

**South Dakota State University  
Department of Chemistry and Biochemistry  
211 Shepard Hall**

**Matthew L. Miller  
Curriculum Vitae**

**I. PERSONAL INFORMATION**

09/20/06

**Home information**

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**Work information**

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**Education**

Ph.D.	Purdue University	2001
MS	Purdue University	1998
BS with honors	University of South Dakota	1985

**Professional Experience**

Assistant Professor of Chemistry and Biochemistry South Dakota State University, Brookings, SD	2001-present
Graduate work in chemistry and chemistry education, Purdue University, West Lafayette, IN	1994-2001
Adjunct faculty, chemistry instructor Ivy Tech State College, Lafayette, IN	1998
Secondary science teacher, Southwestern Wisconsin Community School District, Hazel Green, WI	1985-1994

**Awards and Honors**

Sigma Xi, the Scientific Research Society	2005
Alpha Lambda Delta National 2002 Academic Honor Society for freshman, honorary induction	
Purdue Research Foundation Grant	2000
Certificate of Appreciation, Purdue Excellence 21	1999
Phi Lambda Upsilon, honorary chemical society	1995
Excellence in Science, Teacher Recognition University of Wisconsin, Eau Claire	1990, 1991

## II. PUBLICATIONS

### Refereed Publications

- 1) Williams, Marla & Miller, Matthew (2006) Computers in the General Chemistry Laboratory: The Impact of Using Technology on Student Learning. Manuscript submitted for publication in the *Journal of Chemical Education*.
- 2) Borisch, John, Pilkenton, Sarah, Miller, Matthew L., Raftery, Daniel, & Francisco, Joseph S. (2004). TiO<sub>2</sub> Photocatalytic Degradation of Dichloromethane: An FTIR and Solid-State NMR Study. *Journal of Physical Chemistry B*, 108, 5640-5646.
- 3) Francisco, Joseph S., Nakhleh, Mary B., Nurrenbern, Susan C., & Miller, Matthew L. (2002). Assessing Student Understanding of General Chemistry with Concept Maps. *Journal of Chemical Education*, 79, 248.
- 4) Miller, Matthew L., Borisch, John, Raftery, Daniel, & Francisco, Joseph S. (1998). Changing the Product State Distribution and Kinetics in Photocatalytic Surface Reactions Using Pulsed Laser Irradiation. *Journal of the American Chemical Society*, 120 (32), 8265.

### Book Chapter

- 1) Miller, M. L. (in press). Pedagogical content knowledge. In M. Orgill & G. M. Bodner (Eds.), *Theoretical frameworks for research in chemistry/science education* (pp. 83-102). Upper Saddle River, NJ: Pearson Education Publishing.

## III. GRANT PROPOSALS

### Current Grant Submissions

- 1) US Dept. of Education – Fund for the Improvement of PostSecondary Education (FIPSE) Meeting the Need for Highly-Qualified Chemistry Teachers  
Status – (Pending)                      Principle Investigator                      **Requested \$405,192**
- 2) NSF 06-534 International Polar Year (IPY). IPY: A Catalyst to Enhance Science Education in South Dakota.  
Status – (Pending)                      Co-Principle Investigator                      **Requested \$387,790**
- 3) NSF 05-592 Research Experience for Undergraduates (REU)  
REU Site at South Dakota State University: Promoting Research to Students and Teachers  
Status – (Pending)                      Co-Principle Investigator                      **Requested \$309,760**
- 4) Henry & Camille Dreyfus Foundation Maintaining High Quality Chemistry Teachers: Chemical Activities Workshops for Elementary and Secondary Teachers  
Status – (Pending)                      Principle Investigator                      **Requested \$ 80,561**

### Funded Grant Applications

- 1) SDSU Research Support Fund, 2005, Graduate School                      **Received \$3,116.**
- 2) New Ideas Program, 2004, Provost & Vice-

- Matching funds; College of Arts & Sciences **Received \$700.**
- 4) Research/Scholarship Start-up funds, 2002, Graduate School **Received \$4,000.**

#### **IV. TECHNICAL ADDRESSES**

##### **Invited Address at National Meeting**

- 1) Theoretical Frameworks for Research in Chemistry Education. A symposium organized by MaryKay Orgill (University of Nevada-Las Vegas) and Provi Mayo (South Dakota State University) at the 19th Biennial Conference on Chemical Education in West Lafayette, IN, July 30-August 6, 2006.
- 2) Concept mapping in general chemistry: A t3 (or)8gen



- 17) Making Connections: The Use of Concept Maps in General Chemistry.  
Nakhleh, Mary B.; Nurrenbern, Susan C.; Francisco, Joseph S.; and **Miller, Matthew L.** A presentation at the 2000 National Association for Research in Science Teaching Annual Meeting at the Radisson Hotel, New Orleans, LA, March 2000.

### **Poster Presentation at National Meeting**

(Name in **bold** was presenter)

- 1) Computers in the general chemistry laboratory: The impact of technology on laboratory learning. **Williams, Marla**; Utecht, Ronald; Miller, Matthew. A poster presented at the 2004 Biennial Conference on Chemical Education, an American Chemical Society sponsored meeting at Iowa State University, Ames, IA. July, 2004.

### **Addresses at Regional Meeting**

(Name in **bold** was presenter)

- 1) NSF-REU: Improving the Quality of Undergraduate Research Experiences. **Miller, Matthew L., Cartrette, David P.** A presentation at the 40<sup>th</sup> Midwest Regional Meeting of the American Chemical Society, Joplin, MO, Oct. 2005.
- 2) Using Concept Maps in Science Classrooms to Make Connections. **Miller, Matthew L.** A presentation at the South Dakota Council of Teachers of Mathematics and the South Dakota Science Teachers Association Joint Spring Convention, Crossroads Convention Center, Huron, SD, February 2002.
- 3) Changing the Product State Distribution in Photocatalytic Surface Reactions Using Pulsed Laser Irradiation. **Miller, Matthew L.**; Borisch, John; Raftery, Daniel; Francisco, Joseph S. A presentation at the 20<sup>th</sup> Annual Midwest Environmental Chemistry Workshop at the University of Indiana, Bloomington, November 1997.

### **Invited Addresses at Regional Institutions**

- 1) Concept Mapping in General Chemistry: Mapping Knowledge for Assessment. An invited address at the departmental seminar at Minnesota State University, Moorhead, April, 2006.
- 2) Experiences on the road to SoTL at SDSU. Member of discussion panel. Faculty Interactions and Open Discussions, South Dakota State University, March 30, 2006.
- 3) Integrating research in the classroom. Member of discussion panel. Faculty Interactions and Open Discussions, South Dakota State University, November 10, 2005.
- 4) The scholarship in teaching and learning. Member of discussion panel. Faculty Interactions and Open Discussions, South Dakota State University, April 20, 2005.
- 5) A lost art: Critical thinking in chemistry. Miller, Matthew L. An invited address at the departmental seminar at St. Cloud State University in October, 2004.



Annual Meeting, New Orleans, LA.





## **VI. SERVICE**

### **Departmental**

- 1) Graduate advisory committee r o5-6 750 ( 20000000004798&20027011J EMC /LB /2

**Purdue University**

West Lafayette, IN

University supervisor of student teacher	Fall	2000
Chemistry course supervisor		
CHM 112	Summer	1996
CHM 112	Summer	1995
Chemistry teaching assistant		
CHM 126	Spring	2001
CHM 115	Spring	2001
CHM 100	Fall	2000
CHM 115	Fall	2000
CHM 115	Spring	2000
CHM 115	Fall	1999
CHM 116	Spring	1999
CHM 502/EDCI 424	Fall	1998
Undergraduate Resource Room	Summer	1998
CHM 112	Spring	1998
CHM 116	Fall	1997
CHM 115	Fall	1996
CHM 224	Spring	1996
CHM 116	Spring	1995
Undergraduate Resource Room	Fall	1994
Chemistry laboratory development		
CHM 224	Fall	1995

CHM 100 Remedial chemistry course for beginning chemistry students.

CHM 112 Introductory level chemistry course for non-majors.

CHM 115, 116 Introductory level chemistry course for science and en EMC /P <</MCID 22 >>BDC -3.2 -



## **Past Projects**

### **Research in Teacher Preparation**

#### 1) Ph.D. project, chemical education

Ph.D. dissertation advisor: Dr. Mary B. Nakhleh

Ph.D. dissertation topic: “Enriching Pedagogical Content Knowledge of Prospective Chemistry Teachers: How Can the Science Methods Course Help?”

Funding granted through the Purdue Research Foundation and the Purdue Chemistry Department

#### Past Projects (cont.)

### **Research in Assessment**

#### 2) “Collaborative for Excellence in Teacher Preparation”

This program originally was designed to develop a model to systematically revise undergraduate science courses at Purdue University. Currently, work on this project has investigated the use of concept maps as alternative study tools for students as well as assessment tools for professors and teaching assistants

Principle Investigator: Dr. Mary B. Nakhleh

Associate Investigators: Dr. Joseph S. Francisco  
Dr. Susan C. Nurrenbern

Funding granted through NSF-DUE

Principle investigators: Dr. Gerald H. Krockover  
Dr. Louis A. Sherman  
Dr. Kenneth D. Ridgway

### **Masters Project**

#### MS project, analytical chemistry

MS Thesis advisor: Dr. M. Daniel Raftery

MS Thesis topic: “Semiconductor Photocatalytic Degradation of Volatile Organic Compounds Using Titanium Dioxide”

Funding granted through Lucent Technologies

Principle investigators: Dr. M. Daniel Raftery