

**J. Will Medlin**

Site Director, Colorado Center for Biorefining and Biofuels  
Patten Assistant Professor  
Department of Chemical Engineering  
University of Colorado  
Boulder, CO 80309  
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**EDUCATION: University of Delaware**

Ph.D. in Chemical Engineering, May 2001  
*Advisor: Prof. Mark Barteau*

**Clemson University**

B.S. in Chemical Engineering, May 1996

**APPOINTMENTS:**

**University of Colorado, Boulder, CO**

*Patten Assistant Professor, 2005-present*

*Assistant Professor, 2003-05*

**Sandia National Laboratories, Livermore, CA**

*Postdoctoral Fellow, 2001-03*

**Eastman Chemical Company; Kingsport, Tennessee**

*Co-op and summer technical employee, 1992-96*

**HONORS AND AWARDS :**

- College of Engineering and Applied Science Junior Faculty Award, 2006
- Department of Chemical and Biological Engineering Undergraduate Teaching Award, 2006
- Patten Fellowship, 2005-present
- National Science Foundation CAREER Award, 2004
- Office of Naval Research Young Investigator Award, 2004
- Junior Faculty Development Award, University of Colorado, 2004
- Allan P. Colburn Prize for Outstanding Dissertation in the Mathematical Sciences and Engineering, University of Delaware, 2001
- National Science Foundation Graduate Fellowship, 1997-2000
- AIChE Catalysis and Reaction Engineering Travel Award, 2000
- First Place, Philadelphia Catalysis Club Poster Competition, 2000
- Robert L. Pigford Teaching Assistant Award, 1999
- Garrett Reed Cantwell Graduate Scholarship, 1998
- Robert L. Pigford Graduate Fellowship, 1996-97
- Clemson University Faculty Scholarship Award, 1996

**REFEREED ARTICLES: (# indicates undergraduate coauthor)**

1. S.T. Marshall, D.K. Schwartz, J.W. Medlin, "Selective Acetylene Detection through Surface Modification of Metal-Insulator-Semiconductor Sensors with Alkanethiolate Monolayers", *Sensors and Actuators B* (2008) submitted.
2. D.C. Kershner, W. Zhang, J.W. Medlin, "Oxidation of silane on Pt(111)", *Surface Science* (2008) submitted.

3. D.C. Kershner, M.P. Hyman, J.W. Medlin, “DFT study of the oxidation of silicon on Pd(111) and Pt(111)”, *Journal of Physical Chemistry C* (2008) submitted.
4. S.T. Marshall, S.K. Satija, B.D. Vogt, J.W. Medlin, “Profiling of Hydrogen in Metal-Insulator-Semiconductor Sensors using Neutron Reflectivity”, *Applied Physics Letters* (2008) in press.
5. A.S. Loh, S.W. Davis<sup>#</sup>, J.W. Medlin, “Adsorption and Reaction of 1-Epoxy-3-butene on Pt(111): Implications for Selectivity in Conversions of Unsaturated Oxygenates”, *Journal of the American Chemical Society* (2008) in press.
6. D.C. Kershner, J.W. Medlin, “Adsorption and Decomposition of Silane on Pd(111)”, *Surface Science* 602 (2008) 693-701.
7. D.C. Kershner, J.W. Medlin, “Adsorption and Reaction of Silane and Oxygen on Pd(111)”, *Surface Science* 602 (2008) 786-794.
8. M.P. Hyman, J.W. Medlin, “The Effects of Electronic Structure Modifications on the Adsorption of Oxygen Reduction Reaction Intermediates on Model Pt(111)-Alloy Surfaces”, *Journal of Physical Chemistry C* 111 (2007) 17052-17060.
9. M.P. Hyman, B.T. Loveless<sup>#</sup>, J.W. Medlin, “A Density Functional Theory Study of H<sub>2</sub>S Decomposition on the (111) Surfaces of Model Pd-alloys”, *Surface Science* 601 (2007) 5383-5394.
10. M.P. Hyman, J.W. Medlin, “A Mechanistic Study of the Electrochemical Oxygen Reduction Reaction on Pt(111) Using Density Functional Theory”, *Journal of Physical Chemistry B* 110 (2006) 15338-15344.
11. D. Li, R. Bastasz, and J.W. Medlin, “Application of Polymer-Coated MIS Sensors in Detection of Dissolved Hydrogen”, *Applied Physics Letters* 88 (2006) art. no. 233507.
12. D. Li, A.H. McDaniel, R. Bastasz, J.W. Medlin, “Effects of a Polyimide Coating on the Hydrogen Selectivity of MIS Sensors”, *Sensors and Actuators B* 115 (2006) 86-92.
13. M.P. Hyman, J.W. Medlin, “Effect of Applied Electric Fields on Oxygen Dissociation on Pt(111)”, *Journal of Physical Chemistry B* 109 (2005) 6304-6310.
14. J.W. Medlin, R. Bastasz, A.H. McDaniel, “Hydrocarbon detection via ion implantation in metal-insulator-semiconductor devices,” *Applied Physics Letters* 85 (2004) 5457-5459.
15. R. Bastasz, J. W. Medlin, J. A. Whaley, R. Beikler, E. Taglauer, "Deuterium adsorption on W(100) studied by LEIS and DRS," *Surface Science* 571 (2004) 31-40.
16. J.W. Medlin, A.E. Lutz, R. Bastasz, A.H. McDaniel, “The response of palladium metal-insulator-semiconductor devices to hydrogen-oxygen mixtures: Comparisons between kinetic models and experiment”, *Sensors and Actuators B* 96 (2003) 290-297.
17. J.W. Medlin, A.H. McDaniel, M.D. Allendorf, R. Bastasz, “Effects of competitive carbon monoxide adsorption on the hydrogen response of MIS sensors: The role of metal film morphology”, *Journal of Applied Physics*, 93 (2003) 2267-2274.
18. J.W. Medlin, M.D. Allendorf, “Theoretical study of the adsorption of acetylene on the (111) surfaces of Pd, Pt, Ni, and Rh”, *Journal of Physical Chemistry B*, 107 (2003) 217-223.
19. S. Linic, J.W. Medlin, M.A. Barteau, “Synthesis of oxametallacycles from iodoethanol on Ag(111) and the structure dependence of their reactivity”, *Langmuir*, 18 (2002) 5197-5204.
20. J.W. Medlin, M.A. Barteau, “The reaction of 1-chloro-2-methyl-2-propanol on oxygen-covered Ag(110): Epoxide formation via a surface chlorohydrin reaction”, *Surface Science*, 506 (2002) 105-118.
21. J.W. Medlin, J.R. Monnier, M.A. Barteau, “Deuterium kinetic isotope effects in butadiene epoxidation over unpromoted and Cs-promoted silver catalysts”, *Journal of Catalysis*, 204 (2001) 71-76.
22. J.W. Medlin, M.A. Barteau, “The formation of epoxides from reaction of oxametallacycles on Ag(110): A density functional theory study”, *Journal of Physical Chemistry B*, 105 (2001) 10054-10061.
23. J.R. Monnier, J.W. Medlin, M.A. Barteau, “Use of oxygen-18 to determine kinetics of butadiene epoxidation over Cs-promoted, Ag catalysts”, *Journal of Catalysis*, 203 (2001) 362-368.

24. A.B. Sherrill, J.W. Medlin, J.G. Chen, M.A. Barteau, “NEXAFS investigations of cyclooctatetraene on TiO<sub>2</sub>(001)”, *Surface Science*, 492 (2001) 203-213.
25. H. Ihm, J.W. Medlin, M.A. Barteau, J.M. White, “Thermal activation of *tert*-butyl nitrite on Pt(111): *tert*-butoxy dehydrogenation and oxametallacycle formation”, *Langmuir*, 17 (2001) 798-806.
26. J.W. Medlin, A.B. Sherrill, J.G. Chen, M.A. Barteau, “Experimental and theoretical probes of the structure of oxametallacycle intermediates derived from 1-epoxy-3-butene on Ag(110)”, *Journal of Physical Chemistry B*, 105 (2001) 3769-3775.
27. J.W. Medlin, M.A. Barteau, J.M. Vohs, “Oxametallacycle formation via ring-opening of 1-epoxy-3-butene on Ag(110): A combined experimental/theoretical approach”, *Journal of Molecular Catalysis A*, 163 (2000) 129-145.
28. J.R. Monnier, J.W. Medlin, Y.-J. Kuo, “The selective isomerisation of 2,5-dihydrofuran to 2,3-dihydrofuran using CO-modified, supported Pd catalysts”, *Applied Catalysis A*, 194-195 (2000) 463-474.
29. J.W. Medlin, M. Mavrikakis, M.A. Barteau, “Stabilities of substituted oxametallacycle intermediates: Implications for regioselectivity of epoxide ring-opening and olefin epoxidation”, *Journal of Physical Chemistry B*, 103 (1999) 11169-11175.

**INVITED BOOK CHAPTERS (both independent contributions from U. of Colorado):**

1. M.P. Hyman and J.W. Medlin, “Mechanistic Studies of Electrocatalytic Reactions”, in *Catalysis* (volume 20) pp. 309-337, edited by J.J. Spivey and K.M. Dooley. Royal Society of Chemistry (2007).
2. J.W. Medlin, “Metal-Insulator-Semiconductor Gas Sensors”, in *Encyclopedia of Sensors*, edited by C.A. Grimes, E.C. Dickey, and M.V. Pishko. American Scientific Publishers (2005).

**CONFERENCE PRESENTATIONS :**

1. “Capturing the Bioenergy Opportunity” (invited), J. Will Medlin, Atlantic BioEnergy Conference, Saint John, Canada; April 2008.
2. “Identification of surface intermediates through the combined use of molecular modeling and vibrational spectroscopy” (invited), J. Will Medlin, ACS National Meeting, New Orleans, LA; April 2008.
3. “MIS Sensors for Fault Gas Detections”, J. Will Medlin, ACS National Meeting, New Orleans, LA; March 2008.
4. “Adsorption and Reaction of Multifunctional Oxygenates on Metal Surfaces”, Clay M. Horiuchi and J. Will Medlin, Western States Catalysis Club Annual Symposium, Albuquerque, NM; March 2008
5. “Manipulating the Interface of Catalytic MIS Sensors”, Stephen T/ Marshall and J. Will Medlin, Western States Catalysis Club Annual Symposium, Albuquerque, NM; March 2008
6. “Experimental and Computational Studies of Si-O Bonding Structures on Metal Surfaces”, Dylan C. Kershner and J. Will Medlin, Western States Catalysis Club Annual Symposium, Albuquerque, NM; March 2008
7. “Selectivity Control and Mechanistic Studies of Catalytic MIS Sensors”, Stephen T. Marshall and J. Will Medlin, AIChE Annual Meeting, Salt Lake City; November 2007.
8. “Tuning Surface Reactivity Through Electronic Structure Changes In Alloys”, Matthew P. Hyman and J. Will Medlin, AIChE Annual Meeting, Salt Lake City; November 2007.
9. “Silane adsorption and oxidation on Pd(111)”, Dylan C. Kershner and J. Will Medlin, AIChE Annual Meeting, Salt Lake City; November 2007.
10. “Non situ studies of the oxygen reduction reaction” (**invited**), Matthew P. Hyman and J. Will Medlin, ACS National Meeting, Boston; August 2007.
11. “Reactions of bifunctional reagents on Pd(111) and Pt(111)”, Andrea Loh, Clay M. Horiuchi, and J. Will Medlin, ACS National Meeting, Boston; August 2007.
12. “Adsorption and epoxide ring-opening of 1-epoxy-3-butene on Pt(111): Implications for selective catalysis of bifunctional molecules”, Andrea Loh and J. Will Medlin, 20<sup>th</sup> North American Catalysis Society Meeting, Houston; June 2007.

13. "Model Studies of Electrocatalytic Interfaces", M.P. Hyman and J.W. Medlin, ACS National Meeting, Chicago; March 2007.
14. "Control of Metal-Insulator-Semiconductor Sensor Performance through Surface Modification", Stephen T. Marshall and J. Will Medlin, Western States Catalysis Club Annual Symposium, Provo, Utah; February 2007.
15. "Adsorption and Reaction of Silane on Clean and O-Covered Pd(111)", Dylan C. Kershner and J. Will Medlin, Western States Catalysis Club Annual Symposium, Provo, Utah; February 2007.
16. "Adsorption and Reaction of 1-Epoxy-3-Butene on Pt(111)", Andrea Loh and J. Will Medlin, Western States Catalysis Club Annual Symposium, Provo, Utah; February 2007.
17. "DFT Modeling of Electrocatalytic Reactions", Matthew P. Hyman, J. Will Medlin, AIChE Annual Meeting, San Francisco; November 2006.
18. "Development of the Oxygen Reduction Reaction Mechanism on Pt(111) Using DFT", Matthew P. Hyman, J. Will Medlin, AIChE Annual Meeting, San Francisco; November 2006.
19. "Effect of Sulfur on Surface Structures of Palladium Alloys", Esther M. Wilcox, Matthew P. Hyman, J. Will Medlin, AIChE Annual Meeting, San Francisco; November 2006.
20. "Investigations of Silane Adsorption and Reaction on Oxygen-Covered Metal Surfaces", Dylan C. Kershner, J. Will Medlin, AIChE Annual Meeting, San Francisco; November 2006.
21. "Studying Electrode Surface Reactions using DFT", M.P. Hyman and J.W. Medlin, 2006 ACS Fall National Meeting, San Francisco; September 2006.
22. "Modeling Metal-SiO<sub>2</sub> Interfaces", D.C. Kershner and J.W. Medlin, 2006 ACS Colloids and Surface Science Symposium, Boulder, CO; June 2006.
23. "Studying the Electrocatalytic Oxygen Reduction Reaction Using Density Functional Theory", M.P. Hyman and J.W. Medlin, 2006 ACS Colloids and Surface Science Symposium, Boulder, CO; June 2006.
24. "Using web-based technology for Just-In-Time Teaching of engineering", J.W. Medlin and D.E. Clough, 2006 Symposium of the Rocky Mountain Section of the American Society for Engineering Education, Colorado Springs, CO; April 2006.
25. "Studying the Electrocatalytic Oxygen Reduction Reaction Using Density Functional Theory", M.P. Hyman and J.W. Medlin, Western States Catalysis Club Annual Symposium, Boulder, CO; February 2006.
26. "Photocatalytic Decomposition on TiO<sub>2</sub> and Pt/TiO<sub>2</sub>: the Effect of Water", M. Mogaka, J. Buchholz, J.L. Falconer, and J.W. Medlin, Western States Catalysis Club Annual Symposium, Boulder, CO; February 2006.
27. "A Combined Experimental/Theoretical Approach to Modeling Complex Interfaces" (invited), J.W. Medlin, China/USA/Japan Joint Chemical Engineering Conference, Beijing, China; October 2005.
28. "Integration of Molecular Modeling Concepts in Thermodynamics and Kinetics Courses", J.W. Medlin, 2005 AIChE Annual Meeting, Cincinnati, OH; October 2005.
29. "Tailoring Metal-Insulator-Semiconductor Devices for Selectivity", J.W. Medlin and D. Li, 2005 AIChE Annual Meeting, Cincinnati, OH; October 2005.
30. "Insights into the Electrochemical Oxygen Reduction Reaction through Density Functional Theory", M.P. Hyman and J.W. Medlin, 2005 AIChE Annual Meeting, Cincinnati, OH; October 2005.
31. "Study of Spherosiloxane Adsorption on Metal Surfaces", D.C. Kershner and J.W. Medlin, 2005 AIChE Annual Meeting, Cincinnati, OH; October 2005.
32. "Performance of Polymer Film Modified Sensors in Hydrogen Detection", D. Li and J.W. Medlin, North American Membrane Society Annual Meeting, Providence, RI; June 2005.
33. "Study of Spherosiloxane Adsorption on Metal Surfaces" (poster), D.C. Kershner and J.W. Medlin, 19<sup>th</sup> North American Catalysis Society Meeting, Philadelphia, PA; May 2005.
34. "Electric Field Effects on Fuel Cell Cathodes" (poster), M.P. Hyman and J.W. Medlin, 19<sup>th</sup> North American Catalysis Society Meeting, Philadelphia, PA; May 2005.
35. "Insights into the Electrochemical Oxygen Reduction Reaction through Density Functional Theory", M.P. Hyman and J.W. Medlin, Western States Catalysis Club Annual Symposium, Albuquerque, NM; February 2005.
36. "Catalytic Sensors for Hydrogen Detection in Industrial Applications", D. Li and J.W. Medlin, Western States Catalysis Club Annual Symposium, Albuquerque, NM; February 2005.
37. "Study of Spherosiloxane Adsorption on Metal Surfaces", D.C. Kershner and J.W. Medlin, Western States Catalysis Club Annual Symposium, Albuquerque, NM; February 2005.
38. "Hydrogen-Selective Sensors for Industrial Applications", D. Li, A.H. McDaniel, R. Bastasz, J.W. Medlin, AIChE Annual Meeting, Austin, TX; November 2004.
39. "O<sub>2</sub> Dissociation on Pt(111): Effect of Electric Fields", M.P. Hyman and J.W. Medlin, AIChE Annual Meeting, Austin, TX; November 2004.

40. “A Theoretical Study of Ensemble Size Effects in Silver-Catalyzed Propylene Epoxidation”, S.O. Laursen, A. Goodrow, and J.W. Medlin, Western States Catalysis Club Annual Symposium, Provo, UT; February 2004.
41. “MIS Sensors for Detection of Transformer Fault Gases”, J.W. Medlin, A.H. McDaniel, and R. Bastasz, *EPRI Conference on Transformer Diagnostics*, New Orleans, LA; February 2004.
42. “Sensitivity of MIS Sensors to Energetic Ions: Application to hydrocarbon detection”, J.W. Medlin, A.H. McDaniel, and R. Bastasz, and M.D. Allendorf, *AIChE Annual Meeting*, San Francisco, CA; November 2003.
43. “Mechanistic investigations of the operation of catalytic MIS sensors”, J.W. Medlin, A.H. McDaniel, and R. Bastasz, and M.D. Allendorf, *AIChE Annual Meeting*, San Francisco, CA; November 2003.
44. “Effects of competitive surface processes on the performance of chemical sensors with catalytic metal gates,” J.W. Medlin, R. Bastasz, and A.H. McDaniel, *Western States Catalysis Club Annual Symposium*, Golden, CO; February 2003.
45. “Influence of competitive surface processes on the response of metal-coated gas sensors”, J.W. Medlin, A.H. McDaniel, R. Bastasz, and M.D. Allendorf, *AIChE Annual Meeting*, Indianapolis, IN; November 2002.
46. “Developing metal-insulator-semiconductor sensors for mixed gas environments”, J.W. Medlin, A.H. McDaniel, R. Bastasz, M.D. Allendorf, *AIChE Annual Meeting*, Indianapolis, IN; November 2002.
47. “A theoretical study of the adsorption of hydrogen and acetylene on the (111) surfaces of transition metals”, J.W. Medlin, M.D. Allendorf, *AIChE Annual Meeting*, Indianapolis, IN; November 2002.
48. “Competitive adsorption of multiple analytes on palladium thin-film sensors: Insights into the detection mechanism of hydrogen-sensitive devices”, J.W. Medlin, A.H. McDaniel, R. Bastasz, and M.D. Allendorf, *International Meeting on Chemical Sensors*, Boston, MA; July 2002.
49. “Combined experimental/theoretical studies of oxametallacycle intermediates: Implications for olefin epoxidation”, J.W. Medlin, M.A. Barteau, *American Institute of Chemical Engineers 2000 Annual Meeting*, Los Angeles, California; November, 2000.
50. “Probing the structure and reactivity of oxametallacycle intermediates: A combined experimental/theoretical approach” (poster), J.W. Medlin, M.A. Barteau, *Gordon Research Conference on Catalysis*; June 2000.
51. “Probing the mechanism of silver-catalyzed olefin epoxidation: A combined experimental/theoretical approach”, J.W. Medlin, M.A. Barteau, *Philadelphia Catalysis Club Spring Symposium*; May 2000.
52. “Linking theory to experiment: Relevance of oxametallacycle intermediates in epoxide chemistry”, J.W. Medlin, M.A. Barteau, *American Chemical Society 2000 Spring Meeting*, San Francisco, CA; March 2000.
53. “Oxametallacycle intermediates in epoxide chemistry: A combined experimental/theoretical approach”, J.W. Medlin, M.A. Barteau, *American Institute of Chemical Engineers 1999 Annual Meeting*, Dallas, Texas; November 1999.
54. “Insights from theory: oxametallacycle stability and relevance to epoxide chemistry”, J.W. Medlin, M. Mavrikakis, M.A. Barteau, *North American Catalysis Soc. Conference*, Boston, MA; June 1999.

#### INVITED SEMINARS :

“Model Studies of Complex Interfaces”

Chem. Eng. Dept., Arizona State University, September 2007

“Model Studies of Complex Catalytic Interfaces”

Brookhaven National Laboratories, October 2006

Chem. Eng. Dept., University of South Carolina, October 2006

“Toward Understanding and Manipulating Chemistry and Complex Interfaces”

Pacific Northwest National Laboratories, Richland, WA, February 2006

“Toward Controlling Selectivity in Solid State Sensors”

Chem. Eng. Dept., University of Washington, Seattle, WA, February 2006

“Experimental/Theoretical Approaches to Modeling Complex Interfaces”

Chemistry Dept., Colorado School of Mines, Golden, CO, September 2005

“Solid-State Hydrogen Sensors: From First Principles to Applications”

Chem. Eng. Dept., Colorado School of Mines, Golden, CO, April 2004

“Effects of Competitive Surface Processes on the Performance of Chemical Sensors with Catalytic Metal Gates”

Eastman Chemical Company, Kingsport, TN, February 2003

“Metal-Coated Gas Sensors: Trying to Design for Selectivity”

Keynote address, Student Annual Research Symposium, University of Colorado, February 2003

“MIS Sensors for Hydrogen Detection”

EPRI Transformer Diagnostics Meeting, Oklahoma City, October 2003

“Probing the Mechanism of Silver-Catalyzed Olefin Epoxidation: A Combined Experimental/Theoretical Approach”

North Carolina State University, March 2001

Pacific Northwest National Laboratory, March 2001

Sandia National Laboratories, California, March 2001

University of Colorado - Boulder, February 2001

University of Massachusetts - Amherst, February 2001

University of California - Los Angeles, February 2001

University of Cincinnati, February 2001

University of Michigan, January 2001

#### **PATENTS:**

A.H. McDaniel, J.W. Medlin, and R. Bastasz, “Carbon Monoxide Sensor and Method of Use Thereof”, US Patent 7,264,778 (issued 2007).

D. Li, J.W. Medlin, A.H. McDaniel, and R. Bastasz, “MIS-Based Sensors with Hydrogen Selectivity”, US Patent 7,340,938 (issued 2008).

#### **RESEARCH GRANTS :**

<p>Project/Proposal Title: Development of Metal-Insulator-Semiconductor (MIS) Sensors for the Detection of Fault Gases in Transformers On-line</p> <p>Source of Support: <b>Sandia National Laboratories</b>                  Total Award Amount: \$420,000      Total Award Period Covered: 08/01/03 – 12/31/07</p>
<p>Project/Proposal Title: CAREER: Modeling Metal – Metal Oxide Interactions using Spherosiloxane Adsorption on Single-Crystal Metal Surfaces</p> <p>Source of Support: <b>National Science Foundation</b>                  Total Award Amount: \$400,000      Total Award Period Covered: 04/01/04 – 03/31/09</p>
<p>Project/Proposal Title: Designing Robust Metal Membranes for Hydrogen Purification from Complex Fuel Streams</p> <p>Source of Support: <b>Office of Naval Research</b>                  Total Award Amount: \$322,821      Total Award Period Covered: 06/01/04 – 12/31/07</p>
<p>Project/Proposal Title: Ensemble Size Effects on Silver-Catalyzed Propylene Oxidation</p> <p>Source of Support: <b>ACS Petroleum Research Fund</b>                  Total Award Amount: \$35,000      Total Award Period Covered: 06/01/04-8/31/06</p>
<p>Project/Proposal Title: Role of Weakly Adsorbed Molecules in Catalytic Reactions (co-PI with PI John</p>

Falconer)
Source of Support: <b>National Science Foundation</b> Total Award Amount: \$288,365      Total Award Period Covered: 08/15/04-08/14/07
Project/Proposal Title: Acquisition of a High Resolution Electron Energy Loss Spectrometer for Molecular-Level Surface Characterization
Source of Support: <b>National Science Foundation</b> Total Award Amount: \$385,000      Total Award Period Covered: 10/01/04-10/31/06
Project/Proposal Title: Collaborative Research: Tailoring Solid Catalysts for Selective Reaction of Multifunctional Molecules
Source of Support: <b>National Science Foundation</b> Total Award Amount: \$80,000      Total Award Period Covered: 08/01/05-07/31/08
Project/Proposal Title: Development of Apparatus for MIS Sensor Control
Source of Support: <b>Electric Power Research Institute</b> Total Award Amount: \$30,000      Total Award Period Covered: 10/01/07-12/31/07
Project/Proposal Title: Model studies of sulfur poisoning on Ni-based catalysts
Source of Support: <b>National Renewable Energy Laboratory</b> Total Award Amount: \$130,000      Total Award Period Covered: 07/01/07-06/30/09

**EDUCATIONAL/TRAINING SUPPORT:**

Title: Graduate Program in Renewable and Sustainable Energy  
 Source of Support: Department of Education Graduate Assistantships in Areas of National Need  
 Total Award Amount: \$511,524 (A. Weimer, PI, JWM and 1 other, co-PIs)  
*Proposal prepared by JWM*  
 Total Award Period: 9/07-8/10

Title: Graduate Program in Chemical and Biological Sensing  
 Source of Support: Department of Education Graduate Assistantships in Areas of National Need  
 Total Award Amount: \$633,360 (S. George, PI, JWM and 1 other, co-PIs)  
*Proposal prepared by JWM*  
 Total Award Period: 9/06-8/09

Title: Tablet PCs for Improved Engineering Instruction  
 Source of Support: Engineering Excellence Fund  
 Total Award Amount: \$5200 (J. Falconer, J. Degrazia, JWM to split the funding)  
 Total Award Period: 3/07-3/08

Title: Software for Molecular Scale Engineering  
 Source of Support: Engineering Excellence Fund  
 Total Award Amount: \$3527  
 Total Award Period: 2/04-2/05

### **COURSES TAUGHT:**

CHEN 3220: Chemical engineering thermodynamics (undergraduate), Fall 2004  
CHEN 4330: Chemical engineering reaction kinetics (undergraduate), Spring 2003-2008  
CHEN 5360: Catalysis and kinetics (graduate), Fall 2005 and Fall 2007  
CHEN 5333: Research methods (graduate), Fall 2005 (with co-instructor Ryan Gill)  
CHEG 342: Heat and mass transfer, Spring 2000 (University of Delaware).

### **CENTER DIRECTORSHIP**

Colorado Center for Biorefining and Biofuels (C2B2)  
Co-founder and CU Site Director

*Center was initiated by Ryan T. Gill and JWM, who recruited Al Weimer as Center Executive Director. Gill, Weimer, and JWM were then responsible for recruiting sponsors, identifying PIs, organizing center structure across the four state Energy Collaboratory institutions (CU, Colorado State University, Colorado School of Mines, and the National Renewable Energy Laboratory), etc.*

### **DEPARTMENTAL SERVICE ACTIVITIES**

- CBEN seminar coordinator, 2003-2004
- Freshman student advisor, 2004-present
- Chair of graduate committee, 2006-07
- Chair of graduate recruiting, 2006-present
- Graduate committee member, 2004-06
- Co-director, GAANN program for Chemical and Biological Sensors, 2006-present
- Co-director, GAANN program for Renewable and Sustainable Energy, 2007-present
- Omega Chi Epsilon Advisor, 2004-present
- Coordinator for complete overhaul of departmental website, 2005-2006
- Faculty search committee, 2005-2006
- Presenter at High School Honors Institute, 2004-2005.
- Presenter at Engineering Open House, 2003-2004
- Director for preparation of web site devoted to educating undergraduate students on computational chemistry; site is linked from <http://www.colorado.edu/che/faculty/medlin.htm>

**PhD Committee Member for:** Jarod McCormick, Yanjie Yu, Chris Perkins, Jason Bara, Mitesh Shah, Tara Lovestead, Michael Weber, Tanya Warnecke, Janine Galvin, Miao Yu

### **Department Curriculum Development**

- CHEN 5333: redesigned the course to include multiple research rotations so that entering students could gain an understanding of diverse research areas(2005)
- Incorporation of 3-week segment on molecular modeling methods in CHEN 5360.
- Incorporation of just-in-time teaching methods to CHEN 4330, with required online quizzes (including required questions on the material from the students) submitted on the assigned reading prior to each class. Methods have been communicated to, adopted by, and improved upon by other faculty in the department.
- Added computational chemistry component using packages Gaussian and Spartan to both CHEN 4330 and CHEN 3320

**PROFESSIONAL ACTIVITIES :**

- President, Western States Division of the North American Catalysis Society, 2005-present
- Member of Organizing Committee (invited) for 2008 ACS/RSC/GDCh Frontiers of Chemistry Symposium
- Member of Organizing Committee and Program Chair for Surface Science, 2006 ACS Conference for Colloids and Surface Science (June 2006; Boulder, CO)
- Organizer of 2006 Western States Catalysis Club Annual Symposium (Feb, 2006; Boulder, CO)
- Organizer of 2007 Western States Catalysis Club Annual Symposium (Feb, 2006; Boulder, CO)
- Chair/Vice-chair for Program Area 20c (Catalysis and Reaction Engineering Topical) of the AIChE Annual Meeting, 2005-2007
- Panelist for NSF Graduate Research Fellowship Program, 2007-2008
- Panelist for NSF Proposal Reviews (2 panels in 2007, 2 in 2005)
- National meeting session chair or co-chair:
  - “Chiral Catalysis Topical Keynote Session”, 2007 AIChE Meeting, Salt Lake City
  - “Fundamentals of surface reactivity I”, 2007 AIChE Annual Meeting, Salt Lake City
  - “Fundamentals of surface reactivity II”, 2007 AIChE Annual Meeting, Salt Lake City
  - “Electrocatalysis fundamentals”, 2007 AIChE Annual Meeting, Salt Lake City
  - “Fundamentals of surface reactivity,” 2006 AIChE Annual Meeting, San Francisco
  - “Computational Catalysis III”, 2006 AIChE Annual Meeting, San Francisco
  - “Surface science and catalysis” (2 sessions), 2006 ACS Colloid and Surface Science Symposium
  - "Fundamentals of Surface Reactivity from Surface Spectroscopy", 2005 AIChE Annual Meeting, Cincinnati, OH
  - "Fundamentals of Environmental Catalysis I", 2005 AIChE Annual Meeting, Cincinnati, OH
  - "Fundamentals of Environmental Catalysis II", 2005 AIChE Annual Meeting, Cincinnati, OH
  - "Theory and Computation", 19th North American Catalysis Society Meeting, Philadelphia, PA (2005)
  - "Selective Catalytic Oxidation", 19th North American Catalysis Society Meeting, Philadelphia, PA (2005)
- Member AIChE, North American Catalysis Society, ACS
- Reviewer: Journal of Materials Science, IEEE Electron Device Letters, National Science Foundation, ACS Petroleum Research Fund, Surface Science, Langmuir, Journal of Physical Chemistry, Journal of the American Chemical Society, Journal of Catalysis, IEEE Sensors Journal, Sensors and Actuators, AIChE Journal, Electrochimica Acta, Journal of the Electrochemical Society, Journal of Applied Physics
- Workshop participant:
  - Workshop on Fuel Cell Technologies, sponsored by NSF, Arlington, VA (June 2005).
  - National Effective Teaching Institute Workshop of the ASEE, Portland, OR (June 2005).
  - Workshop on Hydrogen Separation Technologies, DOE, Arlington, VA (September 2004).
  - Chemical Engineering Summer School, Pullman, WA (July 2007)
- Consultant: Sandia National Laboratories, 2003-present

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