

## Publications

### Refereed Publications

Dalvand, K., Rubin, J. Gunukula, S., Wheeler, M.C., and Hunt, G., "Economics of biofuels: Market potential of furfural and its derivatives," *Biomass and Bioenergy* 115 (2018) 56-63.

<https://doi.org/10.1016/j.biombioe.2018.04.005>

Gunukula, S., Pendse, H. P., DeSisto, W. J., and Wheeler, M. C., "Heuristics to Guide the Development of Sustainable, Biomass-Derived, Platform Chemical Derivatives," *ACS Sustainable Chem. Eng.* (2018)

<https://doi.org/10.1021/acssuschemeng.8b00412>

Gunukula, S., Klein, S.J.W., Pendse, H.P., DeSisto, W.J., and Wheeler, M.C., "Techno-economic analysis of thermal deoxygenation based biorefineries for the coproduction of fuels and chemicals," *Applied Energy* (2018)

<https://doi.org/10.1016/j.apenergy.2018.01.065>

AlMohamadi, H, Gunukula, S., DeSisto, W. J. and Wheeler, M. C., "Formate-assisted pyrolysis of biomass: an economic and modeling analysis," *Biofuels, Bioprod. Bioref.* 12:45-55 (2018); DOI: 10.1002/bbb.1827

<http://onlinelibrary.wiley.com/doi/10.1002/bbb.1827/epdf> .

Barclay, W. B., Wheeler, M. C., Moh, A. and van Walsum, G. P., "Hydrolysis of Cellulose and Glucose using Recyclable  $\alpha$ -Hydroxysulfonic Acids," *Ind. Eng. Chem. Res.* 56 (44) 12529-12537 (2017),

<https://doi.org/10.1021/acs.iecr.7b03355>

Carrasco, J. L., Gunukula, S., Boateng, A. A., Mullen, C. A., DeSisto, W. J. and Wheeler, M. C., "Pyrolysis of forest residues: An approach to techno-economics, for bio-fuel production," *Fuel* 193:477-484 (2017).

<https://doi.org/10.1016/j.fuel.2016.12.063>

Eaton, S.J. and Wheeler, M.C., "Decomposition Reactions and Kinetics of Alkaline-Earth Metal Levulinate and Formate Salts," *ACS Sustainable Chemistry & Engineering* 5(4):3039-3045 (2017)

<https://doi.org/10.1021/acssuschemeng.6b02704>

Martinez, N.; Garcia, R.; Fierro, J. L. G.; Wheeler, C., Austin, R. N.; Gallagher, J. R.; Miller, J. T.; Krause, T. R.; Escalona, N.; Sepulveda, C.; "Effect of Cu addition as a promoter on Re/SiO<sub>2</sub> catalysts in the hydrodeoxygenation of 2-methoxyphenol as a model bio oil compound," *Fuel* 186:112-121 (2016).

<https://doi.org/10.1016/j.fuel.2016.08.065>

DeSisto, W.J. and Wheeler, M.C., "A funnel plot to assess energy yield and oil quality for pyrolysis-based processes," *Biomass and Bioenergy* 93:254-258 (2016). <https://doi.org/10.1016/j.biombioe.2016.06.014>

Nelson, R., Byeongjin Baek, Pamela Ruiz, Ben Goundie, Ashley Brooks, M. Clayton Wheeler, Brian G. Frederick, Lars C. Grabow, and Rachel Narehood Austin, "Experimental and Theoretical Insights into the Hydrogen-

Efficient Direct Hydrodeoxygenation Mechanism of Phenol over Ru/TiO<sub>2</sub>," ACS Catalysis, 2015,  
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Eaton, Scott J. , Sedat H. Beis , Sampath A. Karunaratne , Hemant P. Pendse , and M. Clayton Wheeler;  
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C. Newman, X. Zhou, B. Goundie, I.T. Ghampson, R.A. Pollock, Z. Ross, M.C. Wheeler, R.W. Meulenbergh, R.N. Austin, B.G. Frederick, "Effects of support identity and metal dispersion in heterogeneous ruthenium hydrodeoxygenation catalysts," Appl. Catal. A- General, 477 (2014), 64-74.  
<https://doi.org/10.1016/j.apcata.2014.02.030>

S.J. Eaton, S.H. Beis, B.G. Bunting, S.W. Fitzpatrick, G.P. van Walsum, H.P. Pendse, and M.C. Wheeler, "Characterization and Combustion of Crude Thermal Deoxygenation Oils Derived From Hydrolyzed Woody Biomass," Energy & Fuels, 27 (9), 5246-5252 (2013). <https://doi.org/10.1021/ef4007033>

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## Book Chapters

G.P. van Walsum and M.C. Wheeler, "Biofuel Production" in *Wood-Based Energy in the Northern Forests*, Springer, 2013 edited by M. Jacobson and D. Cjolkosz. Conference Proceedings

## Conference Proceedings

M. Bhatia, K. D. Hurley, G. P. van Walsum and M. C. Wheeler, "Thermal Conversion of Carboxylate Salts (Biomass-to-Mixed Alcohols)," *AIChE Annual Meeting Conference Proceedings on CD*, New York, NY (2009).

B. J. Meulendyk, M.C. Wheeler, M. Pereira da Cunha, "Comparison of Rayleigh Wave and Surface Transverse Wave Surface Acoustic Wave Sensors on Quartz for the Detection of Hydrogen Fluoride," *IEEE International Ultrasonics Symposium*, New York, NY (2007).

B. J. Meulendyk, M. C. Wheeler, B. Segee, and M. Pereira da Cunha, "Sensitivity Of A Surface Acoustic Wave Hydrogen Fluoride Sensor To Quartz Substrate Etching," *2007 AIChE Annual Meeting Conference Proceedings on CD*, New York, NY, 2007.

M. Q. Snyder, S. Trebukhova, B. Ravdel, M. C. Wheeler, J. DiCarlo, C. P. Tripp, and W. J. DeSisto, "Preparation and Characterization of ALD TiN Thin Films on Lithium Titanate Spinel (Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>) for Lithium Ion Battery Applications, in *Solid-State Ionics*," *Materials Research Society Symposium Proceedings* 972, Warrendale, PA, (2007).

S. Winchenbach, M. C. Wheeler, M. Pereira da Cunha, and B. Segee, "Demonstrating A Novel Approach To The Control Of Microhotplate Sensors Utilizing A Distributed Computing Approach And Numeric Modeling," *2007 AIChE Annual Meeting Conference Proceedings on CD*, New York, NY, 2007.

## Patents

U.S. patent 8,362,306 (2013) "Energy densification of biomass-derived organic acids", M. C. Wheeler, G.P. Van Walsum, T.J. Schwartz, and A.R.P. van Heiningen.

U.S. patent 8,981,168 (2015) "Formate Assisted Pyrolysis," W.J. DeSisto, M.C. Wheeler, and A.R.P. van Heiningen.

U.S. patent 9,120,712 (2015) "Process for improving the energy density of feedstocks using formate salts," M.C. Wheeler, A.R.P. van Heiningen, and P.A. Case. (International patents pending)

## Theses Advised as Chair or Co-Chair

“Characterization of Catalysts for Phenol Hydrodeoxygenation of Bio-Oils using Phenol as a Model Compound,” Abdulazeez Khlewee, MS 2017

“Propane diols: Value Added Coproducts of Biodiesel Production,” Karl Olson, MS 2017

“Pressurized Fast Pyrolysis of Calcium Formate Pretreated Biomass,” Chi Truong, MS 2016

“Thermal Deoxygenation of Levulinate and Formate Salts for the Production of Transportation Fuels,” Scott Eaton, PhD 2015

“Fundamentals of Pyrolysis of Pretreated Biomass,” Paige Case, PhD 2015

“Hydrolysis of Cellulose and Glucose Using  $\alpha$ -Hydroxysulfonic Acids,” Brett Barclay, MS 2015

“Technoeconomic Analysis of Formate Assisted Pyrolysis,” Hamad AlMohamadi, MS 2014

“Ruthenium Catalysts for Hydrodeoxygenation of Pyrolysis Oil,” Xiaobo Zhou, University of Maine M.S., 2014.

“Technoeconomic Analysis of Pyrolysis of Forest Residues,” Jose Carrasco, University of Maine M.S., 2014.

“A Study of Thin Film Behavior Using Nanocalorimetry and Exploration of Potential Application, Rongkai Chen, M.S., 2012.

“Thermal Conversion of Carboxylate Salts and Catalytic Ketone Hydrogenation,” Mohit Bhatia, M.S., 2011.

“Microhotplate Sensor Array Fabrication,” Daesha More, M.S., 2007.

“Sub-Femtomolar Isothermal Desorption and Reaction Kinetics on Microhotplate Sensor Platforms,” Amol Shirke, Ph.D., 2007.

## Presentations

Gunukula, S., DeSisto, W.J., Pendse, H. and Wheeler, M.C., Economic and Modeling Analysis of Product and Energy Driven Biorefineries Based on Thermal Deoxygenation Pathway, AIChE Annual Meeting, Minneapolis MN, November 2017.

Gunukula, S., DeSisto, W.J., Pendse, H. and Wheeler, M.C., Assessment of Economic Potential of Furfural Platform. AIChE Annual Meeting, Minneapolis MN, November 2017.

Gunukula, S., DeSisto, W.J., Pendse, H., Wheeler, M.C., Economic and Modeling Analysis of Product and Energy Driven Biorefineries Based on Thermal Deoxygenation Pathway. TCBiomass, Chicago IL, September 2017.

Wheeler, M.C., S.J. Eaton, and W.J. DeSisto, Transportation Fuels via a Two-Stage Thermal Deoxygenation Process, oral presentation at the 252nd American Chemical Society National Meeting and Exposition, Philadelphia, PA, August 21, 2016.

Wheeler, M.C., S.J. Eaton, and W.J. DeSisto, Transportation Fuels via a Two-Stage Thermal Deoxygenation Process, poster presentation at the 252nd American Chemical Society National Meeting and Exposition, Philadelphia, PA, August 23, 2016.

Chi Truong (graduate student presenter), M. Clayton Wheeler, William J. DeSisto, Paige A. Case and Brian G. Frederick, Pressurized fast pyrolysis of calcium formate-pretreated pine, International Bioenergy & Bioproducts Conference in Atlanta, GA, 2015

W. Barclay (graduate student presenter), M. C. Wheeler, and G. P. van Walsum, Hydrolysis of Biomass Using a-Hydroxysulfonic Acids, 15AIChE Spring Meeting, Austin, TX, April 28, 2015.

S. Eaton (graduate student presenter) and M. C. Wheeler, Levulinate and Formate Salt Reactions during Thermal Deoxygenation (TDO), 14AIChE Annual Meeting, Atlanta, GA, November 19, 2014.

H. AlMohamadi (graduate student presenter), W. J. DeSisto and M.C. Wheeler, Techno- Economics of Formate Assisted Pyrolysis, 14AIChE Annual Meeting, Atlanta, GA, November 18, 2014.

S. Spatari (presenter), L. Bjomebo, A.A. Boateng, N. Macken, I. Mannoh, B. Mercado, C.A. Mullen, and M.C. Wheeler, "Life Cycle Evaluation of Pyrolysis Fuel Pathways," Frontiers in Biorefining Chemicals and Products from Renewable Carbon, St. Simons Island, Georgia, October 21-24, 2014.

S.J. Eaton (graduate student presenter), P.A. Case, W.J. DeSisto, and M.C. Wheeler, "Decomposition Pathways during Pyrolysis of Hydrolyzate Salts," tcs2014: Symposium on Thermal and Catalytic Sciences for Biofuels and Biobased Products, Denver, CO, September 2-4, 2014.

P.A. Case (graduate student presenter), M.C. Wheeler, and W.J. DeSisto, "Proposed Mechanisms for Pyrolysis of Calcium Pretreated Pine," tcs2014: Symposium on Thermal and Catalytic Sciences for Biofuels and Biobased Products, Denver, CO, September 2-4, 2014.

M.C. Wheeler (presenter), H.P. Pendse, and A. Luce, "UMaine Research in Drop-In Fuel from Lignocellulosics," Biomass 2014: Growing the Future Bioeconomy, Washington, D.C., July 29, 2014.

S. Spatari (presenter), L. Bjomebo, A.A. Boateng, N. Macken, I. Mannoh, B. Mercado, C.A. Mullen, and M.C. Wheeler, "Life Cycle Evaluation of Pyrolysis Fuel Pathways," Frontiers in Biorefining Chemicals and Products from Renewable Carbon, St. Simons Island, Georgia, October 21-24, 2014.

S.J. Eaton (graduate student presenter), P.A. Case, W.J. DeSisto, and M.C. Wheeler, "Decomposition Pathways during Pyrolysis of Hydrolyzate Salts," tcs2014: Symposium on Thermal and Catalytic Sciences for Biofuels and Biobased Products, Denver, CO, September 2-4, 2014.

P.A. Case (graduate student presenter), M.C. Wheeler, and W.J. DeSisto, "Proposed Mechanisms for Pyrolysis of Calcium Pretreated Pine," tcs2014: Symposium on Thermal and Catalytic Sciences for Biofuels and Biobased Products, Denver, CO, September 2-4, 2014.

M.C. Wheeler (presenter), H.P. Pendse, and A. Luce, "UMaine Research in Drop-In Fuel from Lignocellulosics," Biomass 2014: Growing the Future Bioeconomy, Washington, D.C., July 29, 2014.

W.J. DeSisto (presenter) and M.C.Wheeler, "Formate Assisted Pyrolysis of Woody Biomass," Pacific Northwest National Laboratory, June 2013.

S.J. Eaton (graduate student presenter), S.H. Beis, G.P. van Walsum, H.P. Pendse, and M.C. Wheeler, Poster: "Thermal DeOxygenation of Woody Biomass Hydrolyzate," tcbiomass2013, Chicago, September 3-6, 2013.

P.A. Case (graduate student presenter), S. Mukkamala, E.A. Stemmler, W.J. DeSisto, and M.C. Wheeler, Poster: "Formate-Assisted Pyrolysis of Biomass," tcbiomass2013, Chicago, September 3-6, 2013.

W.J. DeSisto (presenter) and M.C.Wheeler, Contributed Talk: "Thermal Conversion of Woody Biomass to Fuels and Chemicals," Latin American Congress on Biorefineries, Pucon Chile, November 2012.

S.H. Beis, A. Hayden, H.P. Pendse, P. van Walsum, D.L. Smith, and M.C. Wheeler (presenter), Contributed Talk: "Performance Characterization of Crude Oil Produced by Thermal Deoxygenation," 2012 Annual Meeting of the American Institute of Chemical Engineers, November 1, 2012, Pittsburgh, PA.

S. Eaton, B.G. Bunting, P. van Walsum, M.C. Wheeler (presenter), Contributed Talk: "Engine Performance of Biohydrocarbons Produced by Thermal Deoxygenation of Biomass Derived Organic Acids," 2012 Annual Meeting of the American Institute of Chemical Engineers, November 1, 2012, Pittsburgh, PA.

N.L. Hammer (presenter), A.A. Boateng, C.A. Mullen, M.C. Wheeler, and J.L. Carrasco, Contributed Talk: "Aspen PLUS Modeling of the Utilization of Equine Waste for Localized Heating Via Fast Pyrolysis," 2012 Annual Meeting of the American Institute of Chemical Engineers, November 1, 2012, Pittsburgh, PA.

S. Mukkamala (graduate student presenter), W.J. DeSisto, M.C. Wheeler, and A. van Heiningen, Contributed Talk: "Thermal Conversion of Lignin to Transportation Fuels and Chemicals Through Formate Assisted Fast Pyrolysis," 2012 Annual Meeting of the American Institute of Chemical Engineers, October 29, 2012, Pittsburgh, PA.

J.L. Carrasco (graduate student presenter), N.L. Hammer, A. McAloon, A.A. Boateng, W.J. DeSisto, and M.C. Wheeler, Contributed Talk: "Technoeconomic Analysis of Pyrolysis of Forest Residues," 2012 Annual Meeting of the American Institute of Chemical Engineers, October 29, 2012, Pittsburgh, PA.

P. Ruiz (graduate student presenter), B. G. Frederick, M.C. Wheeler, W. DeSisto, Contributed Talk: "Activity and Selectivity over a tungsten oxide catalyst", Symposium on Alternative Energy and Fuel Chemistry, 38th Northeast Regional Meeting of the American Chemical Society, Rochester NY, Oct. 1-3, 2012.

X. Zhou (graduate student presenter), C. Newman, B. Goundie, R. A. Pollock, M. C. Wheeler, R. W. Meulenberg, R. N. Austin, B. G. Frederick, "Hydrodeoxygenation of Pyrolysis Oils with Ruthenium Catalysts," Contributed Talk: Symposium on Alternative Energy and Fuel Chemistry, 38th Northeast Regional Meeting of the American Chemical Society, Rochester NY, Oct. 1-3, 2012.

M.C. Wheeler (presenter), "Production of drop-in fuels from waste biomass by thermal deoxygenation," National Council for Air and Stream Improvement Northern Regional Meeting, Portland, Maine, May 9, 2012.



H. P. Pendse (presenter), M.C. Wheeler and W.J. DeSisto, Contributed Talk: "Biomass to hydrocarbons via formate-assisted pyrolysis," Spring Meeting of the American Institute of Chemical Engineers, April 3, 2012, Houston, TX.

M.C. Wheeler (presenter), "Hydrocarbons via thermal deoxygenation (TDO) of biomass hydrolyzates," NIDUS Partners, February 29, 2012.

M. C. Wheeler (presenter), Hydrocarbons via thermal deoxygenation of biomass hydrolyzates, USDA-ARS Teleseminar Series on Chemical Conversion Technologies, [http://www.ars.usda.gov/research/programs/programs.htm?np\\_code=213&docid=21205](http://www.ars.usda.gov/research/programs/programs.htm?np_code=213&docid=21205) , January 3, 2012.

M.C. Wheeler (presenter), "Biomass to Transportation Fuels Research at the University of Maine," University of Concepción, November 22, 2011, Concepción, Chile.

M. C. Wheeler (presenter), W. J. DeSisto, B.G. Frederick, A.R.P. van Heiningen, G. P. van Walsum, H. P. Pendse, R.N. Austin, N. Escalona B., and S. H. Beis, "Biomass Thermal Conversion Research within the University of Maine's Forest Bioproducts Research Institute (FBRI)," XXV Interamerican Congress of Chemical Engineering, November 14-17, 2011, Santiago, Chile.

W.J. DeSisto, S. Mukkamala, A. van Heiningen, and M.C. Wheeler (presenter), Contributed Talk: "Thermal deoxygenation of woody biomass feedstocks: a potential wood-to-drop-in-fuel process with a focus on lignin," XXV Interamerican Congress on Chemical Engineering and XVIII Chilean Congress on Chemical Engineering, November 14-17, 2011.

M.C. Wheeler (presenter), "Hydrocarbon fuels from lignocellulosic biomass," Northeast PIMA/TAPPI Fall Meeting and Conference, Orono, ME, October 13, 2011.

M.C. Wheeler (presenter), P.A. Case, S.J. Eaton, A.R.P. van Heiningen, and W.J. DeSisto, "Atmospheric, Non-catalytic Method for Hydrocarbon Fuels from Cellulosic Biomass by Pyrolysis of Organic Acid Salts," tcbiomass2011, September 27-30, 2011, Chicago, Illinois.

G. P. van Walsum (presenter), C. Wheeler, Adriaan van Heiningen, Hemant Pendse, Byung-Hwan Um, Abigail Engelberth, Sara Walton, Rakhi Baddam, Sampath Karunarathne, Mohit Bahtia, Thomas Schwartz, Paige Case. "Contributed Talk: "Integration of Biofuel Production with Pulp Mill Operations: Forest Biorefinery Models." Woody Biomass Energy Research Symposium for the Northern Forest. University of Vermont, April 28-30, 2011.

T. J. Schwartz, P. A. Case, A. R.P. van Heiningen, G. P. van Walsum, M. C. Wheeler (presenter), "Thermal Deoxygenation of Levulinic Acid," 241st ACS National Meeting & Exposition, March 27-31, 2011, Anaheim, California.

M. Bhatia (graduate student presenter), A. van Heiningen, G. P. van Walsum and M. C. Wheeler, Contributed Talk: "Kinetics and Mechanism for Acetone Hydrogenation by Ru/Carbon," AIChE Annual Meeting Conference Proceedings on CD, New York, NY (2010).

T. J. Schwartz, P. Case, A. van Heiningen, G. P. van Walsum and M. C. Wheeler (presenter), Contributed Talk: "Thermal Deoxygenation of Levulinic Acid," AIChE Annual Meeting Conference Proceedings on CD, New York, NY (2010).

Abigail S. Engelberth (presenter), M. Clayton Wheeler, G. Peter van Walsum. Exploring Three Pathways to Convert a Hemi-Cellulose Rich Pre-Pulping Extract Into Long-Chain Alcohols Via the MixAlco™ Process. AIChE annual Meeting, Salt lake City, UT, November 2010.

Sampath Karunaratne (student presenter), Clayton Wheeler, G. Peter van Walsum. Contributed Talk: "Production of Carboxylic Acids From Acidogenic Fermentation of Algefiber® (Sea Weed Sludge) Using a Mixed Culture of Marine Microorganisms." AIChE annual Meeting, Salt lake City, UT, November 2010.

P. A. Case (student presenter), T. J. Schwartz, A. R. P. van Heiningen, and M. Clayton Wheeler, Contributed Talk: "Energy Densification of Biomass by Thermal Deoxygenation," Regional Meeting of the Society of Women Engineers, Boston University, 2010.

F. G. Amar (presenter), D. R. Moberg, T. J. Thibodeau, M.C. Wheeler, W. J. DeSisto, B. G. Frederick, Contributed Talk: "Hydrodeoxygenation of Acrolein on Reducible Oxide Catalysts: Mechanism for Upgrading of Biomass Derived Feedstock," 2010 Spring National Meeting of the American Chemical Society, San Francisco, CA, Mar. 21-25, 2010.

F. G. Amar (presenter), D. R. Moberg, T. J. Thibodeau, M.C. Wheeler, W. J. DeSisto, B. G. Frederick, Contributed Talk: "Hydrodeoxygenation of Acrolein on Reducible Oxide Catalysts: Mechanism for Upgrading of Biomass Derived Feedstock," 2010 Spring National Meeting of the American Chemical Society, San Francisco, CA, Mar. 21-25, 2010.

K. D. Hurley (presenter), R. Chen, D. Bragg, T. Kirkmann, B. J. Frederick, S. MacKay, W. J. DeSisto, and M. C. Wheeler, Contributed Talk: "High-throughput screening of hydrodeoxygenation catalysts," AIChE Annual Meeting Conference Proceedings on CD, New York, NY (2009).

P. Ruiz, K. D. Hurley, B. G. Frederick, W. J. DeSisto, L. R. Radovic, N. Escalona, and M. C. Wheeler (presenter), Contributed Talk: "Hydrodeoxygenation of guaiacol as a model compound for pyrolysis oil," AIChE Annual Meeting Conference Proceedings on CD, New York, NY (2009).

I.T. Ghampson (graduate student presenter), K. Hurley, R. Pollock, B. Walsh, B. Frederick, E. Pier, R.N. Austin, M.C. Wheeler, A. van Heiningen, and W.J. DeSisto, Contributed Talk: "Pre- and Post-Reaction Measurement of Catalyst Properties for Silica Supported Cobalt Catalysts with Variable Pore Size," AIChE Annual Meeting Conference Proceedings on CD, New York, NY (2009).

M. Bhatia (graduate student presenter), K. D. Hurley, G. P. van Walsum and M. C. Wheeler, Contributed Talk: "Thermal Conversion of Carboxylate Salts (Biomass-to-Mixed Alcohols)," AIChE Annual Meeting Conference Proceedings on CD, New York, NY (2009).

S. H. Beis (presenter), S. Mukkamala, N. Hill, T.-H. Ong, A. Van Heiningen, B. G. Frederick, M. Clayton Wheeler, E. Stemmler and W. J. DeSisto, Contributed Talk: "Fast Pyrolysis of Wood Lignin: Towards A Continuous Process", AIChE Annual Meeting Conference Proceedings on CD, New York, NY (2009).

D. R. Moberg (student presenter), T. J. Thibodeau, F. G. Amar, M. C. Wheeler, W. J. DeSisto, B. G. Frederick, Contributed Talk: "Density Functional Theory Study of Oxygen Vacancy Formation on Cluster Models of the MoO<sub>3</sub>(010) Surface," 36th Northeast Regional Meeting of the American Chemical Society, Hartford, CT, Oct. 7-10, 2009.

R. A. Pollock (graduate student presenter), B. R. Walsh, J. A. Fry, I. T. Ghampson, T. Steinbach, H. Kaiser, R. Pynn, Y. Melnichenko, M. C. Wheeler, W. J. DeSisto, B. G. Frederick, Contributed Talk: "Mild Pressure Liquid Water Modification of Mesoporous Silica," 36th Northeast Regional Meeting of the American Chemical Society, Hartford, CT, Oct. 7-10, 2009.

T. J. Thibodeau (graduate student presenter), B. G. Frederick, M. C. Wheeler, W. J. DeSisto, D. R. Moberg, F. G. Amar, Contributed Talk: "Hydrodeoxygenation of acrolein and allyl alcohol: Model compounds for upgrading of biomass derived feedstocks", 238th National Meeting of the American Chemical Society, Washington, DC, Aug. 17-20, 2009.

R. A. Pollock, B. R. Walsh, J. A. Fry, I. Tyrone Ghampson, T. Steinbach, H. Kaiser, R. Pynn, Y. Melnichenko, M. C. Wheeler (presenter), W. J. DeSisto, B. G. Frederick, Poster: "Mild Pressure Liquid Water Modification of Mesoporous Silica", DOE EPSCOR National Meeting, Brookhaven National Laboratory, July 2009.

K. D. Hurley, R. Chen, D. Bragg, T. Kirkmann, B. J. Frederick, S. MacKay, W. J. DeSisto, A.R.P. van Heiningen and M. C. Wheeler (presenter), Poster: "Hydrodeoxygenation Catalyst Screening and Characterization," DOE EPSCOR National Meeting, Brookhaven National Laboratory, July 2009.

I.T. Ghampson (graduate student presenter), K. Hurley, R. Pollock, B. Walsh, B. Frederick, E. Pier, R.N. Austin, M.C. Wheeler, A. van Heiningen, and W.J. DeSisto, Poster: "Pre- and post-reaction measurement of catalyst properties for Fischer-Tropsch silica supported cobalt catalysts with variable pore size," DOE EPSCOR National Meeting, Brookhaven National Laboratory, July 2009.

W.J. DeSisto (presenter), N. Hill, M. Saikrishna, S. Beis, E. Stemmler, A. van Heiningen, B.G. Frederick and M.C. Wheeler, Poster: "Fast pyrolysis of pine sawdust in a fluidized bed reactor," DOE EPSCOR National Meeting, Brookhaven National Laboratory, July 2009.

R. Nelson (graduate student presenter), W. J. DeSisto, B. G. Frederick, A. van Heiningen, M. C. Wheeler, Contributed Talk: "High Throughput Microcalorimetry for Catalyst Discovery," AIChE Annual Meeting, Philadelphia, PA (2008).

M. C. Wheeler (presenter), W. J. DeSisto, B. G. Frederick, A. van Heiningen, Poster: "Thermochemical Conversion of Woody Biomass to Fuels and Chemicals," First Annual Conference on Cellulosic Biofuels, University of Massachusetts Amherst, September 19, 2008.

M. C. Wheeler (presenter), W. J. DeSisto, B. G. Frederick, A. van Heniningen, and H. Pendse Poster: "DOE Implementation Award: Thermochemical Conversion of Woody Biomass to Fuels and Chemicals," DOE EPSCoR State/National Laboratory Program Review Conference, Oak Ridge, TN, July 23, 2008.

M. C. Wheeler (presenter), A. G. Shirke, and B. G. Frederick. "Femtomolar isothermal desorption to probe surface reactions," The 82nd ACS Colloid and Surface Science Symposium, Raleigh, NC, June 16, 2008.

I. T. Ghampson (graduate student presenter), B. Walsh, M. C. Wheeler, W. J. DeSisto, B. G. Frederick, A. van Heniningen, Poster: "Infrastructure development for rapid screening of potential catalysts for the thermal conversion of woody biomass to fuels and chemicals," Gordon Research Conference: Nanoporous Materials, Waterville, ME 2008.

B. J. Meulendyk (graduate student presenter), M. C. Wheeler, B. Segee, and M. Pereira da Cunha Contributed Talk: "Sensitivity Of A Surface Acoustic Wave Hydrogen Fluoride Sensor To Quartz Substrate Etching," 2007 AIChE Annual Meeting, Salt Lake City, UT, November 8, 2007.

A. Clark (graduate student presenter), M. Pereira da Cunha, B. Segee, and M. C. Wheeler Contributed Talk: "Correlation Of Microhotplate Metal Oxide Sensor Response To Catalytic Fluorocarbon Decomposition Activity," 2007 AIChE Annual Meeting, Salt Lake City, UT, November 8, 2007.

S. Winchenbach (graduate student presenter), M. C. Wheeler, M. Pereira da Cunha, and B. Segee Poster: "Demonstrating A Novel Approach To The Control Of Microhotplate Sensors Utilizing A Distributed Computing Approach And Numeric Modeling," 2007 AIChE Annual Meeting, Salt Lake City, UT, November 5, 2007.

B. J. Meulendyk (graduate student presenter), M.C. Wheeler, M. Pereira da Cunha Contributed Talk: "Comparison of Rayleigh Wave and Surface Transverse Wave Surface Acoustic Wave Sensors on Quartz for the Detection of Hydrogen Fluoride," IEEE International Ultrasonics Symposium, New York, NY, October 30, 2007.

M. C. Wheeler (presenter), W. J. DeSisto, B. G. Frederick, A. van Heniningen, and H. Pendse. "Thermochemical Conversion of Woody Biomass to Fuels and Chemicals," Renewable Energies for a Global Economy: DOE EPSCoR State/National Laboratory Program Review Conference, Golden, CO, July 24, 2007.

M. C. Wheeler (presenter), W. J. DeSisto, B. G. Frederick, A. van Heniningen, and H. Pendse. Poster: "DOE Implementation Award: Thermochemical Conversion of Woody Biomass to Fuels and Chemicals," Renewable Energies for a Global Economy: DOE EPSCoR State/National Laboratory Program Review Conference, Golden, CO, July 23, 2007.

A. G. Shirke, B. G. Frederick, S. Semancik, R. E. Cavicchi, and M. C. Wheeler (presenter) Contributed Talk: "Femtomolar Isothermal Desorption," American Vacuum Society Physical Electronics Conference, Urbana/Champaign, IL, June 21, 2007.

Y. Ji (graduate student presenter), M. C. Wheeler, and A. van Heniningen Contributed Talk: "O<sub>2</sub> Delignification Kinetics from CSTR and Batch Reactor Data," American Institute of Chemical Engineers Annual Meeting, San Francisco, CA November 12, 2006.

M. Q. Snyder (graduate student presenter), S. Trebukhova, B. Ravdel, M. C. Wheeler, J. DiCarlo, C. P. Tripp, and W. J. DeSisto Contributed Talk: "Preparation and Characterization of ALD TiN Thin Films on Lithium Titanate Spinel (Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>) for Lithium Ion Battery Applications, in Solid-State Ionics," Materials Research Society Symposium, Warrendale, PA, 2007.

A. G. Shirke (graduate student presenter), B. G. Frederick, S. Semancik, R. E. Cavicchi, and M. C. Wheeler Contributed Talk: "Microhotplates as Surface Science Tools," 2006 Northeast Regional Meeting of the American Chemical Society, Binghamton, NY, October 5, 2006 .

J. DeAngelis (undergraduate student presenter) and M. C. Wheeler Contributed Talk: "Thermal Modeling of Microhotplates," AIChE Northeast Regional Student Paper Competition, RPI, Troy, NY, April 1, 2006.

G. Craig (undergraduate student presenter) and M. C. Wheeler Contributed Talk: "UMaine MEMS: Design and Fabrication of Micromachined Sensor Platforms," 2005 AIChE Annual Meeting National Student Paper Competition, Cincinnati, OH, October 31, 2005.

G. Craig (undergraduate student presenter) and M. C. Wheeler Contributed Talk: "UMaine MEMS: Micromachined Sensor Platforms," Winner 2005 AIChE Northeast Regional Student Paper Competition, Lowell, MA, April 2, 2005.

A. G. Shirke (graduate student presenter), B. G. Frederick, R. E. Cavicchi, S. Semancik, and M. C. Wheeler Poster: "Characterization of Adsorption on Metal-Oxide Sensor Materials," 11th International Conference on Vibrations at Surfaces, Bar Harbor, ME, June 6, 2004 –.

A. Shirke, G. Craig, and M. C. Wheeler (presenter). Poster: "Microsensors: Temperature and Materials Control for Gas Identification," State of Maine Homeland Security Conference, May 14, 2004.

G. Craig (undergraduate student presenter) and M. C. Wheeler Poster: "UMaine MEMS: Micromachined Sensor Platforms," AIChE Northeast Regional Student Conference, Northeastern University, April 3, 2004.

M. C. Wheeler (presenter), R. E. Cavicchi, and S. Semancik Contributed Talk: "Electronic Detection of Oscillatory Reactions on Supported Platinum Particles," 50th International Symposium of the American Vacuum Society, Baltimore, MD, November 3, 2003.

A. Shirke (graduate student presenter), R. H. Jackson, B. G. Frederick, R. E. Cavicchi, S. Semancik, and M. C. Wheeler Poster: "Microsensor Technique for Analyte Surface Coverage vs. Sensor Response Correlation," 50th International Symposium of the American Vacuum Society, Baltimore, MD, November 5, 2003.