

I. ROBERT M. HANSON

Born: August 26, 1957

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

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 121, 123, 125, 126, 247, 248, 253, 254, 260, 380, 388, 390
Chemistry/Biology 126

V. Professional Activity

Publications (in reverse chronological order)

1. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 12.2," <http://jmol.sourceforge.net>, Oct. 3, 2011
2. 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
3. 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.
4. 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
5. R. M. Hanson, "Jmol -- A Paradigm Shift in Crystallographic Visualization," *J. Appl. Cryst.* **2010**, 43, 1250-1260
6. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 12.0," <http://jmol.sourceforge.net>, July 28, 2010
7. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 11.8,"

- <http://jmol.sourceforge.net>, Aug. 25, 2009
8. A. Herraiez, R. M. Hanson, L. Glasser, "Interactive 3D Phase Diagrams Using Jmol," *J. Chem. Educ.* **2009**, *86*, 566
 9. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 11.6," <http://jmol.sourceforge.net>, Oct. 1, 2008
 10. 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.
 11. 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.
 12. B. McMahon and R. M. Hanson, "A toolkit for publishing enhanced figures" *J. Appl. Cryst.* **2008**, *41*, 811-814 [doi:10.1107/S0021889808015616]
 13. R. M. Hanson and S. E. Green, *Introduction to Molecular Thermodynamics* (University Science Books, Sausalito, CA, **2008**, 296 pp.)
 14. 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.
 15. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 11.4," <http://jmol.sourceforge.net>, Dec. 30, 2007
 16. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 11.2," <http://jmol.sourceforge.net>, Aug. 10, 2007
 17. R. M. Hanson, "Jmol Molecular Visualization Applet, Version 11.0," <http://jmol.sourceforge.net>, Mar 3, 2007
 18. 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.
 19. R. M. Hanson and I. M. Hanson, "Elementary Bingo" *J. Chem. Educ. WebWare* **2004**.
 20. R. M. Hanson, "Playing-Card Equilibrium" *J. Chem. Educ.* **2003**, *80*, 1271.
 21. R. M. Hanson, "Orbital" *J. Chem. Educ.* **2003**, *80*, 109.
 22. R. M. Hanson, "The Organic ChemIST" website (Prentice Hall, 2003).
 23. R. M. Hanson, "Chemical Name Game" *J. Chem. Educ.* **2002**, *79*, 1380.
 24. R. M. Hanson, "What's in a Name?" *J. Chem. Educ. Webware* **2002**, *79*, 1380.
 25. R. M. Hanson, "Principal Species and pH in Acid/Base Solution" *J. Chem. Educ.* **2002**, *79*, 1379.
 26. R. M. Hanson, "Mechanism-Based Kinetics Simulator" *J. Chem. Educ.* **2002**, *79*, 1379.
 27. R. M. Hanson, "Huckel Determinant Solver" *J. Chem. Educ. Webware* **2002**, *79*, 1379.
 28. 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**).
 29. R. M. Hanson, *Written Quantitative Exam Questions*, in *The Hidden Curriculum, Part 1* S. Tobias, J. Raphael, Eds., (Plenum, NY) **1997**, 96-97.
 30. B. Cipra, R. M. Hanson, A. Kolan, "Periodic Trajectories in Right-Triangle Billiards" *Physical Review E*, **1995**, *52*, 2066.
 31. R. M. Hanson, *Molecular Origami: Precision Scale Models from Paper* (University Science Books, **1995**).
 32. R. M. Hanson, S. A. Bergman, "Data-Driven Chemistry: Making Molecular Models (Literally) from Electron Diffraction Data" *J. Chem. Educ.* **1994**, 150.

33. 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.
34. R. M. Hanson, "The Synthetic Methodology of Nonracemic Glycidol and Related 2,3-Epoxy Alcohols" *Chemical Reviews* **1991**, 437–475.
35. 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.
36. 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**.
37. R. M. Hanson, S.Y. Ko, and K. B. Sharpless, "Catalytic Asymmetric Epoxidation" *U.S. Patent* 4,900,847.
38. R. M. Hanson and K.B. Sharpless, "Catalytic Asymmetric Epoxidation" *J. Org. Chem.* **1986**, *51*, 1922.
39. R. M. Hanson, "Absolute Stereochemistry of the Triol Moiety of Gymnoprenols: A Reinvestigation" *Tetrahedron Lett.* **1984**, *25*, 3783–6.
40. 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 co-organizer, "Web-Based Applications for Chemical Education," 20th Biennial Conference on Chemical Education, Indiana University, 2008
2. Symposium co-organizer, "Web-Based Applications for Chemical Education," 19th Biennial Conference on Chemical Education, Purdue University, 2006
3. Conference co-organizer, ACS CONFCHEM on-line conference, "Web-Based Applications for Chemical Education: Experiences and Visions," May 12 – May 18, 2006
4. 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. R. M. Hanson, "Jmol virtual model kit: An entirely new way to build and explore molecular structures," Lexington Section, American Chemical Society, Centre College, Danville, Kentucky, Oct. 17, 2011
2. R. M. Hanson, "Exploring Crystal Structure, Symmetry, and Energetics with Jmol, Crystal Workshop MSSC2011, University of Turin, Italy, Sept. 5, 2011
3. R. M. Hanson, "Cyber-Enabled 24/7 NMR Spectroscopy: Transforming Organic Chemistry," NMR in Biochemistry Workshop, University of Iowa, Iowa City, June 11, 2011
4. R. M. Hanson, "Jmol in the Classroom: Molecule of the Moment," South University School of Pharmacy, Savannah, Georgia, May 26, 2011
5. R.M. Hanson, O. Rothenberger, T. Newton, "Jmol virtual model kit: An entirely new way to build and explore molecular structures," 241st ACS National Meeting, Anaheim, California, March 28, 2011
6. R. M. Hanson, "Jmol – Portal Into the Molecular World," International Council for Scientific and Technical Information 2011 Workshop "Multimedia and Visualizations for Science" Microsoft Research, Redmond, Washington, Feb. 8, 2011
7. R. M. Hanson and A. Herraes, "Advanced Jmol Workshop," 21st Biennial Conference on Chemical Education, University of North Texas, Denton, Aug. 2, 2010
8. "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. Schweinefus, M. Walczak, American Chemical Society 231st ACS National Meeting, Washington, D.C., Aug. 20, 2009
9. "Making Connections Through Visualization," R.M. Hanson, University of Missouri, St. Louis, Aug. 25, 2008
10. "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
11. "Teaching Substitution and Elimination With Real-Life Examples" R. M. Hanson, 20th Biennial Conference on Chemical Education, Indiana University, July 29, 2008
12. "What's New for Jmol," R. M. Hanson, 20th Biennial Conference on Chemical Education, Indiana University, July 28, 2008
13. "Green Chemistry Across the Curriculum At St. Olaf College," R. M. Hanson, 20th

- Biennial Conference on Chemical Education, Indiana University, July 31, 2008
14. "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
 15. "Adventures in Thermodynamics," Bob Hanson, St. Olaf Sabbatical Series, April 8, 2008
 16. "The Challenge of Web-Based Molecular Visualization," Robert M. Hanson, invited presentation, University of Cologne, Nijmegen University, Cambridge University, Aug. 21-25, 2006
 17. "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
 18. "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
 19. "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
 20. "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
 21. "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
 22. "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
 23. "Demystifying Green Chemistry" Robert M. Hanson, invited presentation, Department of Chemistry, Michigan State University, East Lansing, MI, Aug. 10, 2005
 24. "24/7 Remote Access to NMR: A Paradigm Shift in the Undergraduate Organic Laboratory," 88th Canadian Chemistry Conference, Saskatoon, Saskatchewan, May 31, 2005
 25. "Web-Based Interface Allowing 24-Hour Undergraduate Access to a 400-MHz NMR Spectrometer," Bruker BioSpin Midwest Regional Meeting, 2004
 26. "CoolMolecules: A Web-Accessible Database of Experimentally Determined Molecular Structures," American Chemical Society 228th National Meeting, Philadelphia, PA, 2004
 27. "Accessible Quantum Statistical Approach to Molecular Thermodynamics for First-Year College Chemistry Students," 18th Biennial Conference on Chemical Education, Ames, Iowa, 2004
 28. "Web-Based Interface Allowing 24-Hour Undergraduate Access to a 400-MHz NMR Spectrometer.," 18th Biennial Conference on Chemical Education, Ames, Iowa, 2004
 29. "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
 30. "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
31. "24/7 Dynamic OleNMR: A New Paradigm for the Undergraduate Laboratory," American Chemical Society 227th National Meeting, Anaheim, CA, 2004
 32. "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
 33. "Two Novel Nonmolecular Uses of Chime," 17th Biennial Conference on Chemical Education, Bellingham, WA, 2002
 34. "Using Molecular Origami to Explore Structure and Bonding," American Chemical Society 221st National Meeting, San Diego, CA, 2001
 35. "Department-Based Course Toolkits: More Effective than Course Home Pages?" *Learning, Teaching, and Technology Faculty Presentation Series*, St. Olaf College, 2000
 36. "Interactive Study Materials via JavaScript," *Learning, Teaching, and Technology Faculty Presentation Series*, St. Olaf College, 2000
 37. "Take a Chance—Bring Probability Into Your Chemistry Classroom," ChemEd '99, Sacred Heart University, Fairfield, CT, 1999
 38. "Molecular Origami I: Make Your Own Precision Scale Models," ChemEd '99 (Workshop), Sacred Heart University, Fairfield, CT, 1999
 39. "Molecular Origami II: Using Precision Scale Models," ChemEd '99 (Workshop), Sacred Heart University, Fairfield, CT, 1999
 40. "Using Molecular Origami to Enhance Understanding of Molecular Structure and Theory," 15th Biennial Conference on Chemical Education, U. of Waterloo, Waterloo, ON, 1998
 41. "Molecular Origami: A Novel Approach to Investigating Structural Relationships," Department of Chemistry, Montana State University, Bozeman, MT, 1998
 42. "Using Data-Driven Chemistry to Enhance Understanding of Atomic and Molecular Structure and Theory," ChemEd '97, University of Minnesota, Minneapolis, MN, 1997
 43. "Titrations and Buffers: A Successful Investigative Laboratory/Writing Project for First-Year College Chemistry Students," ChemEd '97, University of Minnesota, Minneapolis, MN, 1997
 44. "Data-Driven Chemistry: Application and Evaluation," ChemEd '95, Old Dominion University, Norfolk, VA, 1995
 45. "Molecular Origami: Using Precision Scale Models to Teach Structure and Bonding," ChemEd '95, Old Dominion University, Norfolk, VA, 1995
 46. "Playing-Card Equilibrium," ChemEd '95, Old Dominion University, Norfolk, VA, 1995
 47. "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
 48. "Stereoselectivity in Perspective," (workshop presentation) Institute of Gas Technology, 1993
 49. Participant, NSF Workshop on Research and Education, Washington, DC, 1992
 50. "Stereochemical Factor Analysis: Applications for Natural Product Synthesis and Drug Development," (poster) Gordon Research Conference on Natural Products, New Hampton, NH, 1991
 51. "Stereochemical Factor Analysis," Columbia University, New York, NY, 1991
 52. "Pseudo-C₂-Symmetric Chiral Ligands," Department of Chemistry, Gustavus Adolphus College, St. Peter, MN, 1990

53. "The Chemistry of Color," Lecture/Demonstration, Apple Valley High School, Apple Valley, MN, 1990
54. "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
55. "New Perspectives in Stereochemistry," Department of Chemistry, U. Virginia, Charlottesville, VA, 1990
56. "Stereochemical Factor Analysis" (poster), Council for Chemical Research, Parsippany, NJ, 1989
57. Seminar, Department of Chemistry, College of Wooster, Wooster, OH, 1988
58. Seminar, Department of Chemistry, Loyola College, Chicago, IL, 1988
59. "Reaction-Intrinsic Analysis of Stereochemistry: Kinetic Resolution and Double Diastereoselection," (poster) Gordon Research Conference on Natural Products, Newport, RI, 1988
60. "Stereochemical Factor Analysis," Department of Chemistry, U. Minnesota, Minneapolis, MN, 1987
61. "Catalytic Asymmetric Epoxidation," Department of Chemistry, Carleton College, Northfield, MN, 1987
62. "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 Killo (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. Sasha Schrandt (2011)
66. Erik Wyatt (2011)

Postdoctoral Research Collaborators

1. Eric Epp (2010)

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 Ni^{2+} and Ethylenediamine (new)
5. Chemistry 121: Introduction to Equilibrium (adapted)
6. Chemistry 121: Introduction to Acids, Bases, and pH (new)
7. Chemistry 121: $\text{p}K_{\text{a}}$ 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)

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) $\text{H}_2/\text{D}_2/\text{HD}$ 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) $\text{H}_2/\text{D}_2/\text{HD}$ 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. arosel (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

Honors, awards, grants (in reverse chronological order)

1. St. Olaf College Magnus the Good Student/Faculty Collaboration Grant, 2008
2. St. Olaf College International Studies Faculty Development Grant, 2005
3. W. M. Keck Foundation, "Green Chemistry Throughout the Curriculum," 2004-, \$500,000
4. St. Olaf Capital Equipment Project: Automated 24/7 High-Field NMR Spectrometer, 2002-2003, \$450,000
5. St. Olaf College sabbatical leave, 1999–2000
6. St. Olaf College sabbatical leave, 1992–1993
7. Eli Lilly Co., unrestricted research support, 1992, \$5,000
8. Aldrich Chemical Co., CD-ROM software, 1991, \$875
9. Eli Lilly equipment donation, 1991, \$7560
10. Varian Associates NMR Maintenance Course Tuition Reduction, 1991, \$1500
11. St. Olaf College Pretenure Release Grant (2/3 release), fall 1990

12. ARCO Chemical Co. unrestricted research support, 1990, \$4,000
13. DuPont equipment donation, 1990, \$34,000
14. American Chemical Society Petroleum Research Fund Type B Grant, 1990–92, \$18,000
15. National Science Foundation Presidential Young Investigator Award, 1989–1994, \$312,000
16. Research Corporation Cottrell Grant, 1987–1990, \$19,900
17. National Institutes of Health Research Service Award, 1984–1986
18. Hammett Research Award, Columbia University, 1983
19. National Science Foundation Predoctoral Fellowship, 1979–1982
20. Columbia University Teaching Award, 1981
21. American Institute of Chemists Honor Award, 1979
22. Arie J. Haagan-Smit Memorial Award, 1978
23. Carnation Scholarship, 1978
24. Caltech Prize Scholarship, 1977,78
25. Stauffer Scholarship, 1977

Professional memberships

American Chemical Society; Council on Undergraduate Research

Consulting and advisory boards

1. Software Consultant, Dynamic Minds, Inc., Stamford, CT, 2001–
2. Publishing Consultant, Pearson Education Co., Upper Saddle River, NJ, 2000–
3. Exhibit Consultant, New Museum of Contemporary Art, New York, NY, 1999
4. Software Consultant, Rylaz Products, Madison, WI, 1990–1993
5. Review Panel, NSF Educational Materials Division, Washington, DC, 1991
6. Research Consultant, ARCO Chemical Co., Newtown Square, PA, 1987

Peer reviewing activities

1. Swarthmore College External Examiner, 1990
2. Review of various NSF, PRF, and Research Corporation grant proposals in the field of research chemistry, 1987–
3. Periodic manuscript reviewer for *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*

VI. Service to the Community

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

1. Associate Chair for Curriculum, 2008–
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. cacheset Expands the capabilities of CACHE
2. ddeserve Web server utility allowing dynamic data exchange (server application)
3. getpic Organizes student pictures and creates a database from them
4. grades Integrated departmental grading system (server application)
5. place Allows rapid analysis of department placement exam data
6. quickurl Scripted automation of internet file transfer
7. winreg Program to allow comparison of registration data
8. chemwork Online Department Work Application
9. seminars spreadsheet-based web site seminar listing
10. survey Online Survey Analysis Tool
11. 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. events Allows campus-wide internet-based event scheduling
2. explore Classroom scheduling utility for Registrar's Office
3. maildrop Allows quick, simple E-mail sending from campus computers
4. meetme Online coordination of multiple participant schedules (client application)
5. mysched Graphical display of weekly schedules
6. operator Allows quick look-up in on- or off-campus phone directories
7. regaudit St. Olaf College Degree Planner (client/server application set)
8. register St. Olaf College Schedule Planner (client/server application set)
9. reglist Display/Printing of registration results
10. schedule St. Olaf College Schedule Planner (PC version)

Service to the wider community

1. 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)
2. Minnesota Soaring Club, Airfield Volunteer Coordinator, schedule field operations officers, instructors, and tow pilots for weekend glider operations (2001–)
3. Bethel Lutheran Church Sunday School, Project Team member for 3rd–5th grade Sunday School (2000–2002)
4. 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)
5. Cannon Valley Regional Orchestra, Secretary for the Board of Directors (1998–), violin section leader (1998–), concert master (2000, 2002), principal second (various occasions), violin (1987–)
6. 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)