

# **CURRICULUM VITAE**

## ***Tracy John Benson***

### **EMPLOYMENT**

9/15 – present	Associate Professor Dan F. Smith Department of Chemical Engineering Lamar University
8/09 – 8/15	Assistant Professor Dan F. Smith Department of Chemical Engineering Lamar University
2/08 – 8/09	Postdoctoral Research Associate Dave C. Swalm School of Chemical Engineering Mississippi State University
1/04 – 12/07	Ph.D. Candidate – Chemical Engineering, Mississippi State University
8/00 – 12/03	M.S. Student – Chemical Engineering, Mississippi State University
1/98 – 8/99	Co-op Engineer (3 terms totally 1 year), G.E. Plastics, Bay St. Louis, MS

### **EDUCATION**

High School, 1993, Houston High School in Houston, MS  
B.S. - Chemical Engineering, 2000, Mississippi State University  
M.S. - Chemical Engineering, 2003, Mississippi State University  
Ph.D. - Chemical Engineering, 2008, Mississippi State University

### **RESEARCH INTERESTS**

My research thrust is the minimization (or elimination) of industrial wastes, including hazardous materials, unwanted byproducts, and wasted energies by developing alternate chemical transformation pathways for lipid-based biofuels, as well as the conversion of CO<sub>2</sub> using catalysis and reaction engineering process development.

### **PROFESSIONAL AFFILIATIONS**

- \* American Institute of Chemical Engineers
- \* American Chemical Society

\* American Oil Chemists' Society

### **REFEREE FOR FOLLOWING JOURNALS**

Industrial & Engineering Chemistry Research  
Environmental Progress & Sustainable Energy  
Journal of Chemical Technology and Biotechnology  
Energy and Fuels  
Biomass & Bioenergy  
RSC – Advances  
RSC – Green Chemistry

### **FELLOWSHIPS, ACTIVITIES, AND AWARDS**

2016 – Chair, Advances in Catalysis session at the AIChE spring conference in Houston, TX

2015 – Technical Advisor/Safety Consultant for AIChE Middle East Regional ChemE Car Competition in Bahrain

2015 – Chair, AIChE Sustainability Engineering Forum and area plenary session

2015 – Chair, Advances in Catalysis session at the AIChE spring conference in Austin, TX

2015 – Co-Chair, Chemical and Catalytic Conversions and Processes for Renewable Feedstocks session at the annual AIChE conference in Salt Lake City, UT.

2014 – Lamar University Strategic Planning Committee

2014 – University Merit Award (Lamar University)

2014 – Co-Chair, AIChE Sustainability Engineering Forum

2014 – Chair, New Uses for Glycerol session at the annual AOCS conference in San Antonio, TX.

2013 – Chair, Integrated Thermo-Chemical and Biochemical Processing for Renewable Fuels and Chemicals session at the annual AIChE conference in San Francisco, CA.

2013 – Co-Chair, Recovery of Value-Added Co-Products from Biorefinery Residuals and Effluents at the annual AIChE conference in San Francisco, CA.

2012 Chair, Southeast Texas AIChE local section

2012 Co-Chair, Integrated Thermo-Chemical and Biochemical Processing for Renewable Fuels and Chemicals session at the annual AIChE conference in Pittsburgh, PA.

2011 Chair, New Uses for Glycerol session at the 102<sup>nd</sup> American Oil Chemists' Society conference in Cincinnati, OH.

2010 Co-Chair, Biorefinery – Biochemical Conversion and Biomass Recalcitrance session at the American Institute for Chemical Engineers annual conference held in Salt Lake City, UT.

2010 Co-Chair, New Uses for Glycerol session at the 101<sup>st</sup> American Oil Chemists' Society conference held in Phoenix, AR.

2009 Co-chair, Green Chemistry special session at the 100<sup>th</sup> annual American Oil Chemists' Society conference held in Orlando, FL

2008 Industrial Oil Products Division Student Award for the American Oil Chemists' Society

2007 First place Dave C Swalm School of Chemical Engineering student paper competition

2007 Hearin Fellowship Recipient

2007 Third place poster presentation award at the student poster competition for the 2007 Mississippi Academy of Sciences annual conference

2007 Co-chair, Biorefineries session at the 98<sup>th</sup> annual American Oil Chemists' Society conference held in Quebec, Canada

2006 Delegate at the 27<sup>th</sup> annual Council for Chemical Research meeting. This delegation arose from an essay writing competition.

2005 Search Committee member for the Director of the Dave C. Swalm School of Chemical Engineering at Mississippi State University

## **COURSE TEACHINGS**

### Lamar University

CHEN 4420 – Mass Transfer (Fall '09, Fall '12, Fall '13, Fall '14, Fall '15, Fall '16)

CHEN 3310 – Momentum Transfer (Fall '10, Fall '11, Summer '12, Summer '13)

CHEN 4310 – Unit Operations Laboratory (Fall '11, Fall '12, Fall '13, Fall '14, Fall '15, Fall '16)

CHEN 3330 – Thermodynamics II (Summer '12, Summer '13, Summer '14)

CHEN 6347 – Advanced Thermodynamics (Spring '12, Spring '13, Spring '14, Spring '15, Spring '16)

CHEN 5301 – Industrial Chemical Catalysis (Spring '10, Spring '11, Summer '14)

### Mississippi State University

CHE 3223 – Mass Transfer (Spring '09)

CHE 6000 – Bio-analytical Research Methods (Fall '08)

CHE 3203 – Fluid Flow Operations (Fall '06)

### **RESEARCH GRANTS (funded)**

“Biodiesel Production via Transmethylation of Triglycerides: A Glycerol-free Biofuel,” Project supported by the Texas Hazardous Waste Research Center, FY 2010 (\$15,000), FY 2011 (\$18,250) – PI.

“Temperature Programmed Desorption (TPD) Study for a CO<sub>2</sub> Sequestration Catalyst” Project supported by Lamar University REG, (\$5,000) – PI.

“Hydrotreating Phospholipids: Developing the Biorefinery for Microbial Oils” Project supported by the Texas Hazardous Waste Research Center, FY2013 (\$20,000) – PI.

“Heterogeneous Catalyst Development for the Conversion of Phospholipid-Containing Feedstocks to Renewable Transportation Fuels” Project supported by the Texas Hazardous Waste Research Center, FY2014 - 2015 (\$30,000) – PI.

“In Situ Raman Study for a Renewable Fuels Catalyst” Project supported by Lamar University REG, FY2014 (\$5,000) – PI.

“MRI: Acquisition of an LC/MS/MS System for Multidisciplinary Research and Educational Projects” Project supported by NSF – MRI, FY2014 – FY2016 (\$456,549) – Senior Personnel

“Lamar Introduction to Engineering (LITE)” Project supported by Texas Higher Education Coordinating Board for junior high school engineering summer camp FY2014 (\$12,500) – PI.

“Lamar Introduction to Engineering (LITE)” Project supported by Texas Higher Education Coordinating Board for junior high school engineering summer camp FY2015 (\$13,998) – PI.

“Lamar Introduction to Engineering (LITE)” Project supported by ExxonMobil for junior high school engineering summer camp FY2015 (\$15,000) – PI.

“Direct Photocatalytic Conversion of CO<sub>2</sub>-Containing Flue Gases” Project supported by Texas Air Research Center, FY201 – 2018, (\$33,450) – PI.

“Development and Testing of Amine-Type Scavengers for the Removal of H<sub>2</sub>S from Liquid Sour Crudes” Project Supported by Texas Hazardous Waste Research Center FY2016 – 2018, (\$23,000) – PI.

“Lamar Introduction to Engineering (LITE)” Project supported by Texas Higher Education Coordinating Board for junior high school engineering summer camp FY2015 (\$12,900) – PI.

“Lamar Introduction to Engineering (LITE)” Project supported by ExxonMobil for junior high school engineering summer camp FY2015 (\$15,000) – PI.

“Large Volume Carbon Dioxide Conversions Using Functionalized Visible Light Activated Photocatalytic Materials” Project supported by Center for Advances In Water and Air Quality, FY 2016, (\$25,000) – PI.

“MRI – Acquisition of Transmission Electron Microscope at Lamar University” Submitted to NSF MRI (\$525,000) – coPI

### **SUBMITTED RESEARCH PROPOSALS (unfunded)**

“Critical Fundamental Catalytic Issues in Hydrotreating Phospholipids for Producing Biofuels” Submitted Aug 2009 to NSF – Division of Chemistry – Chemical Catalysis (3 yr Budget: \$281,781) PI

“CO<sub>2</sub> Sequestration: Methane Conversion to Hydrogen via Trireforming” Submitted May 2010 to Texas Air Research Center (1 yr budget: \$59,270)

“Critical Fundamental Catalytic Issues in Hydrotreating Phospholipids for Producing Biofuels” Submitted Aug 2010 to NSF – Division of Chemistry – Chemical Catalysis (3 yr Budget: \$300,094) PI

“A Novel Biodiesel Using Dimethyl Carbonate as a Transmethylating Agent: Elimination of Unwanted Byproducts” Submitted Sept 2010 to NSF – CBET (3 Yr Budget: \$301,016) PI

“Novel Catalyst Synthesis for CO<sub>2</sub> Sequestration via Trireforming of Effluents from Methane Steam Reforming” Submitted Nov 2010 to ACS – Petroleum Research Fund (2 Yr budget: \$100,000) PI

“A Novel Trireforming Catalyst via Nanoparticle Transition Metal Active Sites: A Catalytic Approach to CO<sub>2</sub> Sequestration” Submitted Mar 2011 to NSF – CBET (3 Yr budget: \$288,647) PI

“Lamar’s Center for Innovation and Commercialization - Proof of Concept Center” Submitted May 2011 to Economic Development Authority (2 Yr budget: \$2,000,000) co-PI

“Comprehensive Diagnosis/Remediation Studies of Gulf Coast Wetlands/Estuaries by DWH Oil Spill” Submitted Jun 2011 to Gulf Coast Research Institute (3 Yr Budget: \$10,000,000) co-PI

“Vibrational Spectroscopic Study of Dangling OH on Atmospheric Interfaces” Submitted Jul 2011 to NSF – Environmental Chemical Science (2 Yr Budget: \$192,990) co-PI

“Synthesis and Application of Nanoparticle Catalysts via Reverse Micelle Self-Assembly”  
Submitted Sept 2011 to NSF – CBET (3Yr Budget: \$335,078) PI

“Catalyst Development for CO<sub>2</sub> Sequestration via Trireforming of Refinery Flue Gases”  
Submitted Nov 2011 to ACS – Petroleum Research Fund (2 Yr Budget: \$100,000) PI

“Development of Process Operational Safety within Chemical Engineering Education”  
Submitted May 2012 to NSF TUES (2 Yr Budget: \$199,709) PI

“Large Volume CO<sub>2</sub> Conversion to Useful Fuels and Chemicals Using Tunable Catalytic Nanostructures” Submitted July 2012 to NSF – CAREER (5 Yr Budget: \$427,215) PI

“SusChEM: Conversion of Phospholipid-Containing Feedstocks to Biofuel via a Bio-Inspired Bifunctional Catalyst” Submitted Oct 2012 to NSF Division of Chemistry (3 Yr Budget: \$281,201) PI

“CO<sub>2</sub> Conversion via Trireforming Using Photocatalysis” Submitted Oct 2013 to ACS – Petroleum Research Fund (2 Yr Budget: \$100,000) PI

“Collaborative Research: Direct Photocatalytic Conversion of CO<sub>2</sub>-Containing Flue Gases to Alcohols” Submitted Feb 2014 to NSF CBET (3 Yr Budget: \$418,773) PI  
(Professor Russell Chianelli (UTEP) co-PI)

“CAREER: Large Volume CO<sub>2</sub> Emission Reduction Through Photocatalysis and Environmental Education and Stewardship” Submitted Jul 2014 to NSF CBET (5 Yr Budget: \$396,741) PI

“Development & Implementation of Carbon Sequestration Methods for High School Curriculum” Proposal submitted to NSF PreK-12, (\$369,186) PI

“CO<sub>2</sub> Conversion via Trireforming Using Photocatalysis” Submitted to ACS PRF New Directions. (\$110,000) – PI

### **SUBMITTED SBIR & STTR PROPOSALS (unfunded)**

“Composite Hydrotalcite – Super High Surface Area Carbon Supercapacitors” F103-158, Sept 2010.

“Catalytic Reforming of Renewable Butanol” NSF, Oct 2010.

“Butanol Microchannel Reformer” EPA, Nov 2010.

“Catalyst Immobilization and Optimization to Eliminate Wastewater from Biofuel Production” DOE, Sept 2010

“High Efficiency Materials and Processes for the Reduction CO<sub>2</sub> to Syngas” AF11-BT07, Sept 2011.

### **UNDERGRADUATE STUDENTS MENTORED**

Tamara Frydson (Lamar)	Bradley Goins (Lamar)	Austin Prince (Lamar)
Samir Budhatoki (Lamar)	Bleinie Dickerson (Lamar)	Jennifer Watters (Lamar)
Maxine Jones (MSU)	Bethany Thompson (MSU)	Tray Achorn (MSU)
Katrina Parker (MSU)	Jared Fisher (MSU)	Allison Forks (MSU)
Britton Eyles (MSU)		

### **HIGH SCHOOL STUDENTS MENTORED**

Jennifer Watters (Silsbee ISD) – currently sophomore chemical engineering at Lamar University  
Dylan Stephens (Silsbee ISD) – currently freshman chemical engineering at Lamar University

### **GRADUATE STUDENTS and POST DOCTORATES MENTORED**

Rafiq Islam (PhD Student) – Dissertation Title “Hydrotalcite/Ligand Catalysts for the Formation of Glycerol-free Biodiesel from Lipid Oil Feedstocks Using Dimethyl Carbonate” (Graduated May 2013)

Yishan Zhang (PhD) – Dissertation Title “Synthesis of Novel Catalysts for the Trireforming Conversion of Carbon Dioxide” (Graduated Dec 2014)

Erfan Raihan (PhD candidate) – Dissertation Title “Catalyst Design and Synthesis for the Conversion of CO<sub>2</sub> and Steam to Syngas using UV/VIS Light” (Expected Graduation May 2016)

Yogesh Kurle (MS) – Thesis Title “Process Development for Triacylglycerol Conversion to a Glycerol-free Biofuel” (Graduated Dec 2011)

Thomas Zacharia (MS) – Thesis Title “Multi-metal Nanoparticle Catalyst Synthesis Using Reverse Micelle Technique” (Graduated Dec 2012)

Hayat Raza (MS) – Thesis Title “Aspen Simulation of Hydrothermal Liquefaction Process for the Conversion of Algae to Renewable Fuels and Chemicals” (Graduated May 2014)

Khaled Alamr (MS) – Thesis Title “Reactor Design and Optimization for Photocatalytic Conversion of Carbon Dioxide” (Graduated Aug 2014)

Joshua Borton (MS) – Thesis Title “Parametric Study for Triazabicyclodecene Catalyzed Biofuel Using High Free Fatty Acid Feedstocks” (Graduated Dec 2014)

Keyvan Mollaeian (MS Student) – Thesis Title “Layered Double Hydroxide Catalyst for the Conversion of Crude Vegetable Oils to a Sustainable Biofuel” (Graduated May 2015)

Juan Cruz (Post Doctoral Research Associate) – Research included fundamental chemistries for the reverse micelle formation and subsequent use for nanoparticle, multi-metal catalysts.

## **REFEREED PUBLICATIONS**

1. **Benson, T.** and George, C. (2005), “Cellulose Based Adsorbent Materials for the Dehydration of Ethanol Using Thermal Swing Adsorption,” *Adsorption Journal*, 11, 697 – 701.  
<http://link.springer.com/article/10.1007%2Fs10450-005-6009-1>
2. **Benson, T.**, Hernandez, R., French, W.T., Alley, E.G., and Holmes, W.E. (2007) “Reactions of Fatty Acids in Superacid Media: Identification of Equilibrium Products,” *Journal of Molecular Catalysis A: Chemical*, 274, 173 – 178. <http://dx.doi.org/10.1016/j.molcata.2007.05.003>
3. **Benson, T.**, Holmes, W.E., White, M.G., French, W.T., Alley, E.G., Hernandez, R. (2007) “Development of a Heterogeneous Catalytic Cracking Reactor Utilizing Online Mass Spectrometry Analysis,” *Journal of Chromatography A*, 1172, 204 – 208.  
<http://dx.doi:10.1016/j.chroma.2007.09.061>
4. **Benson, T.**, Holmes, W.E., White, M.G., French, W.T., Alley, E.G., and Hernandez, R. (2008) “Heterogeneous Cracking of an Unsaturated Fatty Acid and Reaction Intermediates on H<sup>+</sup>ZSM-5 Catalyst,” *Clean – Soil, Air, Water*, 36, 652 – 656.  
<http://onlinelibrary.wiley.com/doi/10.1002/clen.200800050/abstract>
5. **Benson, T.**, Hernandez, R., French, W.T., Alley, E.G., and Holmes, W.E. (2009) “Elucidation of the Catalytic Cracking Pathway for Unsaturated Mono-, Di-, and Triacylglycerides on H<sup>+</sup>ZSM-5 Catalyst,” *Journal of Molecular Catalysis A: Chemical*, 303, 117 – 123.  
<http://dx.doi:10.1016/j.molcata.2009.01.008>
6. Zhu, J., Gu, H., Rapole, S.B., Luo, Z., Pallavkar, S., Haldolaarachchige, N., **Benson, T.**, Ho, T.C., Hopper, J., Young, D.P., Wei, S., and Guo, Z. (2012) “Looped Carbon Capturing and Environmental Remediation: Case Study of Magnetic Polypropylene Nanocomposites,” *RSC Advances*, 2, 4844-4856.  
<http://pubs.rsc.org/en/Content/ArticleLanding/2012/RA/C2RA01150F#!divAbstract>
7. Revellame, E., **Benson, T.J.**, Forks, A.L., French, W., and Hernandez, R. (2012) “Parametric Study on the Production of Renewable Fuels and Chemical from Phospholipid-containing Biomass,” *Topics in Catalysis*, 55, 185 – 195.  
<http://link.springer.com/article/10.1007%2Fs11244-012-9787-1>
8. Revellame, E., Hernandez, R., French, W., Phan, P., **Benson, T.J.**, Forks, A., and Callahan, R. (2012) “Lipid Storage Compounds in Raw Activated Sludge Microorganisms for Biofuels and Oleochemicals Production,” *RSC Advances*, 2 (5), 2015 – 2031.  
<http://pubs.rsc.org/en/content/articlelanding/2012/ra/c2ra01078j#!divAbstract>



9. Islam, R.M., Kurle, Y.M., Gossage, J.L., **Benson, T.J.** (2013) "Kinetics of Triazabicyclodene Catalyzed Triglycerides Conversion to Glycerol-free Biofuel Using Dimethyl Carbonate," *Energy & Fuels*, 27, 1564 – 1569. <http://dx.doi.org/10.1021/ef400048v>
10. **Benson, T.J.**, Richmond, P.C., Leblanc, W. (2013) "Unit Operation Experiment Linking Classroom with Industrial Process," *Chemical Engineering Education*, V47, 91-96.
11. Kurle, Y.M., Islam, M.R., and **Benson, T.J.** (2013) "Process Development and Simulation of Glycerol-free Biodiesel from Canola Oil and Dimethyl Carbonate," *Fuel Processing Technology*, 114, 49-57. <http://dx.doi.org/10.1016/j.fuproc.2013.03.030>
12. Zhang, Y., Cruz, J., Zhang, S., Lou, H., **Benson, T.J.** (2013) "Process Simulation and Optimization of Methanol Production Coupled to Tri-reforming Process," *International Journal of Hydrogen Energy*, 38, 13617 – 13630. <http://dx.doi.org/10.1016/j.ijhydene.2013.08.009>
13. Islam, Md. R., Guo, J., Rutman, D., **Benson, T.J.** (2013) "Immobilization of Triazabicyclodecene in Surfactant Modified Mg/Al Layered Double Hydroxides," *RSC – Advances*, 3, 24247 – 24255, <http://dx.doi.org/10.1039/C3RA43051K>
14. **Benson, T.**, Daggolu, P., Hernandez, R., Liu, S., and White, M. (2013) "Review – Deoxygenation Chemistry for Biomass Feedstock Conversion," *Advances in Catalysis*, 56, 187 – 353. (Book Chapter) <http://dx.doi.org/10.1016/B978-0-12-420173-6.00003-6>
15. Zhang, Y., Zhang, S., Gossage, J., Lou, H., **Benson, T.J.** (2014) "Thermodynamic Analysis of Tri-reforming Reactions to Produce Syngas," *Energy & Fuels*, 28, 2717 – 2726. <http://dx.doi.org/10.1021/ef500084m>
16. Zhang, Y., Zhang, S., Gossage, J., Lou, H., **Benson, T.J.** (2014) "A Conceptual Design by Integrating Steam Reforming and Dry Reforming Coupled with Partial Oxidation of Methane Processes for CO<sub>2</sub> Emission Reduction," *Chemical Engineering & Technology*, 37, 1493 – 1499. <http://onlinelibrary.wiley.com/doi/10.1002/ceat.201400132/abstract>
17. Fang, Y., Rasel, M.A.K., **Benson, T.J.**, Richmond, P.C. (2014) "Novel Hands-on Water Overflow SIS Experiment in Undergraduate Process Control Laboratory," *Chemical Engineering Education*, V49, 37 – 46.
18. Zhang, Y., Zhang, S., **Benson, T.J.** (2015) "A Conceptual Design by Integrating Dimethyl Ether (DME) Production with Tri-reforming Process for CO<sub>2</sub> Emission Reduction," *Fuel Processing Technology*, 131, 7 – 13. <http://www.sciencedirect.com/science/article/pii/S0378382014004731>
19. Mollaeian, K., Wei, S., Islam, M.R., Dickerson, B., Holmes, W.E., Benson, T. J. (2016) "Development of an Online Raman Analysis Technique for Monitoring the Production of Biofuels" *ACS Energy & Fuels*, 30 (5), 4112-4117. <http://dx.doi.org/10.1021/acs.energyfuels.6b00313>

## **ORAL PRESENTATIONS**

1. 20 April 2000 – “Batch Oxidation of White Phosphorus in Aqueous Solution in a Parr Bomb Reactor” – This was presented at the AIChE Southern Regional Student Conference
2. 26 September 2001 – “Separation of Fermenter Effluents” – At the 2001 Gulf Coast Regional Environmental Conference, I presented this paper describing the use of biomass adsorbents, derived as by-products, to dehydrate ethanol.
3. 6 June 2002 – “Pilot Scale Peroxone Treatment of Groundwater Contamination with PCP” – At the 2002 Water Environment Federation Conference in Jackson, MS, I presented the results from a pilot plant project in south Mississippi
4. 26 June 2002 – “Innovative Adsorbents for the Dehydration of Ethanol” – Presented the results of Master’s thesis project at the 18<sup>th</sup> Annual International Few Ethanol Workshop and Tradeshow in Springfield, IL.
5. 25 March 2003 – “Separation of Ethanol from Fermenter Effluents” – Presented information on the process of distillation and dehydration of fermented ethanol at the 2003 Mississippi Biomass Conference in Jackson, Ms.
6. 19 November 2003 – “Development of New Adsorption Materials for the Dehydration of Ethanol” – Presented results from master’s thesis project at the 2003 Annual AIChE conference in San Francisco, CA.
7. 9 November 2004 – “Producing Electric Power from Broiler Litter” – Presented at the 2004 Annual AIChE conference in Austin, TX.
8. 1 November 2005 – “Production of Biodiesel from Lipid-Rich Industrial Waste Streams” – Presented at the 2005 Annual AIChE conference in Cincinnati, OH.
9. 15 November 2006 – “Cracking of Lipid Molecules by a Superacid” – Presented at the 2006 Annual AIChE conference in San Francisco, CA.
10. 28 March 2007 – “Product identification from the catalytic cracking of *cis*-9-octadecenoic acid” – Presented at the 233<sup>rd</sup> ACS National Meeting and Exposition in Chicago, IL.
11. 14 May 2007 – “Online Mass Spectrometry Analysis of a Catalytic Cracking Reactor.” Presented at the 98<sup>th</sup> Annual AOCS Meeting & Expo in Quebec City, QC.
12. 16 May 2007 – “Cracking of Fatty Acids Over H-ZSM-5 Catalyst: Elucidation of Reaction Mechanisms” – Presented at the 98<sup>th</sup> Annual AOCS Meeting & Expo in Quebec City, QC.

13. 27 August 2007 – “Catalytically Cracking of Unsaturated Lipids of H-ZSM-5” – Presented at the 2007 Mississippi State University Biofuels Conference.
14. 9 November 2007 – “Identification of The Cracking Mechanism of Mono-, Di-, and Triglycerides Over H<sup>+</sup>Zsm-5 Catalyst” – Presented at the 2007 annual AIChE conference in Salt Lake City, UT.
15. 20 May 2008 – “Elucidation of Mechanism for the Cracking of Unsaturated Lipids Using a Benchmark Catalyst and Commercial Catalysts” Presented at the 98<sup>th</sup> Annual AOCS Meeting & Expo in Seattle, WA.
16. 2 June 2008 – “Catalytic Cracking Reaction Pathway for Unsaturated Acylglycerides on a Benchmark Catalyst and Commercial Catalysts” Presented at the Clean Technology and Sustainable Industries Conference and Trade Show in Boston, MA.
17. 14 August 2008 – “Renewable Diesel: Production Chemistry and Economics” Presented at the 3<sup>rd</sup> annual Biofuels Conference at Mississippi State University.
18. 19 August 2008 – “Proposed Teaching, Research, and Service Philosophy at Florida A&M” Invited Speaker. Presented to the Department of Biological and Agricultural Systems Engineering at Florida A&M University.
19. 25 August 2008 – “Determination of reaction pathway for the Heterogeneous Catalytic Cracking of Unsaturated Acylglycerides” Presented at the 18<sup>th</sup> International Congress of Chemical and Process Engineering in Prague, Czech Republic.
20. 18 November 2008 – “Renewable Diesel: Production Chemistry and Economics” Presented at the 2008 annual AIChE conference in Philadelphia, PA.
21. 20 November 2008 – “Product Distribution for Heterogeneous Catalytic Cracking of Acylglycerides on Commercial Catalysts” Presented at the 2008 annual AIChE conference in Philadelphia, PA.
22. 20 November 2008 – “Identification of Metals Found In Biofuel Lipids Using Inductively Coupled Plasma/mass Spectrometry” Presented at the 2008 annual AIChE conference in Philadelphia, PA.
23. 31 March 2009 – “Conversion of Lipid Feedstocks to Renewable Fuels: Production of Renewable Diesel” Invited Seminar. Presented to the Department of Chemical Engineering at Lamar University.
24. 6 April 2009 – “Production of Green Fuels from Lipids: In Search of Reaction Pathways” Invited Seminar. Presented to the Dave C. Swalm School of Chemical Engineering at Mississippi State University.

25. 27 April 2009 – “Conversion of Lipid Feedstocks to Renewable Fuels: Production of Renewable Diesel” Invited Seminar. Presented to the Department of Chemical Engineering at Worcester Polytechnic University.
26. 6 May 2009 – “Heterogeneous Catalytic Cracking of Phospholipids to Renewable Fuels” Invited Speaker. Presented at the 2009 annual AOCS conference in Orlando, FL.
27. 4 Nov 2009 – “Conversions of Phospholipids to Renewable Diesel: Reaction Pathways and Effects on Hydrotreating Catalysts” Presented at the 2009 annual AIChE conference in Nashville, TN.
28. 19 May 2010 – “Production of Biodiesel Using Dimethyl Carbonate as the Methylating Agent: A Glycerol-free Biofuel.” Presented by graduate student, Michael Miguez, at the annual AOCS conference in Phoenix, AZ.
29. 15 June 2010 – “Development of an Ideal Hydrotreating Catalyst for the Conversion of Phospholipids to Biofuels.” Presented at the 21<sup>st</sup> International Symposium for Chemical Reaction Engineering in Philadelphia, PA.
30. 9 Nov 2010 – “Production of Biodiesel Using Dimethyl Carbonate as the Methylating Agent: A Glycerol-free Biofuel” Presented by graduate student Michael Miguez at the 2010 annual AIChE conference in Salt Lake City, UT.
31. 3 May 2011 – “Alternate Methylating Agent in Producing Glycerol-free Biofuel” Presented at the 102<sup>nd</sup> annual AOCS conference in Cincinnati, OH.
32. 18 Oct 2011 – “In situ FTIR Study for Tri-Reforming Reaction” Presented by graduate student Yishan Zhang at the annual AIChE conference in Minneapolis, MN.
33. 19 Oct 2011 – “Development of Nanoparticle Catalyst for the Trireforming of CO<sub>2</sub>-Rich Flue Gases” Presented at the annual AIChE conference in Minneapolis, MN.
34. 19 Oct 2011 – “Unique Processing Considerations for the Trireforming of CO<sub>2</sub> to Syngas” Presented at the annual AIChE conference in Minneapolis, MN.
35. 28 Mar 2012 – “From Nano-Catalyst to Trireforming Process: Engineered CO<sub>2</sub> Conversion” Presented at the ACS Annual Spring conference in San Diego, CA.
36. 1 Apr 2012 – “Reviving a Dormant Section: A Case Study” Presented at the AIChE Local Section Leadership Workshop in Houston, TX.
37. 23 Aug 2012 – “Catalytic and Process Development for Glycerol-free Biofuel from Acylglyceride Lipids” Presented at the ACS Annual Fall conference in Philadelphia, PA.
38. 23 Aug 2012 – “In situ FTIR Spectroscopy for the Conversion of CO<sub>2</sub> to Syngas via Trireforming” Presented at the ACS Annual Fall conference in Philadelphia, PA.

39. 29 Oct 2012 – “Reverse Micelle Synthesis and Characterization of Nanoparticle Catalysts for Tri-Reforming of CO<sub>2</sub>” Presented at annual AIChE conference in Pittsburg, PA by (Presented by Yishan Zhang-PhD student)
40. 29 Oct 2012 – “Biodiesel Production Without Glycerol Byproduct: Dimethyl Carbonate As Replacement for Methanol” Presented at annual AIChE conference in Pittsburg, PA by (Presented by Tamara Frydson-undergraduate paper competition)
41. 30 Oct 2012 – “A Distillation Experiment Linking Classroom with Industrial Processing” Presented at annual AIChE conference in Pittsburg, PA as part of the ChE Curriculum symposium.
42. 1 Nov 2012 – “In Situ FTIR Identification of the Reactive Sites of a Ni/TiO<sub>2</sub> Steam Reforming Catalyst” Presented at annual AIChE conference in Pittsburg, PA by (Presented by Yishan Zhang-PhD student)
43. 1 Nov 2012 – “Simulation and Heat-Integration of Glycerol-Free Biodiesel Plant from Canola Oil with Dimethyl Carbonate” Presented at annual AIChE conference in Pittsburg, PA by (Presented by Mohammad Rafiqul Islam-PhD student)
44. 25 Sept 2013 – “Catalytic and Process Development for Glycerol-free Biofuel from Lipids” Presented to Renewable Biofuels, Inc. (invited talk)
45. 3 Nov 2013 – “Kinetic Evaluation and Reactor Modeling for Transesterification of Lipids With Dimethyl Carbonate Using the Homogeneous Catalyst Triazabicyclodecene” Presented at annual AIChE conference in San Francisco, CA.
46. 4 Nov 2013 – “Experience Using Inexpensive Water Overflow Experiment to Demonstrate SIS Concepts” Presented at annual AIChE conference in San Francisco, CA. (Presented by colleague Dr. Peyton Richmond)
47. 7 Nov 2013 – “Development of a Heterogeneous Guanidine Base Catalyst for the Conversion of Lipids to a Sustainable Biofuel” Presented at annual AIChE conference in San Francisco, CA.
48. 7 Nov 2013 – “Process Simulation and Optimization of Methanol Production Coupled to Tri-Reforming Process” Presented at annual AIChE conference in San Francisco, CA. (Presented by Yishan Zhang-PhD student)
49. 31 Mar 2014 – “Kinetic and Thermodynamic Aspects for CO<sub>2</sub> Conversion to Methanol via Trireforming” Presented at the annual AIChE spring conference in New Orleans, LA.
50. 6 May 2014 – “Overview: What’s Around the Corner for the Glycerol Market?” Presented at the annual AOCS Conference in San Antonio, TX.

51. 27 April 2015 – “Photocatalyst Development and Reactor Design for the Conversion of Carbon Dioxide and Water to Syngas” Presented AIChE Spring Conference in Austin, TX (Presented by Md. Erfan Raihan-PhD student)
52. 2 Oct 2015 – “Carbon Dioxide Conversion Through Tri-Reforming: Reactor/Process Design and Optimization” Presented at the AIChE Southwest Process Technology Conference in Galveston, TX - Won Best Speaker Award
53. 9 Nov 2015 – “Optimized Annular Reactor Modeling and Performance for Photocatalytic Carbon Dioxide Conversion” Presented at AIChE annual conference in Salt Lake City, UT (Presented by Md. Erfan Raihan-PhD student)
54. 9 Nov 2015 – “Carbon Dioxide Conversion: Catalyzing the Reaction and Society’s Interest” Presented at the Area Plenary session of Health, Safety & Environmental Sustainability at AIChE annual conference in Salt Lake City, UT
55. 11 Nov 2015 – “A Parametric Study for the Conversion of High Free Fatty Acid Lipid Feedstocks to Biofuel Using Triazabicyclodecene Catalyst” Presented at AIChE annual conference in Salt Lake City, UT (Presented by Obakore Agbroko-PhD student)
56. 26 Aug 2016 – “Carbon Dioxide Conversion Through Tri-Reforming: Reactor/Process Design and Optimization” Presented at the Southeast Symposium on Contemporary Engineering Topics in Jackson, MS

## **POSTER PRESENTATIONS**

1. Jones, M., Benson, T., and George, C. (2002) “Ethanol: Fuel for the New Millennium.” Presented at the 1<sup>st</sup> annual E-Week poster competition at Mississippi State University.
2. Smith, T., Benson, T., and George, C. (2003) “Ethanol Dehydration Using Biomass Adsorbents.” Presented at the 2<sup>nd</sup> annual E-Week poster competition at Mississippi State University.
3. Benson, T., Zappi, M., and French, T. (2004) “Preliminary Assessment of the Technical and Economic Viability of Producing Biogas at MS Broiler Poultry Raising Operations.” Presented at the Southern Bio-Products Conference in Biloxi, MS.
4. Benson, T. and George, C. (2004) “Cellulose Based Adsorbent Materials for the Dehydration of Ethanol Using Thermal Swing Adsorption.” Presented at the 8<sup>th</sup> annual Fundamentals of Adsorption in Sedona, AZ.
5. Hartenbower, B., Benson, T., and Zappi, M. (2005) “Methane Generation from Broiler Chicken Litter for the Production of Electrical Energy.” Presented at the Southern Bio-Products Conference in Jackson, MS.

6. Benson, T., Hernandez, R., French, T., and Zappi, M. (2006) "Using Lipids from Industrial Waste Sources to Produce Biodiesel." Presented at the Southern Bio-Products Conference in Choctaw, MS.
7. Benson, T., Holmes, W.E., White, M.G., French, W.T., Alley, E.G, Hernandez, R., (2007) "Development of a Laboratory Scale Catalytic Cracking Reactor." Presented at the 2007 annual AIChE conference in Salt Lake City, UT.
8. Benson, T., Holmes, W.E., Hernandez, R., French, W.T., White, M.G., and Alley, E.G. (2008) "Development of a Laboratory Scale Catalytic Cracking Reactor" – Presented at the Pittcon Conference and Expo 2008 in New Orleans, LA.
9. Forks, A., Benson, T.J., Holmes, W.E., French, W.T., and Hernandez, R. (2009) "Reaction Kinetics for the Homogeneous Catalytic Cracking of a Saturated Triglyceride" – Presented at the 2009 annual AOCS conference in Orlando, FL.
10. Benson, T., Cruz, J., Lou, H., Zhang, Y., Gangadharan, P. (2012) "From Nano-Catalyst to Trireforming Process: Engineered CO<sub>2</sub> Conversion" Presented at the ACS Annual Spring conference SciMix in San Diego, CA.
11. Benson, T.J. and Islam, Md. R. (2013) "Synthesis and Characterization of Guanidine Base-Functionalized Mg/Al Layered Double Hydroxides" Presented the North American Symposium on Chemical Reaction Engineering in Houston, TX.
12. Zhang, Y., Cruz, J., Benson, T.J. (2013) "Development of a Reverse Micelle Catalyst Synthesis Method for Producing Multi-Metal Nano-Structures on a TiO<sub>2</sub> Anatase Support" Presented at the 2013 annual AIChE conference in San Francisco, CA.
13. Benson, T., Raza, H., Roberts, G.W., Fortier, M.O., Stagg-Williams, S.M., Sturm, B.S.M (2013) "Aspen Simulation for the Hydrothermal Liquefaction of Algae to Generate Fuels and Chemicals" Presented at the 2013 annual AIChE conference in San Francisco, CA.
14. Raihan, Md. E. and Benson, T. (2015) "Reactor Simulation of Photocatalytic Carbon Dioxide Conversion By Saturated Steam over TiO<sub>2</sub>" Presented at the 2015 annual AIChE conference in Salt Lake City (Presented by Md. Erfan Raihan-PhD Student)
15. Agbroko, O., Mollaeian, K., Holmes, W., Benson, T.J. (2015) "Online Raman Spectroscopy Analysis Technique for Monitoring Biofuel Reaction Using Heterogeneous Layered Double Hydroxide Catalyst" Presented at the 2015 annual AIChE conference in Salt Lake City (Presented by Obokore Agbroko-PhD Student)