

WILLIAM S. HARWOOD

Department of Chemistry and Biochemistry
University of Northern Iowa
Cedar Falls, IA 50614
(319) 273 - 2506
Email: bill.harwood@uni.edu



RESEARCH INTERESTS

I am exploring the use of eye tracking as a means to detect and monitor Parkinson's disease.

EDUCATION

- Post-doctoral Chemical Education; SERAPHIM Fellow, Eastern Michigan University,
Ypsilanti, MI (Sept 1986 - May 1987)
- Ph.D. Inorganic Chemistry; Purdue University, West Lafayette, IN (May 1986)
- B.S. Chemistry (cum laude); University of Massachusetts, Amherst, MA (May 1980)

ACADEMIC PROFESSIONAL EXPERIENCE

University of Northern Iowa

PROFESSOR, Department of Chemistry & Biochemistry, University of Northern Iowa, Cedar Falls, IA (Aug 2006 – present)

Key Recent University Service:

- Chair, College (CHAS) Promotion and Tenure Committee
- Chair, Facilities Planning Task Force on Residence & Campus Life
- Intellectual Property Committee
- National Awards Mentorship Team (Goldwater and Udall, specifically)
- Steering Committee, University Center Renovation – CHAS Representative
- Steering Committee, Maucker Union Feasibility Study
- Living Learning Communities Team

HEAD, Department of Chemistry & Biochemistry, University of Northern Iowa, Cedar Falls, IA (Aug 2006 – July 2013)

Selected Accomplishments:

- Increased faculty research from 2 active groups to all faculty in the department
- Proposed and passed lab fee that balanced our annual budget
- Increased undergraduate majors from ca 95 to 135 (44% increase)
- Increased tenure-track faculty from a historical low of 11 to 14
 - Note: increased number of female faculty and promoted our first female full professor. Diversity increased also with two Instructor hires.
- Obtained external funding for needed renovations to classroom and research spaces
- Increased number of undergraduate scholarships from donors as well as the size of two established endowments

Key Recent University Service:

Chair, Enhancing Campus Life &
 Residential Communities Master Plan Task Force (2014–2015)
 Chair, Council of Academic Department Heads (2010–11)
 Administration Bargaining Team, 2010–11
 Advisory Board, Office of Sponsored Programs
 Intellectual Property Committee
 National Awards Mentorship Team (Goldwater and Udall, specifically)
 Learning Communities Advisory Council

University of Illinois

VISITING ASSOCIATE PROFESSOR, Department of Chemistry, University of Illinois at Urbana-Champaign, Champaign, IL (Aug 2005 – June 2006)

Indiana University

EXECUTIVE DIRECTOR, 21st Century Teachers Project, Indiana University, Bloomington, IN (Jan 2000 – June 2005).

Coordinated teams of faculty from 5 broad academic areas (Humanities, Social Sciences, Arts and Music, Science, and Mathematics) to align curricula in IU courses taken by pre-service teachers with curricula these future teachers will use on the job. Make teacher education an all-campus activity.

Coordinated with similar efforts at IU branch campuses across the state

DEAN, University Division, Indiana University, Bloomington, IN (Aug 1998 – June 2000)

Portfolio included:

Oversaw advising for all IU first-year students and half of the second-year students (ca. 12,000 students)

Responsible for Freshman Interest Groups, Pre-law/Pre-Health advising, and the Student Assistance Center

Served on Enrollment Management advisory board

Developed a donation to create the first scholarship for Pre-Med students

Awards

1998-99, Fellow, Big Ten Academic Alliance Academic Leadership Program

ASSOCIATE PROFESSOR, School of Education, Indiana University, Bloomington, IN (Aug 1998 – May 2006)

ADJUNCT ASSOCIATE PROFESSOR, Department of Chemistry, Indiana University, Bloomington, IN (Jan 1999 – May 2006)

Awards

2006, Who's Who in America

2004, Sci/Tech Web Awards by Scientific American for Common Molecules website

2004, Who's Who Among America's Teachers (**Nominated by EDUC Q200 student**)

2003, Fellow, Indiana University Scholarship of Teaching & Learning Academy

2002, Who's Who Among America's Teachers (**Nominated by CHEM C105 student**)

2000-2006, Fellow, Center for Research on Learning and Technology, Indiana University

William S. Harwood

University of Maryland

ASSISTANT DEAN, Office of Undergraduate Studies, University of Maryland, College Park, MD (September 1995 – August 1998)

Portfolio included:

Living-Learning Programs—University Honors Program and College Park Scholars

Served on the team that created the College Park Scholars program and hired the first Director
Overseeing CORE review (review of general education courses)

Worked with Math Department supporting their efforts to improve student performance

Maryland K-16: Represented University System in statewide K-16 Working Group and various
sub-committees including those establishing the state's High School Learning Goals

Coordinated campus-wide Summer Undergraduate Research Opportunities Program

Created and managed the Winterterm program

DIRECTOR, UNDERGRADUATE PROGRAMS OFFICE, Department of Chemistry and Biochemistry, University of Maryland, College Park, MD (July 1989 - August 1995);

Portfolio included:

Creating and overseeing a new system for advising majors

Working with area community colleges to increase student success at UMCP

(note: students often move back and forth between the main campus and area community
colleges throughout college)

Coordinated Departmental Summer Undergraduate Research Program (co-PI on NSF-REU
1993-94)

Lecturer, Department of Chemistry and Biochemistry, University of Maryland, College Park, MD (July 1990 – August 1995)

Awards

1996, Outstanding Teacher, University of Maryland—Celebrating Teachers, [**Nominated by
student: Supriya Goyal**]

1994, Outstanding Teacher Award, Panhellenic Society, University of Maryland

1994, Mortar Board Faculty Award, University of Maryland

1994, Outstanding Commitment to Students and Undergraduate Education, College Park
Association of Parents

1993, Outstanding Commitment to Students and Undergraduate Education, College Park
Association of Parents

1993, Phi Kappa Phi Distinguished Faculty Mentor Award, University of Maryland Chapter

1992, Outstanding Teacher, University of Maryland—Celebrating Teachers, [**Nominated by
student: Raymond Hsu**]

Earlier Appointments

VISITING ASSISTANT PROFESSOR, Wittenberg University, Springfield, OH (Sept. 1987 - July 1989)

VISITING LECTURER, Eastern Michigan University, Ypsilanti, MI (January 1987 - May 1987)

Awards

1986-87, SERAPHIM Post-Doctoral Fellow, Project SERAPHIM, Eastern Michigan University

1981 (Summer), David Ross Fellowship, Chemistry Department, Purdue University

1980, Fessendon Award for Service, Department of Chemistry, University of Massachusetts

BUSINESS PROFESSIONAL EXPERIENCE

President and co-Founder, iTR|Diagnostics, Inc., www.itrdiagnostics.com, 2013 – present
 Developing a software tool to analyze eye-gaze tracking data to detect and monitor Parkinson's disease and other neuropathic conditions

President and co-Founder, Discida (formerly iTracking Research Inc.), www.discida.com, Dec 2012 – Dec 2017

A market research firm that uses eye tracking and other research methods to assist clients in optimizing marketing materials, commercials, and user experience (UX and usability) with online resources

Systran Corporation, Dayton, OH, 1988-1989

Worked as a consultant with the Wright-Paterson Air Force Base Materials Research Lab investigating superconducting ceramic compounds

RESEARCH ACTIVITIES

Contracts and Grants Received

Proof of Commercial Relevance award, Iowa Economic Development Authority, William S. Harwood and Curt Nelson, \$25,000, July 2016-17.

Iowa Innovations Corp., Grant to support STTR application, William S. Harwood, \$1000, Jan – Jun 2016.

Venture School I-Corps grant, working with University of Iowa Venture school through their NSF I-Corps grant, William S. Harwood, \$2500, Sept – Aug 2015.

iTR-Diagnostics, Inc., “Parkinson’s disease Detection System”, William S. Harwood, \$2541, Sep 2015 – May 2016.

John Deere, Inc., “Shelf life study of selected ammonium carbamate and Urea mixtures as potential winter formulations for SCR system”, William S. Harwood and Colin Weeks, \$6124, Jan – Mar 2013.

John Deere, Inc. “Supplemental investigation of ammonium carbamate and Urea mixture as a potential winter formulation for SCR system”, William S. Harwood and Colin Weeks, \$2592, Oct – Dec 2012.

John Deere, Inc., “Phase III - Further investigation of ammonium carbamate and Urea mixture as a potential winter formulation for SCR system”, William S. Harwood, \$12,069, May - August 2012.

John Deere, Inc., “Phase III - Freezing point investigation of ammonium carbamate and Urea mixture as a potential winter formulation for SCR system”, William S. Harwood, Michael Elioff, and Colin Weeks, \$8,601, January – May 2012.

John Deere, Inc., “Investigation of Urea Deposit that Formed in Off Road Urea SCR System”, William S. Harwood, \$21,315, June – December, 2011.

Grow Iowa Values Fund, “Eye-tracking for Interactive Online Systems”, William S. Harwood, \$5000, May – June 2011

John Deere, Inc., “Low Temperature Mix Test” William S. Harwood, \$4,629, March – May 2011.

William S. Harwood

Carver Foundation, "Chemistry and Biochemistry Department Renovation", William S. Harwood, \$300,000. July 1, 2010 – August 31, 2011

John Deere, Inc., "Ammonia-SCR Low Temperature Exploration" William S. Harwood, \$15,195, June – October 2010.

Iowa Mathematics and Science Education Partnership, "Improving Chemistry Teaching in Iowa", William S. Harwood, Dawn Del Carlo, Thomas Greenbowe, Thomas Holme, and Norbert Pienta, \$531,463, August 1, 2008 – May 31, 2011.

U.S. Department of Education, "Engaging Iowa in Science and Mathematics", William S. Harwood and Cherin Lee, \$151,310. June 1, 2008 – August 31, 2010.

NSF-S-STEM, "Support for Undergraduate Scholars in Mathematical, Computational, and Physical Sciences at the University of Northern Iowa", Siobahn Morgan, Charles C. Chancey, William S. Harwood, Jerry Ridenhour, and Vernon E. Wallingford, \$598,525, September 1, 2007 – August 31, 2012

Indiana Professional Standards Board, "STEP II", W.S. Harwood, May 1, 2003 – December 31, 2003, Award: \$12,000.

Proffitt Grant, "Inquiry-based Teaching for Secondary Teachers", W.S. Harwood, July 1, 2003 – June 30, 2005, Award: \$39,535.

Howard Hughes Medical Institute, "Undergraduate Biological Sciences Education Program", Lynda Delph, J. Jose Bonner, Andrew Fieg, William S. Harwood, George Malacinski, George Rebec, and Michael Wade, September 1, 2002 – August 31, 2006, Award: \$2,195,008.

Proffitt Grant, "Inquiry in Action: Following a Paradigm Shift in Science Instruction", W.S. Harwood, July 1, 2002 – June 30, 2004, Award: \$37,742.

IU Scholarship of Teaching & Learning Academy Fellowship, June 2002 – August 2003, Award: \$2,500.

Science Team – 21st Century Teachers Project, "Reforming Biology for Elementary Education Majors", Summer 2002, Award: \$8,800.

Outreach Grant, "Scientific Inquiry in a mixed-age classroom: An action research project", W.S. Harwood, January 2002 – June 2002, Award: \$1,970.

National Science Foundation, "Distributed Molecular Structure Library", J.C. Huffman, G. Bernbom, J.C. Bollinger, W.S. Harwood, and G.D. Wiggins, Jan. 2002 – Dec. 2004, Award: \$900,093.

Indiana University President's Office. "21st Century Teachers Project", W.S. Harwood, G.M. Gonzalez, K.R. Subbaswamy July 2001 – June 2003. Award: \$250,000.

Indiana University Scholarship of Teaching and Learning Travel Grant. To attend and present a paper at the 16th Biennial Conference on Chemical Education, Ann Arbor, MI. August 2000. Award: \$750.

Indiana University, President's Office. "21st Century Teachers Project", W.S. Harwood, R. Hanson, D. Warren, February 2000 – August 2001. Award: \$25,000.

U.S. Department of Education, "GEAR UP Orange County", W.S. Harwood, September 1, 1999 – August 31, 2004. Award: \$1,078,266.

William S. Harwood

University System of Maryland – K-16 Project, “Chemistry Education: Sprinning A Seamless Web – Conference”, W.S. Harwood, V. Zdravkovich, L. Boucher, S. Shah, March 1998. Award: \$1,000.

Chemical Society of Washington, “Issues in Gateway Chemistry Courses – Conference”, W.S. Harwood, V. Zdravkovich, L. Boucher, November, 1996. Award: \$500.

Annenberg Foundation. "An Integrated Media Approach to the Teaching of High School Chemistry," W.S. Harwood and N. Ben-Zvi, August 1993 - May 1995. Award: \$29,000.

RTAC-II, USAID and University of Maryland, College Park Travel Grant for Ecuador Conferences, "Use of Textbooks and Other Techniques to Enhance Chemistry Teaching," W.S. Harwood, Summer 1994. Award: \$1,000.

Prince George's County Eisenhower Grant—Inservice Program, "Using Multimedia in the High School Classroom," N. Ben-Zvi, W.S. Harwood, and T. O'Haver, January - June 1994. Award: \$12,500.

National Science Foundation – Research for Undergraduates Program, "Opportunities for Research Training in Chemistry and Biochemistry at the University of Maryland," Philip DeShong and William S. Harwood, 1993-1994. Award: \$65,200.

Wittenberg University – New Course grant, “The Chemistry of Color”, William S. Harwood, \$500

Other Grant Activities

Funded

U.S. Department of Education-GAANN Grant, Jeffrey Zaleski. Chemistry, Indiana University
I wrote the education research and evaluation portion and was senior personnel on this grant. My research project with this grant investigates the transition that women are making into the chemistry doctoral program. \$732,300, August 15, 2004 – August 14, 2006.

PATENTS

Whitson, D.M. & Harwood, W.S., Method for Early Detection for Parkinson’s Disease. Provisional Patent awarded Feb 15, 2013. Full patent not filed.

PUBLICATIONS

Books and Book Chapters

Petrucci, R.H., Harwood, W.S., Herring, F.G., & Madura, J. (2006), *General Chemistry - Principles and Modern Applications*, ninth edition, New York: Prentice Hall

Harwood, W.S. (2004). Science Education Reform: Factors Affecting Science and Science Education Faculty Collaborations. In D. Sunal, E. Wright, & J. Bland (Eds.), *Research in Science Education: Reform in Undergraduate Science Teaching for the 21st Century*. Greenwich, CT: Information Age.

Petrucci, R.H., Harwood, W.S., & Herring, F.G. (2002), *General Chemistry - Principles and Modern Applications*, eighth edition, New York: Prentice Hall

Petrucci, R.H., & Harwood, W.S. (1997), *General Chemistry - Principles and Modern Applications*, seventh edition, New York: Prentice Hall

Petrucci, R.H., & Harwood, W.S. (1993), *General Chemistry - Principles and Modern Applications*, sixth edition, New York: Macmillan

Collaborator, *CRC Handbook of Chemistry and Physics*, 68th Edition.

Research Publications in Refereed Journals

1. Lotter, C.; Harwood, W.S.; Bonner, J.J. (2007). The influence of core teaching conceptions on teachers' use of inquiry teaching practices. *Journal of Research in Science Teaching*, 44(9), 1318-1347.
2. Deniz, H., & Harwood, W. S. (2007). Improving an upper level biology course. *Journal of Turkish Science Education*. 4(1), 2-9.
3. Lotter, C.; Harwood, W.S.; Bonner, J.J. (2006). Overcoming a Learning Bottleneck: Inquiry Professional Development for Secondary Science Teachers. *Journal of Science Teacher Education*, 17(3), 185-216.
4. MaKinster, J.G.; Barab, S.A.; Harwood, W.S., Andersen, H.O. (2006). The Effect of Social Context on the Reflective Practice of Pre-Service Science Teachers: Incorporating a Web-Supported Community of Teachers. *Journal of Technology and Teacher Education*, 14(3), 543-579.
5. Harwood, W.S.; Hansen, J.; Lotter, C. (2006). Measuring teacher beliefs about inquiry: A blended qualitative/quantitative instrument. *Journal of Science Education & Technology*, 15(1), 69-79.
6. Harwood, W.S.; & Korkmaz, A. (2005). An Online Tutorial for Learning Molecular Symmetry and Point Groups. *Journal of Chemical Education: Webware*, available at <http://www.jce.divched.org/JCEDLib/WebWare/collection/open/JCE2005WWOR001/index.html> (accessed September 8, 2005).
7. Harwood, W.S. (2005). A Response to Donald Wink. *Journal of Chemical Education*, 82(5), 682-683.
8. Harwood, W.S., Reiff, R., & Phillipson, T. (2005). Putting the Puzzle Together: Scientists' Metaphors for Scientific Inquiry. *Science Educator*, 14(1), 25-30.
9. Bonner, J.J.; Harwood, W.S.; Lotter, C. (2004). One Bottleneck at a Time. *The Science Teacher*, December, 26-29.
10. Harwood, W.S. (2004). A New Model for Inquiry: Is the Scientific Method Dead? *Journal of College Science Teaching*, 33(7), 29-33.
11. Korkmaz, A.; & Harwood, W.S. (2004). Web-Supported Chemistry Education: Design of an Online Tutorial for Learning Molecular Symmetry. *Journal of Science Education and Technology*, 13(2), 243-253.
12. Harwood, W.S. (2004). An activity model for scientific inquiry. *The Science Teacher*, January, 44-46.
13. Sandvoss, L.M.; Harwood, W.S.; Korkmaz, A.; Bollinger, J.C.; Huffman, J.C.; and Huffmann, J.N. (2003). Common Molecules: Bringing Research and Teaching Together through an Online Collection. *Journal of Science Education and Technology*, 12(3), 277-284.
14. Harwood, W.S. (2003). Course Enhancement: A road map for devising active-learning and inquiry-based science courses. *International Journal of Developmental Biology*, 47, 213-221.
15. Barnett, M., Harwood, W.S., Keating, T., & Saam, J. (2002). Using Emerging Technologies to Help Bridge the Gap Between University Theory and Classroom Practice: Challenges and Successes. *School Science and Mathematics*, 102(6), 299-313.

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16. Harwood, W.S., MaKinster, J.G., Cruz, L., & Gabel, D.L. (2002). Acting Out Science: Using Senate Hearings to Debate Global Climate Change. *Journal of College Science Teaching*, 31(7), 442-447.
 17. Harwood, W.S. (2002). Mercury Breaks the Law! *The Hoosier Science Teacher*, 27(2), 50-54.
 18. Harwood, W.S. (2001). Plagiarism on the Internet: Fighting Fire with Fire. *The Hoosier Science Teacher*, 27(1), 25-27.
 19. Harwood, W.S., & McMahon, M.M. (1997). Integrating Video into the Classroom: A Method of Increasing Student Achievement in High School Chemistry, *Journal of Research in Science Teaching*, 34(6), 617-631.
 20. Harwood, W.S. (1996). The One-Minute Paper: A Communication Tool for Large Lecture Classes, *Journal of Chemical Education*, 73(3), 229-230.
 21. Ben-Zvi, N., Harwood, W.S., Leopold, A., & Ragsdale, L. (1993). Cultural Differences Reflected by an Integrated Media Chemistry Course - An American/Israeli Perspective. *Proceedings of the 19th International Conference on Improving University Teaching*.
 22. Harwood, W.S. (1988). Colors in Gemstones, *ChemMatters Magazine*, December issue.
 23. Feng, A., Moore, J.W., Harwood, W.S., & Gayhart, R.B. (1988) KC? Discoverer: Exploring the Periodic Table by Computer, *Journal of Chemical Education: Software*, October issue, 1B, 17-19 and disks.
 24. Harwood, W.S., Moore, E.A., Moore, J.W., & Susskind, T.Y. (1988). KC? Discoverer Workbook, *Journal of Chemical Education: Software*, October issue, 1B, 20.
 25. Harwood, W.S., Kennedy, S.M., Lytle, F.E., Qui, J-S., & Walton, R.A. (1987). Preparation and Spectroscopic Characterization of the Series of Mixed-Ligand Complexes $\text{Mo}_2\text{X}_n(\text{mhp})_{4-n}(\text{PR}_3)_n$ (X = Cl or Br; PR_3 = PMePh_2 , PMe_2Ph or PEt_3 ; mhp is the Anion of 2-hydroxy-6-methylpyridine; n=1, 2, or 3). *Inorganic Chemistry*, 26, 1784.
 26. Fanwick, P.E., Harwood, W.S., & Walton, R.A. (1987). Bis(diphenylphosphino)methane Complexes of the Multiply Bonded Ditungsten(III,III) Core. The Structure of $\text{W}_2(\mu\text{-H})(\mu\text{-Cl})\text{Cl}_4(\mu\text{-dppm})_2$. *Inorganic Chemistry*, 26, 242.
 27. Fanwick, P.E., Harwood, W.S., & Walton, R.A. (1986). The Structure of an Iodide Complex of the Type $\text{Mo}_2\text{X}_4(\text{LL})_2$ Exhibiting Two Different Rotational Geometries in the Solid State. *Inorganica Chimica Acta*, 122, 7.
 28. Cotton, F.A., Falvello, L.R., Harwood, W.S., Powell, G.L., & Walton, R.A. (1986). Synthesis, Properties and Structural Characterization of the Bis(dimethylphosphino)methane Complex $\text{Mo}_2(\mu\text{-dmpm})_2\text{Cl}_4$. *Inorganic Chemistry*, 25, 3949.
 29. Anderson, L.B., Cotton, F.A., Falvello, L.R., Harwood, W.S., Lewis, D., & Walton, R.A. (1986). The Synthesis, Characterization and Molecular Structure of a Novel Triply Bonded Dirhenium(II) Complex that Contains Three Intramolecular Phosphine Bridging Ligands: $\text{Re}_2\text{Cl}_4(\mu\text{-Me}_2\text{PCH}_2\text{PMe}_2)_3$. *Inorganic Chemistry*, 25, 3637.
 30. Harwood, W.S., Qi, J-S., & Walton, R.A., (1986). Reactivity of Ligand Bridged Quadruply-Bonded Dimolybdenum(II) Complexes with Alkyl Isocyanides: Mo-Mo Bond Cleavage or Retention? *Polyhedron*, 5, 15.

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31. Harwood, W.S., DeMarco, D., & Walton, R.A. (1984). Substitution Chemistry of the Doubly Bonded Tungsten(IV) Ethoxide Complex $W_2Cl_4(\mu-OEt)_2(OEt)_2(HOEt)_2$ toward Heterocyclic Tertiary Amines. *Inorganic Chemistry*, 23, 3078.
 32. Huguenin, R.L., Miller, K.L., & Harwood, W.S. (1979). Frost Weathering on Mars: Experimental Evidence for Peroxide Formation. *Journal of Molecular Evolution*, 23, 103.

Refereed Conference Proceedings

1. MaKinster, J.G., Barab, S., Harwood, W. S., & Andersen, H. (2003). The effect of social context on the reflective practice of pre-service science teachers: Leveraging a Web-supported community of teachers. *2003 AETS Proceedings*.
2. Harwood, W., Reiff, R., & Phillipson, T. (2002) Scientists' conceptions of scientific inquiry: Voices from the front. *2002 AETS Proceedings*. Available at ERIC ED 465602.
3. Reiff, R., Harwood, W., & Phillipson, T. (2002) A scientific method based upon research scientists' conceptions of scientific inquiry. *2002 AETS Proceedings*. Available at ERIC ED 465602.
4. Harwood, W., Reiff, R., & Phillipson, T. (2002) How is your lawnmower working? Understanding scientific inquiry through metaphors. *2002 AETS Proceedings*. Available at ERIC ED 465602.

Other Publications

1. Smist, J.; Harwood, W.S.; Levy, I. (2009). Program for the Division of Chemical Education Salt Lake City, March 22-26, 2009. *Journal of Chemical Education*, 86(3), 286-294.
2. Burke, K.A.; Freilich, M.F.; Greenbowe, T.G.; Harwood, W.S. (2004). Chemistry Everywhere: The 18th Biennial Conference on Chemical Education. *Journal of Chemical Education*, 81(4), 458-461.
3. Harwood, W.S. (2003). Annual Report of the 21st Century Teachers Project.
4. Harwood, W.S. (2003). STEP II Progress Report: Indiana University – Bloomington.
5. First Semester General Chemistry Exam (2002), ACS Exams Institute, team member.
6. Harwood, W.S. (2002). Annual Report of the 21st Century Teachers Project.
7. Harwood, W.S. (2001). Annual Report of the 21st Century Teachers Project.
8. Harwood, W.S., Zdravkovich, V., & Boucher, L. (1997). Issues in Gateway Chemistry Courses: A Statewide Conference on Chemical Curriculum Reform. *Journal of Chemical Education*, 74(7), 755-756.
9. First Semester General Chemistry Exam (1997), ACS Exams Institute, team member.
10. Harwood, W.S. (1997), Aufbau Principle, In J.J. Lagowski (Ed.), *Macmillan Encyclopedia of Chemistry*, New York: Macmillan
11. Harwood, W.S. (1997), Berthollides, In J.J. Lagowski (Ed.), *Macmillan Encyclopedia of Chemistry*, New York: Macmillan
12. Harwood, W.S. (1996). Are You Prepared for College? *Maryland Memorandum* (A publication of the Office of Undergraduate Admissions), October issue, 4.

PROFESSIONAL PRESENTATIONS AND PAPERS**Research**

- Del Carlo, D., Harwood, W.S., Holme, T., Greenbowe, T., Pienta, N. (July, 2012), "Establishing a State-wide Consortium of Secondary and Tertiary Chemistry Educators in Iowa", 22nd Biennial Conference on Chemistry Education, Penn State University, University Park, PA
- Harwood, W.S., Whitson, M., and Williams, J.E. (March, 2012), "Organic Molecular Representations: A comparative study using eye tracking", American Chemistry Society National meeting, San Diego, CA
- Whitson, M., Williams, J., and Harwood, W.S. (November, 2011), "A comparative study of visual-spatial performance with organic molecular representations using eye-tracking", Society for Computers in Psychology National meeting, Seattle, WA
- Kreitzer, M. and Harwood, W.S. (March, 2009), "Using eye gaze analysis to investigate problem-solving strategies of novices and experts", ACS National Meeting, Salt Lake City, UT
- Harwood, W.S. (March, 2009), "Doing Science in Science Class", Truman State University, Kirksville, MO
- Harwood, W.S. (May, 2008), "Undergraduate Research Experiences: Helping Students Become Scientists", Invited presentation, Herzen Pedagogical University, St. Petersburg, Russia
- Harwood, W.S. (May, 2008), "Scientific Inquiry and the Classroom: Reforming Teaching Practice", Invited presentation, Herzen Pedagogical University, St. Petersburg, Russia
- Harwood, W.S. (May, 2008), "Transforming Chemistry Students at the University of Northern Iowa", Invited presentation, Herzen Pedagogical University, St. Petersburg, Russia
- Harwood, W.S. (June, 2007), "What are they thinking?", KEYNOTE Address, Gordon Research Conference on Chemical Education Research & Practice, Bates College, Lewiston, ME.
- Kazempour, M., Amirshokoochi, A., Harwood, W.S. (April, 2007), "Integrated Freshman Learning Experience: Reform-Based Teaching in an Undergraduate Biology Course", National Meeting of the National Association for Research in Science Teaching, New Orleans, LA
- Harwood, W.S. (March, 2007), "Research-enhanced versus Traditional Courses: A Comparison", ACS National Meeting, Chicago, IL
- Kelter, P., & Harwood, W.S. (September, 2006), "Framing the Issue: The blessings and struggles of being a chemical education specialist in the macho academic world", ACS National Meeting, San Francisco, CA
- Harwood, W.S. (July, 2006), "Putting Undergraduate Research Experiences Under the Microscope", Keynote Presentation, Summer Science Undergraduate Research Poster Session, University of Northern Iowa, Cedar Falls, IA
- Lotter, C., & Harwood, W.S. (April, 2006), "The Impact of an Inquiry Professional Development Program on Secondary Science Teachers' Enactment of Inquiry-based Pedagogies", NARST, San Francisco, CA
- Lotter, C. & Harwood, W.S. (January, 2006), "High School Students' Perceptions and Achievement in Science: the Impact of an Inquiry Teacher Professional Development Experience", ASTE National Conference, Portland, OR

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- Harwood, William S. (December, 2005), "Doing Science: Helping Students Along the Road from Novice toward Expert", Chemistry Departmental Seminar, University of Northern Iowa, Cedar Falls, IA
- Harwood, William S. (August, 2005), "Creating scientists: A pilot study examining undergraduate research experiences at a research university", American Chemical Society National Meeting, Washington, DC.
- Harwood, William S. (June, 2005), Poster: "Measuring teacher beliefs about inquiry: The development of a blended qualitative/quantitative instrument", Gordon Conference on Chemistry Education Research & Practice, Connecticut College, CT.
- Harwood, William S. (May, 2005), "Thinking like a chemist: A road map for reform", International Conference on First-Year Undergraduate Chemistry Education, University of Illinois, Urbana, IL.
- Harwood, William S. (April, 2005), "A Roadmap for Improving College Science Teaching & Learning", Faculty of Science Seminar, McGill University, Montreal, Canada
- Sunal, D., Gilbert, S.W., Harwood, W.S., James, M., Karr, C., Mason, C.L., Odell, M., Scharmann, L., Stalheim-Smith, A., Sunal, C., Wright, E. (April, 2005). "Reform in Undergraduate Science Teaching for the 21st Century", NARST, Dallas, TX.
- Deniz, H.; & Harwood, W.S. (April, 2005). "Undergraduate Student Research Experiences: A Situated Way of Learning Science", NARST, Dallas, TX
- Lotter, C.; & Harwood, W.S. (April, 2005) "Inquiry Teaching in Practice: Three Case Studies of High School Teachers Using Inquiry After a Professional Development Program", NARST, Dallas, TX
- Harwood, W.S. (February, 2005). "The Science of Science Education", Science & Mathematics Education Seminar, Iowa State University, Ames, IA.
- Harwood, W.S. (February, 2005). "The Science of Chemistry Education", Chemistry Department Seminar, West Virginia University, Morgantown, WV.
- Harwood, W.S. (February, 2005). "The Science of Chemistry Education", Chemistry Department Seminar, Miami University, Oxford, OH.
- Harwood, W.S. (January, 2005). "The Science of Science Education", Science Education Seminar, The Mallinson Science Education Institute, Western Michigan University, Kalamazoo, MI.
- Sunal, D., Wright, E., Fisher, K.M., Gilbert, S.W., Harwood, W.S., Mason, C.L., Sunal, C. (January, 2005). "Reform in Undergraduate Science Teaching for the 21st Century", AETS National Meeting, Colorado Springs, CO.
- Phillipson-Mower, T., Bohrer, K., & Harwood, W.S. (November, 2004). "Learning as we Teach: Graduate Students' Attempts to Teach through Inquiry", 2004 NABT National Convention, Chicago, IL.
- Harwood, W.S. (October, 2004). "Reforming a science course for pre-service elementary teachers: Scientific Inquiry and Inquiry Teaching", First International Conference on the Scholarship of Teaching and Learning, Bloomington, IN
- Phillipson-Mower, T., & Harwood, W.S. (June, 2004). "Dilution Difficulties: A Biology Issue with Chemistry Implications", ACS Central Regional Meeting, Indianapolis, IN.
- Harwood, W.S. (June, 2004). "Reforming a chemistry course for pre-service elementary teachers: Scientific Inquiry and Inquiry Teaching", ACS Central Regional Meeting, Indianapolis, IN.

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- Harwood, W.S. (April, 2004). "The Science of Chemistry Education", Chemistry Department Symposium, The Ohio State University, Columbus, OH.
- Harwood, W.S., & Lotter, C. (April, 2004). "Secondary teachers' conceptions of scientific inquiry: Impact of a summer research institute", NARST, Vancouver, BC.
- Lotter, C., Harwood, W.S., & Bonner, J.J. (April, 2004). "The Impact of an Inquiry Professional Development Program on Secondary Science Teachers' Conceptions of Inquiry Teaching", NARST, Vancouver, BC.
- Phillipson-Mower, T., & Harwood, W.S. (April, 2004). "Inquiry in Action: Following a Paradigm Shift in Science Instruction", NARST, Vancouver, BC.
- Jones, L., Harwood, W.S., & Phillipson-Mower, T. (April, 2004). "Learning Science for Teaching: Development of Pedagogical Knowledge in Science Courses for Teachers", NARST, Vancouver, BC.
- Harwood, W.S. (March, 2004). "A new model for scientific inquiry: Implications for chemistry education reform", ACS National Meeting, Anaheim, CA.
- Harwood, W.S. (February, 2004). "When are we doing science? A new model for the process of scientific inquiry.", HASTI Convention, Indianapolis, IN.
- Harwood, W.S., & Phillipson-Mower, T. (January, 2004). "Implementing an inquiry-based science course for pre-service elementary teachers: Challenges and changes", AETS National Meeting, Nashville, TN.
- Harwood, W.S., Lotter, C., & Bonner, J.J. (January, 2004). "Overcoming a Learning Bottleneck: Inquiry Professional Development for Secondary Science Teachers", AETS National Meeting, Nashville, TN.
- Harwood, W.S., & Hansen, J. (January, 2004). "Measuring beliefs about inquiry teaching: A qualitative instrument with quantitative potential", AETS National Meeting, Nashville, TN.
- Kirk, M.K., Holliday, W.G., & Harwood, W.S. (September, 2003). "A Pre-Laboratory Guide For General Chemistry Experiments", American Chemical Society National Meeting, New York City, NY.
- Barnett, G.M., Harwood, W.S., & Hansen, J. (April, 2003). "Supporting elementary teachers in learning about inquiry-oriented instructional approaches through the integration of the ILF into an elementary science methods course.", AERA, Chicago, IL.
- Barnett, G.M., Barab, S.A., Harwood, W.S., & Reiguluth, C. (April, 2003). "Investigating Inquiry-Teaching in Elementary Classrooms: A Teaching Experiment", AERA, Chicago, IL.
- Harwood, W.S. (April, 2003). "Scientific Inquiry: From the Laboratory to the Classroom", Michigan State University, Division of Science & Mathematics Education, East Lansing, MI.
- Barnett, G.M., Harwood, W.S., & Hansen, J. (March, 2003). "Coming to terms with inquiry-based teaching through collaborative discussion, participation, and reflection.", NARST, Philadelphia, PA.
- MaKinster, J.G., Barab, S.A., Harwood, W.S., Andersen, H.O. (March, 2003). "The effect of social context on the reflective practice of pre-service science teachers: Leveraging a Web-supported community of teachers.", NARST, Philadelphia, PA.
- Harwood, W.S., & Deniz, H. (March, 2003). "Breaking with tradition: Reform in an upper level Biology course.", NARST, Philadelphia, PA.

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- Harwood, W.S., Barnett, G.M., & Saam, J. (January, 2003). "Using emerging technologies to help bridge the gap between university theory and classroom practice: Challenges and successes", AETS, St. Louis, MO.
- MaKinster, J.G., & Harwood, W.S. (January, 2003). "How the social context of student teaching reflections affects student outcomes and perceptions: Incorporating a web-supported community of teachers", AETS, St. Louis, MO.
- Harwood, W.S. (November, 2002). "Scientists' Conceptions of Scientific Inquiry". Anthropology Department Seminar, Indiana University, Bloomington, IN.
- Harwood, W.S. (November, 2002). "Scientists' Conceptions of Scientific Inquiry". Geography Department Seminar, Indiana University, Bloomington, IN.
- Harwood, W.S. (October, 2002). "Scientists' Conceptions of Scientific Inquiry". Education Seminar, Purdue University, West Lafayette, IN.
- Harwood, W.S., & Phillipson, T. (August, 2002). "Utilizing Grounded Theory Methodology in Science Education: Two Research Examples", Biennial Conference on Chemical Education, Binghamton, WA.
- Harwood, W.S., Reiff, R.R., & Phillipson, T. (April, 2002). "Conceptions of Scientific Inquiry: Voices from the Front" A Multiple Paper Set., NARST, New Orleans, LA.
- Kirk, M.K., Holliday, W., Schafer, W., & Harwood, W.S. (April, 2002). "A Teaching Intervention for Reading Laboratory Experiments in College Level Introductory Chemistry", NARST, New Orleans, LA..
- Harwood, W.S., Reiff, R.R., & Phillipson, T. (January, 2002). "How Is Your Lawnmower Working? Understanding Scientific Inquiry Through Metaphors.", AETS, Charlotte, NC.
- Harwood, W.S., Reiff, R.R., & Phillipson, T. (January, 2002). "Science Faculty Members' Conceptions of Scientific Inquiry: Insights from the Frontlines of Science.", AETS, Charlotte, NC.
- Harwood, W.S., & Reiff, R.R. (January, 2002). "A Scientific Method Based Upon Research Scientists' Conceptions of Scientific Inquiry.", AETS, Charlotte, NC.
- Harwood, W.S., MaKinster, J.G., Cruz, L., Gabel, D.L. (August, 2000). "Learning Chemistry Through Role-Playing: Exploring Global Climate Change in an Integrated Science Course for Preservice Teachers", Biennial Conference on Chemical Education, Ann Arbor, MI.
- Harwood, W.S., & McMahon, M.M. (April, 1995). "Effects of an Integrated Video-enhanced High School Chemistry Curriculum on Student Attitudes", ACS National Meeting, Anaheim, CA.
- Harwood, W.S., & McMahon, M.M. (April, 1995). "ChemCom: A Case Study", ACS National Meeting, Anaheim, CA.
- Harwood, W.S., & McMahon, M.M. (August, 1994). "Effects of an Integrated Video-enhanced High School Chemistry Curriculum on Student Attitudes", 13th Biennial Conference on Chemical Education, Lewisburg, PA.
- Harwood, W.S. (August, 1994). "The One Minute Paper: A Communication Tool for Large Classes", 13th Biennial Conference on Chemical Education, Lewisburg, PA.
- Harwood, W.S. (March, 1994). "The One Minute Paper: A Communication Tool for Large Classes", American Chemical Society - National Meeting, San Diego, CA.

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- Harwood, W.S., McMahon, M.M., Ragsdale, L., Ben-Zvi, N. (March, 1994). "An Integrated Media Approach to Teaching High School Chemistry", American Chemical Society National Meeting, San Diego, CA.
- Ben-Zvi, N., Harwood, W.S., Leopold, A., & Ragsdale, L.L. (August, 1993). "Cultural Differences Reflected by an Integrated Media Chemistry Course - An American/Israeli Perspective", ChemEd93, Butler, IN.
- Ben-Zvi, N., Harwood, W.S., Leopold, A., & Ragsdale, L.L. (June - August, 1993). "Cultural Differences Reflected by an Integrated Media Chemistry Course - An American/Israeli Perspective", Applications of Technology in Teaching Chemistry - An On-Line Computer Conference.
- Harwood, W.S., Feng, A., Moore, J.W. (February, 1987). "KC? Discoverer: A Database of Properties of the Elements", National Advisory Group to Project Seraphim, University of Texas at Austin, Austin, TX.

Teaching

- Harwood, W.S. (September, 2006), "Preparing for first year college chemistry", ACS National Meeting, San Francisco, CA
- Harwood, W.S. (March, 2006), "Preparing for first year college chemistry", ACS National Meeting, Atlanta, GA
- Harwood, W.S. (April, 2005). "Course enhancement: A road map for devising active-learning and inquiry-based science courses", Scholarship of Teaching and Learning poster session, Bloomington, IN
- Harwood, W.S. (November, 2004). "Teaching How Scientists REALLY Do Science", National Science Teachers Association Conference, Indianapolis, IN.
- Harwood, W.S. (October, 2004). "Course Enhancement: A road map for devising active-learning and inquiry-based science courses", A Poster, International Scholarship of Teaching and Learning Conference, Bloomington, IN.
- Harwood, W.S. (October, 2004). "Reforming a science course for pre-service elementary teachers: Scientific Inquiry and Inquiry Teaching", International Scholarship of Teaching and Learning Conference, Bloomington, IN.
- Korkmaz, A., & Harwood, W.S. (July, 2004). "An Online Tutorial for Learning Molecular Symmetry", 18th Biennial Conference on Chemical Education, Ames, IA.
- Harwood, W.S. (June, 2004). "Reforming a chemistry course for pre-service elementary teachers: Scientific Inquiry and Inquiry Teaching", ACS Central Regional Meeting, Indianapolis, IN.
- Harwood, W.S. (November, 2003). "A New Model for Scientific Inquiry: Implications for College Science Teaching and Learning", 23rd Annual Lilly Conference on College Teaching, Oxford, OH.
- Harwood, W.S. (November, 2003). "Course Enhancement: A road map for devising active-learning and inquiry-based science courses", 23rd Annual Lilly Conference on College Teaching, Oxford, OH.
- Harwood, W.S., MaKinster, J.G., & Gabel, D.L. (March, 2001). "A Model for an Integrated Science Course for Elementary Education Majors", NARST.
- Gabel, D.L., Harwood, W.S., MaKinster, J.G. (January, 2000). "Energy and its impact on human lives: A new component in the preparation of elementary and middle school teachers at Indiana University.", Paper presented at the NOVA Leadership Development Conference, NASA, Cape Canaveral, FL.

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- Harwood, W.S. (November, 1996). "Chemistry Curriculum Reform in Maryland," Chemistry Society of Washington meeting, University of Maryland, College Park, MD.
- Harwood, W.S. (November, 1996). "Maryland Science Core Learning Goals: What Are They and How Will They Be Used?" Conference on Issues in Gateway Chemistry Courses, University of Maryland at Baltimore County, Baltimore, MD.
- Harwood, W.S., & McMahon, M.M. (April, 1996). "Reinventing Ourselves: The Challenge of Changing Teaching Style," ACS National Meeting, New Orleans, LA.
- Harwood, W.S. (July, 1994). "Use of Textbooks and Other Techniques to Enhance Chemistry Teaching", RTAC-II, Ecuador Conferences, Quito and Guayaquil, Ecuador.
- Harwood, W.S. (November, 1993). "Training Graduate Teaching Assistants: An Iterative Process", American Association of Higher Education, Chicago, IL.
- Harwood, W.S. (March, 1992). "Kaleidoscope: Explanation of Color Through Chemistry and Physics" University of Maryland Student Union Program Council, Issues and Answers Committee, Stamp Student Union, College Park, MD.
- Harwood, W.S. (November, 1988). "Superconductivity: The Anatomy of a Scientific Breakthrough", Quest & Question, Wittenberg University, Springfield, OH.
- Harwood, W.S., York, R., Botch, B., Bolender, J.P., Beno, M. (August, 1988). "Superconductors, Semiconductors and Metals: An Experiment in Physical Chemistry", 10th Biennial Conference on Chemical Education, Purdue University, West Lafayette, IN.
- Harwood, W.S. (September, 1987). "KC? Discoverer and Its Uses in the Chemistry Classroom", Chemistry Education Division Seminar, Purdue University, West Lafayette, IN

Service

- Harwood, W.S., Gonzalez, G.M., & panel (February, 2004). "The 21st Century Teachers Project", American Association of Colleges for Teacher Education, Chicago, IL.
- Harwood, W.S. (August, 2001). "The 21st Century Teachers Project: Indiana University's response to the call for teacher preparation reform", ACS National Meeting, Chicago, IL
- Harwood, W.S., Zdravkovich, V., Boucher, L. (April, 1997). "Issues in Gateway Chemistry Courses: A Statewide Conference on Chemical Curriculum Reform," ACS National Meeting, San Francisco, CA.
- Harwood, W.S. (August, 1990). "Building Bonds: Developing a Community of Chemists", 11th Biennial Conference on Chemical Education, Georgia Institute of Technology, Athens, GA.

TEACHING ACTIVITIES

Research Mentoring

Indiana University Doctoral Dissertation Direction

- Christine Lotter Science Education Ph.D., June 2005
 “The Influence Of An Inquiry Professional Development Program On Secondary Science Teachers’ Conceptions And Use Of Inquiry Teaching”
Current Position: Associate Professor, Science Education, University of South Carolina
- Rebecca R. (Reiff) Cox Science Education Ph.D., December 2003
 “Scientists’ Conceptions of Scientific Inquiry: Revealing a Private Side of Science”
Current Position: Associate Professor, Science Education, Hollins University
- G. Michael Barnett Instructional Systems Technology Ph.D., May 2003
 (Co-directed with Sasha Barab)
 “Investigating Inquiry Teaching and Learning: The Story of Two Teachers”
Current Position: Professor, Science Education, Boston College
 2012 CASE/Carnegie Foundation Professor of the Year (Massachusetts)
- James G. MaKinster Science Education Ph.D., May 2002
 “The Effect of Social Context on the Reflective Practice of Pre-service Science Teachers: Leveraging a Web-supported Community of Teachers”
Current Position: Associate Professor, Science Education, Hobart and William Smith Colleges

University of Maryland, College Park Doctoral Dissertation Direction

- M. Kristine Kirk Science Education Ph.D., December 2001
 “A Teaching Intervention for Reading Laboratory Experiments in College-level Introductory Chemistry”
Current Position: Professor, Chemistry, College of Notre Dame, Baltimore, MD
- Maureen M. McMahon Science Education Ph.D., December 1994
 “The Effects of an Integrated Video Media-enhanced Chemistry Curriculum on Student Achievement and Attitudes in General High School Chemistry”
Current Position: Deputy Superintendent, Anne Arundel County School System, Maryland

Graduate Doctoral Dissertation Committees

Indiana University:

- | | | |
|--------------|-------------------|----------------|
| Ji-Yoon Yoon | Science Education | Ph.D. May 2002 |
| Sufen Chen | Science Education | Ph.D. May 2001 |

University of Maryland, College Park:

- | | | |
|---------------|-------------------|-----------------|
| Glenn Bennett | Science Education | Ph.D., May 1993 |
| Donald Lewis | Science Education | Ph.D., May 1992 |

Graduate Program Committee Chair

Indiana University

- | | |
|--------------------|--------------------------------------|
| J. Scott Townsend | Advanced to Candidacy, August 2005 |
| Hasan Deniz | Advanced to Candidacy, February 2005 |
| Teddie Phillipson | Advanced to Candidacy, August 2004 |
| Aidin Amirshokoohi | Advanced to Candidacy, February 2006 |
| Mahsa Kazempour | Advanced to Candidacy, February 2006 |

Masters level advisement*University of Northern Iowa*

Brock Krechi	Chemistry	MS, ABD
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Indiana University

Laura Cash Bennett	General Science	MAT, December 2002
Meg Newman	Science Education	MS-Certification, May 2004
Melissa Hamilton	Science Education	MS-Certification, May 2004
Erin Ody	General Science	MAT, 2005

Undergraduate Student Research Direction*University of Northern Iowa*

Megan Kreitzer	Chemistry Education	Summer 2008
Michael Whitson	Psychology	Fall 2010 – Spring 2011 (Honors Thesis) Continuing as Masters degree student

University of Illinois-Urbana Champaign

Samantha Friedman	Chemistry Education	Fall 2005
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Indiana University:

Luis Cruz	Science Education	Completed
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University of Maryland, College Park:

Catherine Cross	Individual Studies Major – “Role of Medicine in the writings of William Carlos Williams and Robert Coles”	Completed
Charlotte Klein	Chemistry Education	Completed
David Wren	Chemistry Education	Completed
Samantha Dix	Chemistry Education	Completed
Michael Vaughan	Chemical Education	Completed

Wittenberg University:

James Bolender	Inorganic Chemistry	Completed
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Courses TaughtUniversity of Northern Iowa

General Chemistry I and II	Advanced Inorganic Chemistry
Descriptive Inorganic Chemistry	Advanced Inorganic Chemistry Lab
Workshops for Organic Chemistry Success	

University of Illinois – Urbana Champaign

General Chemistry I (CHEM 102)	General Chemistry II (CHEM 104)
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Indiana University

General Chemistry I and II (C105 & C106)	Integrated Science Capstone (E405/Q405)
Chemistry as Our World (C100)	Introduction to Scientific Inquiry (Q200)
Elementary Science Methods (E348)	Advanced Science Methods (E548)
Science Education Curriculum (Q610)	

University of Maryland, College Park

General Chemistry I & II	Honors Seminar: Physics & Chemistry of Color
Honors General Chemistry I & II	Chemistry for non-Science Majors

Wittenberg University and Eastern Michigan University

General Chemistry I & II

Descriptive Inorganic Chemistry

Physical Chemistry I & II

Advanced Inorganic Chemistry

Physical Chemistry Lab

Special Topics: Molecular Modeling

Chemistry for non-Science Majors

Curriculum and Program Development***At University of Northern Iowa:***Descriptive Inorganic Chemistry

Improved labs and developed several new labs to replace labs that did not engage students in critical thinking.

At Indiana University:Science Team, 21st Century Teachers Project

Summer 2004, IU campus workshop regarding EDUC Q200. Work begins to align EDUC Q200 course goals across IU campuses and to confirm alignment to state professional standards for teachers.

2001-2003, Revision of BIOL Q201. This is the Biology for Elementary Education majors course. It was substantially revised to focus topics on aspects of Biology that are most relevant for elementary teachers based on state and national content standards. A more inquiry oriented laboratory was created.

2000-2001, Revision of Secondary Science Program. This program was revised to address a change in the certification system for secondary science teachers in Indiana.

Integrated Science – COAS E405/EDUC Q405

2003, Revised course and designed all new laboratories assignments with greater focus on translating adult (college-level) understanding into standards-based lessons for children.

1999 – 2002, Substantially revised this capstone course for elementary education majors taking a science concentration using weather and global climate change as themes to integrate sciences. Assignments also required students to use technology both for science and for explaining science topics. Labs were completed revised.

Advanced Science Teaching Methods – EDUC E548

This is graduate level course in science methods for elementary teachers. I developed a syllabus designed to build on teachers' experience and help them to learn how to bring inquiry-based science activities into their classrooms. The teachers were also introduced to the Inquiry Learning Forum and used it as a place to post inquiry-based lessons they developed as part of the course assignments.

At the University of Maryland, College Park:College Park Scholars Program

I helped develop and advise the process of the development of the living-learning communities in this innovative program for talented students at the University of Maryland, College Park.

Undergraduate Program in Biochemistry & Chemistry

Worked with department faculty to update and revise specific courses in the program. Revised program in line with certification guidelines from the American Chemistry Society. Created, supported, and participated in the faculty advising program for majors.

Honors 100

Created this course for Honors Non-Science majors using physics and chemistry of color as a theme.

William S. Harwood

Chemistry 121

Created this course for non-science majors focused on learning the chemistry behind common real world materials.

At Wittenberg University:

Special Topics

Co-created and co-taught a course on molecular modeling.

Chemistry for non-science majors

Created and taught a non-lab course using color as a theme for learning chemistry.

At Eastern Michigan University:

Descriptive Inorganic Chemistry

Created and taught a sophomore level course in descriptive inorganic chemistry using innovative software as a learning tool.

SERVICE ACTIVITIES

Advisory Board, Chemistry and Geology Dept., Minnesota State University, Mankato, 2012 – present

Chair, Task Force for Proposal to Create Biennial Conferences Board, American Chemical Society
Division of Chemical Education, Jan – Aug 2015

Journal and Grant Program Editing/Reviewing

Editorial Board, *Journal of Science Education & Technology*, 2004 – present

In this capacity I am required to review several articles per year and participate in online meetings of the board regarding the Journal's development and direction. It is also expected that I will encourage appropriate authors to submit articles for possible publication in this Journal.

Editor, *Science Educator*, 2005 – 2007.

This NSELA (www.nsela.org) journal focuses primarily on K-16 STEM issues, especially those topics associated with science education reform, outreach to schools, and the professional development of K-16 science teachers.

NSF Panel Reviewer, Cyberlearning Panel, 2015

NSF Panel Reviewer, DRK-12 Panel, 2009-2011 (panel chair, 2011), 2014

Reviewer (Ad-hoc), *Cell and Biology Education*, 2014

Reviewer, *Proceedings of the National Academy of Sciences*, 2013

Reviewer, *Journal of Chemical Education*, 1998 – present

Reviewer, *Journal of Research in Science Teaching*, 2002 – present

Reviewer, *International Journal of Science Education*, 2004 – present

Reviewer, *Science Education*, 2002-2003, 2008

Review Board, *Science Education*, 2004 – 2007

Review Board, *Journal of College Science Teaching*, 2003 – 2006

Reviewer (Ad-hoc), *Journal of Educational Psychology*, 2004

Conference and Symposia Organization

International Conferences:

“American Chemical Society, Division of Chemical Education”, William Harwood and Amy Cannon, Conference Program co-Chairs, San Diego, CA March 27 – 31, 2012

Responsible for developing symposia, finding symposium chairs and session presiders, overseeing the process of paper submission and acceptance, overseeing special programs such as the high school program, National Awards programs, and Undergraduate Posters program. This is the main meeting for the American Chemical Society and the Division of Chemical Education is among the largest sections of the Society.

“American Chemical Society, Division of Chemical Education”, William Harwood and Irving Levy, Conference Program co-Chairs, Salt Lake City, UT, March 22 – 26, 2009

See similar meeting for spring 2012 (above).

“18th Biennial Conference on Chemical Education,” Mark Freilich and William Harwood, Conference Program co-Chairs, Iowa State University, Ames, IA, July 18-22, 2004

With my colleague Mark Freilich, I was responsible for developing, coordinating, and scheduling all aspects of the technical program for this national meeting, sponsored by the Division of Chemical Education. Over 750 abstracts for presentations were submitted and over 1400 people attended this conference.

National Conferences:

“Research On Improved Teaching Strategies,” William S. Harwood, Symposium Chair, ACS National Meeting, New Orleans, LA. April 1996

I recruited presenters as well as vetted unsolicited paper proposals for this symposium. I organized and presided over each session.

Regional Conferences:

“Chemical Education Research: Insight for Teaching from Chemical Education Research on Teaching and Learning”, William Harwood (presider) and Gabriela Weaver, Symposium co-chairs, ACS Midwest Regional Meeting, Indianapolis, IN, June 2-4, 2004.

On short notice, my colleague Gabriela Weaver (Purdue) and I were asked to organize this symposium. We identified presenters, organized the symposium, and I presided at the session.

“Chemistry Education: Spinning a Seamless Web,” Laurence Boucher, William Harwood, and Vera Zdravkovich, Conference co-Chairs, College of Notre Dame of Maryland, March 13, 1998.

My two colleagues and I developed, organized, handled the program, and found funding for this conference. The goal was to bring together K-12, 2-year college, and 4-year college faculty to discuss issues and shared opportunities. This was an effort on behalf of the K-16 project.

“Issues In Gateway Chemistry Courses,” Laurence Boucher, William Harwood, and Vera Zdravkovich, Conference co-Chairs, University of Maryland Baltimore County, November 8, 1996.

My colleagues and I developed, organized, handled the program, and found funding for this conference. The key issue here was to bring 2-year and 4-year faculty together to discuss ideas regarding teaching and learning in first and second year college chemistry courses. The success of this conference led to our developing a second and more broadly conceived conference (see above).

Consulting and Outreach

External Reviewer, Chemistry and Biochemistry Departments:
 Western Illinois University, February 2017 and April 2009
 Towson University, February 2014
 Southern Connecticut State University, February 2014
 University of Central Oklahoma, March 2011
 Texas A&M University – Kingsville, February 2008

ActiveInk.com – Content expert for on-line interactive science curriculum project, summer 2000.

Prentice Hall – Reviewer for Middle School Science Curriculum Project, 1997-98.

AAAS – Project 2061, 1996-97
 Science consultant to project to develop a methodology for evaluating K-16 curriculum materials.

Keynote Speaker/Demonstrator for various programs for pre-college students, 1990-1998
 Frequent speaker at programs such as the “Saturday Academy” and “Science and Engineering Education Day”. I also did presentations for area schools (sometimes classes visit Maryland and sometimes I went to the school).

Recent Community Service

Judge, Regional Qualifier for First Lego League, December 2015

Coach, Lego Llamas (FIRST Lego Robotics Team) from 2008 – 2012. We have competed at the state level every year and in 2011 won 1st Place in the Programming category. In 2012 we won 1st Place in Iowa for Core Values.

Board of Trustees for my church (2009-11)

Computer Network Roles

Director, Interactive Website for Petrucci/Harwood General Chemistry Text, Prentice Hall (1994 – 1999). Available at <http://www.prenhall.com/divisions/phcanada/app/petrucci/>

Manager, HSGOALS Listserv for Science Content Team on High School Core Learning Goals (1992 – 1998).
 This listserv allowed the science content team to continue its work online. I served as monitor and manager.

Manager, CHEMCORD Listserv for General Chemistry Coordinators (1990 – 1998).
 This listserv allowed faculty and staff who had responsibility for first year chemistry courses to discuss issues and ideas regarding teaching, learning, and managing these courses. I served as manager and monitor for this listserv.

Recent National and University Service

American Chemical Society, Division of Chemistry Education

- Chair, Task Force to Develop Biennial Conference Board (2014 – 2015)
- Program co-chair for Spring 2012 ACS Meeting in San Diego
- Biennial Conference Committee, Co-chair (2009 – December 2016)
- Program Committee (2003 – 2017)
- ACS Pimentel Award Committee (2009-2011, chair in 2011)

University of Northern Iowa

- Chair, CHAS Committee on Promotion and Tenure (2015)
- Chair, Task Force on Campus and Residence Life Facilities (2014 – 2015)
- Chair, Council of Academic Department Heads (2010 – 11)
- Living Learning Communities Team (2014 – present)
- UNI Administration Bargaining Team (2010 – 11)
- National Awards Mentoring Committee (2010 – present)
- Advisory Committee, Office of Sponsored Programs (2007 – 2015)
- Intellectual Property Committee (2008 – present)
- Instructional Technology Committee

Professional Affiliations

Alpha Chi Sigma

American Association for the Advancement of Science (AAAS)

- Nominations Committee, Education Division (2000-2003)

American Association of Higher Education (AAHE)

American Chemical Society (ACS)

- Admissions Committee (1994-1999)

Division of Chemical Education

- Co-Chair, Biennial Conference on Chemistry Education Committee (2009 – 2016)

Note: This committee oversees the development of the largest conference on chemical education in North America

- Program co-chair for Spring 2012 ACS Meeting in San Diego

- Program co-chair for Spring 2009 ACS Meeting in Salt Lake City

- Chemical Education Research Committee (2007 – 2009)

- Biennial Conference on Chemistry Education Committee (2005 – 2007)

- Advisor to Planning Team, 20th Biennial Conference on Chemical Education (2004 – 2008)

- Program Committee (2003 – present)

- Web Committee (2002 – 2003)

- Program co-Chair, 18th Biennial Conference on Chemical Education (2000 – 2004)

- Major ACS Award Committee (2008 – 2011, chair in 2011)

Association for Science Teacher Education (ASTE, 2000-2006)

Council on Undergraduate Research (1992-94)

Hoosier Association of Science Teachers, Inc. (1998-2005)

International Center for First-Year Undergraduate Chemistry Education (ICUC)

- Membership Committee (2004 – 2006)

International Movement Disorder Society (2015 – present)

National Association of Biology Teachers (NABT, 2003 – 2005)

National Association for Research on Science Teaching (NARST)

- Dissertation Awards Committee (2004 – 2007)

- Early Career Award Committee (2006 – 2009)

National Council for Community & Education Partnerships

- National Advisory Board (1999-2001)

National Science Education Leadership Association (NSELA)

William S. Harwood

National Science Teachers Association (NSTA)

Sigma Xi (1987 – 2002)

Treasurer (Wittenberg) 1988-1989