-Hoyo, Francisco Alconchel, Gabriel Pinto, *Revista Española de Física, Real Sociedad Española de Física*, **2012**, 26(1), Enero-Marzo, 1-6.

“New Tools for Examining Undergraduate Students’ STEM Stereotypes: Implications for Women and Other Underrepresented Groups”, *New Directions for Institutional Research*, **2011**, 152 (Winter), 87-98.

“An Acoustic analogy: Tuning Forks and Surface Plasmon Resonance of Metallic Nanostructures”, Marc N. Muniz, Maria T. Oliver-Hoyo*, *Journal of Nano Education*, **2011**, 3, 45-50.

“Lessons Learned From The Implementation And Assessment Of Student-Centered Methodologies”, Maria T. Oliver-Hoyo, *Journal of Technology and Science Education*, **2011**, 1(1), 2-11, ISSN 2013-6474

“Capturing Stereotypes: Developing a scale to explore U.S. college students’ images of science and scientists”, Mary Wyer, Jennifer Schneider, Sylvia Nassar-McMillan, and Maria Oliver-Hoyo, *Science, International Journal of Gender, Science and Technology*, **2010**, 3(2), 381-415.

“Using Focus Groups in Preliminary Instrument Development: Expected and Unexpected Lessons Learned”, Sylvia C. Nassar McMillan, Mary Wyer, Maria Oliver-Hoyo, Amy Ryder-Burge, *The Qualitative Report*, **2010**, 15(6), 1621-1634.

“Multi-sensory Chemical Equilibrium Investigation as a Learning Lab Experience”, Maria T. Oliver-Hoyo*, and Deborah Bromfield Lee, *The Chemical Educator*, **2010**, 15, 1-5. DOI 10.1333/s00897102276a

“The chemistry of self-heating products: An activity for classroom engagement”, Maria T. Oliver-Hoyo*, G. Pinto, J. Llorens-Molina, *Journal of Chemical Education*, **2009**, 86 (11), 1277-1280.

“Enjoy a Hot Drink Thanks to Chemistry!”, G. Pinto, Maria T. Oliver-Hoyo*, J. Llorens-Molina, *Journal of Chemical Education*, **2009**, 86 (11), 1280A-1280B.

“An Esterification Kinetics Experiment that Relies on the Sense of Smell”, Deborah C. Bromfield-Lee and Maria T. Oliver-Hoyo*, *Journal of Chemical Education*, **2009**, 86, (1), 82-84.

“Aspectos fisicoquímicos implicados en las bebidas autocalentables: un caso de aplicación de metodologías activas mediante aprendizaje basado en problemas”, Gabriel Pinto Cañon, Juan Llorens Molina, Maria T. Oliver-Hoyo, *Anales de Química-Real Sociedad Española de Química*, **2009**, 105(1), 50-56.

“What’s in your bottled water? Look at the label!”, Gabriel Pinto and Maria T. Oliver-Hoyo, *The Chemical Educator*, **2008**, 13, 341-343. WebID: S1430-4171(08)62171-5.

"Student Evaluations That Generate More Questions Than Answers", Maria T. Oliver-Hoyo, *Journal of College Science Teaching*, **2008**, Sept/Oct, 37-39.

“Selective Etching via Soft Lithography of Conductive Multilayered Gold Films with Analysis of Electrolyte Solutions”, Ralph W. Gerber and Maria Oliver-Hoyo, *Journal of Chemical Education*, **2008**, 85 (8), 1108-1111.

“Hiring and Promotion in Chemical Education”, Bauer, C.F.; Clevenger, J.V.; Cole, R.S.; Jones, L.L.; Kelter, P.B.; Oliver-Hoyo, M.T.; Sawrey, B.A., *Journal of Chemical Education*, **2008**, 85 (7), 898-901.

“Using Laboratory Chemicals to Imitate Illicit Drugs in a Forensic Chemistry Activity”, Shawn Hasan, Deborah Bromfield-Lee, Maria T. Oliver-Hoyo* and Jose A. Cintron-Maldonado, *Journal of Chemical Education*, **2008**, 85 (6), 813-816.

“Promoting the Use of Higher-Order Cognitive Skills in Qualitative Problem Solving“, Maria Oliver-Hoyo* and Jason Justice, *Journal of College Science Teaching*, **2008**, 37 (5), 62-67.

“Using the Relationship Between Vehicle Fuel Consumption and CO₂ Emissions to Illustrate Chemical Principles”, Maria T. Oliver-Hoyo* and Gabriel Pinto, *Journal of Chemical Education*, **2008**, 85 (2), 218-220

“A Qualitative Organic Analysis That Exploits the Senses of Smell, Touch, and Sound”, Deborah C. Bromfield-Lee and Maria T. Oliver-Hoyo, *Journal of Chemical Education*, **2007**, 84(12), 1976-1978.

“Food Enzymes”, Rachel McBroom and M.T. Oliver-Hoyo, *The Science Teacher*, **2007**, 74(7), 58-63.

“From the Research Bench to the Teaching Laboratory: Gold Nanoparticle Layering”, Maria T. Oliver-Hoyo* and Ralph W. Gerber, *Journal of Chemical Education*, **2007**, 84 (7), 1174-1176.

“Low Cost Six Electrode Instrument for Measuring Electrical Properties of Self-Assembled Monolayers of Gold Nanoparticles”, Ralph W. Gerber and Maria T. Oliver-Hoyo*, *Journal of Chemical Education*, **2007**, 84 (7), 1177-1178.

“Lecciones Prácticas de la Implementación de Métodos Inquisitivos de Enseñanza”, Maria T. Oliver-Hoyo, *Anuario Latinoamericano de Educación Química*, Año XIX, N°XXI, **2005-2006**, 65-71.

"The Use of Triangulation Methods to Validate Results of Qualitative Educational Research", Maria T. Oliver-Hoyo* and DeeDee Allen, *Journal of College Science Teaching*, **2006**, Jan/Feb, 42-47.

"Attitudinal Effects of a Student-Centered Active Learning Environment", Maria Oliver-Hoyo* and DeeDee Allen, *Journal of Chemical Education*, **2005**, 82 (6), 944-949.

"A Closer Look at Olfactory Titrations", Kerry Neppel, Maria T. Oliver-Hoyo*, Connie Queen, and Nicole Reed, *Journal of Chemical Education*, **2005**, 82 (4), 607-610.

"Fractional Distillation of Air and Other Demonstrations with Condensed Gases", Maria T. Oliver-Hoyo and William L. Switzer III, *Journal of Chemical Education*, **2005**, 82 (2), 251-254.

"Trucks, Sales, Mechanics, and Repairs: An Analogy for the Method of Initial Rates", DeeDee Allen* and Maria T. Oliver-Hoyo, *The Chemical Educator*, **2004**, 10(1), 1-4.

"Implementing Inquiry-Guided Instruction: Practical Issues" Maria T. Oliver-Hoyo*, DeeDee Allen, and Misti Ault Anderson, *Journal of College Science Teaching*, **2004**, 33 (6), 20-24.

"Effects of an Active Environment: Teaching Innovations at a Research I Institution", Maria Oliver-Hoyo* and DeeDee Allen, Journal of Chemical Education, **2004**, 81(3), 441-448.

"Visualizing Basic Nuclear reactions", Maria Oliver-Hoyo* and DeeDee Allen, The Journal of Mathematics and Science: Collaborative Explorations, Fall **2003**, 6, 167-173.

"Designing a Written Assignment to Promote the Use of Critical Thinking Skills", Maria Oliver-Hoyo, Journal of Chemical Education, **2003**, 80(8), 899-903.

"Medidas para la Evaluación de Actitudes hacia la Química", Maria T. Oliver-Hoyo, Revista Cubana de Química, Vol XV (1), **2003**. (also online: www.ict.uo.edu.cu)

"Fingerprinting: Commercial Products and Elements", Maria Oliver-Hoyo* and DeeDee Allen, Journal of Chemical Education, **2002**, 79 (4), 459-461.

"Qualitative Analysis of Fourteen White Solids and Two Mixtures Using Household Chemicals", Maria Oliver-Hoyo*, DeeDee Allen, S. Solomon, B. Brook, J. Ciraolo, S. Daly, and L. Jackson; Journal of Chemical Education, **2001**, 78 (11), 1475-78.

"Problem Analysis: Lesson Scripts and Their Potential Applications", Maria Oliver-Hoyo; Journal of Chemical Education, **2001**, 78 (10), 1425-1428.

"Overhead Projector Demonstrations Using Household Materials", S. Solomon, B. Brook, J. Ciraolo, L. Jackson, Chin Hyu Hur, and M. Oliver-Hoyo, The Journal of Mathematics and Science: Collaborative Explorations, 3 (2), Fall **2000**, 141-147.

"Generating Noxious Water-Soluble Gases on the Overhead" Solomon, S., Chinyu Hur, and Maria Oliver-Hoyo, Journal of Chemical Education, **1998**, 75 (12), 1581-82.

"One Hour of Chemical Demonstrations", Solomon, S., Maria Oliver-Hoyo, Jun Tian and Bryan Brook, Journal of Mathematics and Science: Collaborative Explorations, 1 (1), **1997**, 43-52.

"Concepts in General Chemistry"; Laboratory Book (7th Ed) Solomon, S.; A. Addison, and Maria T. Oliver-Hoyo, Kendall-Hunt, Dubuque, Iowa, 1999. (Laboratory manual)

"Different faces of practical work: Activity-based instruction and its impact on learning", Maria T. Oliver-Hoyo in "*Science Education Research and Practical Work*" Ingo Elks, Silvija Markic, and Bernd Ralle, Eds.; Shaker Verlag, Aachen, Germany, **2016**, pp105-117.

"New Tools for Examining Undergraduate Students' STEM Stereotypes: Implications for Women and Other Underrepresented Groups", Sylvia C. Nassar-McMillan, Mary Wyer, Maria Oliver-Hoyo, Jennifer Schneider in "*Attracting and Retaining Women in STEM: New Directions for Institutional Research*", Joy Gaston Gayles, Ed; Jossey-Bass, San Francisco, CA **2012**

"Content coverage in a lecture format versus activity-based instruction", Chapter 14 by Maria T. Oliver-Hoyo in "*Investigating Classroom Myths through Research on Teaching and Learning*", Bunce, Diane, Ed; ACS Symposium Series: ACS Publications, Wash DC. (Invited chapter) **2011**

"Enriching the Chemistry Experience for ALL Students: Sensorial experiments that include visually challenged students", Chapter 11 by Maria Oliver-Hoyo in *Making Chemistry Relevant: Strategies for Including All Students in a Learner-Sensitive Classroom Environment*, Sharmistha Basu-Dutt, Ed.; John Wiley & Sons Inc: NJ **2010**, pp 207-225.

“Practical Issues on the Development, Implementation, and Assessment of a Fully Integrated Laboratory-Lecture Teaching Environment”, Chapter 10 by Maria T. Oliver-Hoyo in “*Chemist’s Guide to Effective Teaching: Perspectives and Applications*” N. J. Pienta, M. Cooper, and T.J. Greenbowe. Eds.; Prentice Hall: NJ **2009**, pp 146-157.

"SCALE-UP: Bringing Inquiry-guided Learning to Large Enrollment Courses", Chapter 5 by Maria T. Oliver-Hoyo and Robert Beichner in "*Teaching and Learning Through Inquiry: A Guidebook for Institutions and Instructors*", Lee, V.S. (Ed.), Sterling, VA: Stylus Publishing, LLC. **2004**, pp 51-69.

"Using Household Chemicals in Qualitative Analysis", Maria T. Oliver-Hoyo, Chemical Education Resources, Thomson Brooks/Cole (Educational module)

ACADEMIC PRESENTATIONS **5 plenaries, 34 contributed papers, 59 invited presentations**

1. UNC Greensboro, April 1, 2022, “The role of frameworks in the development of instructional materials”
2. UNC Wilmington, February 21, 2020, “Instructional resources that promote visualization of chemical phenomena”
3. University of Iowa, November 8, 2019, “Promoting visualization of chemical phenomena”
4. 2018 Reforms in Science Teaching and Learning Conference in Haifa, Israel, Dec. 11-13, 2018, “The design of instructional resources aimed at improving visualization in order to promote understanding of chemical phenomena”.
5. 2018 Biennial Conference in Chemical Education, Univ. of Notre Dame, July 29, 2018, “The Intricacies of CER Positions: Perspectives on what it takes to thrive doing CER in academia”.
6. Univ. of Michigan – Gombert Seminar Series at the Chemistry Department, April 11, 2018, “Instructional resources designed to promote visualization of chemical phenomena”
7. Univ. of Massachusetts, April 26, 2018, “Instructional resources designed to promote visualization of chemical phenomena”
8. North Dakota State University – August 16-18, 2016. a) Talk title: “Development, implementation, and assessment of activity-based instruction”
b) Professional development workshop to STEM faculty on activity-based instructional pedagogies
9. FuSE (Future Science Educators) Program at UNC, Chapel Hill, May 2, 2016, “
10. ACS Award for Achievement in Research for the Teaching & Learning of Chemistry: Symposium in honor of Avi Hofstein, March 14, 2016, “Exploiting all senses in chemistry laboratories: Novel adaptations of sensory activities for laboratory instruction”
11. University of South Florida, FL, Nov. 19, 2015, “Instructional resources that promote conceptualization and visualization in chemistry”.
12. SERMACS/SWRM, November 5, 2015, Title: “Monitoring gains in visualization skills”.
13. American Chemical Society (ACS) Presidential Symposium at National Meeting, Boston, August 17, 2015, “Strategies to effectively incorporate learner-centered instruction into chemistry service courses”.
14. ACS National Meeting, Boston, August 18, 2015, “Curricular changes that affect content and pedagogy”.
15. Congreso Latinoamericano de Química del Perú, October 16, 2014, “Innovación en Química: Cambiando el formato del aula y los experimentos en el laboratorio”.
16. Colorado School of Mines, Golden, CO, Sept. 18, 2014, “Development, Implementation, and Assessment Of Integrated Instruction for Undergraduate Science Courses”
17. ACS National Meeting, New Orleans, April 7-11, 2013, “Rethinking one aspect of the higher education enterprise: Active learning strategies gaining momentum across continents”
18. SERMACS, Raleigh, NC, Nov. 16, 2012, “Teaching intervention to promote visualization skills in an inorganic context”
19. Biennial Conference in Chemical Education, August 2, 2012, “Using the Visual Spatial Chemistry Specific Tool, VSCS, to monitor gains in visualization skills”
20. ACS San Diego, March 28, 2012, “Institutionalizing instructional formats: Two worlds apart”

21. SERMACS, Richmond, VA, October 28, 2011, "VSCS tool: Visual-spatial chemistry specific assessment tool"
22. NC A&T State University, Greensboro, NC, October 21, 2011, "Implementation and Results of Active Learning Strategies in Large Enrollment Classes"
23. University of Wisconsin-Milwaukee, Sept. 23, 2011, "Making Student-Centered Instruction Work Effectively in Large Enrollment Classes"
24. XXXIII Biennial de la Real Sociedad Española de Química, Valencia, Spain, July 27, 2011, "Proyectos educativos que enlazan la química y la pedagogía"
25. Universidad Politécnica de Madrid, Jornada "Aspectos didácticos de la Química", Spain, July 22, 2011
26. Hawaii International Conference on Education, Honolulu, HI, January 5, 2011, "Activity-Based Instruction in College Chemistry Curriculum: A CER Project"
27. Western Connecticut ACS Section, Fairfield, CT, March 18, 2010, "Chemical Education Research: Connecting Advances from Discipline-based and Pedagogy"
28. SERMACS 2009, San Juan, Puerto Rico, October 22, 2009, "Research Aspects of the Development of a Visual-Perceptual Skills Tool".
29. University of South Florida, Sept. 24, 2009, "Practices and Studies of the SCALE-UP Project"
30. GRC: Chemical Education Research & Practice, June 21, 2009, Visual-Perceptual Skills and Their Role in Chemistry Education".
31. CER Graduate Conference at Miami University in Ohio, June 6, 2009, "Merits of Activity-Based Instruction: From Practical Issues to Pedagogical Gains"
32. ACS Division of Education at Clemson University, October 3, 2008, "Flexibility and Impact of SCALE-UP Activities in the Classroom"
33. Keynote Speaker at Cape Fear Community College, Wilmington, NC, October 23, 2008, "Sensorial Experiments: Exploiting All Senses in Chemistry Laboratories".
34. Guilford College, Greensboro, NC, October 18, 2008, "Making Student-Centered Instruction Work Effectively in Large Enrollment Classes".
35. Universidad Politécnica de Madrid, June 10 & 11, 2008, "Poniendo en Práctica el Aprendizaje Activo" & "El Grupo Como Fundación en el Aprendizaje" (workshop).
36. ACS National Meeting, New Orleans, April 6, 2008, "NSF Awards: Encouraging and Advancing Scientific Career at Different Stages" (invited)
37. ACS National Meeting, New Orleans, April 9, 2008, "Problem Solving and the Promotion of High Order Cognitive Skills".
38. 2YC3 Conference, November 2, 2007, "Technology in Chemical Education Research: from technology in the classroom to nanotechnology in the lab".
39. SERMACS 2007, Greenville, SC, October 23, 2007, "Using the GOAL Protocol to Promote Cognitive Skills in Qualitative Problem Solving".
40. University of Miami, Ohio, Sept. 20, 2007, "Aspects of Chemical Education That Expand from Discipline-Based to Pedagogy".
41. Keynote Speaker at 2nd Biennial FYI-CHEM Conference, University of Colorado, Boulder, May 31, 2007, "Integrating Chemistry & Pedagogy: Teaching strategies and instructional materials with ALL students in mind".
42. 2nd Biennial FYI-CHEM Conference, University of Colorado, Boulder, June 1, 2007, "Real life Problems to Promote Active Learning in Chemistry", Gabriel Pinto co-author.
43. ACS National Meeting, Chicago, March 27, 2007, "Sensorial Experiments that Rely on Senses Other than Eyesight".
44. Emory University: Atlanta, January, 26, 2007, "Development, Implementation, and Evaluation of an Integrated Lab-Lecture Format for Undergraduate Science Courses".
45. Escuela Técnica Superior de Ingenieros Industriales, Universidad Politécnica de Madrid, Spain, November 15, 2006, "Un Caso Práctico de Aprendizaje Activo: North Carolina State University".
46. Chemistry and Physics Depts. at U. of Salamanca, Spain, November 8, 2006, "Aprendizaje activo y cooperativo de la Química: un caso práctico en una universidad de Estados Unidos".
47. Instituto de Ciencias de la Educación, Madrid, Spain, October 19, 2006, "Aprendizaje activo y cooperativo de la Química: un caso práctico en una universidad de Estados Unidos".

48. Royal Spanish Society of Chemistry, Madrid, Spain, Sept. 12, 2006, "Aprendizale Activo de la Quimica".
49. Universidad Politecnica de Madrid, Spain, September 20, 2006, "Aprendizaje Cooperativo de Ciencias Experimentales para Alumnos de Ingeniería".
50. Biennial Conference in Chemical Education at Purdue University, August 1, 2006, "Integrating Lecture and Lab Throughout the Chemistry Curriculum".
51. American Association of Physics Teachers Conference at Syracuse University: Invited talk at AAPT, July 25, 2006, "Implementation and Results of Active Learning Strategies in Large Enrollment Classes".
52. University of Maine: Invited speaker at "Integrating Science and Math Education Research Conference", June 26 2006, "Development, Implementation, and Evaluation of an Integrated Lab-Lecture Format for Undergraduate Science Courses".
53. Plenary talk at "Enhancing Student-Centered Learning Strategies in Higher Education Conference", May 27, 2006, "Development, Implementation, and Assessment of Constructivist Strategies".
54. State University of New York: Stonybrook, April 28, 2006, "Making Student-Centered Instruction Work Effectively in Large Enrollment Classes".
55. ACS National Meeting, Atlanta, March 2006, "Curricular changes that address the needs of a variety of majors at a research I institution".
56. University of Texas in Arlington, Arlington, TX, March 6, 2006, "Aspects of Chemical Education That Expand from Discipline-Based to Pedagogy".
57. University of New Hampshire, NH, January 26, 2006, "Aspects of Chemical Education That Expand from Discipline-Based to Pedagogy".
58. ACS National Meeting, Washington DC, August 30, 2005, "Assessing performance and attitudinal effects of an integrated lecture-lab format of instruction".
59. Gordon Conference in Chemical Education, Connecticut College, June 29, 2005, "Sensorial Experiments: Exploiting the Chemistry of Compounds to do Chemistry Using Senses Other than Eyesight".
60. University of Georgia, Athens, GA, April 22, 2005, "Chemical Education: Scholarship Beyond Traditional Research".
61. UNC Wilmington, April 8, 2005, "Chemical Education: Scholarship Beyond Traditional Research".
62. Michigan State University, March 24, 2005, "Chemical Education: Scholarship Beyond Traditional Research: Parts I & II".
63. Virginia Commonwealth University, March 8, 2005, "Chemical Education: Scholarship Beyond Traditional Research".
64. V International Congress-Cuban Chemical Society, October 18-22, 2004, "El Uso de Metodos De Triangulacion para Validar Resultados Cualitativos de Investigacion en Educacion Quimica".
65. Purdue University, West Lafayette, IN, Sept. 2 & 3, 2004. "The SCALE-UP Project: From Curriculum Development to Implementation" & "Aspects of Chemical Education That Expand from Discipline-Based to Pedagogy".
66. U. of Illinois- Urbana Champagne, IL, October 15, 2004, "Aspects of Chemical Education That Expand from Discipline-Based to Pedagogy".
67. Clemson University, SC, September 16, 2004, "Making Student-Centered Instruction Work Effectively in Large Enrollment Classes".
68. ACS National Meeting, Philadelphia, PA 2004, "Overcoming challenges of a student-centered approach: The SCALE-UP Project".
69. ACS National Meeting, Philadelphia, PA 2004, "A Forensic Chemistry Course Designed to Improve Communication Skills of Upper Level Undergraduates".
70. 18th Biennial Conference in Chemical Education, BCCE, Ames, Iowa, July 2004, "Making Student-Centered Instruction Work Effectively In Large Enrollment Classes".
71. 18th Biennial Conference in Chemical Education, BCCE, Ames, Iowa, July 2004, "Developing chemistry experiments for the visually impaired".
72. Iowa State University, Des Moines, Iowa, April 29, 2004, "Making Student-centered Instruction Work Effectively in Large Enrollment Classes".

73. University of Iowa, Iowa City, Iowa, April 28, 2004, " Aspects of Chemical Education that Expand from Discipline-Based to Pedagogy"
74. ACS National meeting, Anaheim, CA, March 31, 2004, " The Use of Triangulation Methods to Validate Results of Qualitative Chemical Education Research"
75. Wake Forest University, Wake Forest, NC, February 25, 2004, " An Integrated Lab-Lecture Format and Its Effects on Student Attitudes and Learning Outcomes"
76. University of Akron, Akron, Ohio, February 11, 2004, "An Integrated Lab-Lecture Format and Its Effects on Student Attitudes and Learning Outcomes"
77. University of Alabama, Tuscaloosa, AL, October 30, 2003, " An Integrated Lab-Lecture Format and Its Effects on Student Attitudes and Learning Outcomes"
78. Colegio De Quimicos de Puerto Rico, Plenary Speaker: Annual National Convention, August 1, 2003, "Los Roles Multiples del Educador Quimico"
79. University of Tennessee, Chattanooga, TN, September 19, 2003, " Chemical Education: Scholarship Beyond Traditional Research"
80. Pontifical Catholic Univ, May 2, 2003 Plenary speaker: "Chemistry for All"
81. ACS National Meeting, New Orleans, LA 2003, "Evaluating attitudes in a student-centered active learning environment"
82. ACS National Meeting, New Orleans, LA 2003, "Taking Advantage of Technological Tools in the SCALE-UP Project"
83. UNC Charlotte - Chemistry Dept., April 14, 2003, " Chemical Education: Scholarship Beyond Traditional Research"
84. UPR Rio Piedras - Chemistry Dept., October 11, 2002, " cAcL2 : concepts Advancements through Chemistry Laboratory-Lecture"
85. 17th Chemistry Conference Santiago de Cuba, Cuba, December 2002, "Estrategias para mejorar el aprendizaje de conceptos y las actitudes de los estudiantes hacia la química"
86. SERMACS 2002, Charleston, SC, Nov. 2002, "Attitudinal Effects of a Student-Centered Active Learning Environment"
87. 17th BCCE, Bellingham, WA, August 2002, "NASAL: Novel Adaptations of Sensory Activities in the Lab"
88. 17th BCCE, Bellingham, WA, August 2002, Educational Innovations at a Research I Institution: cAcL₂"
89. ACS National Meeting, Orlando, FL, 2002, "An Integrated Lab-Lecture Format and Its Effects on Student Learning Outcomes"
90. ACS National Meeting, Chicago, IL, 2001, "SCALE-UP: The Chemistry Perspective"
91. ACS National Mtg, Chicago, IL, 2001, "Using Written Reports to Monitor Critical Thinking Skills"
92. SERMACS 2001, Savannah, GA, "SCALE-UP: A Project That Capitalizes on Activity-Based Instruction"
93. POD Conference (Professional & Organizational Development), 2001, "Science Faculty and the Challenges of Undergraduate Education Reform"
94. Lilly Conference on College & University Teaching, 2001, "Introducing Inquiry-Guided Instruction into Undergraduate Courses"
95. ACS National Meeting, San Diego, 2001, "Research in Chemical Education: Master-level Programs in Chemical Education"
96. NC State University, 2001, "Scaling Up Inquiry Guided Instruction from the Small to the Large Classroom"
97. 16th Biennial Conference in Chemical Education, Michigan State Univ. 2000 , "Intelligent Chemistry Tutoring Program with Natural Language Interface", Co-authors: S. Solomon and Leila Jackson
98. Salem College, Winston-Salem, NC, 1999, "The Chemistry in Chemical Education"

Extended Workshops:

North Dakota State University – August 16-18, 2016.

Professional development workshop to STEM faculty on activity-based instructional pedagogies

“Rationale, Implementation, and Studies on SCALE-UP Chemistry” – Faculty development workshop for Montgomery College, June 16-18, 2011

ADVISEES

- Ph.D. DeeDee Ann Allen 2003: "The Development and Assessment of an Active Learning Environment: cAcL₂ Concept Advancement Through Chemistry Laboratory-Lecture"
- Ph.D. Deborah Bromfield-Lee 2009: “Development of Sensorial Experiments and their Implementation into Undergraduate Laboratories”
- Ph.D. Caroline Christian 2010: “Examining Chemistry Students Visual-Perceptual Skills Using the VSCS tool and Interview Data”
- Ph.D. Sorangel Rodriguez-Velazquez 2012: “Development of an electrochemistry teaching sequence using a phenomenographic approach”
- Ph.D. Holly Schiltz 2013: “Promoting Visualization Skills through Deconstruction Using Physical Models and a Visualization Activity Intervention”
- Ph.D. Marc Muniz 2014: “Teaching Tools for Pedagogy at the Nanoscale: Towards the Understanding of Concepts Through Experience and Experimentation”
- Ph.D. A. Kat Cooper 2017: "Using Drawing-to-Learn, Argumentation, and 3-D Physical Models in the Study of Noncovalent Interactions for Biochemistry Education"
- Ph.D. Lyniesha Wright 2020: “Supporting the Teaching of Spectroscopy Concepts Using Models”
- Ph.D. Emmanuel Echeverri 2022: “Building a Virtual Reality Learning Environment grounded in pedagogical frameworks to visualize cycloaddition reactions, and identifying students' spatial skills, challenges, and strategies therein.”
- M.S. Zeshan Hasan 2006: “Evaluation of Immersive Technology for Chemical Education”
- M.S. Caroline Christian 2009: “The Development and Validation of a Visual-Spatial Chemistry Specific (VSCS) Assessment Tool”