

Mitchell R. M. Bruce

Professor, Department of Chemistry
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Professional Preparation:

Antioch College, Yellow Springs, OH, B.S. Chemistry (1974-1979)

Columbia U., New York, NY, Ph.D., (David R. Tyler, 1980-1985), synthesis/mechanisms/organometallics

UNC, Chapel Hill, NC, Postdoc (Thomas J. Meyer, 1985-1987), catalysis and electrochemistry

Appointments:

UMaine, Chemistry, Orono, Maine, Professor of Chemistry (2017)

UMaine, Cooperating Faculty, Maine Center for Research in STEM Education (RiSE) (2005 - present)

UMaine, Chemistry, Orono, Maine, Assoc. Professor of Chemistry (1993 - present)

UMaine, Chemistry, Orono, Maine, Assist. Professor of Chemistry (1987 - 1993)

Charles F. Kettering Research Lab, Yellow Springs, OH, Research Associate (1977 - 1980)

Professional Activities: Member, American Chemical Society (ACS); Member: National Association of Research in Science Teaching. University of Maine Scientific Misconduct Committee, 2015. Committee on Committees, ACS (elected position), member 2015-1217; Councilor, Maine Section of the ACS (ACS, elected position, 1991 - present); Chair, 2013, Local Section Activity Committee, ACS; Member, 2013, ACS Board Standing Committee on Planning, 2013; Member, 2013, Leadership Institute Planning Group, ACS; Member, 2013, Task Force on Councilor Travel Reimbursement (ACS Council Policy Subcommittee); Member, ACS Fellows Selection Committee, ACS; Member, 2010, Professional & Member Relations Web Strategy and Innovation Subcommittee, American Chemical Society (ACS), Chair, Technology, Tool, and Operations Subcommittee of the Local Section Activities Committee (LSAC), Member, LSAC, ACS (2007-2009); Member, ACS Project SEED committee (1998 – 2005); Scientific Advisory Board, 2009 Taibah International Chemistry Conference, Saudi Arabia; Chair, Project SEED National Scholarship Subcommittee (2001 – 2003); Chair, ACS Project SEED committee (2004 – 2005); Editorial Board, Metal-Based Drugs (2000 – 2002); Associate Member, LSAC, ACS (2005-2006); American Chemical Society (member, 1980-present); Member ACS Technical Divisions: Bioorganic, Inorganic, and Organometallics; Regular reviewer for Journal of Chemical Education, Journal of Inorganic Biochemistry, and various journals in inorganic chemistry.

Honors: ACS Fellow, 2014

Synergistic activities with experimental research:

- Dr. Bruce is Co-PI on the Maine Physical Sciences Partnership Project NSF DUE-0962805, 2011-2015 (PI: Susan McKay), which brings together forty-eight rural Maine schools, the UMaine, three Maine non-profits with expertise in science ed, and science and technology leaders at the Maine Dept. of Ed. to target the teaching and learning of physical sciences in grades 6-9.
- Dr. Bruce co-originated the **InterChemNet (ICN) project** (<http://icn.umeche.maine.edu/icn/>), funded by grants from the U.S. Dept of Ed., the project makes chemical instrumentation accessible to students (UV-vis and FTIR) and integrates assessment in a large lab course (1,000 students/yr).
- Dr. Bruce was responsible for introducing **Peer Led Team Learning** to the University of Maine's chemistry department and has helped develop a highly successful PLTL leader-training program.
- Dr. Bruce is a co-founder of the **Maine Center for Research in STEM Education (RiSE)**.
- Dr. Bruce is general chemistry coordinator at the University of Maine

Collaborators and Other Affiliations: Shirly Avargil (School of Education, Faculty of Social Science, Bar-Ilan University, Ramat-Gan, Israel), RiSE Center faculty at UMaine, F. Amar (UMaine), C. Tripp (UMaine).

Graduate and Postdoctoral Advisors: Professor David R. Tyler, Columbia University (presently U. of Oregon); Professor Thomas J. Meyer, University of North Carolina, Chapel Hill

Graduate Students and Postdoctoral Research Associates Advised/Mentored (2004-2013):

Tiffany Wilson (MST – RiSE Center, current); Clint Eaton (MST – RiSE Center, current); Stephanie Virgillio (MST – RiSE Center, current); Alex Farberg (M.S. Chemistry, current), Natalie Kelly (MS Chemistry, current); Dr. Somnath Sinha (RiSE Center Postdoc for Maine PSP Project, 2014-current)
Dr. Shirly Avargil (RiSE Center Postdoc for Maine PSP Project 2011-2013); Virginia Flood (MST – RiSE Center, 2013); Laura Millay (MST RiSE Center expected 2014); Roby Kurian (Ph.D. Chemistry expected 2013, co-chair); Asela Chandrasoma (Ph.D. Chemistry, 2011 chair); Gamage Garusinghe (Ph.D., Chemistry expected 2013, co-chair); Stanley Bessey (MS Chemistry expected 2013, chair), Maggie Hutchinson (MST RiSE Center 2011, co-chair); Mostapha Aghamoosa (MS Chemistry, 2011, co-chair), Amer Jafer Al Abdel Hamid (Ph.D. Chemistry, 2009, co-chair) (Matt Leland (MST RiSE Center 2006, co-chair); Scott Larkin (Ph.D. Chemistry, 2006, co-chair); Barbara Stewart (Ph.D., 2004, co-chair).

Publications (including patents):

66. Mitchell R. M. Bruce,* Tiffany A. Wilson, Alice E. Bruce, S. Max Bessey and Virginia J. Flood "Infrared Radiation and Greenhouse Gases" *J. Chem. Ed.*, **2016**, 93 (11), pp 1908–1915. (DOI:10.1021/acs.jchemed.6b00047).
65. Gamage S.P. Garusinghe, Stanley Max Bessey, Alice E. Bruce and Mitchell RM Bruce "The Influence of Gold(I) on the Mechanism of Thiolate, Disulfide Exchange" *Dalton Trans.*, Communication, **2016**, 45, 11261 DOI: 10.1039/c6dt01400c.
64. Mitchell R. M. Bruce,* Alice E. Bruce, Shirly Avargil, François G. Amar, Thomas M. Wemyss, Virginia J. Flood, "Polymers and Cross Linking: a CORE Experiment to Help Students Think on the Atomic Scale", *J. Chem. Ed.* **2016** DOI: 10.1021/acs.jchemed.6b00010
63. Roby Kurian, Mitchell R. M. Bruce-Alice E. Bruce, and François G. Amar "The Influence of Zinc(II) on Thioredoxin/Glutathione Disulfide Exchange: QM/MM Studies to Explore How Zinc(II) Accelerates Exchange in Higher Dielectric Environments", *Metallomics*, **2015**, 7, 1265-1273. DOI: 10.1039/C5MT00070J.
62. Shirly Avargil, Mitchell R. M. Bruce, François G. Amar, and Alice E. Bruce, "Students' Understanding of Analogy after a CORE (Chemical Observations, Representations, Experimentation) Learning Cycle, General Chemistry Experiment", *J. Chem. Ed.*, **2015**, 92, 1626-1638.
61. Gamage S. P. Garusinghe, S. Max Bessey, Chelsea Boyd, Mostapha Aghamoosa, Brian Frederick, Mitchell R. M. Bruce, Alice E. Bruce "Identification of dimethyl sulfide in dimethyl sulfoxide and implications for metal-thiolate disulfide exchange reactions" *RSC Advances*, **2015**, 5, 40603 - 40606.
60. Garusinghe, G. S. P.; Bessey, S. M.; Aghamoosa, M.; Meaghan McKinnon; Bruce, A. E.; Bruce, M. R. M. "Disulfide Competition for Phosphine Gold(I) Thiolates: Phosphine Oxide Formation vs. Thiolate Disulfide Exchange" *Inorganics* **2015**, 3, 40-54.
59. Flood, V. J.; Amar, F. G.; Nemirovsky, R.; Harrer, B. W.; Bruce, M. R. M.; Wittmann, M. C. "Paying Attention to Gesture when Students Talk Chemistry: Interactional Resources for Responsive Teaching", *J. Chem. Ed.* **2015**, 92, 11-22.
58. Chandrasoma, Asela, Grant, Robert W., Bruce, A. E., Bruce, Mitchell R. M. "Electrochemical polymerization of aniline on carbon-aluminum electrodes for energy storage" *J. Power Sources*, **2012**, 219, 285-291.
57. Chandrasoma, A.; Hamid, A. A.; Bruce, A. E.; Bruce, M. R. M.; Tripp, C. P. "An Infrared Spectroscopic Based Method for Mercury(II) Detection in Aqueous Solutions." *Analytica Chimica Acta*, **2012**, 728, 57-63

56. Grant, Robert W.; Bruce, Mitchell R. M.; Acharige, Asela C. Maha “Methods for producing textured electrode based energy storage device using conductive polymers”, Int. Appl. (2011), WO 2011066569 A1 20110603, Language: English, Database: CAPLUS
55. Bruce, Alice E.; Tripp, Carl P.; Bruce, Mitchell R. M.; Al Abdel Hamid, Amer A. G.; Acharige, Asela C. Maha “Sensitive and selective detection method for mercury (II) in aqueous solution” From U.S. Pat. Appl. Publ. (2011), US 20110281363
54. Al Abdel Hamid, Amer; Tripp, Carl P.; Bruce, Alice E.; Bruce, Mitchell R. M., “Application of structural analogs of dimercaptosuccinic acid-functionalized silica nanoparticles (DMSA-[silica]) to adsorption of mercury, cadmium, and lead,” Research on Chemical Intermediates (2011), 37(7), 791-810.
53. Bessey, S. M., Aghamoosa, M., Garusinghe, G. S. P., Chandrasoma, A., Bruce, A. E., and Bruce, M. R. M. “The synthesis of triethylphosphine gold(I) 4-nitrobenzenethiolate and solvent dependent visible absorption spectra of 4-nitrobenzenethiolate” *Inorganica Chimica Acta*, 2010, 363(1), 279-282.
52. Dyadchenko, V. P., Belov, N. M., Lemenovskii, D. A., Antipin, M. Y., Lyssenko, K. A., Bruce, A. E. “Synthesis, crystal and molecular structure of gold(I) thiophenolate with 4'-ferrocenyl[1,1'-]biphenylisocyanides”, et al. *J. Organomet. Chem.*, 2010, 695(2), 304-309.
51. Elbjeirami, O.; Gonser, M. W. A.; Stewart, B. N.; Bruce, A. E.; Bruce, M. R. M.; Cundari, T. R.; Omary, M. A. “Luminescence, structural, and bonding trends upon varying the halogen in isostructural aurophilic dimers.”, *Dalton Trans.* 2009, (9), 1522-1533.
50. Al Abdel Hamid, Amer; Tripp, Carl P.; Bruce, Alice E.; Bruce, Mitchell R. M., “Preferential adsorption of mercury(II) ions in water: chelation of mercury, cadmium, and lead ions to silica derivatized with meso-2,3-dimercaptosuccinic acid” From Journal of Coordination Chemistry (2010), 63(5), 731-741.
49. Amar, F., Stewart, B.N., Fortin, H., Bruce, M.R.M. “Using the Workshop Model for Modular, Student-Centered Leader Training” *Progressions: The Peer-Led Team Learning Project Newsletter*, 2009, Volume 10, Number 3, Spring.
48. Amar, F., Stewart, B.N., Fortin, H., Bruce, M.R.M. “Leader Training Module and Faculty Guide for PLTL Training Module: Why There Are No Answer Keys” *Progressions: The Peer-Led Team Learning Project Newsletter*, 2009, Volume 10, Number 3, Spring.
47. Amar, F., Fortin, H., Bruce, M.R.M. “Four Leader Training Modules for PLTL: Getting Started; Group Development; Communication; Mattering and Marginality” *Progressions: The Peer-Led Team Learning Project Newsletter*, 2009, Volume 10, Number 3, Spring.
46. Amar, F., Fortin, H., Bruce, M.R.M. “Four Faculty Guides for PLTL training modules: Getting Started; Group Development; Communication; Mattering and Marginality.” *Progressions: The Peer-Led Team Learning Project Newsletter*, 2009, Volume 10, Number 3, Spring.

45. Janet B. Foley, Stanley E. Gay, Michael J. Vela, Bruce M. Foxman, Alice E. Bruce, and Mitchell R. M. Bruce, "Structure and Photochemical Isomerization of the Dinuclear Gold(I) Halide Bis(diphenylphosphanyl)ethylene Complexes: Correlation Between Quantum Yield and Aurophilicity" *Eur. J. Inorg. Chem.*, **2007**, 4946-4951.
44. Barbara Stewart, Francois Amar and Mitchell Bruce "Challenges and Rewards of Offering Peer Led Team Learning (PLTL) in A Large General Chemistry Course", *Australian J. Education in Chem.*, **67**, **2007**, 31-36.
43. Thermotropic Liquid Crystals Based on Ferrocenylbiphenyl and Ferrocenylterphenyl Mikhail V. Makarov, Dimitri A. Lemenovskii, Alice E. Bruce, Mitchell R. M. Bruce, Victor P. Dyadchenko *Liquid Crystals*, **2006**, *33*, 485-494.
42. Inter-Chem-Net: A Web-based Platform to Support Instrumentation and Curriculum Delivery in Large Laboratory Courses Stewart, Barbara; Kirk, Robert; Labrecque, David; Amar, François; Bruce, Mitchell *J. Chem. Ed.* **2006**, *83* (3), 494.
41. Chen, J.; Mohamed, A. A.; Abdou, H. A.; Krause Bauer, J. A.; Fackler, Jr., J. P.; Bruce, A. E.; Bruce, M. R. M. "Novel Metallamacrocyclic Gold(I) Thiolate Cluster Complex: Structure and Luminescence of $[\text{Au}_6(\mu\text{-dppm})_4(\mu\text{-p-tc})_2](\text{PF}_6)_4$." *J. Chem. Soc. Chem. Commun.* **2005**, 1575-1577.
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39. Mohamed, A. A.; Krause Bauer, J. A.; Bruce, A. E.; Bruce, M. R. M. "[μ -o-Phenylenebis(diphenylphosphine)- $\kappa^2\text{P}:\text{P}'$]bis[chlorogold(I)], $\text{dppbz}(\text{AuCl})_2$." *Acta Crystallographica, Section C: Crystal Structure Communications*, **2003**, *C59(3)*, m84-m86.
38. Mohamed, A. A.; Chen, J.; Bruce, A. E.; Bruce, M. R. M.; Krause Bauer, J. A.; Hill, D. T. "Formation of a Cationic Gold(I) Complex and Disulfide by Oxidation of the Antiarthritic Gold Drug Auranofin." *Inorganic Chemistry*, **2003**, *42(7)*, 2203-2205.
37. Lemenovskii, D. A.; Makarov, M. V.; Dyadchenko, V. P.; Bruce, A. E.; Bruce, M. R. M.; Larkin, S.; Averkiev, B. B.; Starikova, Z. A.; Antipin, M. Yu. "Ferrocenyl Derivatives of Biphenyl. Synthesis and Crystal Structure." *Russian Chemical Bulletin*, **2003**, *3*.
36. Mohamed, A. A.; Abdou, H. E.; Chen, J.; Krause Bauer, J. A.; Bruce, A. E.; Bruce, M. R. M. "Perspectives in Inorganic and Bioinorganic Gold Sulfur Chemistry." *Comments on Inorganic Chemistry*, **2002**, *23(5)*, 321-334.

35. Chadwick, S.; English, U.; Ruhlandt-Senge, K.; Watson, C. Bruce, A.E.; Bruce, M.R.M." Formation of Separated *versus* Contact Ion-Pairs in Alkali Thiolates and Selenolates", *Journal of the Chemical Society, Dalton Transactions*, **2000**, 2167-2173.
34. Chen, J.; Jiang, T.; Wei, G.; Mohamed, A.A.; Homrighausen, C.; Krause Bauer, J.A.; Bruce, A.E.; Bruce, M.R.M. "Electrochemical and Chemical Oxidation of Gold(I) Thiolate Phosphine Complexes: Formation of Gold Clusters and Disulfide", *Journal of the American Chemical Society*, **1999**, *121*, 9225.
33. Watson, C. M.; Dwyer, D. J.; Andle, J.; Bruce, A. E.; Bruce, M. R. M. "Stripping Analysis of Mercury Using Gold Electrodes: Irreversible Adsorption of Mercury", *Analytical Chemistry*, **1999**, *71*, 3181.
32. DiLorenzo, M.; Ganesh, S.; Tadayon, L.; Bruce, M.R.M.; Bruce, A.E. "Reactions of Organic Disulfides and Gold(I) Complexes", *Metal-Based Drugs*, **1999**, *6*, 247.
31. Foley, J.B.; Gay, S.E.; Turmel, C.; Wei, G.; Jiang, T.; Narayanaswamy, R.; Foxman, B.M.; Vela, M.J.; Bruce, A.E.; Bruce, M.R.M. "Electronic Structure of Dinuclear Gold(I) Complexes", *Metal-Based Drugs*, **1999**, *6*, 255.
30. Mohamed, A.A.; Bruce, A.E.; Bruce, M.R.M. "Cyclic Voltammetry of Auranofin", *Metal-Based Drugs*, **1999**, *6*, 233.
29. Mohamed, A.A.; Bruce, A.E.; Bruce, M.R.M. "Electrochemistry of Gold and Silver Complexes", in *Organic Derivatives of Silver and Gold*, Patai, S. and Rappaport, Z., Eds., John Wiley & Sons, England, 1999.
28. Schwerdtfeger, P.; Bruce, A.E.; Bruce, M.R.M. "Theoretical Studies on the Photochemistry of the *cis* to *trans* Conversion in Dinuclear Goldhalide Bis(diphenylphosphino)ethylene Complexes", *Journal of the American Chemical Society*, **1998**, *120*, 6587.
27. Andle, J.; Schweyer, M.; Munson, J.; Roderick, R.; McAllister, D.; French, L.; Vetelino, J.; Watson, C.; Foley, J.; Bruce, A.; Bruce, M. "Electrochemical Piezoelectric Sensors for Trace Ionic Contaminants", *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, **1998**, *45*, 1408.
26. French, L. A.; Schweyer, M. G.; Foley, J. B.; Andle, J. C.; Watson, C.; Bruce, M. R. M.; Bruce, A. E.; Vetelino, J. F. "Heavy metal detection combining stripping electrochemistry and piezoelectric sensor technology" In Proceedings of SPIE-The International Society for Optical Engineering **1998**; Vol. 3539, p 161.
25. Foley, J.B.; Bruce, A.E.; Bruce, M.R.M. "An Unprecedented Photochemical Cis to Trans Isomerization of Dinuclear Gold(I) Bis(diphenylphosphino)ethylene Complexes." *Journal of the American Chemical Society*, **1995**, *117*, 9596.

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23. Foley, J.; Fort, R.C., Jr.; McDougal, K.; Bruce, M.R.M.; Bruce, A.E. "Electronic and Steric Effects in Gold(I) Phosphine Thiolate Complexes." *Metal Based Drugs*, **1994**, *1*, 405.
22. Jiang, T.; Wei, G.; Turmel, C.; Bruce, A.E.; Bruce, M.R.M.; "Redox Chemistry of Gold(I) Phosphine Thiolates: Sulfur-Based Oxidation." *Metal Based Drugs*, **1994**, *1*, 419.
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19. Bruce, M. R. M.; Megehee, E.; Sullivan, B. P.; Thorp, H.; O'Toole, T. R.; Downard, A.; Meyer, T.J. "Electrocatalytic Reduction of Carbon Dioxide Based on 2,2'-Bipyridyl Complexes of Osmium." *Inorganic Chemistry*, **1992**, *31*, 4864-4873.
18. Saravanamuthu, A.; Bruce, A. E.; Bruce, M. R. M.; Fermin, M. C.; Hneihen, A. S.; Bruno, J. W. "Spectroelectrochemistry: Reversible C-C Bond Activation in Niobium Ketene Complexes." *Organometallics*, **1992**, *11*, 2190-2198.
17. Fei, M.; Tyler, D. R.; Bruce, M. R. M.; Bruce, A. E.; Rieger, A. L.; Rieger, P. H. "Solvent Effects on Electron Delocalization in Paramagnetic Organometallic Complexes; Solvent Manipulation of the Amount of 19-Electron Character in $\text{Co}(\text{CO})_3\text{L}_2$ (L_2 = a chelating phosphine)." *Journal of the American Chemical Society* **1992**, *114*, 6418-6423.
16. Fourquet, J. L.; Leblanc, M.; Saravanamuthu, A.; Bruce, M. R. M.; Bruce, A. E. "Reactions of Molybdenum(0) Tricarbonyl Complexes with 8-Azidoquinoline. Crystal Structure of the Phosphinimine Complex, $\text{Mo}(\text{CO})_4[\text{N}(\text{PPh}_3)(\text{C}_9\text{H}_6\text{N})]$ and Evidence for a Bent Nitrene Intermediate." *Inorganic Chemistry* **1991**, *30*, 3242-3242.
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12. Silavwe, N. D.; Bruce, M. R. M.; Philbin, C. E.; Tyler, D. R. "Descriptive Photochemistry and Electronic Structure of Cp_2MoO and $(\text{MeCp})_2\text{MoO}$ ($\text{Cp} = \eta^5\text{-C}_5\text{H}_5$, $\text{MeCp} = \eta^5\text{-CH}_3\text{C}_5\text{H}_4$)." *Inorganic Chemistry* **1988**, *27*, 4669-4676.

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9. Bruce, M.R.M.; Sclafani, A.; Tyler, D. R. "Photochemical Consequences of the Manipulation of the Lowest Energy Excited States by Substitution of the Cp (Cp = η^5 -C₅H₅) Ligands in the Cp₂TiX₂ (X = Br, I) Complexes." *Inorganic Chemistry* **1986**, 25, 2546.
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7. Bruce, M.R.M.; Bruce, A. E.; Tyler, D. R. "SCF-X α -SW Molecular Orbital Calculation of [CpMoS(μ -S)]₂, A Molecule that Undergoes a Photochemically Induced Isomerization ." *Polyhedron* **1985**, 12, 2073.
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2. Treharne, R.; McKibben, C.; Moles, D.; Bruce, M.R.M. "Arc Reactor Device ." U.S. Patent 4,256,967 (**1981**).
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Presentations (1999-present)

118. Invited Workshop for K-12 teachers: Experiencing and Understand **CORE**: a new learning cycle designed to foster making connections between macroscopic, submicroscopic, and representational levels. Mitchell R. M. Bruce, Joseph C. Walter, Alice E. Bruce, Anna C. Turner, Devin Howard, Samantha R. Poll, Clinton D. Eaton, RiSE Summit, Nov. 18, 2017, Point Lookout, ME.
117. Workshop for K-12 teachers: Chemistry of Environmental Science with Mitchell Bruce, July 10th-13th, 2017. RiSE Center Content Workshops. University of Maine, RiSE Center, Orono, ME 05569. Dissemination of several **CORE** lab experiments and assisted by Clint Eaton.

116. Joseph C. Walter, Mitchell R. M. Bruce, Alice E. Bruce, Anna C. Turner, Devin Howard
Poster: **CORE**: Using Analogical Reasoning in Lab to Foster Macroscopic-Submicroscopic Connections, June 18-23, Transforming Research in Undergraduate STEM Education (TRUSE), July 5 - July 9, 2017, University of St. Thomas, Minnesota, St. Paul, Minnesota 55105, USA
115. Joseph C. Walter, Mitchell R. M. Bruce, Alice E. Bruce, Anna C. Turner, Devin Howard
Poster: **CORE**: Using Analogical Reasoning in Lab to Foster Macroscopic-Submicroscopic Connections, Gordon Conference on Chemistry Education Within the National and Global Educational Context, June 18-23, 2017, Bates College, Lewiston, ME.
114. Invited Workshop. Mitchell Bruce and Alice Bruce. Want to improve your teaching of chemistry? Try analogical reasoning! RiSE Summit Conference. Point Lookout, ME. (Nov 19, 2016)
113. Invited Workshop (90 min): Mitchell R. M. Bruce Examining the Use of Representations in Science: A Hands-On Introduction to Structure Mapping Theory, 2016 RiSE National Conference, June 27-29 Orono, Maine.
112. Invited Talk: Mitchell R. M. Bruce Connecting Macroscopic, Submicroscopic, and Representational Levels Using Analogical Reasoning: Working Towards a Generalized Understanding of Using Representations, 2016 RiSE National Conference, June 27-29 Orono, Maine.
111. Garusinghe, G. S.; Bruce, A. E.; Bruce, M. R. Metal-assisted (Zn, Au) thiolate-disulfide exchange: Explorations of the mechanism using 2D NMR. In American Chemical Society: Abstracts of Papers, 251st ACS National Meeting & Exposition, San Diego, CA, United States, March 13-17, 2016. INOR-1256, 2016 (March 17, 2015).
110. Invited Talk: Mitchell R. M. Bruce "Research and Classroom/Laboratory Teaching: Promoting Engagement in the Process of Learning" Mitchell Bruce, Nov. 14, 2015. 2015 RiSE Partnership Summit Conference, Sugarloaf Mountain Resort, Carrabassett Valley, ME.
109. Invited Talk: "Fostering Connections between Macroscopic, Submicroscopic, and Representational Levels Using Analogical Reasoning in the Chemistry Lab" Mitchell Bruce, Oct 28, 2015, Purdue University, Department of Chemistry, West Lafayette, IN.
108. Poster: "Conservation of Mass and Limiting Reactants: A two-week CORE laboratory experiment employing chemical observations, a bridging analogy, and student designed experiments" Mitchell Bruce, Alice Bruce, François Amara, and Shirly Avargil Chemistry Education Research & Practice, Gordon Research Conference, Chemistry

Education as an Agent in Global Progress, June 21-26, 2015, Bates College, Lewiston, ME.

107. Poster: “Teacher Professional Development Using Iterative Inquiry Based Chemistry Activities” Clint Eaton, Stephanie Virgilio, Mitchell R. M. Bruce, Somnath Sinha, Laura A. Millay. No Question Left Behind: Teaching, Learning, and Assessment in the Context of the Next Generation Science Standards and the Common Core State Standards in Mathematics, University of Maine, Orono, Maine June 28th-June 30th. Co-hosted by: The Maine Center for Research in STEM Education (RiSE Center) and the Jackson Laboratory.
106. Poster: “Students’ Understanding of Middle School SEPUP Chemistry Curriculum” Stephanie Virgilio, Clint Eaton, Mitchell R. M. Bruce, Somnath Sinha, Laura A. Millay. No Question Left Behind: Teaching, Learning, and Assessment in the Context of the Next Generation Science Standards and the Common Core State Standards in Mathematics, University of Maine, Orono, Maine June 28th-June 30th. Co-hosted by: The Maine Center for Research in STEM Education (RiSE Center) and the Jackson Laboratory.
105. The Synthesis and Characterization and Electrochemical Study of $\text{DPPF}(\text{AuSC}_6\text{H}_5\text{NO}_2)_2$, Kyle A. Veillette, Bruce, M. R., Bruce Alice E., Garusinghe, G. Srimal, Farberg, A. 40th Northeast Regional Meeting of the American Chemical Society, Ithaca, NY, June 10, 2015.
104. Invited talk: “Infrared Radiation and Greenhouse Gases: An Introductory Chemistry Laboratory Experiment”, Mitchell Bruce, Tiffany Wilson, Alice Bruce, and S. Max Bessey 249th ACS National Meeting & Exposition, Denver, CO, United States, March 23, 2015.
103. Invited talk: “Examining Student Analogical Reasoning in Introductory Chemistry Laboratory”, Mitchell Bruce, Shirly Avargil, Alice Bruce, and François Amar 249th ACS National Meeting & Exposition, Denver, CO, United States, March 24, 2015.
102. Invited Workshop: Infrared Radiation and Greenhouse Gases, Maine Physical Sciences Partnership Professional Development Cohort Meeting, middle and high school teachers participated in inquiry-based lab activity, March 11, 2015. Several gradate students participated.
101. “Teacher Growth During Chemistry Professional Development and Middle School Student Learning of Chemistry Content through Innovative Science Partnerships in the Maine PSP”, Somnath Sinha, Clint Eaton, Stephanie Virgilio, Mitchell R. M. Bruce, Laura A. Millay, International Teacher-Scientist Partnership Conference, San Francisco, Feb 11-12, 2015.

100. Using Maine Learning Assistants to Improve Student Learning and Retention in Introductory Chemistry, Mitchell R. M. Bruce, Jon Kreps, Maine Physical Sciences Partnership Summit, November 14-16, 2014, Point Lookout, ME. (Nov 15, 2014)
99. Workshop: Inquiry-based activity for middle school teachers, Mitchell Bruce and Somnath Sinha, Maine Physical Sciences Partnership Summit, November 14-16, 2014, Point Lookout, ME. (March 14, 2014)
98. "CORE learning cycle: Anchoring analogical reasoning to the laboratory experience." Bruce, M. Avargil, S.; Amar, F. Bruce, A. E., In *2014 Biennial Conference on Chemical Education*, Grand Valley State University, August 3-7, 2014.
97. "Graduate TA professional development towards reliable assessment of student lab reports" Bruce, M.; Avargil, S.; Klemmer, S. In *2014 Biennial Conference on Chemical Education*, Grand Valley State University, August 3-7, 2014.
96. "A Framework for Anchoring Analogical Reasoning Activities to the Chemistry Laboratory Experience" Mitchell Bruce, Shirly Avargil, Alice Bruce, François Amar National Association of Research in Science Teaching (NARST) Pittsburg, PA, March 31, 2014.
95. "Using Laboratory Centered Analogies to Enhance Student Understanding of Chemical Concepts at the Molecular Level." Bruce, M., Avargil, S., Amar, F.G., Shemwell, J. & Bruce, A. (2013). *2013 NARST The S in STEM Education: Policy, Research, and Practice*. Wyndham Rio Mar, Rio Grande, Puerto Rico.
94. "Everything You Always Wanted to Know about Laboratory Learning* (*But were afraid to ask), Mitchell Bruce, Maine PSP Teaching Assistant Workshop (invited), University of Maine, November 7, 2013.
93. "Using Lab-Based Analogies for Meaningful Understanding", Mitchell Bruce, Shirly Avargil, François Amar, Virginia Flood, Alice Bruce 2012 National Summer Conference, Integrating STEM Education Research into Teaching, University of Maine, June 21, 2012
92. "Analogy/Learning Cycle Labs used in Introductory Chemistry", Mitchell Bruce, Shirly Avargil, François Amar, Alice Bruce, Virginia Flood, Shahram "Shawn", Carly Matthews, Tommy Wemyss, Michael Wittmann, University of Maine, Department of Chemistry, and the RiSE (Research in STEM Education) Center, March 28, 2012
91. "Computational investigation of metal assisted disulfide reduction by thioredoxin" Kurian, Roby; Amar, Francois G.; Bruce, Alice E.; Bruce, Mitchell R., From Abstracts, 38th Northeast Regional Meeting of the American Chemical Society, Rochester, NY, United States, Sept. 30-Oct. 3 (2012), NERM-316.
90. "Solution chemistry of clinically significant gold complexes with low molecular weight thiols and disulfides" Kurian, Roby; Amar, Francois G.; Bruce, Alice E.; Bruce, Mitchell

- R. From Abstracts of Papers, 244th ACS National Meeting & Exposition, Philadelphia, PA, United States, August 19-23, 2012 (2012), INOR-452.
89. "Formation of phosphine oxide during gold(I) mediated thiol-disulfide exchange reactions" Bruce, Alice E.; Garusinghe, Gamage; Aghamoosa, Mostapha; Bruce, Mitchell R. From Abstracts of Papers, 243rd ACS National Meeting & Exposition, San Diego, CA, United States, March 25-29, 2012 (2012), INOR-866.
 88. "Cycle labs used in introductory chemistry" Bruce, Mitchell R.; Amar, Francois G.; Fiouzian, Shahram; Wemyss, Tommy M.; Bruce, Alice E.; Wittmann, Michael C. From Abstracts of Papers, 243rd ACS National Meeting & Exposition, San Diego, CA, United States, March 25-29, 2012 (2012), CHED-1592.
 87. "Paying attention to gesture in chemical explanations: What does it tell us?" Amar, Francois G.; Flood, Virginia; Nemirovsky, Ricardo; Bruce, Mitchell R.; Wittmann, Michael From Abstracts of Papers, 243rd ACS National Meeting & Exposition, San Diego, CA, United States, March 25-29, 2012 (2012), CHED-203.
 86. Workshop presenter on active learning strategies. Mitchell Bruce, Local Maine PSP (Physical Sciences Partnership), STEM Education Improvement Program. Oct 3, 2011
 85. Invited: Technology, Tools and Operation Presentation, Mitchell Bruce, American Chemical Society, National Local Section Leaders presentation at ACS Leadership conference, Ft. Worth, TX. 2011, Jan 21, 2011
 84. "Comparing metal assisted thiolate disulfide exchange reactions (M=Au, Zn)", By Garusinghe, Gamage S.; Bruce, Mitchell R.; Bruce, Alice E. From Abstracts of Papers, 240th ACS National Meeting, Boston, MA, United States, August 22-26, 2010 (2010), INOR-676.
 83. "Solvent effects on metal-assisted thiolate-disulfide exchange (M=Zn,Au)", By Garusinghe, Gamage S.; Bruce, Alice E.; Bruce, Mitchell R., From Abstracts of Papers, 239th ACS National Meeting, San Francisco, CA, United States, March 21-25, 2010 (2010), INOR-171.
 82. "Effect of solvent on the rate of gold(I)-assisted thiolate-disulfide exchange", By Aghamoosa, Mostapha; Garusinghe, Gamage S.; Bruce, Alice E.; Bruce, Mitchell R. From Abstracts of Papers, 239th ACS National Meeting, San Francisco, CA, United States, March 21-25, 2010 (2010), INOR-414.
 81. Special invitation to Sci Mix at 240th ACS National Meeting "Solvent dielectric effect on metal assisted thiolate-disulfide exchange: No free thiolate", By Chandrasoma, Asela; Bruce, Alice E.; Bruce, Mitchell R., From Abstracts of Papers, 240th ACS National Meeting, Boston, MA, United States, August 22-26, 2010 (2010).
 80. "Solvent dielectric effect on metal assisted thiolate-disulfide exchange: No free thiolate", By Chandrasoma, Asela; Bruce, Alice E.; Bruce, Mitchell R., From Abstracts of Papers,

- 240th ACS National Meeting, Boston, MA, United States, August 22-26, 2010 (2010), INOR-494.
79. "Interactions Between Metal Thiolate, $R_3PAuSC_6H_4NO_2$ (R=Ph and Et) and Bis(4-nitrophenyl) Disulfide". Garusinghe, G. S. P.; Bessey, S. Max; Bruce, Alice E.; Bruce, Mitchell R. M., From Abstracts, 36th Northeast Regional Meeting of the American Chemical Society, Hartford, CT, United States, October 7-10 (2009), NERM-285.
 78. "Insight into Metal-Mediated Thiol-Disulfide Exchange", Asela Chandrasoma, Alice Bruce, Mitchell Bruce, From Abstracts, 35th North East Regional Meeting of the American Chemical Society, June 30 (2008).
 77. "Metal(I) Mediated Disulfide Exchange Kinetics as a Function of Solvent Dielectric Constant", Mostapha Aghamoosa, Benjamin Briggs, Andrew Cashman, Srimal Garusinghe, Erik Harriman, Mitchell Bruce, and Alice Bruce From Abstracts, 35th North East Regional Meeting of the American Chemical Society, June 30 (2008).
 76. "Sensitive and selective detection method for mercury(II) in aqueous solution," By Chandrasoma, Asela; Hamid, Amer A.; Tripp, Carl P.; Bruce, Alice E.; Bruce, Mitchell R., From Abstracts of Papers, 239th ACS National Meeting, San Francisco, CA, United States, March 21-25, 2010 (2010), INOR-715.
 75. "Using analogies in introductory chemistry labs", By Bruce, Mitchell R.; Amar, Francois G.; Matthews, Carly M.; Wemyss, Tommy M.; Bruce, Alice E.; Wittmann, Michael C., From Abstracts of Papers, 242nd ACS National Meeting & Exposition, Denver, CO, United States, August 28-September 1, (2011), CHED-388.
 74. "Active learning in the classroom", Mitchell Bruce, Oct 3, 2011, University of Maine, Maine PSP (Physical Sciences Partnership), STEM Education Improvement Program. Workshop presenter on active learning strategies.
 73. "The Power of Using Analogies in the Lab." Oct 1, 2010, Mitchell R. Bruce Camden, ME, Workshop: New England Chemistry Teachers Association 522nd meeting.
 72. "Scaffolding Undergraduate Peer Facilitation: The Maine Learning Assistant Program". Mitchell R. Bruce, Nov. 30, 2011, Workshop presenter, University of Maine, Physical Sciences Partnership, RiSE Center.
 71. "Seeking Equity: Managing PLTL Resources in General Chemistry", Barbara Stewart, Mitchell Bruce, Alice Bruce, Francois Amar, in Strategies for Student Engagement in General Chemistry, Biennial Conference on Chemical Education, University Of North Texas, Denton, TX, 1-5 August 2010
 70. "Using Analogies in General Chemistry" Mitchell R. Bruce, François Amar, Alice Bruce, et al. Workshop Presented, No Question Left Behind Conference, University of Maine, June 23, 2011

69. “Students' Embodied Apprehension of Molecular Scale Phenomena”, François Amar, Virginia Flood, Mitchell Bruce, et al. No Question Left Behind Conference, University of Maine, Presented Poster: Gesture Analysis of Chemical Explanations. No Question Left Behind Conference, University of Maine, June 23, 2011
68. “Invited Poster Session: Student understanding of deductive and inductive reasoning.” Bruce, Mitchell R. M.; Amar, Francois G.; Bruce, Alice E.; Gaudette, Carly. Department of Chemistry, University of Maine, Orono, ME, USA. Abstracts of Papers, 239th ACS National Meeting, San Francisco, CA, United States, March 21-25, 2010 (2010), CHED-1694.
67. “Teaching Science to the English Language Learner”, François Amar and Mitchell Bruce, 3:30-5:00 PM, Lyman Moore Middle School, 171 Auburn St., Portland, ME 04103, June 2, 2010.
66. “Laboratory Learning Styles: Can we determine it and would it be a useful concept?” Mitchell Bruce, François Amar, Alice Bruce, Carly Gaudette MST Seminar Series, Department of Physics, University of Maine, April 1, 2009
65. “Do Students have Different Laboratory Learning Styles in General Chemistry?,” Mitchell Bruce, François Amar, Barbara Stewart, and Alice Bruce, North East Regional Meeting of the American Chemical Society, June 30, 2008.
64. “Laboratory learning styles: Is this a useful concept?” Mitchell Bruce, Francois Amar, Robert Kirk, Barbara Stewart, 20th Biennial Conference on Chemical Education Indiana University, Bloomington, Indiana, July 28, 2008.
63. Invited talk: “Structural and Mesogenic Properties of Gold(I) Thiolate and Isocyanide Complexes.”, S. Larkin¹, A. E. Bruce¹, M. R. M. Bruce¹, M. V. Makarov², D. A. Lemenovskii², V. P. Dyadchenko², O. Elbeirami³, M. A. Omary³; ¹University of Maine, Orono, Maine, ME 04469-5706; ²M. V. Lomonosov Moscow State University, 119992 Moscow, Russian Federation; ³University of North Texas, Denton, TX 76203. 9th International Symposium on Metallomesogens, Lake Arrowhead, California, May 31-June 3, 2005.
62. Invited talk: “Liquid Crystals Based on Ferrocenylbiphenyl and Ferrocenylterphenyl”, M. V. Makarov¹, D.A.Lemenovskii¹, A. E. Bruce², M. R. M. Bruce², V. P. Dyadchenko¹ ¹M. V. Lomonosov Moscow State University, 119992 Moscow, Russian Federation. ²University of Maine, Orono, Maine, ME 04469-5706. 9th International Symposium on Metallomesogens, Lake Arrowhead, California, May 31-June 3, 2005.
61. Invited talk: “Genuine Role of Auophilic Bonding on Luminescence and Mesogenic Properties of Simple Isonitrile Complexes.” M. A. Omary^a, O. Elbjeirami,^a S. Larkin,^b M. R. M. Bruce,^b and A. E. Bruce^{a,b} ^aUniversity of North Texas, Denton, TX 76203; ^bUniversity of Maine, Orono, Maine, ME 04469-5706. 9th International Symposium on Metallomesogens, Lake Arrowhead, California, May 31-June 3, 2005.

60. Invited talk: Lab Curriculum Development and Evaluation Using InterChemNet, Barbara Stewart, François Amar, Mitchell Bruce, and Matthew Leland, Symposium on Web-based Applications for Chemical Education held at the 19th Biennial Conference on Chemical Education, West Lafayette, Indiana, July 30-August 3, 2006.
59. Invited talk: “Using InterChemNet for lab curriculum development and evaluation”, Barbara Stewart, Robert Kirk, Francois Amar, and Mitchell Bruce, ConfChem online conference, Web-Based Applications for Chemical Education: Experiences and Visions, May 5-June 29, 2006, http://www.stolaf.edu/depts/chemistry/bh/confchem/confchem_s2006.htm#papers.
58. Invited talk: “Modular Leader Training at the University of Maine”, Barbara Stewart, Hali Sirois, Zahirah Salahudin, François Amar, and Mitchell Bruce, PLTL National Conference on Leader Training, Houston, April 20-23, 2006.
57. Invited talk: “Constructing Student Understanding of Beer’s Law in the General Chemistry Laboratory”, Matthew Leland, Robert Kirk, Michael Wittman, Mitchell Bruce and François G. Amar, UM Center Summer Conference, Integrating Science and Mathematics Education Research into Teaching, Orono, ME, June 25-28, 2006
56. “Poster: “Using for Parallel Curriculum Development and Assessment”, François G. Amar, Matthew Leland, Barbara N. Stewart, and Mitchell R. M. Bruce, Gordon Research Conference on Chemical Education Theory and Practice, June 26-July 1, 2005.
55. “Structural and Mesogenic Properties of Gold(I) Thiolate and Isocyanide Complexes.”, S. Larkin¹, A. E. Bruce¹, M. R. M. Bruce¹, M. V. Makarov², D. A. Lemenovskii², V. P. Dyadchenko², O. Elbeirami³, M. A. Omary³; ¹University of Maine, Chemistry Department, Aubert Hall, Orono, Maine, ME 04469-5706; ²M. V. Lomonosov Moscow State University, Chemistry Department, Leninskie Gory, 119992 Moscow, Russian Federation; ³University of North Texas, Department of Chemistry, 9th International Symposium on Metallomesogens, Lake Arrowhead, California May 31-June 3, 2005.
54. “Liquid Crystals Based on Ferrocenylbiphenyl and Ferrocenylterphenyl.” M. V. Makarov¹, D.A.Lemenovskii¹, A. E. Bruce², M. R. M. Bruce², V. P. Dyadchenko¹ ¹M. V. Lomonosov Moscow State University, Chemistry Department, Leninskie Gory, 119992 Moscow, Russian Federation. ²University of Maine, Chemistry Department, Aubert Hall, Orono, Maine, ME 04469-5706. (Poster), 9th International Symposium on Metallomesogens, Lake Arrowhead, California May 31-June 3, 2005.
53. “Genuine Role of Auophilic Bonding on Luminescence and Mesogenic Properties of Simple Isonitrile Complexes.” M. A. Omary,^a O. Elbjeirami,^a S. Larkin,^b M. R. M. Bruce,^b and A. E. Bruce^{a,b} ^aUniversity of North Texas, Department of Chemistry, P.O. Box 305070, Denton, TX 76203; ^bUniversity of Maine, Chemistry Department, Aubert Hall, Orono, Maine, ME 04469-5706. (Oral), 9th International Symposium on Metallomesogens, Lake Arrowhead, California May 31-June 3, 2005.

52. “Using InterChemNet to Promote University/High School Collaboration in Chemistry, Barbara Stewart, Mitchell R. M. Bruce, François G. Amar. Symposium on K-16 Collaborations held at the 18th Biennial Conference on Chemical Education, Ames, Iowa, July 18-22, 2004.
51. “Addressing Barriers to the Adoption of PLTL: Logistics and Training, Mitchell R.M. Bruce, François G. Amar, Barbara Stewart, Shaun Murphree, Pratibha Varma-Nelson. Symposium on Applying the Peer-Led Workshop Model Across the Undergraduate Chemistry Curriculum held at the 18th Biennial Conference on Chemical Education, Ames, Iowa, July 18-22, 2004.
50. “Discipline-Based Professional Development for High School Science Teachers at the University of Maine”, François G. Amar, Barbara Stewart, Mitchell R. M. Bruce, Susan McKay. Symposium on Learning to Teach Chemistry: The Professional Development of High School Chemistry Teachers held at the 18th Biennial Conference on Chemical Education, Ames, Iowa, July 18-22, 2004.
49. “Discipline-Based Professional Development for High School Science Teachers at the University of Maine”, François G. Amar, Barbara Stewart, Mitchell R. M. Bruce, Susan McKay. Invited poster for the Sci-Mix session held at the 18th Biennial Conference on Chemical Education, Ames, Iowa, July 18-22, 2004.
48. “Addressing Cross-Disciplinary Barriers to the Sustainable Adoption of PLTL: Logistics and Training”, Mitchell R.M. Bruce, Barbara Stewart, François G. Amar, oral presentation at the Conference, Integrating Science Education Research into Teaching, Orono, Maine, June 20-22, 2004.
47. “Curriculum Development Cycles Using the InterChemNet System: A Tool for Action Research”, François G. Amar, Barbara Stewart, and Mitchell R. M. Bruce, oral presentation at the Conference, Integrating Science Education Research into Teaching, Orono, Maine, June 20-22, 2004.
46. “The Colors of Light: Using Spectrometers in High School and Middle School Science Classes”, Barbara Stewart, François G. Amar, Robert Kirk, Mitchell R.M. Bruce, Workshop presented at the Conference, Integrating Science Education Research into Teaching, Orono, Maine, June 20-22, 2004.
45. “Inter-Chem-Net”, Mitchell Bruce, Francois Amar, Barbara Stewart, Robert Kirk., invited presentation at the Conference Integrated Laboratory Network Workshop, Western Washington University, Bellingham, WA, August 10-13, 2004.
44. “Outreach in high school chemistry courses between the University of Maine and surrounding communities”, Lisa M. Armstrong, William Leathem, Brad Veitch, Mitchell R.M. Bruce, and François G. Amar, 227th National ACS meeting, March 28-April 1, 2004, Anaheim, CA. [Selected for Sci-Mix]

43. “Measuring the effect of PLTL in a large general chemistry course”, Barbara Stewart, François Amar and Mitchell Bruce, PLTL Symposium, 227th National ACS meeting, March 28-April 1, 2004, Anaheim, CA.
42. “Managing PLTL in a Large General Chemistry Class”, François Amar, Barbara Stewart, Mitchell Bruce, Gordon Research Conference on Chemical Education: Research and Practice, Ventura, CA, January 4 –9, 2004
41. “Peer Led Team Learning in General Chemistry at the University of Maine”, François Amar, Barbara Stewart, and Mitchell Bruce. Poster outlines the PLTL project at UMaine and presents data, which indicates improved grades and success rates as a result of PLTL. March, 2004.
40. “Peer Led Team Learning Leader Training Workshop, Barbara Stewart, Mitchell Bruce, and Francois Amar, Chemistry Dept, USM, Westbrook, ME, January 16, 2003.
39. “Measures of Success, Evaluation Peer Led Team Learning in General Chemistry”, Barbara Stewart, François Amar, and Mitchell Bruce, MMSTEC Mid-year conference, Jan. 25, 2003
38. “Using PLTL in General Chemistry at the University of Maine”, François Amar, Jenn Jackson, Barbara Stewart and Mitchell Bruce, MMSTEC Mid-year conference, Jan. 25, 2003
37. “Peer Led Team Learning in General Chemistry at the University of Maine”, François Amar, Barbara Stewart and Mitchell Bruce, Center for Science and Mathematics Education Research, February 5, 2003.
36. “Peer Led Team Learning in General Chemistry at the University of Maine”, Barbara Stewart, François Amar, and Mitchell Bruce, Active Learning Workshop, Center for Teaching Excellence, University of Maine, March 18, 2003.
35. “Peer Led Team Learning in General Chemistry at the University of Maine”, François Amar, Barbara Stewart and Mitchell Bruce, Department of Mathematics & Statistics, University of Maine, April 3, 2003.
34. “Measuring the Success of PLTL in General Chemistry at the University of Maine”, François Amar, Barbara Stewart and Mitchell Bruce, Northeast Regional Meeting of the American Chemical Society, Saratoga Springs, NY, June 18, 2003. Symposium paper and workshop.
33. “Evaluation of Sigma Bridges for Aviram-Ratner Rectifiers”, Gamarnik, A.; Wang, H.; Bruce, M. R. M. Gordon Research Conference on Chemistry of Electronic Materials; New London, CT; July 13-18, 2003.

32. "Cyclic Voltammetry of Pentafulvenes as a Measure of Pi Coupling across Sigma Spaces", Wang, H.; Bruce, M. R. M., Gamarnik, A Gordon Research Conference on Chemistry of Electronic Materials; New London, CT; July 13-18, 2003.
31. "Unusual luminescence and liquid crystalline properties of CyNCAuCl", Omary, Mohammad A.; Larkin, Scott A.; Elbjeirami, O.; Bruce, Alice E.; Bruce, Mitchell R. M.. Department of Chemistry, University of North Texas, Denton, TX, USA. Abstracts of Papers, 226th ACS National Meeting, New York, NY, United States, September 7-11, 2003 (2003), INOR-454.
30. "The Nottingham Galley Cannon Collection ca. 1710: A proposed scientific inquiry into the reasons a conserved iron cannon dramatically cracked into pieces in storage. Carlson, M.O., Bruce, M.R.M., Riess, W. C. in Preservation of Heritage Artifacts of the NACE Northern Area Eastern Conference, Corrosion Control for Enhanced Reliability and Safety. Ottawa, Ontario, Canada, September 15, 2003.
29. "The Peer-Led Team Learning Leader Training Project, Mitchell Bruce (UM), François Amar (UM), Barbara Stewart (UM), Shaun Murphree (Allegheny College), Pratibha Varma-Nelson (Northeastern Illinois University). Invited presentation at the PLTL National Conference, CCNY, October 13-15, 2003.
28. "Leader Training Module: Why Are There No Answer Keys? Mitchell Bruce (UM), François Amar (UM), Barbara Stewart (UM), Shaun Murphree (Allegheny College), Pratibha Varma-Nelson (Northeastern Illinois University). Workshop exploring the issue of answer keys, algorithmic vs conceptual learning, problem solving strategies in group settings. PLTL National Conference, CCNY, October 13-15, 2003.
27. "Inter-Chem-Net and active learning in the large course setting", Stewart, Barbara; Kirk, Robert E.; Amar, Francois G.; Bruce, Mitchell R. M., 223rd ACS National Meeting, Orlando, FL, United States, April 7-11, 2002 , CHED-1153.
26. "Towards adamantane based molecular rectifiers", Gamarnik, Alla; Slobodzian, Sergei V.; Soares, Jeronimo; Bruce, Mitchell R. M. 223rd ACS National Meeting, Orlando, FL, United States, April 7-11, 2002 (2002), ORGN-313.
25. "Mechanism of Oxidation of Auranofin, an Antiarthritic gold drug." Stewart, B.; Mohamed, A. A.; Krause Bauer, J. A.; Chen, J.; Bruce, M. R. M.; Bruce, A. E. Poster presented at the Metals in Medicine Gordon Conference, July, 2002.
24. "InterChemNet: An OnlineTool to Develop, Deliver and Assess Curriculum in the Laboratory. Barbara N. Stewart, Robert E. Kirk, François G. Amar, Mitchell R.M. Bruce, invited presentation at 224th ACS National Meeting, Boston, Massachusetts, August, 2002.
23. "Mechanism of oxidation of Auranofin: An antiarthritic gold drug.", Stewart, B.; Mohamed, A. Ali; Abdou, H.; Krause Bauer, J.; Chen, J.; Bruce, M. R. M.; Bruce, A. E.. Poster

presented at the 224th ACS National Meeting, Boston, MA, United States, August 18-22, 2002 (2002), INOR-101.

22. “InterChemNet: A Lab-Management Tool”, Barbara N. Stewart, Robert E. Kirk, François G. Amar, Mitchell R.M. Bruce (invited talk at the Gordon Research Conference on Innovations in College Chemistry Teaching), New London, CT, June, 2002.
21. “Laptops and Chemical Instrumentation in the Secondary School Laboratory”, Barbara Stewart, Michele Benoit, Robert Kirk, François Amar, and Mitchell Bruce, oral presentation at the Learners, Laptops, and Powerful Ideas Conference, University of Maine, Orono, Maine, August, 2002.
20. “Building Sustainable Cycles of Laboratory Curriculum Improvement Using InterChemNet Technology”, Barbara N. Stewart, Robert E. Kirk, François G. Amar, Mitchell R.M. Bruce, oral presentation at the Biennial Chemical Education Conference, Bellingham, Washington, July, 2002.
19. “Enhancing Student Learning in the Laboratory with an Online Assessment Tool”, Barbara N. Stewart, Robert E. Kirk, François G. Amar, Mitchell R.M. Bruce, poster presentation at the Gordon Research Conference on Innovations in College Chemistry Teaching, New London, CT, June 2002 and at Center for Science and Mathematics Education Research Summer Conference, University of Maine, Orono, Maine, June, 2002
18. “InterChemNet: A Web-based Tool to Develop, Deliver and Assess Curriculum in the Laboratory”, Barbara N. Stewart, Robert E. Kirk, François G. Amar, Mitchell R.M. Bruce, at the Gordon Research Conference on Innovations in College Chemistry Teaching, New London, CT, June 2002 and at Center for Science and Mathematics Education Research Summer Conference, University of Maine, Orono, Maine, June, 2002
17. “The University of Maine Center for Science and Mathematics Education Research: A Catalyst for Discipline-Based Research and its Applications in the Teaching and Learning of Science and Mathematics”, Barbara N. Stewart, Robert E. Kirk, François G. Amar, Mitchell R.M. Bruce at the Gordon Research Conference on Innovations in College Chemistry Teaching, New London, CT, June 2002 and at Center for Science and Mathematics Education Research Summer Conference, University of Maine, Orono, Maine, June, 2002
16. “Liquid crystalline gold phosphine complexes”, Larkin, Scott A.; Aksenov, Kirill; Dyadchenko, Victor; Lemenovskii, Dmitri; McClymer, James; Bruce, Mitchell R. M.; Bruce, Alice E. Department of Chemistry, University of Maine, Orono, ME, USA. Abstracts of Papers - American Chemical Society (2001), 221st INOR-480.

15. "Lab Navigator snapshots: A web-based browser application program for on-line evaluation," with B. Stewart, R. Kirk, D. Labrecque. and M. Bruce, 222nd ACS National Meeting, Chicago, IL, August 26, 2001 (selected for Sci-Mix poster session).
14. "Inter-Chem-Net and Lab Navigator: Web-based browser applications for managing experimental laboratory courses", with B. Stewart, R. Kirk, D. Labrecque. and M. Bruce, 222nd ACS National Meeting, Chicago, IL, August 26, 2001 (selected for Sci-Mix poster session).
13. "Oxidation Chemistry of Solganol: a Gold-sulfur Drug", A. A. Mohamed, M.R.M. Bruce, A.E. Bruce, 220th American Chemical Society Meeting, Washington, DC, August, 2000, INORG Paper #99.
12. "Gold(I) Clusters and Disulfide from the Oxidation of Gold(I) Thiolate Complexes", M.R.M. Bruce, A.E. Bruce, J. Chen, A. A. Mohamed, S. Negm, H. Adbou, 219th American Chemical Society Meeting, San Francisco, March, 2000, INORG Paper #173.
11. "Designing Gold(I) Complexes for New Materials", A.E. Bruce, M.R.M. Bruce, S.A. Larkin, D. Lemenovskii, V. Dyadchenko, K. Aksenov, A. Tsvetkov, 219th American Chemical Society Meeting, San Francisco, March, 2000, INORG Paper #257.
10. "Personalized Instruction in the Large General Chemistry Lab Program: The Role of Instrumentation and Computer Technology", M. Bruce, F. G. Amar, R. Kirk, D. LaBrecque, B. Stewart, 219th American Chemical Society Meeting, San Francisco, March, 2000, CHED Paper #146.
9. "Strategies for Using Instrumentation for Assessment of Student Performance in the Lab", M. Bruce, F. G. Amar, R. Kirk, D. LaBrecque, B. Stewart, 219th American Chemical Society Meeting, San Francisco, March, 2000, CHED Paper #983.
8. "Formation of a Gold(I) Cluster and Disulfide from Oxidation of the Antiarthritic Gold Drug, Auranofin", M.R.M. Bruce, A. A. Mohamed, A.E. Bruce, D. T. Hill 218th American Chemical Society Meeting, New Orleans, August, 1999, INORG Paper #390.
7. "Inter-Chem-Net: Integrating Instrumentation into Large General Chemistry Courses", M. Bruce, F. Amar, R. Kirk, and D. LaBrecque, Northeast Regional Meeting of the American Chemical Society, Pottsdam, N.Y., June 23, 1999.
6. "Inter-Chem-Net: Aspects Important for High School Teachers", M. Bruce, F. Amar, R. Kirk, and D. LaBrecque, UMaine Science Fair Workshop for High School Teachers, Orono, ME, September 24, 1999.
5. "Tipping the Balance: Scaling Principles in the Undergraduate Chemistry Lab", M. Bruce, F. Amar, R. Kirk, D. LaBrecque, B. Stewart, United States Department of Education FIPSE meeting, Washington, DC, October, 1999.

4. "Individualized Student Instruction using Instrumentation in the General Chemistry Lab: A Case Study at the University of Maine", F. G. Amar, M. R. M. Bruce, R. Kirk, D. LaBrecque, B. Stewart, United States Department of Education FIPSE meeting, Washington, DC, October, 1999.
3. "From Mastery to Discovery: Using Inter-Chem-Net to Create individualized Student Pathways in General Chemistry", M. Bruce, F. Amar, R. Kirk, D. LaBrecque, 217th American Chemical Society Meeting, Anaheim, March 25, 1999, CHED Paper #827.
2. "Individualized Student Learning Paths Using Inter-Chem-Net", F. Amar, M. Bruce, R. Kirk, D. LaBrecque, 217th American Chem Society Meeting, Chemical Education Division, Anaheim, CA, March 21, 1999, CHED Paper #047.
1. "Oxidation of gold(I) thiolate phosphine complexes: Formation of gold clusters and disulfide", Chen, Jinhua; Jiang, Tong; Wei, Gang; Narayanaswamy, Ratnavathany; Homrighausen, Craig; Bauer, Jeanette A. Krause; Bruce, Mitchell R. M.; Bruce, Alice E., 217th ACS National Meeting, Anaheim, Calif., Ma