

J. Will Medlin

Denver Business Challenge Endowed Professor and Department Chair

Department of Chemical & Biological Engineering

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Date of Birth: July 3, 1973; Place of Birth: Houston, Texas, USA

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

Department Chair, 2020-present

Instituto de Tecnología Química, Valencia, Spain

Visiting Professor, 2025

University of Twente, Enschede, Netherlands

Visiting Professor, 2025

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:

- Fellow of the Royal Society of Chemistry, 2021
- Dept. of Chemical and Biological Eng. Graduate Teaching Award, 2020 and 2012
- 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
- 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

SELECTED INDEPENDENT REFEREED RESEARCH ARTICLES

Google Scholar: <https://scholar.google.com/citations?user=CGtmFscAAAAJ&hl=en>

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165 Peer-review articles; full list below.

Corresponding author denoted with *. Medlin advisees denoted with ‡.

1. Y. Xu[‡], H. Pham, A.K. Datye, A. Holewinski*, J.W. Medlin*, “Using Pore Window Size to Control Selectivity for Acetylene Hydrogenation on Pd@ LTA Zeolite Catalysts”, *ACS Catalysis* 15 (2025) 12816-12821; <https://doi.org/10.1021/acscatal.5c02994>
2. Z.W. Meduna[‡], D.K. Schwartz, J.W. Medlin*, “Support modification by phosphonic acid ligands controls ethylene hydroformylation on single-atom rhodium sites”, *Catal. Sci. Technol.*, (2025) (online advance article); <https://pubs.rsc.org/en/content/articlelanding/2025/cy/d5cy00684h>
3. A. Mishra[‡], A.M. Robinson, C.L. Perkins, E.M. Karp*, J.W. Medlin*, “Electronic and reactivity changes in epitaxially grown Ce_{1-x}Zr_xO_{2-δ} (111) thin films, *Surface Science* 757, (2025) 122739; <https://doi.org/10.1016/j.susc.2025.122739>
4. L.I. Paz Herrera[‡], R. Cortright, J.W. Medlin*, “Effects of water vapor on the reactivity of aluminosilicates in vapor-phase propanal aldol condensation”, *Journal of Catalysis* 447 (2025) 116110; <https://doi.org/10.1016/j.jcat.2025.116110>
5. B.E. Oliphant[‡], L.I. Paz Herrera[‡], J.W. Medlin*, “Improving the Selectivity of Aldehyde–Ketone Cross-Aldol Condensation Reactions with Phosphate-Modified TiO₂ Catalysts”, *ACS Catalysis* 15 (2025) 6990-7002; <https://doi.org/10.1021/acscatal.4c07836>
6. X. Zhao[‡], J.L. Falconer, J.W. Medlin*, “Organic-coated zeolites for selective gas adsorption: Effect of functional group Identity and coating density”, *Separation and Purification Technology*, 363 (2025) 132040; <https://doi.org/10.1016/j.seppur.2025.132040>
7. W. Ou, R. He, R. Arstingstall, S.D. Marks, B.E. Oliphant[‡], H. Luo, M. Zhou, J.W. Medlin, R.C. Tenent, M.F. Toney*, “LiNi_{0.8}Mn_{0.1}Co_{0.1}O₂ Thin Films Prepared by Polymer-Assisted Deposition for the Study of Cathode–Electrolyte Interphases in Lithium-Ion Batteries”, *ACS Applied Energy Materials*, 8 (2025) 11561-11569; <https://doi.org/10.1021/acsaem.5c01685>
8. T.B. Alina, S.A. Saemundsson, L.E. Mortensen, Y. Xu[‡], J.W. Medlin, J.N. Cha*, A.P. Goodwin*, “Impact of surface chemistry and particle size on inertial cavitation driven transport of silica nanoparticles and microparticles”, *Adv. Fun. Mater.* 35 (2025) 2412344; <https://doi.org/10.1002/adfm.202412344>
9. X. Zhao[‡], J.L. Falconer, J.W. Medlin*, “Competitive adsorption between propylene and propane on zeolite 5A and the influence of organic phosphonic acid coatings”, *Separation and Purification Technology*, 346 (2024) 127435; <https://doi.org/10.1016/j.seppur.2024.127435>
10. Z. Dong, E.E. Dunphy[‡], A.B. Wegner, J.W. Medlin, M.F. Toney, K.G. Sprenger* “An in Silico Investigation into Polyester Adsorption onto Alumina toward an Improved Understanding of Hydrogenolysis Catalysts”, *Langmuir*, 40 (2024) 27416, <https://doi.org/10.1021/acs.langmuir.4c03679>

11. B. Oliphant[‡], M. Rasmussen[‡], L. Paz Herrera[‡], M.B. Griffin, J.W. Medlin*, “Aldol Condensation of Mixed Oxygenates on TiO₂”, *Catal. Sci. Technol.* 14 (2024) 1911; <https://doi.org/10.1039/D3CY01798B>.
12. Z. Blanchette[‡], X. Zhao[‡], D.K. Schwartz, J.W. Medlin*, “Using Phosphonic Acid Monolayers to Control CO₂ Adsorption and Hydrogenation on Pt/Al₂O₃”, *ChemCatChem* 16 (2024) e202400451; <https://doi.org/10.1002/cctc.202400451>
13. E.A. Baghdady[‡], J.W. Medlin*, D.K. Schwartz*, “Enhancing the Self-Propelled Motion of Hydrogen Peroxide Fueled Active Particles with Formic Acid and Other Oxygen Scavengers”, *Langmuir* 40 (2024) 21097; <https://doi.org/10.1021/acs.langmuir.4c02482>
14. N.C. Ramos[‡], J.W. Medlin, A. Holewinski*, “Anodic Hydrogen Generation from Benzaldehyde on Au, Ag, and Cu: Rotating Ring-Disk Electrode Studies”, *J. Electrochem. Soc.* 171 (2024) 126507; <https://doi.org/10.1149/1945-7111/ada065>
15. J.K. Kenny[‡], S.R. Neefe, D.G. Brandner, M.L. Stone, R.M. Happs, I. Kumaniaev, W.P. Mounfield, A.E. Harman-Ware, K.M. Devos, T.H. Pendergrast, J.W. Medlin, Y. Román-Leshkov*, G.T. Beckham*, “Design and Validation of a High-Throughput Reductive Catalytic Fractionation Method”, *JACS Au* 4 (2024) 2173; <https://doi.org/10.1021/jacsau.4c00126>
16. A.H. Jenkins[‡], E.E. Dunphy[‡], M.F. Toney, C.B. Musgrave, J.W. Medlin*, “Tailoring the Near-Surface Environment of Rh Single-Atom Catalysts for Selective CO₂ Hydrogenation”, *ACS Catal.* 13 (2023) 15340-15350; <https://doi.org/10.1021/acscatal.3c03768>
17. Z. Blanchette[‡], D.K. Schwartz, J.W. Medlin*, “Directing Reaction Pathways on Supported Metal Catalysts with Low-Density Self-Assembled Monolayers”, *ACS Appl. Nano Mater.* 6 (2023) 9059-9069; <https://doi.org/10.1021/acsanm.3c01836>
18. F.W.S. Lucas, N.C. Ramos[‡], D.K. Schwartz, J.W. Medlin, A. Holewinski*, “Understanding reactivity of self-assembled monolayer-coated electrodes: SAM-induced surface reconstruction”, *Electrochim. Acta* 459 (2023) 142586; <https://doi.org/10.1016/j.electacta.2023.142586>
19. F.M. Al Khulaifi[‡], Y.A. Alsunni, C.B. Musgrave, A. Holewinski*, J.W. Medlin*, “Impact of pretreatment and thiol modifiers on the partial oxidation of glutaraldehyde using Pd/Al₂O₃”, *Appl. Catal. A: Gen.* 661 (2023) 119229; <https://doi.org/10.1016/j.apcata.2023.119229>
20. N.C. Ramos[‡], J.W. Medlin*, A. Holewinski*, “Electrochemical Stability of Thiolate Self-Assembled Monolayers on Au, Pt, and Cu”, *ACS Appl. Mater. Interfaces* 15 (2023) 14470–14480; <https://doi.org/10.1021/acsam.3c01224>
21. J.K. Kenny[‡], J.W. Medlin, G.T. Beckham*, “Quantification of Phenolic Hydroxyl Groups in Lignin via ¹⁹F NMR Spectroscopy”, *ACS Sustainable Chem. Eng.* 11 (2023) 5644-5655; <https://doi.org/10.1021/acssuschemeng.3c00115>
22. B. Greydanus[‡], J.W. Medlin*, D.K. Schwartz*, “Elucidating the Influence of Metal Surface Composition on Organic Adsorbate Binding Using Active Particle Dynamics”, *Journal of Physical Chemistry C*, 127 (2023) 1006-1014; <https://doi.org/10.1021/acs.jpcc.2c05907>.
23. D.R. Clark*, D.R. Diercks, S. Ricote, T.T. Dearden[‡], N.P. Sullivan, J.W. Medlin, B.P. Gorman, R.P. O’Hayre*, “Understanding the effects of fabrication process on BaZr_{0.9}Y_{0.1}O_{3-δ} grain-boundary chemistry using atom probe tomography”, *J. Mater. Chem. C* 15 (2023) 5082-5091; <https://doi.org/10.1039/D2TC04093J>
24. L. Chen, P. Moura[‡], J.W. Medlin, H. Grönbeck*, “Multiple Roles of Alkanethiolate-Ligands in Direct Formation of H₂O₂ over Pd Nanoparticles”, *Angewandte Chemie* 61 (2022) e202213113; <https://doi.org/10.1002/ange.202213113>

25. J.K. Kenny[‡], D.G. Brandner, S.R. Neefe, W.E. Michener, Y. Román-Leshkov, G.T. Beckham*, J.W. Medlin*, “Catalyst choice impacts aromatic monomer yields and selectivity in hydrogen-free reductive catalytic fractionation”, *Reaction Chemistry & Engineering* 7 (2022) 2527-2533; <https://doi.org/10.1039/D2RE00275B>
26. Z. Blanchette[‡], J. Zhang[‡], S. Yazdi, M.B. Griffin, D.K. Schwartz, J.W. Medlin*, “Investigating deposition sequence during synthesis of Pd/Al₂O₃ catalysts modified with organic monolayers”, *Catalysis Science & Technology* 12 (2022) 2306-2314; <https://doi.org/10.1039/D1CY02131A>
27. E. Baghdady[‡], D.K. Schwartz, J.W. Medlin*, “Effects of Surface Hydrophobicity on Catalytic Transfer Hydrogenation of Styrene with Formic Acid in a Biphasic Mixture”, *ACS Applied Materials and Interfaces* 14 (2022) 33457; <https://doi.org/10.1021/acsami.2c11732>
28. X. Zhou[‡], J.L. Falconer, J.W. Medlin*, “Mechanism of selectivity control for zeolites modified with organic monolayers”, *Microporous and Mesoporous Materials* 337 (2022) 111913; <https://doi.org/10.1016/j.micromeso.2022.111913>
29. M.J. Rasmussen[‡], S. Najmi, G. Innocenti, A.J. Medford*, C. Sievers*, J.W. Medlin*, “Supported molybdenum oxides for the aldol condensation reaction of acetaldehyde”, *Journal of Catalysis* 408 (2022) 216-226; <https://doi.org/10.1016/j.jcat.2022.03.002>
30. L.I. Paz Herrera[‡], L. Freitas de Lima e Freitas, J. Hong, A.S. Hoffman, S.R. Bare, E. Nikolla*, J.W. Medlin*, “Reactivity of Pd-MO₂ encapsulated catalytic systems for CO oxidation”, *Catalysis Science and Technology*, 12 (2022) 1476-1486; <https://doi.org/10.1039/D1CY01916C>
31. B. Greydanus[‡], M. Saleheen, H. Wu, A. Heyden, J.W. Medlin, D.K. Schwartz*, “Probing surface-adsorbate interactions through active particle dynamics”, *Journal of Colloid and Interface Science* 614 (2022) 425-435; <https://doi.org/10.1016/j.jcis.2022.01.053>
32. A.H. Jenkins[‡], C.B. Musgrave*, and J.W. Medlin*, “Altering Linear Scaling Relationships on Metal Catalysts via Ligand–Adsorbate Hydrogen Bonding”, *Journal of Physical Chemistry C*, 125 (2021) 23791-23802; <https://doi.org/10.1021/acs.jpcc.1c07550>
33. A.H. Jenkins[‡], J.W. Medlin*, “Controlling Heterogeneous Catalysis with Organic Monolayers on Metal Oxides”, *Accounts of Chemical Research*, 54 (2021) 4080-4090; <https://doi.org/10.1021/acs.accounts.1c00469>
34. P. Ranadive, Z. Blanchette[‡], A.P. Spanos, J.W. Medlin, N. Brunelli*, “Scalable Synthesis of Selective Hydrodeoxygenation Inverted Pd@TiO₂ Nanocatalysts”, *Journal of Flow Chemistry* 11 (2021) 393-406; <https://doi.org/10.1007/s41981-021-00171-4>
35. J. Zhang[‡], C. Asokan, G. Zakem, P. Christopher*, J.W. Medlin*, “Enhancing Sintering Resistance of Atomically Dispersed Catalysts in Reducing Environments with Organic Monolayers”, *Green Energy & Environment*, in press (2021); <https://doi.org/10.1016/j.gee.2021.01.022>
36. P.D. Coan[‡], C.A. Farberow, M.B. Griffin, J.W. Medlin*, “Organic Modifiers Promote Furfuryl Alcohol Ring Hydrogenation via Surface Hydrogen-Bonding Interactions”, *ACS Catalysis* 11 (2021) 3730-3739; <https://doi.org/10.1021/acscatal.0c04138>
37. L. Chen, J.W. Medlin, H. Grönbeck*, “On the Reaction Mechanism of Direct H₂O₂ Formation over Pd Catalysts”, *ACS Catalysis* 11 (2021) 2735-2745; <https://doi.org/10.1021/acscatal.0c05548>
38. L.O. Mark[‡], W. Chen, C.N. Eads, D. Lu, J.A. Boscoboinik, D. Stacchiola, J.W. Medlin*, S.A. Tenney*, “Confinement Effects on Furfuryl Alcohol Reactions over Porous Bilayer Silica-Modified Pd(111)”, *Journal of Physical Chemistry C*, 124 (2020) 25437-25446; <https://doi.org/10.1021/acs.jpcc.0c09095>

39. T.K. Slot, N. Riley, N.R. Shiju, J.W. Medlin, G. Rothenburg*, “An experimental approach for controlling confinement effects at catalyst interfaces”, *Chemical Science*, 11 (2020) 11024-11029.
40. A.M. Román[‡], N. Agrawal, J.C. Hasse, M.J. Janik, J.W. Medlin, A. Holewinski*, “Electro-oxidation of furfural on gold is limited by furoate self-assembly”, *Journal of Catalysis*, 391 (2020) 327-335; <https://doi.org/10.1016/j.jcat.2020.08.034>
41. A.M. Román[‡], T.D. Spivey, J.W. Medlin, A. Holewinski*, “Accelerating Electro-oxidation Turnover Rates via Potential-Modulated Stimulation of Electrocatalytic Activity”, *Industrial Chemistry & Engineering Research*, 59 (2020) 19999-20010; <https://doi.org/10.1021/acs.iecr.0c04414>
42. 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>.
43. 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>.
44. 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>.
45. 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.
46. 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.
47. 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.
48. 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.
49. 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.
50. 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
51. 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.
52. J. Sá, J.W. Medlin, “On-the-fly Catalyst Modification: Strategy to Improve Catalytic Process Selectivity and Understanding”, *ChemCatChem*, 11 (2019) 3355-3365. <https://doi.org/10.1002/cctc.201900770>.

53. 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.
54. 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.
55. 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.
56. 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
57. 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.
58. 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.
59. G. Kumar, E. Nikolla, S. Linic, J.W. Medlin, M.J. Janik*, “Multicomponent Catalysts: Limitations and Prospects”, *ACS Catalysis*, 8 (2018) 3202-3208.
60. 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.
61. 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.
62. 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).
63. 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.
64. 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.
65. 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.
66. 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.
67. 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.

68. A.M. Robinson[‡], L.O. 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.
69. 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.
70. 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.
71. A.M. Robinson[‡], J. Hensley, J.W. Medlin*, “Bifunctional catalysts for upgrading of biomass-derived oxygenates: A Review”, *ACS Catalysis* 6 (2016) 5026-5043.
72. 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 Catalysis* 6 (2016) 5086-5094.
73. C.-H. Lien[‡], J.W. Medlin*, “Control of Pd catalyst selectivity with mixed thiolate monolayers”, *Journal of Catalysis*, 339 (2016) 38-46.
74. 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.
75. 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.
76. S.H. Pang[‡], C.-H. Lien, J.W. Medlin*, “Control of surface alkyl catalysis with thiolate monolayers”, *Catal. Sci. Technol.* 6 (2016) 2413-2418.
77. 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.
78. 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.
79. 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.
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95. 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.
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100. 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.
101. 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.
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115. 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.
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PEER-REVIEWED BOOK CHAPTERS

159. 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.
160. 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).
161. 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

162. 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.
163. J.L. Falconer*, J. Will Medlin, G. Nicodemus, K. Hoferkamp, J. deGrazia, “A Thermodynamics Course Package in OneNote”, *Chemical Engineering Education* 48 (2014) 209-214.
164. “Chemical Engineering Screencasts”, J.L. Falconer*, J. deGrazia, J.W. Medlin, M.P. Holmberg, *Chemical Engineering Education* 46 (2012) 58-62.
165. “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)

166. J.W. Medlin*, “A Stable Home for Metal Catalysts”, *Nature Mater.* **24** (2025) 810; <https://doi.org/10.1038/s41563-025-02190-1>
167. J.W. Medlin*, M.M. Montemore, “Heterogeneous catalysis: Scaling the rough heights”, *Nature Chemistry*, 7 (2015) 378-380.

INVITED RESEARCH SEMINARS SINCE 2012:

1. Forschungszentrum Jülich, Institute for a Sustainable Hydrogen Economy, Jülich, Germany, August 2025
2. Aalto University, Chemical Engineering, Helsinki, Finland, June 2025
3. University of Twente, Chemical Engineering, Enschede, Netherlands, May 2025
4. Instituto Catalá d’Investigació Química (ICIQ), Tarragona, Spain, May 2025
5. Instituto de Tecnología Química, Valencia, Spain, February 2025
6. Washington University St. Louis, Chemical Engineering, November 2024

7. Texas A&M University, Chemical Engineering, October 2024
8. Brookhaven National Laboratory, September 2024
9. Stevens Institute of Technology, Chemical Engineering, September 2024
10. Texas Tech University, Chemical Engineering, April 2024
11. University of South Florida, Chemical Engineering, April 2024
12. Marquette University, Chemistry, March 2024
13. Tufts University, Chemical Engineering, February 2024
14. Iowa State University, Chemical Engineering, October 2023
15. Virginia Commonwealth University, Chemical Engineering, September 2022
16. University of Alabama, Chemical Engineering, September 2022
17. Purdue University, Chemical Engineering, March 2022
18. University of Notre Dame, Chemical Engineering, February 2022
19. Colorado School of Mines, Chemical Engineering, January 2022
20. Clemson University, Chemical and Biomolecular Engineering, November 2021
21. Columbia University, Chemical Engineering, January 2021
22. Rice University, Chemical and Biomolecular Engineering, March 2019
23. Oklahoma State University, Chemical Engineering, February 2019
24. Los Alamos National Laboratory, February 2019
25. University of Delaware, Chemical Engineering, December 2018
26. Virginia Tech, Chemistry Department, September 2018
27. Ohio State University, Chemical and Biomolecular Engineering, September 2018
28. University of Pittsburgh, Chemical and Petroleum Engineering, September 2018
29. ETH-Zurich, Chemical and Biochemical Engineering, May 2018
30. Technical University of Munich, Institute for Advanced Study, November 2017
31. Technical University of Denmark, Chemistry Department, October 2017
32. Chalmers University of Technology, Competence Centre for Catalysis, September 2017
33. Missouri University of Science and Technology, Dept. of Chemical Engineering, April 2016
34. ExxonMobil Research and Engineering Company, Clinton, NJ, Sept. 2015
35. University of Pennsylvania, Dept. of Chem./Bio. Engineering, Sept. 2015
36. University of Amsterdam, Institute for Molecular Sciences, May 2015
37. Leiden University, Institute of Chemistry, May 2015
38. Michigan State University, Dept. of Chemical and Materials Engr., Feb. 2015
39. Michigan Catalysis Society, Feb. 2015
40. Wayne State University, Nanoscience Initiative, Feb. 2015
41. Georgia Institute of Technology, Dept. of Chemical and Biomol. Engr., Oct. 2014
42. University of California – Riverside, Dept. of Chem. and Environ. Engr., May 2014
43. University of Illinois – Chicago, Dept. of Chemical Engineering, December 2013
44. Chicago Catalysis Club, December 2013
45. Brookhaven National Laboratory, July 2013
46. University of Wyoming, Dept. of Chemical Engineering, January 2013
47. Notre Dame University, Dept. of Chemical Engineering, November 2012
48. University of South Carolina, September 2012
49. National Renewable Energy Laboratory, September 2012
50. Pennsylvania State University, Dept. of Chemical Engineering, September 2012
51. Pacific Northwest National Laboratories, May 2012

INVITED/KEYNOTE CONFERENCE PRESENTATIONS (SINCE 2013 ONLY)

1. "Moderating solvent effects in catalysis with surface functionalization", ACS Fall National Meeting, August 2024, Denver.
2. "Controlling bifunctional effects in CO₂ hydrogenation over atomically dispersed metals", ACS Fall National Meeting, August 2024, Denver.
3. "Use of organic monolayers to control metal-support interactions on supported metal catalysts", ACS Fall National Meeting, August 2024, Denver.
4. "Controlling bifunctional effects in CO₂ hydrogenation over atomically dispersed metals", International Symposium on the Catalytic Chemistry of C1 Molecules, July 2024, Lille, France.
5. "Controlling Catalyst Selectivity with Organic Monolayers on Metal Oxides", Catalysis Science & Technology Symposium, April 2024, London.
6. "Effects of hydrophobic surface functionalization on liquid-phase hydrogenation reactions", ACS Spring National Meeting, March 2023, Indianapolis
7. "Experimental and computational design of interfaces for bifunctional hydrogenation catalysis", ACS Spring National Meeting, March 2023, Indianapolis
8. "Controlling Selectivity in Reactions of Complex Oxygenates over Metal Catalysts", AIChE Annual Meeting, Nov 2022, Phoenix
9. "Interaction effects in multifunctional catalysts for selective C-O bond activation", ACS Fall 2022 National Meeting, Chicago, Aug 2022
10. "Controlling hydrogenation selectivity with hydrophobic and hydrophilic surface coatings", ACS Fall 2022 National Meeting, Chicago, Aug 2022
11. "Modification of catalyst supports with organic monolayers", 2021 ACS Fall Meeting, Atlanta, August 2021.
12. "Controlling catalysis on oxide-supported metals with organic monolayers", ACS Fall National Meeting, virtual, August 2020.
13. "Controlling catalysis on oxide-supported metals with organic monolayers", ACS Fall National Meeting, virtual, August 2020.
14. "Controlled Bifunctional Catalysis via Organic Modification of Oxide-Supported Metals", 26th North American Catalysis Society Meeting, Chicago, June 2019.
15. "Toward Surface Science-Informed Design of Bifunctional Deoxygenation Catalysts". American Vacuum Society National Meeting, Long Beach, CA, October 2018.
16. "Opportunities and limitations for surface science-informed design of deoxygenation catalysts", ACS National Fall Meeting, Boston, Fall 2018
17. "Controlling selectivity on metal nanoparticles with organic monolayers", ACS National Fall Meeting, Boston, Fall 2018
18. "Tuning the activity and selectivity of metal oxide catalysts with organic monolayers", ACS National Meeting; San Francisco, April 2017
19. "Control of catalyst performance using nanometer-scale thin films", ACS National Meeting; Boston, August 2015.
20. "Understanding and controlling reactivity in heterogeneous catalysis of oxygenates", Surface Analysis Conference; Golden, CO, June 2015.
21. "Understanding and controlling selectivity in heterogeneous catalysis of oxygenates", ACS National Meeting; Denver, March 2015.
22. "Controlling selectivity in heterogeneous catalysis by surface and near surface design", ACS National Meeting, San Francisco; August 2014.

23. "Design of active sites for selective reaction of highly functional oxygenates", ACS National Meeting, Indianapolis; September 2013.
24. "Surface-level studies of photocatalytic and electrocatalytic reactions", Israel Science Foundation Workshop on Liquid Fuels from Renewable Resources, February 2013.
25. "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, 2019, 2022
 CHEN 3660: Energy fundamentals, Spring 2019, 2020
 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, 2024
 CHEN 5333: Research methods (graduate), Fall 2005 (with co-instructor Ryan Gill)
 CHEN 5838: Bioenergy Fundamentals (graduate), Fall 2020 (with co-instructor Joel Kaar)
 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 30 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

- Associate Editor for Royal Society of Chemistry journal *Catalysis Science and Technology*, 2016-present.
- Chair-elect, ACS Catalysis Division, 2024-present. Will serve as Chair of the division 2026-2027.
- Member of ACS Board for Petroleum Research Fund, 2021-2023. Service on a 3-person board charged with evaluation of approximately 100 funding proposals per year.
- President/ President-Elect/ Past President, Organic Reactions Catalysis Society, 2013-2018

- Technical Program Chair, 25th North American Catalysis Society Meeting, Denver (2017): responsible for organizing program containing >1200 abstracts.
- Technical Program Co-Chair, 17th International Congress in Catalysis, San Diego (2020): responsible for programming for a meeting that drew approximately 2000 abstracts. (Meeting was canceled due to pandemic, though abstract book was published.)
- President, Rocky Mountain Division of the North American Catalysis Society, 2005-09
- National Representative for the Rocky Mountain Division of NACS, 2009-15
- Editorial Advisory Board for the journal *ACS Catalysis* (2016)
- Organizing Committee Member, 2008 ACS/RSC/GDCh Frontiers of Chemistry Symposium, Cranage, UK
- Member of Organizing Committee and Program Chair for Surface Science, 2006 ACS Conference for Colloids and Surface Science (June 2006; Boulder, CO)
- Chair/Vice-chair, Catalysis and Reaction Eng. Topical at AIChE Annual Meeting, 2005-2007
- Panelist for NSF Graduate Research Fellowship Program, 2007-2008, 2013
- Panelist for NSF Proposal Reviews (served on >15 panels)
- National meeting session chair or co-chair for total of >30 sessions at national meetings such as NACS, ORCS, AIChE, ACS.
- 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, Nature Catalysis, Journal of the American Chemical Society, Journal of Physical Chemistry, Journal of Catalysis, >25 other scientific journals.

INTERNAL LEADERSHIP ACTIVITIES

- Department Chair, 2020-present
- Associate Department Chair, 2012-2016
- Leader, task force for creation of Energy Engineering Minor in College of Engineering and Applied Science, 2013-2014
- Chair of graduate recruiting, 2006-09
- Co-director, GAANN graduate training programs in Chemical and Biological Sensors, Renewable and Sustainable Energy, Catalysis and Biocatalysis (2005-present)
- 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), Alex Román (2020, Pioneer Astronautics), Jordi Ballesteros (MS 2019, ITQ-Valencia), Lesli Mark (PhD 2020, Univ. of Wisconsin), Patrick Coan (PhD 2020), Mathew Rasmussen (PhD 2021, NREL), Ben

Greydanus (PhD 2022, Global Thermostat), Alex Jenkins (PhD 2022, CU Boulder), Jake Kenny (PhD 2023, NREL), Faysal Kalaifi (PhD 2024, King Faud University of Petroleum and Minerals), Ezra Baghdady (PhD 2024, postdoc at CU), Xinpei Zhou (PhD 2024, John Hopkins Univ.), Zack Blanchette (PhD 2024, Reaction Systems Inc.), Laura Paz Herrera (PhD 2024, Dow Chemical). Current: Ashutosh Mishra, Nathanael Ramos, Dami Akinneye, Erin Dunphy, Brandon Oliphant, Yiqi Xu, Marc Manye Ibanez, Júlia Callejon, Jesús Melendez Gil, Zachary Meduna, Zoe Benedict, Eva Peurrung, Lilly Garcia, Anthony Gullion, Kobi Hobert, Mara Fischer.

Postdoctoral Researchers: Dongmei Li (Univ. of Wyoming), Esther Wilcox (NREL), Brian Hassler (Elevance Renewable Sciences), April Corpuz (FuelCell Energy), Jing Zhang (East China University of Science and Technology), Tim Van Cleve (National Renewable Energy Laboratory), Jiajie Huo (Bristol Myers Squibb), Alex Jenkins (current).

More than 100 undergraduate and masters advisees have worked in the laboratory.