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**Education:**

*Ph.D., Curriculum and Instruction* December, 1998  
Emphasis: Chemistry Education  
Purdue University  
Thesis: *Teaching Innovation in Organic Chemistry: An Inquiry into What Happens When the Lecturer Stops Lecturing*

*M.S., Chemistry* August, 1992  
Purdue University  
Thesis: *The Content of Freshman Chemistry: Concepts, Principles, and Process Skills*

*B.S., Chemistry, ACS certified* December, 1985  
Saginaw Valley State University  
Biology minor

**Professional Experience:**

*Faculty Head, Science, Mathematics, and Social Science*, School of Letters and Sciences, Arizona State University – Phoenix Downtown Campus, July 2007 to present. Supervise the science and math program, assist school director in budget management, hire and evaluate personnel, and plan the schedule of classes.

*Senior Lecturer*, Arizona State University – Phoenix Downtown Campus, July 2006 to present. Lecturer for introductory chemistry course. Assist in program and facility development for a new ASU campus.

*Senior Lecturer/General Chemistry Coordinator*, Arizona State University, August 2003 to June 2006.

*Lecturer/General Chemistry Coordinator*, Arizona State University, August 2000 to July 2003. In addition to the lab coordinator duties mentioned below, manage the general chemistry program, work with other faculty to establish course curricula and policies, teach sections of general chemistry, and serve on undergraduate programs committee.

*General Chemistry Laboratory Coordinator*, Arizona State University, July 1996 to August 2000. Establish lab curriculum and develop new experiments. Train new teaching assistants in course administration, cooperative learning classroom activities, and inquiry-based laboratory instruction. Manage the general chemistry laboratory program and assignment of teaching assistants.

*Visiting Assistant Professor*, Clemson University, August 1994 to June 1996. Lecturer for first and second semester general chemistry courses for science and engineering majors.

*Organic Chemistry Teaching Assistant*, Purdue University, Fall 1993. Responsible for grading and consulting with the professor to facilitate students' learning in a discussion oriented classroom technique.

*Freshman Chemistry Course Instructor*, Purdue University, Summer, 1991 and Summer, 1992. Lecturer for a second semester course taken by science and engineering majors. Served as professor in charge of Chemistry 116, the second semester of a two semester sequence for science and engineering majors. Organized lecture activities and laboratory experiments conducted by students.

*Course Supervisor*, Purdue University, January 1989 to May 1992. Responsible for all aspects of the chemistry course outside of lecture. This included supervision of teaching assistants and coordinating with preparatory chemists to ensure the safe and smooth operation of freshman chemistry laboratories.

*Graduate Teaching Assistant*, Purdue University, August 1987 to May 1992. Responsibilities included the teaching of freshman chemistry recitations and laboratories, grading homework and quizzes, and proctoring exams.

*Research Technologist*, The Dow Chemical Company, Midland, MI, 1986 - 1987. Developed and implemented method for the evaluation of paint film fungicides. This included formulating paints, determining realistic test conditions, and selecting compounds to be evaluated based on preliminary screening results. Trained new employees in microbiological and safety techniques. Laboratory inventory manager.

*Student Technologist*, The Dow Chemical Company, Midland, MI, 1982 - 1985. Conducted the primary evaluation of selected compounds for biocidal activity. Based on results of primary testing, chose compounds for end-use testing in a number of matrices. Directed the synthesis of new experimental compounds based on previous results and structure-activity relationships.

### ***Publications:***

R. C. Bauer, J. P. Birk, and P. S. Marks, *Conceptual Introduction to Chemistry, Second Edition*, Introductory chemistry textbook to be published by McGraw-Hill (Dubuque, IA), 2010.

R. C. Bauer, J. P. Birk, and D. J. Sawyer, *Laboratory Inquiry in Chemistry, 3<sup>rd</sup> Edition (Custom)*, Laboratory manual published for ASU's Introductory Chemistry course (CHM 101) by Brooks/Cole Publishing (Pacific Grove, CA), 2009.

R. C. Bauer, J. P. Birk, and D. J. Sawyer, *Laboratory Inquiry in Chemistry, 3<sup>rd</sup> Edition*, Laboratory manual published for national distribution by Brooks/Cole Publishing (Pacific Grove, CA), 2009.

J. P. Birk, R. C. Bauer, and D. D. E. Leedy, *Using Visualization Technology and Group Activities in Large General Chemistry Courses*, Chapter in *Chemists' Guide to Effective Teaching* (eds. N. Pienta, M. Cooper, & T. Greenbowe) Pearson Education, 2009.

R. C. Bauer, J. P. Birk, and P. S. Marks, *Conceptual Introduction to Chemistry*, Introductory chemistry textbook published by McGraw-Hill (Dubuque, IA), 2007.

R. C. Bauer, J. P. Birk, and D. J. Sawyer, *Laboratory Inquiry in Chemistry, 1<sup>st</sup>, and 2<sup>nd</sup> Editions*, Laboratory manual published for national distribution by Brooks/Cole Publishing (Pacific Grove, CA), 2001 and 2005.

R. C. Bauer, J. P. Birk, and D. J. Sawyer, *Laboratory Inquiry in Chemistry, 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> Editions*, Laboratory manual published for local use by Hayden-McNeil (Plymouth, MI), 1997, 1998, and 1999, respectively.

S. Krause, J. Birk, R. Bauer, B. Jenkins, and M. Pavelich, *Development, Testing and Application of a Chemistry Concept Inventory*, Proceedings from the 34<sup>th</sup> ASEE/IEEE Frontiers in Education Conference, October 20-23, 2004, Savannah, GA.

### ***Professional Activities:***

R. C. Bauer (presiding) and D. S. Domin (organizer), *General Papers: Strengthening Programs*. Chemical education session organized for the ACS National Meeting, Salt Lake City, UT, March 26, 2009.

R. Bauer, J. Birk, S. Krause, B. Jenkins, *Status of the ASU Chemistry Concept Inventory*. Poster presented at an NSF sponsored workshop on science, engineering, and mathematics concept inventories. Washington, DC, May 11, 2007.

R. Bauer, J. Birk, and R. Culbertson, *Project Pathways: Connecting Chemistry, Physics, and Math*. Paper presented at the 19<sup>th</sup> Biennial Conference on Chemical Education, July 30, 2006.

R. Bauer, J. Birk, and D. Sawyer, *Ten Years of Guided Inquiry at Arizona State University*. Paper presented at the 19<sup>th</sup> Biennial Conference on Chemical Education, July 31, 2006.

- J. Birk, R. Bauer, and P. Marks, *Visualization: An Important Component of Introductory Chemistry Instruction*. Paper presented at the 19<sup>th</sup> Biennial Conference on Chemical Education, July 31, 2006.
- P. Marks, R. Bauer, and J. Birk, *Implementation of a Teaching Teams Program at Arizona State University*. Paper presented at the 19<sup>th</sup> Biennial Conference on Chemical Education, August 1, 2006.
- R. Bauer, J. Birk, and P. Marks, *A Conceptual Approach to General Chemistry Instruction*. Invited paper presented at the 61<sup>st</sup> Northwest Regional Meeting of the American Chemical Society, June 26, 2006.
- R. Bauer, J. Birk, and P. Marks, *Student Study Habits: Why Do They Succeed?* Paper presented at the ACS National Meeting, San Diego, CA, March 15, 2005.
- R. Bauer, *Research in Chemical Education*. Presided over session at the ACS National Meeting, San Diego, CA, March 16, 2005.
- B.E. Jenkins, J. P. Birk, R. C. Bauer, S. Krause, and M. J. Pavelich, *Development Testing and Application of a Chemistry Concept Inventory*. Paper presented at *Frontiers in Education Conference*, Savanna, GA, October 2004; and at the 18<sup>th</sup> Biennial Conference on Chemical Education, July 18, 2004.
- S. Brown and R. Bauer, *Managing Large General Chemistry Programs*. Symposium organized for the 18<sup>th</sup> Biennial Conference on Chemical Education, July 19, 2004.
- B.E. Jenkins, J. P. Birk, R. C. Bauer, S. Krause, and M. J. Pavelich, *Development and Application of a Chemistry Concept Inventory*, Paper presented at 227<sup>th</sup> National Meeting of the American Chemical Society, Anaheim, CA, Mar. 28-Apr. 1, 2004.
- M. Pavelich, B. Jenkins, J. Birk, R. Bauer, and S. Krause, *Development of a Chemistry Concept Inventory and Correlations to a Materials Concept Inventory*, American Society for Engineering Education Annual Conference and Exposition, Salt Lake City, UT, June 20-23, 2004.
- R. Bauer, J. Birk, and P. Marks, *Modification of an Introductory Chemistry Course to Improve Learning*. Paper presented at the 18<sup>th</sup> Biennial Conference on Chemical Education, July 19, 2004.
- S. Krause, J. P. Birk, R. C. Bauer, M. J. Pavelich, and B.E. Jenkins, *Chemistry Concept Inventory*. Paper presented at *Sharing the Future IV* (conference of four engineering education coalitions), Tempe, AZ, March 17, 2003.
- R. Bauer, P. Marks, and J. Birk, *Adventures In Introductory Chemistry For Lost Boys And Girls*. Paper presented at the ACS National Meeting, New Orleans, LA, March 23, 2003.
- R. C. Bauer, *Overcoming Barriers to Teaching Inquiry Investigations*. Invited plenary lecture, Developments in Teaching/Learning Methods in General Chemistry conference sponsored by the Minnesota State Colleges and Universities System, St. Cloud, MN, October 26, 2002.
- R. C. Bauer and J. P. Birk, *Addressing Perceived Disadvantages of Inquiry Experiments in General Chemistry*. Paper presented at the 17<sup>th</sup> Biennial Conference on Chemical Education, Bellingham, WA, July 29, 2002.
- R. C. Bauer and J. P. Birk, *Implementing and Sustaining Inquiry-Based Laboratory Programs in General Chemistry*. Symposium organized for the ACS National Meeting, Chicago, IL, August 28, 2001.
- R. C. Bauer and J. P. Birk, *Addressing Instructors' Beliefs About Laboratory Teaching*. Paper presented at the ACS National Meeting, Chicago, IL, August 28, 2001.
- R. C. Bauer and J. P. Birk, *Student Presentations and Poster Sessions in a Large General Chemistry Program*. Paper presented at the ACS National Meeting, Chicago, IL, August 26, 2001.
- R. C. Bauer and J. P. Birk, *Guided-Inquiry Experiment Development*. Workshop run at the Biennial Conference on Chemical Education, Ann Arbor, MI, July 13, 2000.
- R. C. Bauer, J. P. Birk, and D. J. Sawyer, *Guided-Inquiry Investigations in General Chemistry*. Workshop run at the ACS National Meeting, San Francisco, CA, March 27, 2000.
- R. C. Bauer, J. P. Birk, and D. J. Sawyer, *Guided-Inquiry Investigations at Arizona State University*. Invited

paper presented at the ACS National Meeting, New Orleans, LA, August 23, 1999.

J. Firestine, J. P. Birk, and R. C. Bauer, *Preparing Future Faculty*, Paper presented at the ACS National Meeting, Dallas, TX, April 1998.

E. Nickoles, J. P. Birk, and R. C. Bauer, *New TA Orientation*, Paper presented at the State of Arizona meeting of high school teachers, October 1997.

R. C. Bauer and J. P. Birk, *The Teaching Assistant as Guide in an Inquiry-Based General Chemistry Lab Program*. Paper presented at the ACS National Meeting, Las Vegas, NV, September 12, 1997.

R. C. Bauer, G. M. Bodner, and G. M. Loudon, *Curriculum Change in the Organic Chemistry Course: What Happens to Material Coverage When the Instructor Changes the Mode of Delivery?* and *Assessment of Students' Learning in an Organic Chemistry Course in Which a Discussion Format Was Used to Deliver Course Material*. Papers presented at the Joint Regional ACS Meeting, Ann Arbor, MI, June 1994.

R. C. Bauer, G. M. Bodner, and G. M. Loudon, *The Organic Chemistry Lecture: What Happens When the Instructor Changes the Mode of Delivery?* and *The Development of Higher Order Thinking Skills in Organic Chemistry: One Instructor's Teaching and Evaluation Methods*. Papers presented at the 13th Biennial Conference on Chemical Education, Lewisburg, PA, July 1994.

R. C. Bauer, G. M. Bodner, and G. M. Loudon, *Overcoming the Barriers to Implementing Cooperative Learning Techniques in the Organic Chemistry Lecture* and *The Organic Chemistry Lecture: What Happens When the Instructor Decides Not to Lecture?* Papers presented at the ACS National Meeting, Washington, D.C., August 1994.

*Board of Advisors for Chemistry: "The Molecular Nature of Matter and Change (3<sup>rd</sup> and 4<sup>th</sup> Ed.)"* (Author: Martin Silberberg). McGraw-Hill, 2003.

### ***Service Activities:***

I have been involved in the following activities during the nine years I have worked at ASU:

- ASU Articulation Task Force representative for chemistry
- Chair and secretary of the Central Arizona Section of the American Chemical Society
- Co-chair and member, Undergraduate Program Committee (Department of Chemistry and Biochemistry)
- Chair and member, Teaching Assistant Committee (Department of Chemistry and Biochemistry)
- Liaison to College of Education Initial Teacher Certification program (Department of Chemistry and Biochemistry)
- Member, College of Liberal Arts and Science Quality of Instruction Committee

### ***Courses Taught:***

Methods of Teaching Chemistry

Organic Chemistry for Pharmacy Majors

General Chemistry for Science Majors

General Chemistry for Non-science Majors

General Chemistry for Engineers

PULSAR, Chemistry for gifted high school students through Purdue's Summer Programs (1992 and 1993)

### **Grants:**

*Increasing Access, Retention, and Excellence in General Chemistry at all ASU Campuses.* Co-PI on \$100,000 grant to develop guided inquiry recitation activities. Source: Arizona Board of Regents, 2008

*Math Science Partnership.* Project Pathways: A Math and Science Partnership Program for Arizona Targeted Project Track, Participation as senior personnel on \$12 million dollar grant to improve pre-service and in-service instruction of science teachers. Source: NSF EHR-0412537

*Chemistry Concept Inventory.* Co-PI on \$125,000 grant over two years to develop inventory to test students' misconceptions and improve instruction. Source: Subcontract with Foundation Coalition, NSF.

*Using Technologically Mediated Lecture Halls to Improve Instruction and Learning throughout the Chemistry Curriculum.* Co-PI on \$8,730 grant to equip a lecture hall with a projector for multimedia presentations. Source: ASU College of Liberal Arts and Sciences, *Grant to Advance the Quality of Undergraduate Education, 2003.*

*Laboratory Computers in General Chemistry.* PI on \$19,500 grant to place computers in the general chemistry teaching laboratories. Source: ASU College of Liberal Arts and Sciences, *Grant to Advance the Quality of Undergraduate Education, 1998.*

*Development of New Inquiry-Based Investigations.* Co-PI on \$5,000 grant to develop inquiry based investigations for ASU's General Chemistry Program. Source: Arizona Collaborative for Excellence in the Preparation of Teachers, *Teaching Innovations Award, 1998.*

*Improving Student Visualization of Chemistry Concepts.* Co-PI on \$9,000 grant to develop computer based visualization tools on lab computers to help students understand particulate nature of chemical systems. Source: ASU College of Liberal Arts and Sciences, *Grant to Advance the Quality of Undergraduate Education, 1999.*

*Development of Inquiry-Based Teaching Materials.* Co-PI on \$5,000 grant to develop teaching materials to accompany inquiry based investigations for ASU's General Chemistry Program. Source: Arizona Collaborative for Excellence in the Preparation of Teachers, *Teaching Innovations Award, 1999.*

*Development of Exercises to Follow General Chemistry Inquiry Experiments.* PI on \$11,500 grant to develop conceptual questions that will serve as follow-up exercises after completion of inquiry experiments. Source: ASU College of Liberal Arts and Sciences, *Grant to Advance the Quality of Undergraduate Education, 2000.*

*Proposal Review Panelist.* Served on panel to review proposals submitted to the National Science Foundation DUE-CCLI program; 2004, 2005, 2006, 2007, and 2008.

### **Professional Societies:**

American Chemical Society  
National Science Teacher's Association  
Society for College Science Teaching