J. Will Medlin

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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

**EMPLOYMENT HISTORY:**

**University of Colorado**, Dept. of Chemical and Biological Engineering, Boulder, CO

*Assistant/Associate/Full Professor*, 2003-present

*Associate Department Chair*, 2012-2016

*Chair*, 2020-present

**Chalmers University of Technology**, Gothenburg, Sweden

*Visiting Professor*, 2017-2018

**Swiss Federal Institute of Technology**, Zurich, Switzerland

*Visiting Professor*, 2010-2011

**Sandia National Laboratories**, Livermore, CA

*Postdoctoral Fellow*, 2001-03; *Advisors: Mark Allendorf and Bob Bastasz*

**SELECTED HONORS AND AWARDS:**

* Dept. of Chemical and Biological Engineering Outstanding Service Award, 2016
* College of Engineering Dean’s Outstanding Research Award, 2015
* AIChE Himmelblau Award for computer-based chemical engineering education, 2015 (shared with John Falconer, Janet Degrazia, Garret Nicodemus)
* Dept. of Chemical and Biological Engineering Graduate Teaching Excellence Award, 2015
* Denver Business Challenge Endowed Professorship, 2014-present
* Provost’s Faculty Achievement Award, 2013 and 2008
* Dept. of Chemical and Biological Eng. Graduate Teaching Award, 2012
* College of Engineering Hutchinson Teaching Award, 2009
* Boulder Faculty Assembly Teaching Excellence Award, 2009
* Dept. of Chemical and Biological Eng. Undergraduate Teaching Award, 2009 and 2006
* ConocoPhillips Faculty Fellowship, 2008-2011
* College of Engineering and Applied Science Junior Faculty Award, 2006
* Patten Fellowship, 2005-2009
* National Science Foundation CAREER Award, 2004
* Office of Naval Research Young Investigator Award, 2004
* Colburn Prize for Outstanding Dissertation in the Math. Sci. and Eng., Univ. of Del., 2001
* National Science Foundation Graduate Fellowship, 1997-2000

**INDEPENDENT REFEREED RESEARCH ARTICLES:**

**Corresponding author denoted with \*.**

1. S. Najmi, M. Rasmussen, G. Innocenti, C. Chang, E. Stavitski, S.R. Bare, A.J. Medford\*, J.W. Medlin\*, and C. Sievers\*, “Pretreatment Effects on the Surface Chemistry of Small Oxygenates on Molybdenum Trioxide”, *ACS Catalysis*, 10 (2020) 8187-8200; <https://doi.org/10.1021/acscatal.0c01992>.
2. L. Freitas de Lima e Freitas, B. Puértolas, J. Zhang, B. Wang, A.S. Hoffman, S.R. Bare, J. Pérez-Ramírez\*, J.W. Medlin\*, E. Nikolla\*, “Tunable Catalytic Performance of Palladium Nanoparticles for H2O2 Direct Synthesis via Surface-Bonded Ligands”, *ACS Catalysis*, 10 (2020) 5202-5207; <https://doi.org/10.1021/acscatal.0c01517>.
3. L.O. Mark, C. Zhu, J.W. Medlin, H. Heinz\*, “Understanding Surface Reactivity of Ligand-Protected Metal Nanoparticles for Biomass Upgrading”, *ACS Catalysis*, 10 (2020) 5462-5474; <https://doi.org/10.1021/acscatal.9b04772>.
4. J. Zhang, S. Deo, M.J. Janik, J.W. Medlin\*, “Control of molecular bonding strength on metal catalysts with organic monolayers for CO2 reduction”, *J. Am. Chem. Soc*., 142 (2020) 5184-5193; DOI: 10.1021/jacs.9b12980.
5. L.D. Ellis, S. Parker, J. Hu, M. Dzara, H.H. Funke, C. Sievers, S. Pylypenko, J.L. Falconer, J.W. Medlin\*, “Tuning gas adsorption selectivity and diffusion rates in zeolites with phosphonic acid monolayers”, *Cell Rep. Phys. Sci*. 1 (2020) 100036; DOI: 10.1016/j.xcrp.2020.100036.
6. M.J. Rasmussen, J.W. Medlin\*, “Role of tungsten modifiers in bimetallic catalysts for enhanced hydrodeoxygenation activity and selectivity”, *Catal. Sci. Technol*., 10 (2020) 414-423; DOI: 10.1039/C9CY02240F.
7. B. Greydanus, D.K. Schwartz, J.W. Medlin\*, “Controlling Catalyst-Phase Selectivity in Complex Mixtures with Amphiphilic Janus Particles”, *ACS Appl. Mater. Interfaces*, 12 (2020) 2338-2345; DOI: 10.1021/acsami.9b16957.
8. L.O. Mark, N. Agrawal, A. Román, A. Holewinski, M.J. Janik, J.W. Medlin\*, “Insight into the oxidation mechanism of furanic compounds on Pt(111)”, *ACS Catalysis*, 9 (2019) 11360-11370; DOI: 10.1021/acscatal.9b03983.
9. A.H. Jenkins, C.B. Musgrave, J.W. Medlin\*, “Enhancing Au/TiO2 Catalyst Thermostability and Coking Resistance with Alkyl Phosphonic-Acid Self-Assembled Monolayers”, *ACS Applied Materials & Interfaces* 11 (2019) 41289-41296. DOI: 10.1021/acsami.9b13170
10. A.M. Román, J.C. Hasse, J.W. Medlin, A. Holewinski\*, “Elucidating Acidic Electro-Oxidation Pathways of Furfural on Platinum”, *ACS Catalysis*, 9 (2019) 10305-10316, DOI: 10.1021/acscatal.9b02656.
11. J. Ballesteros-Soberanas, L.D. Ellis, J.W. Medlin\*, “Effects of Phosphonic Acid Monolayers on the Dehydration Mechanism of Aliphatic Alcohols on TiO2”, *ACS Catalysis*, 9 (2019) 7808-7816; DOI: 10.1021/acscatal.9b02082.
12. P.D. Coan, M.B. Griffin, P.N. Ciesielski, J.W. Medlin\*, “Phosphonic acid modifiers for enhancing selective hydrodeoxygenation over Pt catalysts: The role of the catalyst support”, *Journal of Catalysis*, 372 (2019) 311-320; DOI: 10.1016/j.jcat.2019.03.011.
13. B. Wang, J. Zhang, J.W. Medlin\*, E. Nikolla\*, “Fabrication of Inverted Pd@TiO2 Nanostructures for Selective Catalysis”, *Industrial & Chemistry Engineering Research*, 58 (2019) 4032-4041. DOI: 10.1021/acs.iecr.8b05896.
14. L.D. Ellis, J. Ballesteros-Soberanas, D.K. Schwartz, J.W. Medlin\*, “Effects of metal oxide surface doping with phosphonic acid monolayers on alcohol dehydration activity and selectivity”, *Applied Catalysis A: General*, 571 (2019) 102-105. DOI: 10.1016/j.apcata.2018.12.009
15. J. Zhang, L.D. Ellis, B. Wang, M.J. Dzara, C. Sievers, S. Pylypenko, E. Nikolla, J.W. Medlin\* “Control of interfacial acid–metal catalysis with organic monolayers”, *Nature Catalysis*, 1 (2018) 148-155; DOI: 10.1038/s41929-017-0019-8.
16. P. Hao, D.K. Schwartz, J.W. Medlin, “Effect of Surface Hydrophobicity of Pd/Al2O3 on Vanillin Hydrodeoxygenation in a Water/Oil System”, *ACS Catalysis*, 8 (2018) 11165-11173.
17. G. Kumar, E. Nikolla, S. Linic, J.W. Medlin, M.J. Janik\*, “Multicomponent Catalysts: Limitations and Prospects”, *ACS Catalysis*, 8 (2018) 3202-3208.
18. J. Zhang, J.W. Medlin\*, “Catalyst design using an inverse strategy: From mechanistic studies on inverted model catalysts to applications of oxide-coated metal nanoparticles”, *Surface Science Reports*, 73 (2018) 117-152.
19. P. Hao, D.K. Schwartz, J.W. Medlin\*, “Phosphonic acid promotion of supported Pd catalysts for low temperature vanillin hydrodeoxygenation in ethanol”, *Applied Catalysis A: General*, 561 (2018) 1-6.
20. L.O. Mark, A.H. Jenkins, H. Heinz, J.W. Medlin\*, “Furfuryl alcohol deoxygenation, decarbonylation, and ring-opening on Pt (111)”, *Surface Science*, 677 (2018), 333-340. DOI: [10.1016/j.susc.2018.07.001](https://doi.org/10.1016/j.susc.2018.07.001).
21. P.D. Coan, L.D. Ellis, M.B. Griffin, D.K. Schwartz, J.W. Medlin\*, “Enhancing Cooperativity in Bifunctional Acid-Pd Catalysts with Carboxylic Acid-Functionalized Organic Monolayers”, *Journal of Physical Chemistry C*, 122 (2018) ﻿6637-6647; DOI: 10.1021/acs.jpcc.7b12442.
22. T. Van Cleve, D. Underhill, M. Veiga Rodrigues, C. Sievers, J.W. Medlin\*, “Enhanced Hydrothermal Stability of γ-Al2O3 Catalyst Supports with Alkyl Phosphonate Coatings”, *Langmuir* 34 (2018) ﻿3619-3625; DOI: 10.1021/acs.langmuir.8b00465.
23. G. Kumar, T. Van Cleve, J. Park, A. van Duin, J.W. Medlin, M.J. Janik\*, “Thermodynamics of Alkanethiol Self-Assembled Monolayer Assembly on Pd Surfaces”, *Langmuir*, 34 (2018) 6346-6357; DOI: 10.1021/acs.langmuir.7b04351.
24. J. Zhang, B. Wang, E. Nikolla\*, J.W. Medlin\*, “Directing Reaction Pathways through Controlled Reactant Binding at Pd–TiO2 Interfaces”, *Angewandte Chemie*, 129 (2017) 6694-6698.
25. L.D. Ellis, R.M. Trottier, C.B. Musgrave, D.K. Schwartz, J.W. Medlin\*, “Controlling the Surface Reactivity of Titania via Electronic Tuning of Self-Assembled Monolayers”, *ACS Catalysis*, 7 (2017) 8351-8357; DOI: 10.1021/acscatal.7b02789.
26. A.M. Robinson, L. Mark, M. Rasmussen, J.E. Hensley, J.W. Medlin\*, “Surface Chemistry of Aromatic Reactants on Pt and Mo-Modified Pt Catalysts”, *J. Phys. Chem. C*, 120 (2016) 26824–26833.
27. P. Hao, S. Pylypenko, D.K. Schwartz, J W. Medlin\*, “Application of thiolate self-assembled monolayers in selective alcohol oxidation for suppression of Pd catalyst deactivation”, *Journal of Catalysis*, 344 (2016) 722–728.
28. M.M. Montemore\*, O. Andreussi, J.W. Medlin\*, “Hydrocarbon adsorption in an aqueous environment: A computational study of alkyls on Cu(111)”, *Journal of Chemical Physics*, 145 (2016) 074702.
29. A.M. Robinson, J. Hensley, J.W. Medlin\*, “Bifunctional catalysts for upgrading of biomass-derived oxygenates: A Review”, *ACS Catalysis* 6 (2016) 5026-5043.
30. G. Kumar, C.-H. Lien, M.J. Janik\*, J.W. Medlin\*, “Catalyst Site Selection via Control over Non-Covalent Interactions in Self-Assembled Monolayers”, *ACS Catal*y*sis* 6 (2016) 5086-5094.
31. C.-H. Lien, J.W. Medlin\*, “Control of Pd catalyst selectivity with mixed thiolate monolayers”, *Journal of Catalysis*, 339 (2016) 38-46.
32. A.M. Robinson, G. Ferguson, J. Gallagher, S. Cheah, G. Beckham, J. Schaidle\*, J. Hensley, J.W. Medlin\*, "Enhanced hydrodeoxygenation of m-cresol over bimetallic Pt-Mo catalysts through oxophilic metal-induced tautomerization pathway", *ACS Catal*. 6 (2016) 4356-4368.
33. L.D. Ellis, S. Pylypenko, S.R. Ayotte, D.K. Schwartz, J.W. Medlin\*, “Trimethylsilyl functionalization of alumina (γ-Al2O3) increases activity for 1, 2-propanediol dehydration”, *Catal. Sci. Technol*. 6 (2016) 5721-5728.
34. S.H. Pang, C.-H. Lien, J.W. Medlin\*, “Control of surface alkyl catalysis with thiolate monolayers”, *Catal. Sci. Technol*. 6 (2016) 2413-2418.
35. S.H. Pang, J.W. Medlin\*, “Controlling Catalytic Selectivity via Adsorbate Surface Orientation: From Furfural Deoxygenation to Olefin Epoxidation", *J. Phys. Chem. Lett.* 6 (2015) 1348-1356.
36. T.D. Gould, A.M. Lubers, A.R. Corpuz, A.W. Weimer, J.L. Falconer, J.W. Medlin\*, “Controlling nanoscale properties of supported platinum catalysts through atomic layer deposition”, *ACS Catalysis*, 5 (2015) 1344-1352.
37. T.D. Gould, M.M. Montemore, A.M. Lubers, A.W. Weimer, J.L. Falconer, J.W. Medlin\*, “Enhanced dry reforming of methane on Ni and NiPt catalysts synthesized by atomic layer deposition”, *Applied Catalysis A: Chemical*, 492 (2015) 107-116.
38. K.R. Kahsar, D.K. Schwartz, J.W. Medlin\*, “Stability of Self-Assembled Monolayer Coated Pt/Al2O3 Catalysts for Liquid Phase Hydrogenation”, *Journal of Molecular Catalysis A: Chemical*, 396 (2015) 188-195.
39. S.H. Pang, N.E. Love, J.W. Medlin\*, “Synergistic Effects of Alloying and Thiolate Modification in Furfural Hydrogenation over Cu-Based Catalysts”, *J. Phys. Chem. Lett*., 5 (2014) 4110-4114.
40. R.M Williams, S.H. Pang, J.W. Medlin\*, “Ring opening and oxidation pathways of furanic oxygenates on oxygen-precovered Pd(111)”, *J. Phys. Chem. C*, 118 (2014) 27933-27943.
41. A.R. Corpuz, S.H. Pang, C.A. Schoenbaum, J.W. Medlin\*, “Hydrogen Exposure Effects on Pt/Al2O3 Catalysts Coated with Thiolate Monolayers”, *Langmuir*, 30 (2014) 14104-14110.
42. C.-H. Lien, J.W. Medlin\*, “Promotion of Activity and Selectivity by Alkanethiol Monolayers for Pd-Catalyzed Benzyl Alcohol Hydrodeoxygenation”, *Journal of Physical Chemistry C*, 118 (2014) 23783-23789.
43. K.R. Kahsar, S. Johnson, D.K. Schwartz, J.W. Medlin\*, “Hydrogenation of cinnamaldehyde over Pd/Al2O3 catalysts modified with thiol monolayers”, *Topics in Catalysis*, 57 (2014) 1505-1511.
44. T. Tauer, R. O’Hayre, J.W. Medlin\*, “An ab initio investigation of proton stability at BaZrO3 interfaces”, *Chemistry of Materials*, 26 (2014) 4915-492.
45. M.M. Montemore, J.W. Medlin\*, “Scaling Relations Between Adsorption Energies for Computational Screening and Design of Catalysts”, *Catalysis Science and Technology*, 4 (2014) 3748-3761.
46. S.H. Pang, C.A. Schoenbaum, D.K. Schwartz, J.W. Medlin\*, “Effects of Thiol Modifiers on the Kinetics of Furfural Hydrogenation over Pd Catalysts”, *ACS Catal.*, 4 (2014) 3123-3131.
47. T.D. Gould, A. Izar, A.W. Weimer, J.L. Falconer, J.W. Medlin\*, “Stabilizing Ni Catalysts by Molecular Layer Deposition for Harsh Dry Reforming Conditions”, *ACS Catalysis*, 4 (2014) 2714-2717.
48. M.M. Montemore, J.W. Medlin\*, “A Unified Picture of Adsorption on Transition Metals Through Different Atoms”, *J. American Chemical Society*, 136 (2014) 9272-9275.
49. C.A. Schoenbaum, D.K. Schwartz\*, J.W. Medlin\*, “Controlling the Surface Environment of Heterogeneous Catalysts Using Self-Assembled Monolayers”, *Accounts of Chemical Research*, 47 (2014) 1438-1445.
50. R.M. Williams, J.W. Medlin\*, “Benzyl alcohol oxidation on Pd(111): aromatic substituent effects on alcohol reactivity”, *Langmuir*, 30 (2014) 4642-4653.
51. M.M Montemore, J.W. Medlin\*, “Predicting Differences Between C-M and O-M Bond Strengths for Adsorption on Transition Metal Surfaces”, *Journal of Physical Chemistry C*, 118 (2014) 2666-2672.
52. K.R. Kahsar, D.K. Schwartz, J.W. Medlin\*, “Control of Metal Catalyst Selectivity through Specific Non-Covalent Molecular Interactions”, *J. Am. Chem. Soc*., 136 (2014) 520-526.
53. R.M. Williams, S.H. Pang, J.W. Medlin\*, “O-H versus C-H Bond Scission Sequence in Ethanol Decomposition on Pd(111)”, *Surface Science* 619 (2014) 114-118.
54. R.M. Williams, J.W. Medlin\*, “The Influence of Oxygen on the Surface Chemistry of 1,2-Propanediol on Pd(111)”, *Surface Science* 619 (2014) 30-38.
55. A.M. Robinson, M.M Montemore, S. Tenney, P. Sutter, J. W. Medlin\*, “Interactions of hydrogen, CO, oxygen, and water with Mo-modified Pt(111)”, *J. Phys. Chem. C* 117 (2013) 26716-26724.
56. M.M. Montemore, J.W. Medlin\*, “Site-Specific Scaling Relations for Hydrocarbon Adsorption on Transition Metal Surfaces”, *J. Phys. Chem. C* 117 (2013) 20078-20088.
57. M.B. Griffin, A.A. Rodriguez, M.M. Montemore, J.R. Monnier, C.T. Williams, J.W. Medlin\*, “The selective oxidation of ethylene glycol and 1,2-propanediol on Au, Pd, and Au-Pd bimetallic catalysts”, *Journal of Catalysis* 307 (2013) 111-120.
58. S.H. Pang, C.A. Schoenbaum, D.K. Schwartz, J.W. Medlin\*, “Directing Reaction Pathways by Catalyst Active-Site Selection using Self-Assembled Monolayers”, *Nature Communications* 4 (2013) 2448.
59. K.R. Kahsar, D.K. Schwartz, J.W. Medlin\*, “Selective Hydrogenation of Polyunsaturated Fatty Acids Using Alkanethiol Self-Assembled Monolayer-Coated Pd/Al2O3 Catalysts”, *ACS Catalysis* 3 (2013) 2041.
60. C.A. Schoenbaum, D.K. Schwartz, J.W. Medlin\*, “Controlling surface crowding on a Pd catalyst with self-assembled monolayers”, *Journal of Catalysis*, 303 (2013) 92-99.
61. T.D. Gould, A.M. Lubers, B.T. Neltner, J.V. Carrier, A.W. Weimer, J.L. Falconer, J.W. Medlin\*, “Synthesis of supported Ni catalysts by atomic layer deposition”, *J. Catal*., 303 (2013) 9-15.
62. M.M. Montemore, J.W. Medlin\*, “A Simple, Accurate Model for Alkyl Adsorption on Transition Metals”, *J. Phys. Chem. C*., 117 (2013) 2835-2843.
63. T. Tauer, R. O’Hayre, J.W. Medlin\*, “Computational investigation of defect segregation at the (001) surface of BaCeO3 and BaZrO3: The role of metal-oxygen bond strength in controlling vacancy segregation”, *J. Mater. Chem. A*, 1 (2013) 2840-2846.
64. K.R. Kahsar, D.K. Schwartz, J.W. Medlin\*, “Liquid- and Vapor-Phase Hydrogenation of 1-Epoxy-3-butene Using Self-Assembled Monolayer Coated Palladium and Platinum Catalysts”, *Applied Catalysis A: Chemical*, 445-446 (2012) 102-106.
65. M. Makosch, V. Bumbálek, J. Sá, W.-I. Lin, M. Rovezzi, J.W. Medlin, K. Hungerbühler, J.A. van Bokhoven\*, “Organic thiol modified Pt/TiO2 catalysts to control chemoselective hydrogenation of substituted nitroarenes”, *ACS Catalysis* 2 (2012) 2079-2081.
66. S.H. Pang, A.M. Roman, J.W. Medlin\*, “Adsorption Orientation Induced Selectivity Control

of Reactions of Benzyl Alcohol on Pd(111)”, *J. Phys. Chem. C*, 116 (2012) 4201-4208.

1. M.M. Montemore, J.W. Medlin\*, "A Density Functional Study of C1-C4 Alkyl Adsorption on Cu(111)", *Journal of Chemical Physics*, 136 (2012) 204710 (9 pages).
2. M. Rangan, M.M. Yung, J.W. Medlin\*, “Characterization of Ni-W/Al2O3 catalysts for ethylene reforming in the presence of sulfur”, *Catalysis Letters*, 142 (2012) 718-727.
3. M.B. Griffin, S.H. Pang, J.W. Medlin\*, “The Surface Chemistry of 2-Iodoethanol on Pd(111): Orientation of Surface-bound Alcohol Controls Selectivity”, *Journal of Physical Chemistry C* 116 (2012) 4201-4208.
4. T. Tauer, R. O’Hayre, J.W. Medlin\*, “A theoretical study of the influence of dopant concentration on the hydration properties of yttrium-doped barium cerate”, *Solid State Ionics*, 204-206 (2011) 27-34.
5. J.W. Medlin\*, “Understanding and controlling reactivity of unsaturated oxygenates and polyols on metal catalysts”, *ACS Catalysis*, 1 (2011) 1284-1297.
6. S.T. Marshall, J.W. Medlin\*, “Surface-level mechanistic studies of adsorbate–adsorbate interactions in heterogeneous catalysis by metals”, *Surface Science Rep.*, 66 (2011) 173-184.
7. S.H. Pang, J.W. Medlin\*, "Adsorption and Reaction of Furfural and Furfuryl Alcohol on Pd(111): Unique Reaction Pathways for Multifunctional Reagents", *ACS Catalysis,* 1 (2011) 1272-1283.
8. M. Rangan, M.M. Yung, J.W. Medlin\*, “Experimental and computational investigations of sulfur-resistant bimetallic catalysts for reforming of biomass tar components”, *Journal of Catalysis*, 282 (2011) 249-257.
9. S.T. Marshall, D.K. Schwartz, J.W. Medlin\*, “Adsorption of Oxygenates on Alkanethiol-Functionalized Pd(111) Surfaces: Mechanistic Insights into the Role of Self-Assembled Monolayers on Catalysis”, *Langmuir*, 27 (2011) 6731-6737.
10. K.L. Miller, E. Morrison, S.T. Marshall, J.W. Medlin\*, “Experimental and modeling studies of acetylene detection in hydrogen/acetylene mixtures on PdM bimetallic metal–insulator–semiconductor devices”, *Sensors and Actuators B*, 156 (2011) 924-931.
11. K.L. Miller, J.L. Falconer, J.W. Medlin\*, “Effect of water on the adsorbed structure of formic acid on TiO2 anatase (101)”, *Journal of Catalysis*, 278 (2011) 321-328.
12. K.L. Miller, C.B. Musgrave, J.L. Falconer, J.W. Medlin\*, “Effects of Water and Formic Acid Adsorption on the Electronic Structure of Anatase TiO2(101)”, *Journal of Physical Chemistry C*, 115 (2011) 2738-2749.
13. S.T. Marshall, M. O’Brien, B. Oetter, A. Corpuz, R.M. Richards, D.K. Schwartz, J.W. Medlin\*, “Controlled selectivity for palladium catalysts using self-assembled monolayers”, *Nature Materials*, 9 (2010) 853-858.
14. K.L. Miller, C.W. Lee, J.L. Falconer, J.W. Medlin\*, “Effect of Water on Formic Acid Photocatalytic Decomposition on TiO2 and Pt/TiO2”, *J. Catal.*, 275 (2010) 294-299.
15. C.M. Horiuchi, J.W. Medlin\*, “Adsorption and Reactivity of 2,3-Dihydrofuran and 2,5-Dihydrofuran on Pd(111): Influence of the C═C Position on the Reactivity of Cyclic Ethers”, *Langmuir*, 26 (2010) 13320–13332.
16. M.B. Griffin, E.L. Jorgensen, J.W. Medlin\*, “The adsorption and reaction of ethylene glycol and 1,2-propanediol on Pd(111): A TPD and HREELS study”, *Surface Science*, 604 (2010) 1558-1564.
17. J.W. Medlin\*, C.M. Horiuchi, M. Rangan, “Effects of ring structure on the reaction pathways of cyclic esters and ethers on Pd(111)”, *Topics in Catalysis*, 53 (2010) 1179-1184.
18. C.M. Horiuchi, J.W. Medlin\*, “Adsorption and decomposition of gamma-butyrolactone on Pd(111) and Pt(111)”, *Surface Science*, 604 (2010) 98-105.
19. C.M. Horiuchi, M. Rangan, B. Israel, J.W. Medlin\*, “Adsorption and ring-opening of 2,5(H)-furanone on the (111) surfaces of Pd and Pt: Implication for selectivity in reactions of unsaturated cyclic oxygenates”, *Journal of Physical Chemistry C*, 113 (2009) 14900-14907.
20. M.T. Schaal, M.P. Hyman, M. Rangan, S. Ma, C.T. Williams, J.R. Monnier, and J.W. Medlin\*, “Theoretical and experimental studies of Ag-Pt Interactions for supported Ag-Pt bimetallic catalysts”, *Surface Science* 603 (2009) 690-696.
21. 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* 136(2009) 315-319.
22. S.T. Marshall, C.M. Horiuchi, W. Zhang, J.W. Medlin\*, “Common Decomposition Pathways for 1-Epoxy-3-butene and 2-Butenal on Pd(111)”, *Journal of Physical Chemistry C* 112 (2008) 20406-20412.
23. D.C. Kershner, W. Zhang, J.W. Medlin\*, “Investigation of submonolayer SiOX species formed from oxidation of silane on Pt(111)”, *Surface Science* 602 (2008) 3225-3231.
24. D.C. Kershner, M.P. Hyman, J.W. Medlin\*, “DFT study of the oxidation of silicon on Pd(111) and Pt(111)”, *Surface Science* 602 (2008) 3603-3610.
25. 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* 92 (2008) art. no. 153503.
26. A.S. Loh, S.W. Davis, 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* 130 (2008) 5507-5514.
27. D.C. Kershner, J.W. Medlin\*, “Adsorption and Decomposition of Silane on Pd(111)”, *Surface Science* 602 (2008) 693-701.
28. D.C. Kershner, J.W. Medlin\*, “Adsorption and Reaction of Silane and Oxygen on Pd(111)”, *Surface Science* 602 (2008) 786-794.
29. 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.
30. M.P. Hyman, B.T. Loveless, J.W. Medlin\*, “A Density Functional Theory Study of H2S Decomposition on the (111) Surfaces of Model Pd-alloys”, *Surf. Sci.* 601 (2007) 5383-5394.
31. 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.
32. 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.
33. 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*.*
34. 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.
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38. 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.
39. 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.
40. 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.
41. 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.
42. 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.
43. 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.
44. 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.
45. A.B. Sherrill, J.W. Medlin, J.G. Chen, M.A. Barteau\*, “NEXAFS investigations of cyclooctatetraene on TiO2(001)”, *Surface Science*, 492 (2001) 203-213.
46. 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.
47. 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.
48. 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.
49. 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.
50. 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.

**PEER-REVIEWED BOOK CHAPTERS**

1. J.W. Medlin\*, “Surface science studies relevant for metal-catalyzed biorefining reactions”, in *Chemical and Biochemical Catalysis for Next Generation Biofuels*, edited by Blake A. Simmons (2011), Royal Society of Chemistry.
2. M.P. Hyman and J.W. Medlin\*, “Mechanistic Studies of Electrocatalytic Reactions”, in *Catalysis* (volume 20) pp. 309-337, edited by J.J. Spivey, K.M. Dooley. RSC (2007).
3. J.W. Medlin\*, “Metal-Insulator-Semiconductor Gas Sensors”, in *Encyclopedia of Sensors*, edited by C.A. Grimes, E.C. Dickey, M.V. Pishko. American Scientific Publishers (2005).

**PEER-REVIEWED EDUCATION ARTICLES**

1. J.L. Falconer\*, J. DeGrazia, J.W. Medlin, K. McDanel, “Learnchem.com: Teaching/learning resources for chemical engineering”, *Chemical Engineering Education*, 52 (2018) 176-180.
2. J.L. Falconer\*, J. Will Medlin, G. Nicodemus, K. Hoeferkamp, J. deGrazia, “A Thermodynamics Course Package in OneNote”, *Chemical Engineering Education* 48 (2014) 209-214.
3. “Chemical Engineering Screencasts”, J.L. Falconer\*, J. deGrazia, J.W. Medlin, M.P. Holmberg, *Chemical Engineering Education* 46 (2012) 58-62.
4. “Using Screencasts in Chemical Engineering Courses”, J.L. Falconer\*, J. deGrazia, J.W. Medlin, M.P. Holmberg, *Chemical Engineering Education* 43 (2009) 296-289.

**NEWS AND VIEWS ARTICLE** (Not peer-reviewed)

1. J.W. Medlin\*, M.M. Montemore, “Heterogeneous catalysis: Scaling the rough heights”, *Nature Chemistry*, 7 (2015) 378-380.

**INVITED RESEARCH SEMINARS SINCE 2012:**

1. Rice University, Chemical and Biomolecular Engineering, March 2019
2. Oklahoma State University, Chemical Engineering, February 2019
3. University of Delaware, Chemical Engineering, December 2018
4. Virginia Tech, Chemistry Department, September 2018
5. Ohio State University, Chemical and Biomolecular Engineering, September 2018
6. University of Pittsburgh, Chemical and Petroleum Engineering, September 2018
7. ETH-Zurich, Chemical and Biochemical Engineering, May 2018
8. Technical University of Munich, Institute for Advanced Study, November 2017
9. Technical University of Denmark, Chemistry Department, October 2017
10. Chalmers University of Technology, Competence Centre for Catalysis, September 2017
11. Missouri University of Science and Technology, Dept. of Chemical Engineering, April 2016
12. ExxonMobil Research and Engineering Company, Clinton, NJ, Sept. 2015
13. University of Pennsylvania, Dept. of Chem./Bio. Engineering, Sept. 2015
14. University of Amsterdam, Institute for Molecular Sciences, May 2015
15. Leiden University, Institute of Chemistry, May 2015
16. Michigan State University, Dept. of Chemical and Materials Engr., Feb. 2015
17. Michigan Catalysis Society, Feb. 2015
18. Wayne State University, Nanoscience Initiative, Feb. 2015
19. Georgia Institute of Technology, Dept. of Chemical and Biomol. Engr., Oct. 2014
20. University of California – Riverside, Dept. of Chem. and Environ. Engr., May 2014
21. University of Illinois – Chicago, Dept. of Chemical Engineering, December 2013
22. Chicago Catalysis Club, December 2013
23. Brookhaven National Laboratory, July 2013
24. University of Wyoming, Dept. of Chemical Engineering, January 2013
25. Notre Dame University, Dept. of Chemical Engineering, November 2012
26. University of South Carolina, September 2012
27. National Renewable Energy Laboratory, September 2012
28. Pennsylvania State University, Dept. of Chemical Engineering, September 2012
29. Pacific Northwest National Laboratories, May 2012

**INVITED/KEYNOTE CONFERENCE PRESENTATIONS (SINCE 2013 ONLY)**

1. “Controlled Bifunctional Catalysis via Organic Modification of Oxide-Supported Metals”, 26th North American Catalysis Society Meeting, Chicago, June 2019.
2. “Toward Surface Science-Informed Design of Bifunctional Deoxygenation Catalysts”. American Vacuum Society National Meeting, Long Beach, CA, October 2018.
3. “Opportunities and limitations for surface science-informed design of deoxygenation catalysts”, ACS National Fall Meeting, Boston, Fall 2018
4. “Controlling selectivity on metal nanoparticles with organic monolayers”, ACS National Fall Meeting, Boston, Fall 2018
5. “Tuning the activity and selectivity of metal oxide catalysts with organic monolayers”, ACS National Meeting; San Francisco, April 2017
6. “Control of catalyst performance using nanometer-scale thin films”, ACS National Meeting; Boston, August 2015.
7. “Understanding and controlling reactivity in heterogeneous catalysis of oxygenates”, Surface Analysis Conference; Golden, CO, June 2015.
8. “Understanding and controlling selectivity in heterogeneous catalysis of oxygenates”, ACS National Meeting; Denver, March 2015.
9. “Controlling selectivity in heterogeneous catalysis by surface and near surface design”, ACS National Meeting, San Francisco; August 2014.
10. “Design of active sites for selective reaction of highly functional oxygenates”, ACS National Meeting, Indianapolis; September 2013.
11. “Surface-level studies of photocatalytic and electrocatalytic reactions”, Israel Science Foundation Workshop on Liquid Fuels from Renewable Resources, February 2013.
12. “Adsorption and Reaction of Aromatic Oxygenates on Pd Surfaces and Catalysts”, ACS National Meeting, New Orleans; April 2013.

**COURSES TAUGHT:**

CHEN 2120: Material and Energy Balances, Spring 2009

CHEN 3320: Chemical engineering thermodynamics (undergraduate), Fall 2004, 2008-09, 2011

CHEN 3660: Energy fundamentals, Spring 2019

CHEN 4330: Chemical Eng. reaction kinetics (undergraduate), Spring 2003-08, Spring 2013-14

CHEN 5360: Catalysis and kinetics (graduate), Fall 2005, Fall 2007, Spring 2016

CHEN 5390: Chemical reaction engineering (graduate), Fall 2009, 2011, 2014, 2018

CHEN 5333: Research methods (graduate), Fall 2005 (with co-instructor Ryan Gill)

ENEN 4321: Oil and gas processing, Spring 2016

**CENTER DIRECTORSHIP**

Colorado Center for Biorefining and Biofuels (C2B2)

Co-founder and CU Site Director, 2006-2017

*Center was initiated by Ryan T. Gill and JWM, who recruited Al Weimer as Executive Director. Gill, Weimer, and JWM were 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.*

**EDUCATION OUTREACH**

* Co-investigator on multiple grants to prepare screencasts on chemical engineering topics from 2009-present. Screencasts have been downloaded approximately 10 million times to date. See: <http://learncheme.com>
* Co-investigator on grant to provide easy-to-use active learning materials (course packages) for chemical engineering courses. A complete thermodynamics course was released in 2013 and utilized by dozens of faculty at other institutions.
* Presenter at 2012 Chemical Engineering Summer School at the University of Maine; the use of screencasts and course packages were discussed in a workshop that received the 2nd-highest ratings of the summer school.
* Co-instructor, annual Teaching Workshop for new Engineering faculty, 2008-11

**PROFESSIONAL ACTIVITIES**

1. Associate Editor for Royal Society of Chemistry journal *Catalysis Science and Technology*, 2016-present.
2. President/ President-Elect/ Past President, Organic Reactions Catalysis Society, 2013-2018
3. Technical Program Chair, 25th North American Catalysis Society Meeting, Denver (2017): responsible for organizing program containing >1200 abstracts.
4. Technical Program Co-Chair, 17th International Congress in Catalysis, San Diego (2020): responsible for programming for a meeting expected to draw approximately 1500 abstracts.
5. President, Rocky Mountain Division of the North American Catalysis Society, 2005-09
6. National Representative for the Rocky Mountain Division of NACS, 2009-15
7. Editorial Advisory Board for the journal *ACS Catalysis* (2016)
8. Organizing Committee Member, 2008 ACS/RSC/GDCh Frontiers of Chemistry Symposium, Cranage, UK
9. Member of Organizing Committee and Program Chair for Surface Science, 2006 ACS Conference for Colloids and Surface Science (June 2006; Boulder, CO)
10. Chair/Vice-chair, Catalysis and Reaction Eng. Topical at AIChE Annual Meeting, 2005-2007
11. Panelist for NSF Graduate Research Fellowship Program, 2007-2008, 2013
12. Panelist for NSF Proposal Reviews (served on 11 panels)
13. National meeting session chair or co-chair for total of 23 sessions at national meetings such as NACS, ORCS, AIChE, ACS.
14. Reviewer: NSF, ACS Petroleum Research Fund, Dept. of Energy, US-Israel Binational Science Foundation, Swiss National Science Foundation, ACS Catalysis, Nature Chemistry, Nature Materials, Nature Communications, Journal of the American Chemical Society, Journal of Physical Chemistry, Journal of Catalysis, >25 other scientific journals.

**INTERNAL LEADERSHIP ACTIVITIES**

1. Associate Department Chair, 2012-2016
2. Leader, task force for creation of Energy Engineering Minor in College of Engineering and Applied Science, 2013-2014
3. Chair of graduate recruiting, 2006-09
4. Co-director, GAANN graduate training programs in Chemical and Biological Sensors, Renewable and Sustainable Energy, Catalysis and Biocatalyis (2005-present)
5. Faculty search committee chair or co-chair, 2011-2019

**ADVISEES (current affiliation indicated parenthetically for graduates):**

*PhD Students*: Matt Hyman (Ph.D. 2007, now at Intel), Dylan Kershner (Ph.D. 2008, US Patent Office), Clay Horiuchi (Ph.D. 2010, Perfect Day Foods), Steve Marshall (Ph.D. 2010, Phillips66), Kristi Miller (Ph.D. 2010, Colorado Mountain College), Meghana Rangan (Ph.D. 2011, Intel), Mike Griffin (Ph.D. 2013, NREL), Tania Tauer (Ph.D. 2013, Boston Museum of Science / MIT), Troy Gould (Ph.D. 2014, BASF), Simon Pang (Ph.D. 2014, Lawrence Livermore National Laboratory), Rhea Williams (Ph.D. 2014, ACS Publications), Matt Montemore (Ph.D. 2014, Tulane Univ.), Carolyn Schoenbaum (Ph.D. 2014, University of Colorado-instructor), Rudy Kahsar (Ph.D. 2014, University of Colorado-ENVS), Ally Robinson (Ph.D. 2016, TDA Research), Chih-Heng Lien (Ph.D. 2017, Globalfoundries), Lucas Ellis (Ph.D. 2018, NREL), Pengxiao Hao (Ph.D. 2018, Northwestern University), Current: Patrick Coan, Alex Román, Lesli Mark, Ashutosh Mishra, Alex Jenkins, Mathew Rasmussen, Faysal Kalaifi, Benjamin Greydanus, Jordi Ballesteros, Jake Kenny.

*Postdoctoral Researchers*: Dongmei Li (Univ. of Wyoming), Esther Wilcox (NREL), Brian Hassler (Elevance Renewable Sciences), April Corpuz (FuelCell Energy), Jing Zhang (current), Tim Van Cleve (National Renewable Energy Laboratory).

*More than 75 undergraduate and masters advisees* have worked in the laboratory.