

I. ROBERT M. HANSON

Edolph A. Larson and Truman E. Anderson, Sr., Chair of Chemistry
St. Olaf College
Northfield, MN 55057
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<http://stolaf.edu/people/hansonr>

II. Education

B.S. California Institute of Technology, 1979
Ph.D. Columbia University, 1984 (Gilbert Stork)
Thesis: *Studies Directed Toward the Total Synthesis of the Steroidal Alkaloid Germin*

III. Postgraduate Employment and Appointments

6/14– Chair, Department of Chemistry, St. Olaf College
6/12–5/13 Chair, Department of Chemistry, St. Olaf College
2/03– St. Olaf College, Professor of Chemistry
5/92–2/03 St. Olaf College, Associate Professor of Chemistry
9/86–5/92 St. Olaf College, Assistant Professor of Chemistry
9/85– Integrated Graphics, Sole Proprietor
1/84–8/86 Massachusetts Institute of Technology, Postdoctoral Fellow (K. Barry Sharpless)
6/80–8/80 Health-Chem Corporation, Chemist
3/79–6/79 California Institute of Technology, Technician

IV. Courses Taught

St. Olaf College: Chemistry 110, 121, 123, 125, 126, 247, 248, 253, 254, 260, 380, 388,
390, 398, Chemistry/Biology 126

V. Professional Activity

Professional affiliations

American Chemical Society
International Society for Computational Biology

Publications (in reverse chronological order)

1. R. M. Hanson, E. F. Wyatt, "Jmol Contact: Visualizing protein-ligand contacts using Van der Waals mapping functions," (manuscript in preparation)
2. Simone Sturniolo, Timothy F. G. Green, Robert M. Hanson, Miri Zilka, Keith Refson, Paul Hodgkinson "Visualization and Processing of Computed solid-state NMR parameters: MagresView and MagresPython" (manuscript in preparation)
3. Bob Hanson, "Molecular Visualization for the Masses - PDB Goes to Disneyland" PDB Newsletter, Fall 2014, No. 63.
http://www.rcsb.org/pdb/general_information/news_publications/newsletters/2014q4/cor

- [ner.html](#)
4. Antony N. Davies, Mohan Cashyap, Robert Lancashire, Robert M. Hanson, "A head in the clouds?—Part two: exploring distributed, multi-server 1H NMR prediction" *Spectroscopy Europe* **2014**, <http://www.spectroscopyeurope.com/columns/tony-davies-column/3382-a-head-in-the-cloudspart-two-exploring-distributed-multi-server-1h-nmr-prediction>
 5. R. M. Hanson, J. Prilusky, Z. Renjian, T. Nakane, and J. L. Sussman, "JSmol and the Next-Generation Web-Based Representation of 3D Molecular Structure as Applied to Proteopedia" *Israel J. Chem.* **2013**, 53, 207-216.
 6. S. P. Tully, T. M. Stitt, R. D. Caldwell, B. J. Hardock, R. M. Hanson, and P. Maslak, "Interactive Web-Based Pointillist Visualization of Hydrogenic Orbitals Using Jmol" *J. Chem. Educ.* **2013**, 90, pp 129–131. <http://dx.doi.org/10.1021/ed300393s>
 7. R. M. Hanson, "A Unified Graphical Representation of Chemical Thermodynamics and Equilibrium," *J. Chem. Educ.*, **2012**, 89, 1526–1529.
 8. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 13.0," <http://jmol.sourceforge.net>, Aug. 22, 2012.
 9. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 12.2," <http://jmol.sourceforge.net>, Oct. 3, 2011
 10. N.M. O'Boyle, R.Guha, E.L. Willighagen, S.E. Adams, J. Alvarsson, J.-C. Bradley, I.V. Filippov, R.M. Hanson, M.D. Hanwel, G.R. Hutchison, C.A. James, N. Jeliaskova, A. Lang, K.M. Langner, D.C. Lonie, D.M. Lowe, J. Pansanel, D. Pavlov, O. Spjuth, C. Steinbeck, A.L. Tenderholt, K.J. Theisen, and P. Murray-Rust "Open Data, Open Source and Open Standards in chemistry: The Blue Obelisk five years on" *Journal of Cheminformatics* **2011**, 3:37
 11. R.M. Hanson, D. Kohler, S.G. Braun, "Quaternion-based definition of protein secondary structure straightness and its relationship to Ramachandran angles", *PROTEINS* **2011**, 79, 2172-2180.
 12. P. Canepa, R.M. Hanson, P. Ugliengo, M. Alfredsson, "J-ICE: a new Jmol interface for handling and visualizing Crystallographic and Electronics properties", *J. Appl. Cryst.* **2011**, 44, 225-229.
 13. S. Unni, Y. Huang, R. M. Hanson, M. Tobias, S. Krishnan; W. Li; J. E. Nielsen, N. A. Baker, "Web servers and services for electrostatics calculations with APBS and PDB2PQR", *J. Comp. Chem.* **2011**, 32, 1488-1491.
 14. R. M. Hanson, "Jmol -- A Paradigm Shift in Crystallographic Visualization," *J. Appl. Cryst.* **2010**, 43, 1250-1260
 15. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 12.0," <http://jmol.sourceforge.net>, July 28, 2010
 16. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 11.8," <http://jmol.sourceforge.net>, Aug. 25, 2009
 17. A. Herraiez, R. M. Hanson, L.Glasser, "Interactive 3D Phase Diagrams Using Jmol," *J. Chem. Educ.* **2009**, 86, 566
 18. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 11.6," <http://jmol.sourceforge.net>, Oct. 1, 2008
 19. R. M. Hanson, P. Riley, J. Schweinfus, P. J. Fischer, "Using Graphs of Gibbs Energy versus Temperature in General Chemistry Discussions of Phase Changes and Colligative Properties" *J. Chem. Educ.* **2008**, 85, 1142.

20. M. A. Klingshirn, A. F. Wyatt, R. M. Hanson, G. O. Spessard, "Determination of the Formula of a Hydrate: A Greener Alternative" *J. Chem. Educ.* **2008**, *85*, 819.
21. B. McMahan and R. M. Hanson, "A toolkit for publishing enhanced figures" *J. Appl. Cryst.* **2008**, *41*, 811-814 [doi:10.1107/S0021889808015616]
22. R. M. Hanson and S. E. Green, *Introduction to Molecular Thermodynamics* (University Science Books, Sausalito, CA, **2008**, 296 pp.)
23. R. M. Hanson, "24/7 dynamic NMR spectroscopy : A new paradigm for undergraduate NMR use" in *Modern Nuclear Magnetic Resonance in Undergraduate Education*, D. Rovnyak, Ed., ACS Symposium Series No. 969, **2007**, pp 62-76.
24. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 11.4," <http://jmol.sourceforge.net>, Dec. 30, 2007
25. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 11.2," <http://jmol.sourceforge.net>, Aug. 10, 2007
26. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 11.0," <http://jmol.sourceforge.net>, Mar 3, 2007
27. R. M. Hanson, B. Michalek, "Give Them Money: The Boltzmann Game, a Classroom or Laboratory Activity Modeling Entropy Changes and the Distribution of Energy in Chemical Systems" *J. Chem. Educ.* **2006**, *83*, 581.
28. R. M. Hanson and I. M. Hanson, "Elementary Bingo" *J. Chem. Educ. WebWare* **2004**.
29. R. M. Hanson, "Playing-Card Equilibrium" *J. Chem. Educ.* **2003**, *80*, 1271.
30. R. M. Hanson, "Orbital" *J. Chem. Educ.* **2003**, *80*, 109.
31. R. M. Hanson, "The Organic ChemIST" website (Prentice Hall, 2003).
32. R. M. Hanson, "Chemical Name Game" *J. Chem. Educ.* **2002**, *79*, 1380.
33. R. M. Hanson, "What's in a Name?" *J. Chem. Educ. Webware* **2002**, *79*, 1380.
34. R. M. Hanson, "Principal Species and pH in Acid/Base Solution" *J. Chem. Educ.* **2002**, *79*, 1379.
35. R. M. Hanson, "Mechanism-Based Kinetics Simulator" *J. Chem. Educ.* **2002**, *79*, 1379.
36. R. M. Hanson, "Huckel Determinant Solver" *J. Chem. Educ. Webware* **2002**, *79*, 1379.
37. R. M. Hanson, *Epoxide Migration (Payne Rearrangement) and Related Reactions*, in *Organic Reactions, Vol. 60*, Larry E. Overman, et al., Ed., pp 1-156 (Wiley, **2002**).
38. R. M. Hanson, *Written Quantitative Exam Questions*, in *The Hidden Curriculum, Part 1* S. Tobias, J. Raphael, Eds., (Plenum, NY) **1997**, 96-97.
39. B. Cipra, R. M. Hanson, A. Kolan, "Periodic Trajectories in Right-Triangle Billiards" *Physical Review E*, **1995**, *52*, 2066.
40. R. M. Hanson, *Molecular Origami: Precision Scale Models from Paper* (University Science Books, **1995**).
41. R. M. Hanson, S. A. Bergman, "Data-Driven Chemistry: Making Molecular Models (Literally) from Electron Diffraction Data" *J. Chem. Educ.* **1994**, 150.
42. G. L. Hardgrove, J. S. Clark, A. Q. Thieu, R. M. Hanson, "Structure of (*S,S*)-(E)-3-(2-butenoyl)-2,4-bis(phenylmethyl)oxazolidine" *Acta Cryst. C49* **1993**, 336.
43. R. M. Hanson, "The Synthetic Methodology of Nonracemic Glycidol and Related 2,3-Epoxy Alcohols" *Chemical Reviews* **1991**, 437-475.
44. Yun Gao, R. M. Hanson, Janice M. Klunder, Soo Y.Ko, Hiroko Masamune, and K. Barry Sharpless, "Catalytic Asymmetric Epoxidation and Kinetic Resolution: Modified Procedures Including in Situ Derivatization" *J. Amer. Chem. Soc.* **1987**, *109*, 5765.
45. R. M. Hanson, "FLATLAND and the Threefold Challenge of Text and Chemical

- Graphics Integration” in *Graphics for Chemical Structures*, W. Warr, Ed.; ACS Symposium Series #341; American Chemical Society: Washington, D.C., **1987**.
46. R. M. Hanson, S.Y. Ko, and K. B. Sharpless, “Catalytic Asymmetric Epoxidation” *U.S. Patent* 4,900,847.
 47. R. M. Hanson and K.B. Sharpless, “Catalytic Asymmetric Epoxidation” *J. Org. Chem.* **1986**, *51*, 1922.
 48. R. M. Hanson, “Absolute Stereochemistry of the Triol Moiety of Gymnoprenols: A Reinvestigation” *Tetrahedron Lett.* **1984**, *25*, 3783–6.
 49. R. M. Hanson, “Studies Directed Toward the Total Synthesis of the Steroidal Alkaloid Germine” Ph.D. Thesis, Columbia Univ., 1983. (not included collection)

Conference/Symposium Organizing Activities (in reverse chronological order)

1. Symposium presider, Gordon Research Conference on Visualization in Science and Education, Bates College, Aug. 2-7, 2015.
2. Symposium co-organizer, “Web-Based Resources for Chemical Education: Online Resources,” 22nd Biennial Conference on Chemical Education, Penn State Univ., 2012
3. Symposium co-organizer, “Web-Based Applications for Chemical Education,” 21st Biennial Conference on Chemical Education, University of North Texas, 2010
4. Symposium co-organizer, “Web-Based Applications for Chemical Education,” 20th Biennial Conference on Chemical Education, Indiana University, 2008
5. Symposium co-organizer, “Web-Based Applications for Chemical Education,” 19th Biennial Conference on Chemical Education, Purdue University, 2006
6. Conference co-organizer, ACS CONFCHEM on-line conference, “Web-Based Applications for Chemical Education: Experiences and Visions,” May 12 – May 18, 2006
7. Symposium organizer/presider, “Automation and Remote Access Technology in the Undergraduate Teaching Laboratory”, American Chemical Society 229th National Meeting, San Diego, CA, 2005

Professional presentations (in reverse chronological order)

1. “Real-time classroom comparison of structures and NMR spectra using Jmol/JSpeView and nmrdB” R. M. Hanson, R. Lancashire, and L. Patiny, 249th ACS National Meeting, Denver, Colorado, March 22, 2015.
2. “JCAMP-MOL: A JCAMP-DX extension to allow interactive model/spectrum exploration using Jmol and JSpeView” R. M. Hanson and R. Lancashire, 249th ACS National Meeting, Denver, Colorado, March 25, 2015.
3. “Innovative Molecular Visualization in Biochemistry and Pharmacology: Using Surfaces to Depict Contacts and Interactions,” Universidad de Alcalá, Alcalá de Henares, Spain, May 22, 2014.
4. “Molecular Visualization in the Age of International Connectivity,” Universidad de Alcalá, Alcalá de Henares, Spain, May 21, 2014.
5. “Molecular Visualization in the Age of International Connectivity,” Universidad de País Vasco, Leioa, Spain, May 15, 2014.
6. “Introduction to Jmol for the Solid State,” Departamento de Física de la Materia

- Condensada, Universidad de País Vasco, Leioa, Spain, May 8, 2014.
7. "Molecular Visualization in the Age of International Connectivity," University of the West Indies, Mona, Kingston, Jamaica, January 23, 2014.
 8. "Jmol/JSmol," Scripps Research Institute, La Jolla, Ca., Nov. 12, 2013.
 9. "Jmol/JSmol," Workshop on Theoretical Model Archiving, Validation, and PDBx/mmCIF Data Exchange Format, Rutgers University-Piscataway, N.J., Oct. 22, 2013.
 10. "JCAMP-MOL: A JCAMP-DX extension to allow interactive model/spectrum exploration using Jmol and JSpecView," Robert M. Hanson and Robert Lancashire, 246th ACS National Meeting, Indianapolis, Indiana, Sept. 11, 2013.
 11. "JSmol: Full-service molecular visualization on the Web without Java," Robert Hanson, Zhou Renjian, Takanori Nakane, Paul Pillot, 246th ACS National Meeting, Indianapolis, Indiana, Sep. 8, 2013.
 12. "Exploring Crystal Structure, Symmetry, and Energetics with Jmol," Crystal Workshop MSSC2013, l'Università di Torino, Turin, Italy, Sept. 2, 2013.
 13. "Integration of Spectroscopy with Molecular Structure: Recent Advances and Future Plans," Workshop in Cheminformatics, École Polytechnique Fédérale de Lausanne, Switzerland, Aug. 30, 2013.
 14. "JSmol: Full-Service Molecular Visualization On the Web Without Java," Robert M. Hanson, Zhou Renjian, Gordon Research Conference on Visualization In Science & Education, Bryant University, July 21-26, 2013.
 15. "Visualization of periodic crystalline structure and wave functions using Jmol," The University of Warwick, Coventry, UK, July 3, 2013.
 16. "Visualization of periodic crystalline structure and wave functions using Jmol," Rutherford-Appleton Laboratories, Chilton, Oxfordshire, UK, June 26, 2013.
 17. "Novel Surface Visualizations in Macromolecular, Crystalline, and Solid-State Systems, Hebrew University in Jerusalem, Israel, Jan. 30, 2013.
 18. "Novel Surface Visualizations in Macromolecular, Crystalline, and Solid-State Systems, Weizmann Institute of Science, Rehovot, Israel, Jan. 27, 2013.
 19. "Making the connection between molecular structure and spectroscopy: Jmol, JSpecView, and JCAMP-MOL," R. M. Hanson, R. J. Lancashire, and A. Leone, 244th National Meeting of the American Chemical Society, Philadelphia, Pennsylvania, Aug. 21, 2012.
 20. "Making the connection between green chemistry and safety at the undergraduate level," R. M. Hanson, 244th National Meeting of the American Chemical Society, Philadelphia, Pennsylvania, Aug. 21, 2012.
 21. "Molecular visualization for the masses: Virtual model kits to virtual playgrounds," R. M. Hanson, E. Wyatt, and H. Nguyen, 22nd Biennial Conference on Chemical Education, Penn. State University, State College, Pennsylvania, Aug. 1, 2012.
 22. "Molecular visualization for the masses: Virtual model kits to virtual playgrounds," R. M. Hanson, St. Olaf Alumni College, June 1, 2012.
 23. "Visualization of periodic crystalline structure and wave functions using Jmol", R. M. Hanson, CCP-NC Visualization Planning Meeting, Department of Materials, University of Oxford, Oxford, UK, May 24, 2012.
 24. "Molecular visualization for the masses: Virtual model kits to virtual playgrounds," R. M. Hanson, Department of Chemistry, St. Olaf College, Dec. 8, 2011.
 25. "Jmol virtual model kit: An entirely new way to build and explore molecular structures,"

- R. M. Hanson, Lexington Section, American Chemical Society, Centre College, Danville, Kentucky, Oct. 17, 2011.
26. "Exploring Crystal Structure, Symmetry, and Energetics with Jmol," R. M. Hanson, Crystal Workshop MSSC2011, University of Turin, Italy, Sept. 5, 2011.
 27. "Interactive Visualization of Intermolecular Contacts" (poster), R. M. Hanson and E. Wyatt, Gordon Research Conference on Visualization in Science and Education, Bryant University, July 10-15, 2011.
 28. "Cyber-Enabled 24/7 NMR Spectroscopy: Transforming Organic Chemistry," R. M. Hanson, NMR in Biochemistry Workshop, University of Iowa, Iowa City, June 11, 2011.
 29. "Jmol in the Classroom: Molecule of the Moment," R. M. Hanson, South University School of Pharmacy, Savannah, Georgia, May 26, 2011.
 30. "Jmol virtual model kit: An entirely new way to build and explore molecular structures," R.M. Hanson, O. Rothenberger, T. Newton, 241st ACS National Meeting, Anaheim, California, March 28, 2011.
 31. "Jmol – Portal Into the Molecular World," R. M. Hanson, International Council for Scientific and Technical Information 2011 Workshop "Multimedia and Visualizations for Science" Microsoft Research, Redmond, Washington, Feb. 8, 2011.
 32. "Advanced Jmol Workshop," R. M. Hanson and A. Herraes, 21st Biennial Conference on Chemical Education, University of North Texas, Denton, Aug. 2, 2010.
 33. "Integrated Chemistry and Biology: A Three-Course Sequence of First-Year Science Students," R. J. Abdella, R. M. Hanson, P. T. Jackson, K. A. Kandl, G. Miessler, J. J. Schweinfus, M. Walczak, American Chemical Society 231st National Meeting, Washington, D.C., Aug. 20, 2009.
 34. "Using Quaternions to Visualize the Secondary Structure of Proteins and Nucleic Acids," R. M. Hanson and E. F. Wyatt, Gordon Research Conference on Visualization in Science and Education, University of Oxford, Oxford, UK, July 28, 2009.
 35. "Making the Most Out of Jmol Protein Explorer," R. M. Hanson, American Chemical Society 230th National Meeting, Mar. 22, 2009.
 36. "Making Connections Through Visualization," R. M. Hanson, University of Missouri, St. Louis, Aug. 25, 2008.
 37. "CoolMolecules: Teaching Molecular Structure with the Cambridge Structural Database," R. M. Hanson, M. Casavant, M. McGuan, and S. Wherland, 20th Biennial Conference on Chemical Education, Indiana University, July 30, 2008.
 38. "Teaching Substitution and Elimination With Real-Life Examples" R. M. Hanson, 20th Biennial Conference on Chemical Education, Indiana University, July 29, 2008.
 39. "What's New for Jmol," R. M. Hanson, 20th Biennial Conference on Chemical Education, Indiana University, July 28, 2008.
 40. "Green Chemistry Across the Curriculum At St. Olaf College," R. M. Hanson, 20th Biennial Conference on Chemical Education, Indiana University, July 31, 2008.
 41. "Green Chemistry At the Undergraduate Level," Invited Panel: Green Chemistry in Minnesota: Opportunities and Challenges for Leadership, University of Minnesota Humphrey Institute of Public Affairs, May 28, 2008.
 42. "Adventures in Thermodynamics," Bob Hanson, St. Olaf Sabbatical Series, April 8, 2008.
 43. "The Jmol Voxel (JVXL) File Format: Efficient Delivery of Isosurfaces Over the Web" (poster), R. Hanson, Gordon Research Conference on Visualization in Science and Education, Bryant University, July 1-6, 2007.
 44. "The Challenge of Web-Based Molecular Visualization," Robert M. Hanson, invited

- presentation, University of Cologne, Nijmegen University, Cambridge University, Aug. 21-25, 2006.
45. "Using the web-based Green Chemistry Assistant to enhance understanding of chemical reactions and processes", Robert M. Hanson, 19th Biennial Conference on Chemical Education, Purdue University, Aug. 3, 2006.
 46. "AJAX /JSON Click-JavaScript -- A New Vision for Web-Based Chemistry Applications", Robert M. Hanson, 19th Biennial Conference on Chemical Education, Purdue University, Aug. 1, 2006
 47. "Jmol: Open-source molecular visualization and analysis," Robert M. Hanson, Egon Willighagen, Nicolas Vervelle, Timothy Driscoll, and Miguel Howard, ACS CONFCHEM on-line conference, "Web-Based Applications for Chemical Education: Experiences and Visions," May 12 – May 18, 2006
 48. "The Green Chemistry Assistant: a new concept in web applications," ACS CONFCHEM on-line conference, "Web-Based Applications for Chemical Education: Experiences and Visions," May 12 – May 18, 2006
 49. "The Green Chemistry Assistant: Expanding the horizons of green chemistry in chemical education," Robert M. Hanson, Paul R. Campbell, Gary O. Spessard, and Marc A. Klingshirn, American Chemical Society 231st ACS National Meeting, Atlanta, GA, March 26-30, 2006
 50. "Bringing green chemistry to the first-year chemistry curriculum," Marc A. Klingshirn, Allison F. Christensen, Robert M. Hanson, and Gary O. Spessard, American Chemical Society 231st ACS National Meeting, Atlanta, GA, March 26-30, 2006
 51. "Demystifying Green Chemistry" Robert M. Hanson, invited presentation, Department of Chemistry, Michigan State University, East Lansing, MI, Aug. 10, 2005
 52. "24/7 Remote Access to NMR: A Paradigm Shift in the Undergraduate Organic Laboratory," 88th Canadian Chemistry Conference, Saskatoon, Saskatchewan, May 31, 2005
 53. "Web-Based Interface Allowing 24-Hour Undergraduate Access to a 400-MHz NMR Spectrometer," Bruker BioSpin Midwest Regional Meeting, 2004
 54. "CoolMolecules: A Web-Accessible Database of Experimentally Determined Molecular Structures," American Chemical Society 228th National Meeting, Philadelphia, PA, 2004
 55. "Accessible Quantum Statistical Approach to Molecular Thermodynamics for First-Year College Chemistry Students," 18th Biennial Conference on Chemical Education, Ames, Iowa, 2004
 56. "Web-Based Interface Allowing 24-Hour Undergraduate Access to a 400-MHz NMR Spectrometer.," 18th Biennial Conference on Chemical Education, Ames, Iowa, 2004
 57. "Kinetics Explorer: An Interactive Web-Based Resource for Teaching Kinetics at the First-Year College Level.," 18th Biennial Conference on Chemical Education, Ames, Iowa, 2004
 58. "Four Web-Based Methods for Delivering Dynamic Interactive Material for Teaching Thermodynamics and Kinetics at the First-Year College Level," 18th Biennial Conference on Chemical Education, Ames, Iowa, 2004
 59. "24/7 Dynamic OleNMR: A New Paradigm for the Undergraduate Laboratory," American Chemical Society 227th National Meeting, Anaheim, CA, 2004
 60. "A Modified Bruker Avance 400 MHz NMR Spectrometer Allowing 24/7 Web-Based Access by Undergraduates to Spectrometer Control and Data Analysis," 44th Experimental NMR Conference, Savannah, GA, 2003

61. "Two Novel Nonmolecular Uses of Chime," 17th Biennial Conference on Chemical Education, Bellingham, WA, 2002
62. "Using Molecular Origami to Explore Structure and Bonding," American Chemical Society 221st National Meeting, San Diego, CA, 2001
63. "Department-Based Course Toolkits: More Effective than Course Home Pages?" *Learning, Teaching, and Technology Faculty Presentation Series*, St. Olaf College, 2000
64. "Interactive Study Materials via JavaScript," *Learning, Teaching, and Technology Faculty Presentation Series*, St. Olaf College, 2000
65. "Take a Chance—Bring Probability Into Your Chemistry Classroom," ChemEd '99, Sacred Heart University, Fairfield, CT, 1999
66. "Molecular Origami I: Make Your Own Precision Scale Models," ChemEd '99 (Workshop), Sacred Heart University, Fairfield, CT, 1999
67. "Molecular Origami II: Using Precision Scale Models," ChemEd '99 (Workshop), Sacred Heart University, Fairfield, CT, 1999
68. "Using Molecular Origami to Enhance Understanding of Molecular Structure and Theory," 15th Biennial Conference on Chemical Education, U. of Waterloo, Waterloo, ON, 1998
69. "Molecular Origami: A Novel Approach to Investigating Structural Relationships," Department of Chemistry, Montana State University, Bozeman, MT, 1998
70. "Using Data-Driven Chemistry to Enhance Understanding of Atomic and Molecular Structure and Theory," ChemEd '97, University of Minnesota, Minneapolis, MN, 1997
71. "Titrations and Buffers: A Successful Investigative Laboratory/Writing Project for First-Year College Chemistry Students," ChemEd '97, University of Minnesota, Minneapolis, MN, 1997
72. "Data-Driven Chemistry: Application and Evaluation," ChemEd '95, Old Dominion University, Norfolk, VA, 1995
73. "Molecular Origami: Using Precision Scale Models to Teach Structure and Bonding," ChemEd '95, Old Dominion University, Norfolk, VA, 1995
74. "Playing-Card Equilibrium," ChemEd '95, Old Dominion University, Norfolk, VA, 1995
75. "Data-Driven Chemistry: A Novel Approach to the Teaching and Learning of Atomic and Molecular Theory" (Poster), Gordon Research Conference on Innovations in the Teaching of College Chemistry, Ventura, CA, 1994
76. "Stereoselectivity in Perspective," (workshop presentation) Institute of Gas Technology, 1993
77. Participant, NSF Workshop on Research and Education, Washington, DC, 1992
78. "Stereochemical Factor Analysis: Applications for Natural Product Synthesis and Drug Development," (poster) Gordon Research Conference on Natural Products, New Hampton, NH, 1991
79. "Stereochemical Factor Analysis," Columbia University, New York, NY, 1991
80. "Pseudo-C₂-Symmetric Chiral Ligands," Department of Chemistry, Gustavus Adolphus College, St. Peter, MN, 1990
81. "The Chemistry of Color," Lecture/Demonstration, Apple Valley High School, Apple Valley, MN, 1990
82. "The Presidential Young Investigator Program: Nurturing the Next Generation of Researchers" (panel), National Meeting, American Association for the Advancement of Science, New Orleans, LA, 1990
83. "New Perspectives in Stereochemistry," Department of Chemistry, U. Virginia,

Charlottesville, VA, 1990

84. "Stereochemical Factor Analysis" (poster), Council for Chemical Research, Parsippany, NJ, 1989
85. Seminar, Department of Chemistry, College of Wooster, Wooster, OH, 1988
86. Seminar, Department of Chemistry, Loyola College, Chicago, IL, 1988
87. "Reaction-Intrinsic Analysis of Stereochemistry: Kinetic Resolution and Double Diastereoselection," (poster) Gordon Research Conference on Natural Products, Newport, RI, 1988
88. "Stereochemical Factor Analysis," Department of Chemistry, U. Minnesota, Minneapolis, MN, 1987
89. "Catalytic Asymmetric Epoxidation," Department of Chemistry, Carleton College, Northfield, MN, 1987
90. "Catalytic Asymmetric Epoxidation," Department of Chemistry, Iowa State University, Ames, IA, 1987

Undergraduate Research Collaborators (alphabetically within years)

1. Lee Banett (1987)
2. Daniel Higgins (1987)
3. Laura Knoll (1987)
4. Elizabeth Newburg (1987)
5. Brian Lieske (1988)
6. Anh Thieu (1988, 1989)
7. Lori Bates (1989)
8. Jason Gilster (1989)
9. Thomas Maier (1989)
10. Rebecca Nyquist (1989)
11. Patrick Swanson (1989)
12. Michael Forseth (1990)
13. Christopher George (1990)
14. Paul Jackson (1990, 1991)
15. Thomas Rauenhorst (1990, 1991)
16. Douglas Beussman (1991)
17. Steven Higgins (1991)
18. Nathan Stehle (1991-92)
19. Sonja Swenson (1991)
20. James Baron (1992, 1993)
21. Sara Bergman (1992)
22. R. Evan Easton (1992)
23. T. André Erickson (1992)
24. Susan Green (1992)
25. Shawn Hausmann (1992)
26. Brian Raymer (1992)
27. Adam Renslo (1992)
28. Deborah Dryer (1993)
29. Lizbet Langseth (1993)
30. Leah Mattson (1993)
31. Karl Nelsen (1993)
32. Thuan Truong (1993)
33. David Bierbrauer (1994)
34. Colleen Rooney (1994)
35. Christopher Rasmussen (1994)
36. Resha Eriksmoen (1994)
37. Ryan Hardin (1994)
38. Shelly Driver (1995)
39. Adam Hoogenraad (1995)
40. Erica Kylo (1995)
41. Merideth Schrader (1995)
42. Craig Schulz (1995)
43. Ross Meyer (1996)
44. Kathryn Olsen (1996)
45. Erin Carlson (1998)
46. Nathan Falk (1998)
47. Paul Wray (1998)
48. Michael Purnell (2002)
49. Stephanie Skladzien (02)
50. Gregg Sydow (2002)
51. Bryan Anderson (2003)
52. Jared Irwin (2003)
53. Melanie Casavant (2004)
54. Michael McGuan (2004)
55. Paul Campbell (2005)
56. Allison Christensen (05)
57. Jenea Fabini (2007)
58. Daniel Kohler (07,08)
59. Ryan Vink (2007)
60. Benjamin Thompson (08)
61. Sean Johnston (2009)
62. Steven Braun (2009,10)
63. Kallie Doeden (2010)
64. Evan Anderson (2011)
65. Hai Nguyen (2011)*
66. Sasha Schrandt (2011)
67. Erik Wyatt (2011)
68. Amanda Leone (2012)
69. Kellan Passow (2012)
70. Brigitte Honaker (2015)
71. Patrick Stefak (2015)
72. Elizabeth New (2015)
73. Jacob LaNasa (2015)

**Carleton College student*

Postdoctoral Research Collaborators

1. Eric Epp (2010)

Honors, appointments, awards, grants (in reverse chronological order)

1. US Office of Naval Research Broad Agency Announcement *Enhancing AFLOW Visualization Using Jmol*, \$80,000 subcontract (Duke University) 2015-2016
2. St. Olaf College sabbatical leave, 2013-2014
3. Fulbright Specialist Program Roster Member 2013-2018
4. Jean Dreyfus Boissevain Lectureship for Undergraduate Institutions, 2013, \$18,500
5. Chair, Department of Chemistry, 2012-2016 (on leave, 2013-14)
6. Edolph A. Larson and Truman E. Anderson, Sr., Chair of Chemistry, 2012-present (\$25,000 discretionary funds)
7. St. Olaf College Opening Convocation Faculty Speaker, 2013
8. St. Olaf College Magnus the Good Student/Faculty Collaboration Grant, 2008
9. St. Olaf College sabbatical leave, 2006–2007
10. St. Olaf College International Studies Faculty Development Grant, *Development of the January Interim course, Chemistry 260, Medicinal Chemistry in Jamaica: An International Perspective*, 2005
11. W. M. Keck Foundation, *Green Chemistry Throughout the Curriculum*, 2004-2010, \$500,000
12. St. Olaf Capital Equipment Project: *Automated 24/7 High-Field NMR Spectrometer*, 2002-2003, \$450,000
13. St. Olaf College sabbatical leave, 1999–2000
14. St. Olaf College sabbatical leave, 1992–1993
15. Eli Lilly Co., unrestricted research support, 1992, \$5,000
16. Aldrich Chemical Co., CD-ROM software, 1991, \$875
17. Eli Lilly equipment donation, 1991, \$7560
18. Varian Associates NMR Maintenance Course Tuition Reduction, 1991, \$1500
19. St. Olaf College Pretenure Release Grant (2/3 release), fall 1990
20. ARCO Chemical Co. unrestricted research support, 1990, \$4,000
21. DuPont equipment donation, 1990, \$34,000
22. American Chemical Society Petroleum Research Fund Type B Grant, 1990–92, \$18,000
23. National Science Foundation Presidential Young Investigator Award, 1989–1994, \$312,000
24. Research Corporation Cottrell Grant, 1987–1990, \$19,900
25. National Institutes of Health Research Service Award, 1984–1986
26. Hammett Research Award, Columbia University, 1983
27. National Science Foundation Predoctoral Fellowship, 1979–1982
28. Columbia University Teaching Award, 1981
29. American Institute of Chemists Honor Award, 1979
30. Arie J. Haagan-Smit Memorial Award, 1978
31. Carnation Scholarship, 1978
32. Caltech Prize Scholarship, 1977,78
33. Stauffer Scholarship, 1977

Consulting and advisory boards, and contracts

1. European Bioinformatics Institute, Hinxton, UK, 2014.
2. Research Consortium for Structural Bioinformatics (RCSB), 2013.
3. University of Oxford, Department of Materials Science/Rutherford Laboratories/
Collaborative Computational Project for NMR Crystallography (CCP-NC), 2012-
4. Indigo Instruments, Waterloo, Ontario, Canada, 2011–
5. Cornell University/Epcot Theme Park, “Touch-A-Molecule” kiosk development for
interactive Innoventions Building exhibit “Take a Nanooze Break”, 2010-2011
6. Contracted Content Provider, Houghton-Mifflin (high school text book content producer;
"Why It Matters" video glider pilot/narrator), 2007-2008
7. Software Consultant, Dynamic Minds, Inc., Stamford, CT, 2001–02
8. Publishing Consultant, Pearson Education Co., Upper Saddle River, NJ, 2000–02
9. Exhibit Consultant, New Museum of Contemporary Art, New York, NY, 1999
10. Software Consultant, Rylaz Products, Madison, WI, 1990–1993
11. Review Panel, NSF Educational Materials Division, Washington, DC, 1991
12. Research Consultant, ARCO Chemical Co., Newtown Square, PA, 1987

Peer reviewing activities

1. Simpson College External Department Reviewer, 2013
2. Centre College External Department Reviewer, 2011
3. Swarthmore College External Examiner, 1990
4. Review of various NSF, PRF, and Research Corporation grant proposals in the field of
research chemistry, 1987–
5. Periodic manuscript reviewer for *Journal of Cheminformatics*, *Chemical Reviews*;
Journal of Organic Chemistry; *Organic Letters*; *Organic Preparations and Procedures*,
Int.; *Journal of Chemical Education*; *University Science Books*; *McGraw-Hill*; *Prentice*
Hall; *W.W. Norton*

Curricular developments—Laboratory Experiments (included in professional works collection)

1. Chemistry 121: Measurement, Observation, and Calculation (new)
2. Chemistry 121: Hazardous Material Disposal/Recovery (new)
3. Chemistry 121: Quantitative Determination of Metal Ions (new)
4. Chemistry 121: Stoichiometry: The Reaction Between Ni²⁺ and Ethylenediamine (new)
5. Chemistry 121: Introduction to Equilibrium (adapted)
6. Chemistry 121: Introduction to Acids, Bases, and pH (new)
7. Chemistry 121: pK_a of the Anthocyanin in Cranberry Juice (adapted)
8. Chemistry 121: Investigative Chemistry (new)
9. Chemistry 125: Fragrance Chemistry: Identification of Unknowns by GC/MS (new)
10. Chemistry 125: Hazardous Material Disposal/Recovery (new)
11. Chemistry 125: Quantitative Assay Development (new)
12. Chemistry 125: Investigative Chemistry (new)

13. Chemistry 126: Introduction to the Chemical Literature (new)
14. Chemistry 126: Probability and Equilibrium (new)
15. Chemistry 126: Energy Levels and Spectra—Atomic Spectroscopy (adapted)
16. Chemistry 126: Energy Levels and Spectra—Molecular Spectroscopy (new)
17. Chemistry 126: Internal Energy (adapted)
18. Chemistry 126: Probability and Entropy (new)
19. Chemistry 253/254: Tricks of the Trade (new)

VI. Service to the Community

Departmental committees and duties (only a representative portion are listed)

1. Department Chair, Chemistry, 2012-2013, 2014-present
2. Associate Chair for Curriculum, 2001-2004
3. Student Teacher Specialist Coordinator, 2001
4. Alumni Liaison, 2000
5. Chem Mess Editor, 1991, 2001
6. ACS Student Section Adviser, 1991
7. NMR Oversight Committee, 1989–
8. Seminar Committee, 1986, 1989, 2001

Additional departmental service: software development

1. OleNMR Web-Based Bruker 400 MHz NMR interface
2. cacheset Expands the capabilities of CACHE
3. ddeserve Web server utility allowing dynamic data exchange (server application)
4. getpic Organizes student pictures and creates a database from them
5. grades Integrated departmental grading system (server application)
6. place Allows rapid analysis of department placement exam data
7. quickurl Scripted automation of internet file transfer
8. winreg Program to allow comparison of registration data
9. chemwork Online Department Work Application
10. seminars spreadsheet-based web site seminar listing
11. survey Online Survey Analysis Tool
12. toolkit Web-Based Chemistry Course Toolkit

College committees, duties and assignments

1. Review and Planning Committee, 2003-2005 (chair, 2004)
2. Gold Form Committee 2002 (*ad hoc*), member
3. Student Teacher Specialist Supervisor, 2001–2002 (Sean Holmes, chemistry)
4. Student Teacher Specialist Supervisor, 2001–2002 (Gabe Kortuem, physics)
5. Admissions, Retention, and Financial Aid 2001– (standing), divisional representative
6. Admissions Task Force 1997 (*ad hoc*), member
7. Curriculum and Educ. Policy 1991–95 (standing), faculty at-large representative

8. Media Board 1988–90 (standing), faculty at-large representative
9. Appeals Board 1990–92 (standing), chair for both years
10. Committee on the Status of Women 1988–89 (*ad hoc*), member
11. Women's Week Committee 1989–90 (*ad hoc*), organizer, discussion leader

Additional college-wide service: software development

1. sis2 Augmented Student Information Service web application
2. events Allows campus-wide internet-based event scheduling
3. explore Classroom scheduling utility for Registrar's Office
4. maildrop Allows quick, simple E-mail sending from campus computers
5. meetme Online coordination of multiple participant schedules (client application)
6. mysched Graphical display of weekly schedules
7. operator Allows quick look-up in on- or off-campus phone directories
8. regaudit St. Olaf College Degree Planner (client/server application set)
9. register St. Olaf College Schedule Planner (client/server application set)
10. reglist Display/Printing of registration results
11. schedule St. Olaf College Schedule Planner (PC version)

Curricular developments: software (included in professional works collection)

(1-first year, 2-organic chem., 3-other; VB-Visual Basic, JS-JavaScript)

1. bunt (1-VB) Application of the Boltzmann distribution to currency exchange
2. chmsolv (1-VB) Simplex-Based Chemical/Mathematical Equation-Solving Calculator
3. kab (1-VB) Equilibrium simulation based on a quantized energy level system
4. orbital (1-VB) Hydrogen atom orbital display using Chime
5. plotscan (1-VB) Allows *x-y* coordinate correlation of a digitally scanned images
6. windata (1-VB) Application to enable the collection of experimental data
7. wineq (1-VB) H₂/D₂/HD equilibration simulation
8. wintropy (1-VB) Simulation of an evenly-spaced quantized energy level system
9. acidbase (1-JS) Principal Species and pH in Acid/Base Solutions
10. animate (1-JS) Animation of a graph of *K* vs. *T* for a simple reaction system
11. banana (1-JS) Simulation of a simple 3-particle 3-unit energy system
12. boltz (1-JS) Simulation of an evenly-spaced quantized energy level system
13. graph (1-JS) JavaScript Graphing Calculator
14. h2d2 (1-JS) H₂/D₂/HD equilibration simulation
15. jscal (1-JS) JavaScript Chemical/Mathematical Equation-Solving Calculator
16. kab (1-JS) Equilibrium simulation/graphing utility (client application)
17. kinetics (1-JS) Mechanism-Based Kinetics Simulator
18. lewis (1-JS) Lewis structure practice page
19. namegame (1-JS) a chemical "Jeopardy" game covering inorganic nomenclature
20. naming (1-JS) Inorganic compound/ion naming practice page

21. quiz (1-JS) Quiz over entropy and enthalpy
22. ftir (2-VB) Demonstration of a simple infrared interferometer
23. optics (2-VB) Demonstration of linearly/circularly polarized light
24. 24-7 (2-JS) Remote NMR Spectrometer Interface (work in progress)
25. aminoac (2-JS) Amino acid naming practice page (licensed)
26. aroname (2-JS) Aromatic compound name practice page (licensed)
27. aroset (2-JS) Aromatic compound reaction selectivity practice page (licensed)
28. arosyn (2-JS) Aromatic compound synthesis practice page (licensed)
29. cyclohex (2-JS) Animation of chair/chair interconversion of cyclohexanes (licensed)
30. data (2-JS) Reaction Finder for *Organic Chemistry, 2nd Ed.* (licensed)
31. huckel (2-JS) Simple Huckel molecular orbital theory pi-system determinant solver
32. isomers(1) (2-JS) Alkane isomer identification practice page (licensed)
33. isomers(2) (2-JS) *R, S* stereochemistry identification practice page (licensed)
34. masscalc (2-JS) Simple nominal mass/formula identifier (licensed)
35. names(1) (2-JS) Alkane Quiz I: Comparing Alkane Structures (licensed)
36. names(2) (2-JS) Alkane Quiz II: Naming Alkanes (licensed)
37. names(3) (2-JS) Draw This Structure (draws a structure from an IUPAC name)
38. pi (2-JS) Amino Acid pI Calculator (licensed)
39. showprot (2-JS) Protein Investigator (licensed)
40. callchk (3-VB) creates a database and cross-referencing code for Visual Basic
41. cdxedit (3-VB) Allows full integration of ChemDraw (CDX) files into large projects
42. chimemap (3-VB) Converts 3-D data sets to Chime-based graphs
43. ediff (3-VB) Simulates the collection and analysis of electron diffraction data
44. morphxyz (3-VB) Allows the morphing of chemical structures into a smooth sequence
45. origami (3-VB) Allows the creation of precision-scaled paper models of molecules
46. divgraph (3-JS) DIV-based graphing package for HTML applications
47. rotate (3-JS) Chime Model Rotation Calculator
48. varignu (3-JS) Web-based variable GNUplot graphing utility

Service to the wider community

1. Co-organizer and student science activities coordinator, Mano a Mano International Bolivia Rural Elementary Teachers Workshop, Arani, Bolivia, June, 2015.
2. Co-organizer and workshop leader, Mano a Mano International Bolivia Rural Elementary Teachers Workshop, Arani, Bolivia, June, 2014.
3. Principal developer and project manager, Jmol Visualization Project, 2006-present
4. Interactive user documentation developer, Jmol Visualization Project, 2005-2006
5. Violin accompanist, Northfield Retirement Center Chapel service, 2010-2015
6. Cannon Valley Regional Orchestra, Secretary for the Board of Directors (1998–2005), violin (1987–), violin section leader (1998–2005), concert master (2000, 2002), principal second (2003–)

7. Minnesota Soaring Club, Airfield Volunteer Coordinator, schedule field operations officers, instructors, and tow pilots for weekend glider operations (2001–)
8. Greenvale Park Elementary School, parent volunteer, including the weekly teaching of Challenge Math 3rd grade (1999/2000), 4th grade (2000/01), and 5th grade (2001/02), reading assistant, 1st grade (2001/02), 3rd grade “Cool Science” presenter (2000), 5th grade “Super Magnets” presenter (2001)
9. Bethel Lutheran Church Sunday School, Project Team member for 3rd–5th grade Sunday School (2000–2002)
10. Bethel Lutheran Church Justice Committee, helped organize the CROP walks of 1990 and 1991; lead various discussions relating to hunger, third-world, and other social issues (1987–1995)
11. Northfield Community Action Center, volunteer, established a service for the free repair of household appliances for the elderly and low-income families in Northfield (1987–1990), Food Shelf volunteer (1987–1990)