

HOLLY A. STRETZ, PHD.

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EDUCATION:

- PhD Chemical Engineering: University of Texas at Austin (8-2005)
“Nanocomposite Blends of ABS and Montmorillonite: Compatibilization and Dispersion”
Thesis Advisor: Dr. Donald R. Paul
- MS Chemistry: Texas State University, San Marcos, TX (12-1996)
“Rubber-Toughened Blends of Bisphenol A Polycarbonate and Styrene-Maleic Anhydride Copolymer”
Thesis Advisor: Dr. Patrick Cassidy
- BS Chemistry: Texas A&M University, College Station, TX (5-1980)

AWARDS:

- Member of Department award, Insight into Diversity Inspiring Programs in STEM Award, 2018
- TTU University Scholar-Mentor Award, 2018
- TTU Excellence in Creative Inquiry Mentoring Award, 2018
- TTU College of Engineering Teacher-Scholar Eminence Award, 2016
- TTU College of Engineering Teacher-Scholar Eminence Award, 2015
- TTU College of Engineering Brown-Henderson Award, honoring teaching and service, 2013.
- ASEE Southeastern Section New Faculty Research Award, 2010.
- TTU Sigma Xi Outstanding Research Award, 2009.
- TTU College of Engineering Kinslow Award, best paper written by a TTU engineering faculty, 2007.
- American Institute of Chemical Engineers Student Chapter Advisor, Tennessee Technological University, 2005-2006.(First Place, Team National Chem-E-Car Champions, 11-2005.)
- Marion Johnson Society of Plastics Engineers Presidential Scholarship, 2003 -2005.
- SAMPE Outstanding Paper of Conference Award, 2003 (out of 350 papers).

ACADEMIC AND PROFESSIONAL EXPERIENCE:

a- Academic:

- *Full Professor*, Tennessee Technological University, Cookeville, TN ■ 2017-present. Research program in nanocomposites in sensors, interfacial properties of 3-D printing, nanoparticle-modified composite water treatment membranes, high throughput drug manufacturing.
- *Associate Professor*, Tennessee Technological University, Cookeville, TN ■ 2011-2017. Research program in nanocomposite thermal stability, nano-materials for protein separations, nano-stability of organophotovoltaics, nanoparticle environmental fate and transformation.
- *Assistant Professor*, Tennessee Technological University, Cookeville, TN ■ 2005-2011.

Secondary Teaching – Advanced Placement Chemistry (LBJ Science Academy, Austin, TX. Noblesville High, Noblesville IN. New Braunfels High, New Braunfels, TX.) ■ 1986 - 1998. Developed outreach programs and led award-winning students in advanced and inquiry-based chemistry

b- Professional:

- *Chief Technology Officer*, Promethia Labs LLC, Cookeville, TN ■ 2013-2015. Co-founder of biomedical diagnostics device company based on research patents.
- *Project Manager*, Texas State University, San Marcos, TX ■ 1998 – 2005. Supervised a staff of 4-5 undergraduate and 1 graduate researchers. Assisted in writing proposals, developed collaborations, developed documented quality control program. Proposals won totaled over \$1MM, primarily SBIR.

- *Process Engineer II*, Advanced Micro Devices, Austin TX ■ 1984 – 1986. Provided production engineering support in diffusion, CVD, laser repair and implant.
- *Process Engineer I*, Celanese, Bishop, TX ■ 1983 – 1984. Provided support during scale-up of new plastics compounding products. Responsibility for inventory, analytical development, and troubleshooting leading to commercialization.
- *Plant Chemist*, Celanese, Bay City and Bishop, TX ■ 1980 – 1983. Unit support. Supervised technician in OSHA and RCRA analytical compliance.

PROFESSIONAL LISTINGS:

Academic Keys “Who’s Who in Engineering Education”

PATENTS:

1. “Fluidic System for High Throughput Preparation of Polymeric Microparticles and Nanoparticles,” WO 20151788792 A1, H. A. Stretz, J. Massingill, T. Betancourt, Tennessee Technological University, Texas State University, Chemtor, Filed 11-26-2015.
2. “Thermoresponsive microparticle composite hydrogels for electrophoresis,” US 8177950, J. W. Thompson, H. A. Stretz, P. E. Arce, Tennessee Technological University. Filed 11-21-2008, Issued 05-15-2012.
3. “Nanocomposite polymer hydrogel with aligned nanoparticles,” PCT/US2012/047380, J. W. Thompson, H. A. Stretz, P. E. Arce, Tennessee Technological University, Filed 07-19-2012.

PUBLICATIONS:

a- *Peer-Reviewed Contributions:*

1. Pascal, J. A., Medidhi, K. R., Oyanader, M., A., Stretz, H. A., Arce, P. E., “Understanding collaborative effects between the polymer gel structure and the applied electrical field in gel electrophoresis separation,” *International Journal of Polymer Science*, submitted 7/24/2018.
2. Spreeman, M. E., Stretz, H. A., Dadmun, M. “*Role of Compatibilizer in 3-D Printing of Polymer Blends*,” *Journal of Applied Polymer Science*, submitted 3-25-2018.
3. Altalhi, A., Stretz, H. A., “Analysis of a Nanocomposite Reverse Osmosis Membrane: Resistance to Chlorine,” *Polymer Degradation and Stability*, submitted 1-17-2018.
4. Jamkhindikar, S. P., Stretz, H. A., Massingill, J. L. Jr., Betancourt, T., “High Throughput Fiber Reactor Process for Organic Nanoparticle Production: PNIPAM, Poly(acrylamide) and Alginate,” *Journal of Applied Polymer Science*, 134 (2017) 45524.
5. Esfahani, M. R., Pallem, V. L., Stretz, H. A., Wells, M. J. M., “Core-size regulated aggregation/disaggregation of citrate-coated gold nanoparticles (5-50 nm) and dissolved organic matter: Extinction, emission, and scattering evidence,” *Spectrochimica Acta*, 189 (2018) 415-426.
6. Esfahani, M. R. Pallem, V. L., Stretz, H. A., Wells, M.J.M., “Absorption, fluorescence and scattering spectroscopy of 5-50nm citrate-coated gold nanoparticles: an argument for radius of curvature effects on aggregation,” *Spectrochimica Acta A*, 175 (2017) 100-109.
7. Esfahani, M., Pallem, V., Stretz, H. A., Wells, M.J.M., “Disaggregation of humic acid in the presence of gold nanoparticles, effects of nanoparticle size and pH,” *Environmental Nanotechnology Monitoring and Management*, 6 (2016) 54-63.

8. Koutahzadeh, N., Esfahani, M., Stretz, H. A., Arce, P. E., “Investigation of UV/H₂O₂ pretreatment effects on humic acid fouling at PSF/TiO₂ and PSF/MWCNT nanocomposite ultrafiltration membranes,” *Environmental Progress and Sustainable Energy*, 36 (2017) 27-37.
9. Simhadri, J. J., Stretz, H. A., Arce, P. E., “Choosing the optimal gel morphology in electrophoresis separation by a differential evolution approach,” *Journal of Brazilian Chemical Engineering*, 33 (2016) 123-131.
10. Esfahani, M. R., Tyler, J. L., Stretz, H. A., Wells, MJM, “Effects of a dual nanofiller, nano-TiO₂ and MWCNT for polysulfone-based nanocomposite membranes for water purification,” *Desalination*, 372 (2015) 47-56.
11. Esfahani, M. R., Stretz, H. A., Wells, MJM, “Abiotic reversible self-assembly of fulvic and humic acids in low electrolytic conductivity solutions by dynamic light scattering,” *Science of the Total Environment*, 537 (2015) 81-92.
12. Esfahani, M. R., Stretz, H. A., Wells, MJM, “Comparing humic acid and protein fouling on polysulfone ultrafiltration membranes: adsorption and reversibility,” *Journal of Water Process Engineering*, 6 (2015) 83-92.
13. Simhadri, J., Arce, P. E., Stretz, H. A., “Assessing performance of irregular macrovoids in electrophoresis separations,” *Industrial and Chemical Engineering Research*, 54 (2015) 10434-10441.
14. Ambuken, P. V., Stretz, H. A., Dadmun, M., Kilbey, S. M., “Gas expanded polymer process to anneal nanoparticle dispersion in thin films,” *Solar Energy Materials and Solar Cells*, 140 (2015) 101-107.
15. Kaiser, A., Probst, M., Stretz, H. A., Hagelberg, F., “Aggregates of PCBM molecules: a computational study,” *International Journal of Mass Spectrometry*, 365-366 (2014) 225-231.
16. Ambuken, P.V., Stretz, H.A., Koo, J.H., Messman, J. M., Wong, D., “Effect of addition of montmorillonite and carbon nanotubes on a thermoplastic polyurethane: high temperature thermomechanical properties,” *Polymer Degradation and Stability*, 102 (2014) 160-169.
17. Keen, Olya S.; Bell, Katherine Y.; Cherchi, Carla; Finnegan, Benjamin J.; Mauter, Meagan S.; Parker, Austa Marie; Rosenblum, James S.; Stretz, Holly A., “Emerging Pollutants, Part II: Treatment,” *Water Environment Research, Literature Review*, 61 (2014) 2036-2096.
18. Bell, K.Y., Bandy, J., Finnegan, B. J., Keen, O., Mauter, M. S., Parker, A. M., Sima, L. C., Stretz, H. A., “Emerging pollutants part II - Treatment,” *Water Environment Research Literature Review*, 50 (2013) 2022-2071.
19. Kumar, G., Mahajan, S. M., Stretz, H. A., “Tuning the magneto-optic response of maghemite doped poly phenyl methyl vinyl siloxane through electric field based nanoparticle orientation,” *Optical Materials Express*, 2 (2012) 864.
20. Thompson, J. W., Stretz, H. A., Arce, P. E., Gao, H., Ploehn, H., He, J., “Effect of magnetization on gel structure and protein electrophoresis in polyacrylamide hydrogel nanocomposites,” *Journal of Applied Polymer Science*, 126 (2012) 1600-1612.
21. Simhadri, J. J., Stretz, H. A., Oyanader, M., Arce, P. E., “Role of gel morphology in the separation of biomolecules: Review,” *Industrial & Engineering Chemistry Research*, 49 (2010) 11866-11877.

22. Thompson, J. W., Stretz, H. A., Arce, P. E., "Preliminary observations of the role of material morphology on protein-electrophoretic transport in gold nanocomposite hydrogels," *Industrial & Engineering Chemistry Research*, **49** (2010) 12104-12110.
23. Stretz, H. A., "Polymer Nanocomposites, When Is It Useful to Go Nano? Comments." AIChE Kansas City Chapter Newsletter, **25**, 1. <http://www.jec-kc.com/OrgDocs.asp>.
24. Fox, B., Ambuken, P., Stretz, H. A., Payzant, A., Meisner, R., "Organo-montmorillonite barrier layers formed by combustion: Nanostructure and permeability," *Applied Clay Science*, **49**, (2010) 213-223.
25. Pallem, V., Stretz, H. A., Wells, M. J., "Evaluating aggregation of gold nanoparticles and humic substances using fluorescence spectroscopy," *Environmental Science and Technology*, **43** (2009) 7531-7535.
26. Bhosale, P. S., Stretz, H. A. "Gold nanoparticle deposition using CO₂ expanded liquids: Effect of pressure oscillation and surface-particle interactions," *Langmuir*, **24** (2008) 12241-12246.
27. Bhosale, P. S., Panchagnula, M. V., Stretz, H. A., "Mechanically robust nanoparticle stabilized liquid marbles," *Applied Physics Letters*, **93**, (2008) 034109.
28. H. A. Stretz, D. R. Paul, "Properties and morphology of nanocomposites based on styrenic polymers. Part II: effects of maleic anhydride units," *Polymer* **47** (2006) 8527- 8535.
29. H. A. Stretz, D. R. Paul, "Properties and morphology of nanocomposites based on styrenic polymers. Part I: Styrene-acrylonitrile copolymers," *Polymer*, **47** (2006) 8123-8136.
30. H. A. Stretz, D. R. Paul, P. E. Cassidy, "Poly(styrene-co-acrylonitrile)/montmorillonite organoclay mixtures: A model system for ABS nanocomposites," *Polymer*, **46** (2005) 3818.
31. H. A. Stretz, D. R. Paul, R. Li, H. Keskkula, P. E. Cassidy, "Intercalation and exfoliation relationships in melt-processed poly(styrene-co-acrylonitrile)/montmorillonite nanocomposites," *Polymer*, **46** (2005) 2621.
32. H. A. Stretz, W. Wootan, P. E. Cassidy, J. H. Koo, "Effect of exfoliation on poly(styrene-co-acrylonitrile)/montmorillonite nanocomposite flammability," *Polymers for Advanced Technology*, **16** (2005) 1.
33. S. Bourbigot, D. L. Vanderhart, J. W. Gilman, S. Bellayer, H. A. Stretz, D. R. Paul, "Solid state NMR characterization and flammability of styrene-acrylonitrile copolymer /montmorillonite nanocomposites," *Polymer*, **45** (2004) 7627-7638.
34. Z. Shaker, R. Browne, H. Stretz, P. Cassidy, and M. Blanda, "Epoxy-toughened, unsaturated polyester interpenetrating networks," *Journal of Applied Polymer Science*, **84** (2002) 2283-2286.
35. H. A. Stretz, P. E. Cassidy and D. R. Paul, "Rubber-toughened blends of bisphenol A polycarbonate and styrene-maleic anhydride copolymer," *Journal of Applied Polymer Science*, **74** (1999) 1508.

b-Invited Book Chapters:

1. Ambuken, P., Kumar, G., Rabbani Esfahani, M., Pallem, V., Stretz, H. A., "Regulatory and Environmental Issues of Nanotechnology Safety," Ch. 4 R. Asmatulu editor, Nanotechnology Safety, Elsevier, June 2013, ISBN . 9780444594389, p. 43-56.

2. Ambuken, P. V., Stretz, H. A., Koo, J. H., Lee, J., Trejo, R., "High temperature flammability and mechanical properties of thermoplastic polyurethane nanocomposites," ACS Books, Fire Retardant Polymers VI: New Advances in Flame Retardant Chemistry and Science, Ch. 23., 12-18-2012, p. 343-360.
3. Tant, M., Stretz, H. A., Ambuken, P., "Polymeric Composites: Heat Transfer," Encyclopedia of Composites, 2nd ed, Wiley & Sons, 2012, Luigi Nicolais, Assunta Borzacchiello, eds., p. 2212-2225.
4. Harrats, C., Groeninckx, G., book citation of TEM images : Atlas on Phase Morphology, Taylor and Francis (CRC Press), 2008.
5. Bourbigot, S., Vanderhart, D. L., Gilman, J. W., Bellayer, S., Stretz, H. A., Paul, D. R., "Styrene-Acrylonitrile Copolymer/Montmorillonite Nanocomposite: Processing Characterization and Flammability," book section: Flame Retardancy, the Use of Minerals from Micro to Nano, FRPM 2003.

C - Proceedings:

Select Recent Faculty Technical Presentations, INVITED:

1. H. Stretz, "Towards Self-Cleaning Chlorine Resistant Water Treatment Membranes," AICHE/Eastman Corp, Kingsport, TN, 11-15-2017.
2. H. Stretz, "Team Alchemy, an Overview," Center for Educational Research and Teaching Innovation, Missouri University of Science and Technology, Rolla, MO, 2-24-2017.
3. H. Stretz, "Tennessee Technological University Pathways to Innovation," Pathways to Innovation National 3rd Cohort Kickoff Conference, Phoenix, AZ, 1-2016.
4. H. Stretz, "Tennessee Technological University Pathways to Innovation," Pathways to Innovation National Summary Conference, Las Vegas, Nevada, 10-2015.
5. H. Stretz, "Innovation and Entrepreneurship: Network Building and Collaboration," Tennessee EPSCOR State Annual Conference, Nashville, TN, 6/19/2015.
6. M. Aikens, S. Canfield, A. Davis, V. Motevalli, H. Stretz, "I&E Network Building: Connecting Student Innovators with a Bigger Shark Pool," Deshpande Symposium, Lowell, MA, 6/11/2015.
7. E. Nilsen, H. A. Stretz, "Fostering Institutional Change: What Can We learn from Agents in the Field?," Network for Academic Renewal Conference, Transforming STEM Higher Education, Association of American Colleges and Universities, Atlanta, GA, Nov. 8, 2014.
8. H. A. Stretz, M. Rao, "Strategic Doing for Mechanical Engineering, 2014," Tennessee Technological University Department of Mechanical Engineering Faculty Retreat, Cookeville, TN, 08-21-2014.
9. H. A. Stretz, "Gas Expanded Polymer Annealing of PCBM in P3HT Thin Films," Kentucky Organic Electronic Materials Symposium, Lexington, KY, 6/24/2014.

10. H. A. Stretz, "Achieving Scalable Control of Nanoparticle Patterning," Fisk University, Nashville, TN 04-16-2014.
11. H. A. Stretz, "Achieving Nanoparticle Dispersion in Thin Films of Poly(3-Hexyl Thiophene) for Roll-to-Roll Processing," University of Tennessee Space Institute, Tullahoma, TN, 03-05-2014.
12. H. A. Stretz, "Achieving Nanoparticle Dispersion in Thin Films of Poly(3-Hexyl Thiophene) for Roll-to-Roll Processing," University of Tennessee – Knoxville, Knoxville, TN, 1-28-2014.
13. H. A. Stretz, "Achieving Nanoparticle Dispersion in Thin Films of Poly(3-Hexyl Thiophene) for Roll-to-Roll Processing," Eastman Corp., Kingsport, TN 11-20-2013.
14. H. A. Stretz, "Women in SAMPE Panel," SAMPE National Conference, Wichita, KS, 10-2013.
15. H. A. Stretz, C. Cherchi, "Nanoparticles, Zombies and Water Reclamation: Get the Facts!" Training Webinar developed for CDM Smith, 01-30-2013, nationally cast.
16. H. A. Stretz, "Women's Panel, Finding a Work/Life Balance," SAMPE National Conference, Charleston, South Carolina, 10-2012.
17. H. A. Stretz, "From Solar Cells to Hydrogels," University of Texas-Austin Department of Mechanical Engineering, Austin, TX, 07-20-2012.
18. H. A. Stretz, "Aggregation of PCBM in Solvent-Based Deposition with P3HT," Tennessee EPSCoR Thrust I Retreat, Montgomery Bell State Park, 04-25-2012.
19. H. A. Stretz, "Nanoparticle patterning in hydrogels and other nanomagic," East Tennessee State University Department of Physics and Astronomy, Johnson City, TN, 11-15-2011.
20. H. A. Stretz, P. Arce, J. Thompson, R. Sanders, "Polyacrylamide/MMT Nanocomposite Hydrogels: Novel Protein Separations in Electrophoresis," Vanderbilt University Department of Biomedical Engineering, Nashville, TN, 07-21-2011.
21. H. A. Stretz, "Gold Nanoparticles as an Emerging Contaminant in Surface Waters: Fate and Transformation." University of Alabama- Birmingham Department of Materials Science and Engineering, October 05, 2010.
22. H. A. Stretz, "Assembly of nanoparticles: Issues in wet processing." North Carolina State University Department of Chemical Engineering, Raleigh, NC, April 20, 2010.
23. H. A. Stretz, "Engineering Nanocomposites, Properties and Processing," *National Nuclear Security Administration*, 07-02-2009, Kansas City, MO.
24. Stretz, H. A., Pallem, V., "Biomedical Imaging Gold Nanoparticles: Transformation in Surface Water Conditions," US EPA National Exposure Research Laboratory, Athens, GA, 08-27-2008.
25. Stretz, H. A., "Nanomaterials in Ablative Applications," University of Tennessee Space Institute, 06-03-2008.
26. Stretz, H. A., "Nanocomposite Fire Performance: Contribution of Montmorillonite Barrier Layer," Samuel Ginn College of Engineering Chemical Engineering Seminar Series, Auburn University, 10-17-2007.
27. Stretz, H. A., "Montmorillonite Organoclay Dispersion in Styrenic Copolymers Using Melt Compounding," Eastman Chemical, Kingsport TN, 02-07-2007.

Graduate Student/Faculty Collaborative Proceedings:

1. Mohammadizadeh, M., Fidan, I., Stretz, H. A., Ameri, A. "Thermo-mechanical properties of 3-D Printed Fiber-Reinforced Nylon Composites, AICHE Annual Proceedings, Pittsburg, PA Nov. 2018.
2. Bonning, B., Blackburn, J., Stretz, H. A., Wilson, C., "Thermomechanical Behavior of Polymer Films at Cryogenic Temperatures," AICHE Annual Proceedings, Pittsburg, PA, Nov. 2018.
3. Stretz, H. A., Altalhi, A., "Montmorillonite-Modified Aromatic Polyamide Membrane Materials with Chlorine Resistance," AICHE Annual Proceedings, Pittsburg, PA, Nov. 2018.
4. Mohammadizadeh, M., Stretz, H. A., Mu, R., "Fluorescent Metal Nanosensors in IR Range for Nitrate Detection in Water," AICHE Annual Proceedings, Pittsburg, PA, Nov. 2018.
5. Taheri Afarani, H., Stretz, H. A., Massingill, J., Betancourt, T., "Diffusion and Concentration Profiles for Loading D,L-Propranolol in a Crosslinked Drug Carrier, Poly(N-isopropylacrylamide) Hydrogel," AICHE Annual Proceedings, Pittsburg, PA, Nov. 2018.
6. Stretz, H. A., Altalhi, A., "Analysis of a Nanocomposite Reverse Osmosis Membrane: Resistance to Chlorine," North American Membrane Society 2018 National Conference, Lexington, KY, 6-09-2018.
7. Mohammadizadeh, M., Stretz, H. A., Mu, R., IR Fluorescent Probe for Water-Based Agricultural Nutrients, 255th American Chemical Society National Conference, New Orleans, March 18, 2018.
8. Wells, MJM, Esfahani, M. R., Stretz, H. A., "Analysis of natural organic nanomaterial supramolecular self-assembly: Fulvic and humic acids," 254th American Chemical Society National Conference, Washington, D. C., Aug 20, 2017
9. Altalhi, Abdulmajeed, Stretz, H A, "Development and analysis of a thin film nanocomposite membrane: Resistance to chlorine," American Chemical Society National Conference, Washington, D. C., Aug 20, 2017.
10. Tallapudi, Sashanka, Massingill, J., Stretz, H. A., "Synthesis of monodisperse lithium carbonate nanoparticles using an upscaled microfluidic reactor," American Chemical Society National Conference, Washington, D. C., Aug 20, 2017.
11. Altalhi, A., Stretz, H. A., "Development and Analysis of a Thin Film Nanocomposite Membrane: Resistance to Chlorine," AICHE Annual Proceedings, Minneapolis, MN, 10-30-2017.
12. Tallapudi, S., Stretz, H. A., Massingill, J. Jr., "Synthesis of Lithium Carbonate Nanoparticles Using an Upscaled Microfluidic Reactor," AICHE Annual Proceedings, Minneapolis, MN, 10-30-2017.
13. Spreeman, M, Stretz, H. A., "Role of Compatibilizer in 3D Printed Objects," AICHE Annual Proceedings, Minneapolis, MN, 10-30-2017.
14. Wells, MJM, Esfahani, M. R., Stretz, H. A., "Analysis of natural organic nanomaterial supramolecular self-assembly: fulvic and humic acids," ACS Annual Conference Proceedings, Washington, D.C., 8-2017.
15. Stretz, HA, Spreeman, M, Skottegard, E, "Characterization of 3D Printed Parts," AICHE Annual Proceedings, San Francisco, CA, 11-14-2016.
16. Stretz, HA, Pullen, M, Finegan, H, Kisielius, O, "3-D Printed Properties of Interfaces in Fatigue," REU Symposium, Arlington, VA, 10-24-16.

17. Tallapudi, S., Stretz, H., Massingill, J., "Production of monodisperse lithium carbonate nanoparticles to be used as a sacrificial anode template for direct acid fuel cells," 12th National Graduate Research Polymer Conference, Akron, Ohio, 06-21-2016.
18. Jamkhindikar, S., Stretz, H. A., Massingill, J., "Production of monodisperse polyacrylamide & PNIPAm nanoparticles using fiber reactor with high throughput" 12th National Graduate Research Polymer Conference, Akron, Ohio, 06-21-2016.
19. Khoutazadeh, N., Stretz, H., Wiecaorek, M., Arce, P. E., "Surface energy enhancement of poly(butylene-terephthalate) by addition of TiO₂ and polyhedral oligomeric silsesquioxane nanoparticles," AICHE Annual Proceedings, San Francisco, CA, 11-14-2016.
20. Tallapudi, S., Stretz, H., Massingill, J., "Production of monodisperse lithium carbonate nanoparticles to be used as a sacrificial anode template for direct acid fuel cells," AICHE Annual Proceedings, San Francisco, CA, 11-14-2016.
21. Jamkhindikar, S., Stretz, H. Massingill, J., "Production of monodisperse polyacrylamide and poly(N-isopropyl acrylamide (PNIPAM) nanoparticles using Chemtor fiber reactor with high throughput," AICHE Annual Proceedings, San Francisco, CA, 11-14-2016.
22. Jamkhindikar, S., Stretz, H. A., Massingill, J., "Fabrication of alginate nanoparticles using microfluidics, effect of flow rate on dispersity of particle diameters," AICHE Annual Proceedings, Salt Lake City, Utah, 11-2015.
23. Jamkhindikar, S., Stretz, H. A., "Microfluidics to production of LiCO₃ using fractional precipitation," Tennessee EPSCOR State Conference, Nashville, TN, 6-18-2015.
24. Koutahzadeh, N., Esfahani, M. R., Stretz, H. A., Arce, P. E., "Hybrid Advanced Oxidation Process-Ultrafiltration Polysulfone Membrane: Application to Industrial Waste Water Treatment," AICHE Annual Proceedings, Salt Lake City, Utah, 11-2015.
25. Koutahzadeh, N., Esfahani, M. R., Stretz, H. A., Arce, P. E., "Effect of UV/H₂O₂ Pretreatment on the Natural Organic Matter Fouling on Nanocomposite Ultrafiltration Membranes," 2015 North American Membrane Society Boston, MA, 2015.
26. Esfahani, M. R., Stretz, H. A., Wells, MJM, "Effects of a Dual Nanofiller: nano-TiO₂ and MWCNT, for Polysulfone-based Nanocomposite Membranes for Water Purification," 2015 North American Membrane Society Boston, MA, 2015.
27. Wells, MJM, Esfahani, M., Stretz, H. A., "Dynamic Light Scattering and Zeta Potential Investigation of Fulvic and Humic Acid Reversible Self-Assembly in Low Electrolytic Conductivity Solutions," *ACS Annual Conference, Environmental Division*, Denver, CO, 3-24-2014.
28. Russell, S. E., Stretz, H. A., Dadmun, M., Kilbey, S. M. III, "Controlling Solar Cell Active Layers Via Surface Modification and Gas Expanded Polymer Annealing," *AICHE Annual Proceedings*, Atlanta, GA, 11-17-2014.
29. Esfahani, Milad R, Stretz, H. A., "Size and Zeta Potential Behavior of Gold Nanoparticles, Polyelectrolyte Complexation," *AICHE Annual Proceedings*, Atlanta, GA, 11-17-2014.
30. R. Mu, J. Jones, H. A. Stretz, "Development of ZnO Nanostructure - Polyvinylidene Fluoride for Radiation Detection and Sensing," Chemical and Biological Defense Science and Technology Conference, Nov. 17, 2014, St. Louis, MO.

31. M. Rabbani Esfahani, H. A. Stretz, M. J. M. Wells, "Investigation of Humic Acid Fouling on Polysulfone Ultrafiltration Membranes" *24th annual Meeting of North American Membrane Society (NAMS)*, Houston, TX, 6-3-2014.
32. S. Russell, H. A. Stretz, M. Dadmun, M. Kilbey, Z. Seibers, "Controlling Solar Cell Active Layers via Surface Modification and Gas Expanded Polymer Annealing," Center for Nanomaterials Sciences User Meeting, Oak Ridge National Laboratory, Oak Ridge, TN 09-2014.
33. S. Russell, H. A. Stretz, M. Dadmun, M. Kilbey, "Controlling Solar Cell Active Layers via Surface Patterning and Gas Expanded Polymer Annealing," TNSCORE Annual Conference (statewide), Nashville, TN, 06-2014 (invited talk).
34. D. Wong, D. Pinero, M. Jaramillo, J. H. Koo, P. V. Ambuken, H. A. Stretz, "Ablation and Combustion Characteristics of Thermoplastic Polyurethane Nanocomposites," AIAA/ASME/SAE/ASEE Joint Propulsion Conference, San Jose, CA, July 15 2013.
35. K. Shpik, R. Tijaro, H. A. Stretz, P. E. Arce, "Electrokinetic Separation of Heavy Metals in Porous Media, an Experimental Approach," *AICHE Annual Proceedings*, San Francisco, CA, 10-28-2013.
36. M. R. Esfahani, V. Pallem, H. A. Stretz, "Complexation of Various Polyelectrolytes with Gold Nanoparticles, Colloidal Properties," *AICHE Annual Proceedings*, San Francisco, CA, 10-28-2013.
37. M. R. Esfahani, H. A. Stretz, "Investigation of Adsorption-Deposition Behavior of Natural Organic Matter Fouling on Polysulfone Ultrafiltration Membrane," *AICHE Annual Proceedings*, San Francisco, CA, 10-28-2013.
38. M. R. Esfahani, H. A. Stretz, M. J. M. Wells, "Determination of the Effect of Humic Acid Aggregation on Membrane Fouling by Zeta Potential and Dynamic Light Scattering," *AICHE Annual Proceedings*, San Francisco, CA, 10-28-2013.
39. P. V. Ambuken, H. A. Stretz, "Concentration Profile of Oscillation Annealed PCBM in P3HT Films," *AICHE Annual Proceedings*, San Francisco, CA, 10-28-2013.
40. A.W. Sherrill, H. A. Stretz, P. E. Arce and G. A. Holburn, "Synthesis of PNIPAM Microparticles With Novel Fiber Packed Reactor for Use in Hydrogels," *AICHE Annual Proceedings*, San Francisco, CA, 10-28-2013.
41. C. P. Mbachu, H. A. Stretz, A. H. Elsayy, P. E. Arce, "Modeling of a Fiber-Packed Reactor Under Laminar Regime for the Production of Chemicals, Including Biodiesel and Nanoparticles," *AICHE Annual Proceedings*, San Francisco, CA, 10-28-2013.
42. D. N. Wong, D. Pinero, J. H. Koo, P. Ambuken, H. A. Stretz, "Thermoplastic Polyurethane Nanocomposites, Ablation and Charring Characteristics," *SAMPE Proceedings*, Long Beach, CA, 05-2013.
43. Esfahani, MR, Stretz, HA, Wells, MJM, "Investigation of humic acid aggregation by zeta potential and dynamic light scattering," ACS National Proceedings, ENVR division, New Orleans, LA, 04-8-2013.
44. Wong, D, Koo, J, Stretz, HA, Ambuken, P, "Analyzing ablative and combustion characteristics of thermoplastic polyurethane nanocomposites," AIAA Joint Propulsion Conference and Exhibit: Solid Rocket Propulsion, 49th annual, 2012.

45. Simhadri JJ, Stretz HA, Arce PE, "Optimal Resolutions for Microvoids with Imperfections in Gel Electrophoresis," *AICHE Annual Proceedings*, Pittsburg, PA, 10-28-2012.
46. Simhadri JJ, Stretz HA, Arce PE, "Effect of Imperfections in Microvoids on Optimal Time of Separations," *AICHE Annual Proceedings*, Pittsburg, PA, 10-28-2012.
47. Simhadri JJ, Stretz HA, Arce PE, "The Role of Material Scale in Bioseparations," *AICHE Annual Proceedings*, Pittsburg, PA, 10-28-2012.
48. Ambuken PV, Stretz HA, "Thin Film Conductivity Measurement of PEDOT:PSS Nanocomposite Films," *AICHE Annual Proceedings*, Pittsburg, PA, 10-28-2012.
49. Ambuken PV, Stretz HA, Koo JH, Lee JC, Trejo R, "High Temperature Mechanical Properties of Thermoplastic Polyurethane Nanocomposites," *AICHE Annual Proceedings*, Pittsburg, PA, 10-28-2012.
50. Thompson JW, Stretz HA, Arce PE, "Electrophoretic Annular Separator with Combined Poiseuille and Electroosmotic Flow," *AICHE Annual Proceedings*, Pittsburg, PA, 10-28-2012.
51. Esfahani MR, Stretz HA, Wells MJM, "Role of Engineered Nanoparticles in Ultrafiltration of Drinking Water," *AICHE Annual Proceedings*, Pittsburg, PA, 10-28-2012.
52. Esfahani MR, Pallem VL, Stretz HA, Wells MJM, "Aggregation of Humic Substances, Effects of Filtration," *AICHE Annual Proceedings*, Pittsburg, PA, 10-28-2012.
53. Ambuken PV, Stretz HA, Koo J, Lee J, Trejo, R, "High temperature mechanical properties of thermoplastic polyurethane nanocomposites," *ACS Annual Conference, PMSE*, San Diego, CA, 03-2012.
54. Thompson JW, Pascal JA, Stretz HA, Oyanader M, Arce PE, "Effect of Morphology On Optimal Separation Times In Nanocomposite Polymer Gel Electrophoresis: Diverging Annular Pore Morphology" *AICHE Annual Proceedings*, Minneapolis, MN, 10-16-2011.
55. Thompson JW, Stretz HA, Arce PE, Ploehn HJ, Gao H, "Electrophoresis of Proteins in Polyacrylamide/Montmorillonite Hydrogel Composites," *17th Symposium on Separation Science and Technology for Energy Applications*, Gatlinburg, TN 10-24-2011.
56. Simhadri JJ, Oyanader M, Stretz HA, Arce PE, "Analysis of Channel Morphology for Electrophoresis of Bio-molecules: Effect of Axial and Orthogonal Fields," *AICHE Annual Proceedings*, Minneapolis, MN, 10-16-2011.
57. Ambuken P, Stretz HA, Patel H, Cannon D, " A Simple Mechanical Evaluation of Polymer Encapsulant Toughness," *AICHE Annual Proceedings*, Minneapolis, MN, 10-16-2011.
58. Pascal JA, Stretz HA, Oyanader M, Arce PE, "Effect of Morphology on Optimal Separation Times in Nanocomposite Polymer Gel Electrophoresis: Diverging Annular Pore Morphology," *AICHE Annual Proceedings*, Minneapolis, MN, 10-16-2011.
59. Ambuken P, Stretz HA, Koo JH, Lee JC, "Char Layer Mechanical Properties for Thermoplastic Polyurethane Elastomer Nanocomposites," *AICHE Annual Proceedings*, Minneapolis, MN, 10-16-2011.
60. Simhadri JJ, Oyanader M, Stretz HA, Arce PE, "Role of Material Morphology on Electrophoresis of Bio-molecules: Effect of Poiseuille Flow," *AICHE Annual Proceedings*, Minneapolis, MN, 10-16-2011.

61. Thompson JW, Stretz HA, Arce PE, "Impact of Material Morphology on Bioseparations in Nanocomposite Hydrogels: a Modeling Approach in an Annular Channel," *AICHE Annual Proceedings*, Minneapolis, MN, 10-16-2011.
62. Thompson JW, Stretz HA, Arce PE, Ploehn HJ, Gao H; "Effect of Nanoparticle Alignment in PAM-MMT Nanocomposite Hydrogels on Protein Electrophoretic Separations," *AICHE Annual Proceedings*, Minneapolis, MN, 10-16-2011.
63. Payne JT, Black JL, Gunderson LA, Garduno RA, Pallem VL, Stretz HA, Berk SG. Effect of Engineered Nanoparticles on the Ciliate, *Tetrahymena*, in Natural Waters. *American Society for Microbiology Proceedings*, New Orleans, LA, 05-23-2011.
64. Thompson JW, Stretz HA, Arce PE, Ploehn HJ, Gao H. Polyacrylamide –MMT nanocomposite hydrogels: effect of nanoparticle loading on protein electrophoretic mobility. *AICHE Annual Proceedings*, Salt Lake City, UT. 11-2010.
65. Simhadri JJ, Pascal J, Oyanader M, Stretz H, Arce, PE. Comparative study on the effect of material morphology on electrokinetic-based bioseparations. *AICHE Annual Proceedings*, Salt Lake City, UT. 11-2010.
66. Biernacki JJ, Visco DP, Oyanader M, Stretz HA, Abdelrahman M. Research Experience for Teachers in the Manufacturing for Competitiveness in the United States. *AICHE Annual Proceedings*, Salt Lake City, UT. 11-2010.
67. Thompson JW, Wynne S, Stretz HA, Oyanader M, Arce PE. Electro-poiseuille flow modeling in annular geometry. *AICHE Annual Proceedings*, Salt Lake City, UT. 11-2010.
68. Simhadri JJ, Oyanader M, Stretz HA, Arce PE. Role of nanocomposite hydrogel morphology in electrophoretic separation of biomolecules. *AICHE Annual Proceedings*, Salt Lake City, UT 11-2010. Third place Materials Engineering Science Division poster session.
69. Simhadri JJ, Oyanader M, Stretz HA, Arce PE. Analysis on the effect of channel morphology for electrophoresis of biomolecules: dynamics. *AICHE Annual Proceedings*, Salt Lake City, UT 11-2010.
70. Pallem VL, Stretz HA, Wells MJM, Ma X, Bouchard D. Gold nanoparticles core size effect in interactions with humic substances. *AICHE Annual Proceedings*, Salt Lake City, UT 11-2010.
71. Pallem VL, Stretz HA, Wells MJM, Ma X, Bouchard D. Gold nanoparticle interactions with humic acid: Role of nanoparticle core size effects. *American Chemical Society*, 240 National Meeting, Boston MA, August 22-26, 2010.
72. Pallem VL, Stretz HA, Wells MJM & Kline S. Study of gold nanoparticle interactions with humic acid using Small Angle Neutron Scattering. *Goldschmidt Conference*, Knoxville TN, June 13-18, 2010.
73. Pugh, B. L., McCulley, A., Stretz, H. A., Abdelrahman, M., "Engineering ideas based on nanomaterials into the high school science classroom; research into practice," *American Society of Engineering Education Proceedings*, Louisville, KY, AC-2010-826.
74. J. Simhadri, M. Oyanader, H. A. Stretz, P. E. Arce, "Effect of material morphology on optimal time of separation of bio-molecules," *AICHE Annual Proceedings*, 11-2009.

75. J. Simhadri, J. Pascal, M. Oyander, H. A. Stretz, P. E. Arce, "Effect of material morphology on electrophoresis of bio-molecules: A computational-based approach," *AICHE Annual Proceedings*, 11-2009.
76. J. W. Thompson, H. A. Stretz, P. E. Arce, "Nanocomposite gels for improved separations in clinical diagnostics," *AICHE Annual Proceedings*, 11-2009.
77. V. Pallem, H. A. Stretz, MJM Wells, "Transformation of gold nanoparticles in presence of humic substances," *AICHE Annual Proceedings*, 11-2009.
78. J. Thompson, H. A. Stretz, P. E. Arce, "Towards improved durability of nanocomposite hydrogels for bio-separations," *AICHE Annual Proceedings*, 11-2009.
79. J. Simhadri, M. Oyanader, H. A. Stretz, P. E. Arce, "Effect of material morphology on electrokinetic-based bioseparations: Comparison between computational and analytical results," *AICHE Annual Proceedings*, 11-2009.
80. H. A. Stretz, "Self-assembly of nanoparticles in polymer nanocomposites under fire conditions," *Division of Industrial and Engineering Chemistry Preprints*, 08-2009, ACS, Washington DC.
81. V. Pallem, H. A. Stretz, MJM Wells, "Dispersibility behavior of diagnostic gold nanoparticles in the presence of humic substances," *Division of Environmental Chemistry Preprints*, 08-2009, ACS.
82. J. W. Thompson, H. A. Stretz, P. E. Arce, "Thermoresponsive microparticle gels for electrophoresis, PNIPAM templated PAGE," *AICHE Annual Proceedings*, 11-16-2008.
83. H. A. Stretz, C. Wilson, "Nanomaterials curricula, An interdisciplinary module for chemical engineering," *AICHE Annual Proceedings*, 11-16-2008.
84. V. L. Pallem, H. A. Stretz, MJM Wells, "Biomedical imaging gold nanoparticles, interactions with humic substances," *AICHE Annual Proceedings*, 11-16-2008.
85. P. S. Bhosale, M. V. Panchagnula, H. A. Stretz, "Mechanically robust nanoparticle stabilized transparent liquid marbles," *AICHE Annual Proceedings*, 11-16-2008.
86. J. A. Pascal, H. A. Stretz, M. A. Oyanader, P. E. Arce, "Effects of gel morphology on predicting optimal times of separation in nanocomposite gels," *AICHE Annual Meeting Proceedings*, 11-16-2008.
87. Stretz, H. A., Palla, N., "Modulus-based scaling parameter for process control of exfoliation efficiency in nanocomposite melt compounding," SAMPE Fall Technical Conference, Memphis, TN, 09-08-2008.
88. Pascal, J. A., Stretz, H., Oyanader, M. A., Arce, P. E., "Modeling the electrophoretic transport in nanoparticle-embedded polymer gels," *Division of Colloid and Surface Chemistry Preprints*, ACS, 4-2008.
89. Pallem, V., Stretz, H., Wells, M. J. M., "Biomedical imaging gold nanoparticles: Transformation in surface water conditions," *Division of Environmental Chemistry Preprints*, ACS, 04-2008.
90. Sedrick, H. E., Bollig, J. R., Burns, N. A., Stretz, H. A., Arce, P. E., "Nanoparticle-composite gels for protein separation: synthesis and preliminary characterization," *Division of Colloid and Surface Chemistry Preprints*, ACS, 04-2008.

91. Thompson, J., Stretz, H. A., Arce, P., "Thermoresponsive microparticle gels for electrophoresis: poly-n-isopropyl acrylamide templated PAGE," *Division of Colloid and Surface Chemistry Preprints*, ACS, 04-2008.
92. Fox, J. B., Stretz, H. A., Payzant, A., Meisner, R., "Aggregation of nanoparticles using real-time high temperature x-ray diffraction," *Polymer Materials Science and Engineering Preprints*, ACS, 04-2008.
93. Pascal, J. A., Stretz, H. A., Oyanader, M. A., Arce, P. E., "Electrohydrodynamics in nanoparticle-embedded polymer gels: Effects of morphology and electrostatic potential," *AICHE National Meeting Proceedings*, 11-03-2007.
94. Fox, J. B., Stretz, H. A., John, V. T., Tan, G., He, J., "Reinforcement of nylon-6 with synthesized porous silica nanoparticles," *AICHE National Meeting Proceedings*, 11-03-2007.
95. Bhosale, P. S., Stretz, H. A., Hurst, K. M., Roberts, C. B., "CO₂ Expanded liquid deposition of organoclay thin films," *AICHE National Meeting Proceedings*, 11-03-2007.
96. H. A. Stretz, M. A. Oyanader, "Critical thinking in a senior-level capstone lab: Construction of biodiesel reactors," *AICHE National Meeting Proceedings*, 11-03-2007.
97. Sedrick, H. E., Bollig, J. R., Burns, N. A., Stretz, H. A., Arce, P. E., "Nanoparticle-composite gels for protein separation: Characterization based on acoustic methods," *AICHE National Meeting Proceedings*, 11-03-2007.
98. Sedrick, H. E., Bollig, J. R., Burns, N. A., Stretz, H. A., Arce, P. E., "Nanoparticle-composite gels for protein separation: Synthesis and preliminary characterization," *AICHE National Meeting Proceedings*, 11-03-2007.
99. Hunter, H. J., Holt, C. T., Butcher, C., Stretz, H. A., Carpen, I., Visco, D., Oyanader, M., Arce, P. E., "Female mentoring efforts in chemical engineering at Tennessee Tech: Collaboration among students, faculty and SWE," *AICHE National Meeting Proceedings*, 11-03-2007.
100. Pallem, V. L., Stretz, H. A., "Biomedical imaging nanoparticles in surface water: Surfactant response to environment," Oak Ridge National Lab User Week, SNS and HFIR User Group, 10-08-2007.
101. Bhosale, P. S., Stretz, H. A., "Nanoparticle stabilization study in CO₂ expanded liquid using SANS," Oak Ridge National Lab User Week, SNS and HFIR User Group, 10-08-2007.
102. Stretz, H. A., Paul, D. R., "Properties and morphology of organoclay/poly(styrene-maleic anhydride) nanocomposites: Effect of copolymer structure," *Polymer Materials Science and Engineering Preprints*, 03-26-2006.
103. Stretz, H. A., Paul, D. R., "Properties and morphology of organoclay/poly(styrene-co-acrylonitrile) nanocomposites: Effect of copolymer composition," *AICHE National Meeting Proceedings*, 11-01-2005.
104. Koo, J. H., Pilato, L. A., Wissler, G., Cheng, J., Ho, D., Nguyen, K., Stretz, H., Luo, Z. P., "Flammability and mechanical properties of nylon 11 nanocomposites," *Proc. SAMPE 2005 ISEE*, SAMPE, Covina, CA, 5-2005.
105. H. A. Stretz, D. R. Paul, "Intercalation and exfoliation in melt-processed poly(styrene-co-acrylonitrile)/montmorillonite nanocomposites," *AICHE National Meeting Proceedings*, November 2004.

106. H. A. Stretz, D. R. Paul, "Comparison of mechanical properties and exfoliation of ABS/montmorillonite melt-processed blends with a non-rubber modified model system," *AIChE National Meeting Proceedings*, November, 2004.
107. H. A. Stretz, W. Wootan, J. Koo, J. Weispfenning, J. Luo, "Nanocomposite rocket ablative materials: subscaled ablation test," *SAMPE*, **48**, May 2004.
108. J. H. Koo, H. A. Stretz, A. Bray, J. Weispfenning, Z. Luo, W. Wootan, "Nanocomposite rocket ablative materials: Processing, characterization and performance," *SAMPE*, **48**, May, 2003.
109. J. H. Koo, H. Stretz, W. Chow, A. Cheng, A. Bray, and J. Weispfenning, "Flammability properties of polymer nanostructured materials," *SAMPE*, **48**, May, 2003.
110. J. H. Koo, H. A. Stretz, A. V. Bray, J. Weispfenning, Z. P. Luo, R. Blanski, P. Ruth, "Nanostructured materials for rocket propulsion system: recent progress," *AIAA Structures, Structural Dynamics and Materials Conference*, Norfolk VA, April 7-10, 2003, #1769.
111. J. H. Koo, H. A. Stretz, A. V. Bray, W. Wootan, S. Mulich, B. Powell, J. Weispfenning, and T. Grupa, "Phenolic-clay nanocomposites for rocket propulsion systems," *SAMPE Proceedings*, **47**, May 2002, 1085-1098.
112. A. V. Bray, H. A. Stretz, S. C. Buckner, "Coating effects in microwave NDE in the detection of corrosion for aircraft applications," *Corrosion 2000*, NACE International, Houston, TX.
113. Stretz, H. A., Wootan, M., Cassidy, P. E., Paul, D. R., "Effect of quaternary ammonium ion on exfoliation and flammability of poly (styrene acrylonitrile)/montmorillonite nanocomposites," *7th International Symposium on Polymers for Advanced Technologies*, American Chemical Society, (9-2003) 113.
114. Luo, Z. P., Koo, J. H., Stretz, H. A., Pendleton, M. W., Littleton, R. L., "Microstructural evaluation of polymer nanocomposites as rocket ablative materials," *Microscopy Microanalysis*, **9** (Suppl 2), 2003.
115. Stretz, H. A., Paul, D. R., Li, R., Cassidy, P. E., "Blends of ABS and montmorillonite for recyclable computer housings," *Polymer Preprints*, **43** (2) (2002) 936.
116. Stretz, H. A., Koo, J. H., Dimas, V. M., Zhang, Y., "Flame retardant properties of polycarbonate/montmorillonite clay nanocomposites blends," *Polymer Preprints*, **42** (2), (2001) 50.
117. Stretz, H. A., Dekar, A., Koo, J., "Flame retardant properties of novolac phenolic/bisoxazoline amended with an epoxy-terminated siloxane and clay nanocomposite," *PMSE Preprints*, (2000) 234.
118. Stretz, H. A., Pavlat, K., Koo, J. H., "Recycling atactic polypropylene as a modifier in polyolefin blends," *4th Annual Green Chemistry & Engineering Conference Proceedings*, National Academy of Science, Washington D. C., (2000) 139.
119. Stretz, H. A., Padgett, J., Lehane, G., Koo, J. H., Cassidy, P. E., "Performance of a wood adhesive of recycled poly(vinyl butyral) and phenolic resins," *PMSE Preprints*, **81**, (1999) 409.

COURSES TAUGHT:

1. CHE 7970: Special Topics in Rheology of Particulate Suspensions and Non-Newtonian Fluids, Fall 2017.
2. CHE 7970: Special Topics: Advanced Issues in Gel Science, Spring 2017.
3. CHE 7230: Advanced Nanocomposite Engineering and Technology, Spring 2010.
4. CHE 7970: Special Topics: Issues in the Regulation of Nanotechnology in the Environment. Fall 2011.
5. CHE 6010: Advanced Chemical Engineering Thermodynamics: Spring 2007, Spring 2009, Spring 2011 Spring 2013, Spring 2017. Text: Prausnitz, Lichtenthaler, Gomes de Azevedo.
6. CHE 4330/5330: Polymer Engineering: Spring 2006, Spring 2008, Spring 2010, Spring 2012, Spring 2014, Spring 2016. Text: McCrum, Buckley and Bucknall. (Unique elective course emphasizing polymers of commercial significance, kinetics of synthesis, processing, characterization, mechanical performance.)
7. CHE 4210: Kinetics and Reactor Design: Fall 2005, Fall 2006, Fall 2007, Fall 2008, Fall 2009. Text: Rawlings and Ekerdt.
8. CHE 4131: Transfer Science III: Diffusion and Diffusive-Convective Mass Transfer, Fall 2016. Text: Cussler.
9. CHE 4420: Design. (design coach) Spring 2016, Spring 2017.
10. CHE 3010: Thermodynamics. Fall 2011, Fall 2012, Fall 2014. Text: Smith, Van Ness, Abbot.
11. CHE 3021: Separations and Solution Thermodynamics, Spring 2015, Spring 2016. Text: Smith, Van Ness, Abbot.
12. CHE 3111: Transfer Science I: Conduction, Radiation and Diffusion: Fall 2010. Text: Incropera, DeWitt, Bergman, Levine.
13. ENGR 3951: Engineering – An International and Historical Perspective. Text: N/A. (International studies in France.) Spring 2010, Spring 2011, Spring 2013, Spring 2015, Summer 2017. (co-taught, Dr. Corinne Darvennes)
14. CHE 1010: Freshman Engineering Connections. Fall 2011, Fall 2012, Fall 2013, Fall 2014.
15. LIST 1093: Nanotechnology, Summer 2010, Summer 2011, Summer 2012. (High school outreach.)

RECENT FUNDED EFFORTS:

1. “Improving Interfacial Strength of Printed Weld Lines.”
 - i. DOE Ramp UP, H. Stretz, PI, \$95,227/1 year, funded 3/2016.
2. “High Throughput Nanoparticle Manufacturing for Biomedicine.”
 - i. NIH, J. Massingill, H. Stretz, T. Betancourt, \$150K/1 year, funded 10/01/2014.
3. “REU Site: Summer Research Internships in Manufacturing and Techno-Entrepreneurship Preparation,”
 - i. NSF, J.J. Rencis and V. Motevalli, PI, H. Stretz, S. Canfield, J. Biernacki, Ismail Fidan, A. Anderson, A. Qasaimeh, I Bhattacharya, P. Shervanian. \$374/3 years, Funded 12-8-2013.
4. “Reliability Investigation of Josephson-Junction Based Systems,”
 - i. Lincoln Labs, W. Johnson, PI, H. Stretz, S. Mahajan, C. Wilson, J. Cui, co-PIs, \$1.7 MM/3 years, *Funded 10-30-2014.*
5. REU for Kathryn Shpik, Stanton Hornsby.
 - i. TTU URECA, P. Arce and H. A. Stretz co-PIs, \$6000/3 mos., *Funded 05-2013.*
6. “EPSCOR: Tennessee Advanced Solar Conversion and Innovation Team. Rational Design of the Next Generation Hybrid Organic-Semiconductor Solar Cells”
 - i. NSF Research Infrastructure Improvement, B. Bruce, PI, H. A. Stretz, senior personnel, \$200,000/5 yrs to Stretz group, *Funded 02-2011.*
 - ii. Research Infrastructure, syringe pump, \$15,000, *Funded 11-2012.*
7. “Polymer Microcapsule Pesticide Product Imaging and UV Degradation,”
 - i. Syngenta Corp., H. A. Stretz – PI, \$19,974/6 mos, *Funded 08-2010.*
8. “FY2009 Summer Undergraduate Research Fellowship,”
 - i. NIST, \$15,000, *Funded 05-2009.*
9. “MRI: Extending X-ray Lab Capabilities with Temperature and Atmosphere Control,”

- i. NSF, J. Biernacki, PI, H. A. Stretz, senior personnel, \$171,000 2009, *Funded 08-2009.*
- 10. “RET Site: Research Experience for Teachers in Manufacturing for Competitiveness in the United States (RETainUS)”
 - i. NSF, M. Abdelrahman, PI, H. A. Stretz, senior personnel, \$499,695/3 yr, *Funded 03-01-2009.*
- 11. “Bridging the Gap Between Science and Math Education and Engineering”
 - i. QEP Committee, \$3000/1 yr., *Funded 07-22-2008.*
- 12. “Effect of Responsive Nanoparticles Embedded in a Polymer Gel on Solute Transport,” TTU
 - i. Faculty Research Committee Grant, 1-18-2008, \$4000/1 year, H. A. Stretz, PI, *Funded 08-2008.*
- 13. “FY2007 Summer Undergraduate Research Fellowship,”
 - i. NIST, \$7620, *Funded 05-2007.*
- 14. “Precision-flow pump for Interdisciplinary Undergraduate/Graduate Laboratory Enhancement,”
 - i. TTU Engineering Development Fund, \$10K/1 year, submitted 12-22-2006 *Funded 02-29-2006.*
- 15. “Undergraduate Laboratory Enhancement: Continuous Flow and Bioreactor Experiments,”
 - i. Tennessee State Board of Engineers, \$5000/1 year, submitted 10-31-2006, *Funded 02-05-2006.*
- 16. “Real-Time spectroscopy for Biodiesel Reactor Optimization: A Real World Experimental Study for Senior Chemical Engineering Students,”
 - i. TTU QEP Committee, \$3000/5 mos. submitted 12-2006, *Funded, 12-2006.*
- 17. “Determination of Montmorillonite Nanocomposite Aggregation Rates Using Real Time X-Ray Diffraction Techniques at High Temperatures,”
 - i. NIST, submitted 11-21-2005, \$93,954/1 year, H. A. Stretz, PI (collaborator A. Payzant, Oak Ridge National Labs). *Funded 3-2007.*
- 18. “Effect of Nanoparticle Packing on Surface Roughness and Impact Properties of Multiscale-Reinforced Composites,”
 - i. TTU Faculty Research Committee Grant, 2-20-2006, \$4000/1 year, H. A. Stretz, PI. *Funded 8-2006.*
- 19. “TTU QEP: ENGR 4993. Creative Inquiry, Fermentation Processes.
 - i. TTU QEP Committee Grant, \$11,570/1 year. H. A. Stretz co-PI with Lenly Weathers PI. *Funded 07-2017.*

SUPERVISION:

- a. Graduate Students, Current
 - 1. PhD: Mahdi Mohammadizadeh, “A dual-functional water pollutant sensor/membrane for water purification,” expected 12-2020.
 - 2. PhD: Bo Bonning, “Time temperature superposition theory as it applies to property prediction for polymer films at 4K,” expected 12-2019.
- b. Graduate Students, Graduated
 - 3. MS: Dekar, Aicha, graduated 12-2000, “Flame Retardant Properties of Phenolic Thermoset Amended with Siloxane and Montmorillonite Clay.”
 - 4. MS: Li, Rui, graduated 5-2002, “Flame Retardant System for Acrylonitrile-Butadiene-Styrene (ABS) Polymer Blended with Montmorillonite Clay via Melt-Processing.”
 - 5. MS: Palla, Nagesh, graduated 12-2007, “Scaling of the Reinforcement Effect for Polymer/Montmorillonite Nanocomposites.”
 - 6. MS: Bhosale, Prasad, graduated 12-2007, “Effect of Nanoparticle Layered Deposition on Surface Roughness in Multiscale Epoxy Composites.”
 - 7. MS: Fox, Brent, graduated 12-2008 “Kinetics of Aggregation of Montmorillonite in a Polymer Melt Pool”

8. PhD: Pallem, Vasanta, graduated 05-2011 “Fate and Transformation of Gold Nanoparticles in Surface Water Conditions.” **Research Day Award 2009.**
9. PhD: Simhadri, Jyothi, graduated 05-2012, “Assessing the Role of the Gel Microvoid Scale, Geometry, and Shape on the Optimal Time of Separation in Electrophoresis,” (Co-advised with Dr. Pedro Arce).
10. PhD: Jeffrey Thompson, graduated 05-2012, “Role of Material Morphology on Separation of Proteins in Nanocomposite Hydrogels.” (Co-advised with Dr. Pedro Arce) **Research Day Award 2009 & 2010.**
11. PhD: Preejith Ambuken, graduated 12-2013, “The Influence of Polymer Charring and Crystallization on Nanoparticle Dispersion for Rubbery Polymer Nanocomposites.” **Research Day Award 2012.**
12. MS: Nathan Dick, graduated 12-2014, “Enhanced Verdet Constant via Gold Coated Iron Oxide Nanoparticles and via Change in Host Medium.” (Co-advised with Dr. Satish Mahajan)
13. PhD: Milad Rabbani Esfahani, graduated 05-2015, “Effect of Nanoparticle Solid Inclusions in Water-Treatment Membrane Antifouling.”
14. MS: Sarah Russell, graduate May 2015 “Gas Expanded Polymer Processing Leading to Uniform Azimuthal Distribution of Nanoparticles for Solar Cells.” **Research Day Award 2012.**
15. MS: Bryan Divilbiss, “Fiber Film Reactor Processing/Synthesis of Monodisperse Nanoparticles,” withdrew 05-2016, withdrew 5-2017.
16. MS: Erik Graubner (co-advised with S. Mahajan), “Magneto-Optic Effect as a Function of Temperature,” withdrew 12-2015.
17. MS: Sumit Jamkhidikar, “High Throughput Fiber Reactor Process for Drug Delivery Nanoparticle Production: Alginate, PNIPAm and Polyacrylamide,” graduated 12-2016. **(POLY Travel Award 2016.)**
18. MS: C. Jordan Blackburn (co-advised with C. Wilson), “Mechanical and Thermal Behaviors of Two Polymer Films at Cryogenic Temperatures,” graduated 12-2016.
19. PhD: Negin Koutazadeh (co-advised with P. Arce), “Removal of contaminants from water and oil by using advanced oxidation processes and membrane technology: modification towards performance enhancement,” graduated 8-2017.
20. MS: Matt Spreeman, “Role of Compatibilization in 3-D Printing,” graduated 8- 2017.
21. MS: Sashanka Tallapudi, “Use of a Fiber Reactor to Nanoprecipitate Lithium Carbonate Nanoparticles for Fuel Cell Applications,” graduated 8-2017.
22. MS: Abdulmajeed Altalhi, “Development and Analysis of a Thin Film Nanocomposite Membrane: Resistance to Chlorine,” graduated 12-2017.

c. Thesis Committee Member, Current

1. Uttam Sharma Phuyal, PhD (Dr. A. Callender)
2. Bibek Tiwari, PhD (Dr. Bhattacharya)
3. Ali Zolghadr, PhD (Dr. Biernacki)
4. Behnaz Papari, PhD (Dr. Bhattacharya)
5. Scott Hill, PhD (Dr. S. Canfield)
6. Marshall Norris (Dr. C. Canfield)
7. Koteswararao Medidhi, PhD (Dr. Padmanabhan)
8. Babajide Onanuga, MS (Dr. J. Biernacki)]
9. Micah Rentschler, MS (Dr. Bhattacharya)

c. Thesis Committee Member, Graduated

1. Rylan Cox, MS Mechanical Engineering, Advisor Dr. Chris Wilson, grad 8-2007.

2. Sean Mikel, MS Chemical Engineering, Advisor Dr. C. Wang and Dr. Joe Biernacki, grad 12-2007.
3. Narendar Mogulla, MS Chemical Engineering, Advisor Dr. J. Biernacki, grad 12-2008.
4. Uday Kasavaijula, PhD, Advisors Dr. C. Wang and Dr. P. Arce, grad 05-2009.
5. Pravin Kannan, PhD (Dr. J. Biernacki), grad 05-2009.
6. Matthew Priest, MS (Dr. Zhang, ME), grad 05-2009.
7. Neeharika Anantharaju, PhD (Dr. M. Panchagnula, ME), grad 12-2009.
8. Deepika Rao Gollamandala, MS (Dr. I. Carpen), grad 12-2009.
9. Tiantian Xie, PhD (Dr. J. Biernacki) grad 05-2009.
10. Jennifer Pascal, PhD (Dr. P. Arce) grad 08-2011.
11. Ganapathy, Kumar, PhD (Dr. Mahajan, EE) grad 05-2012.
12. David Kirby, MS (Dr. J. Biernacki) grad 08-2011.
13. Albert Wilson, MS (Dr. J. Biernacki) grad 08-2012.
14. Aukshay Bauskar, PhD (Dr. C. Rice) grad 12-2013.
15. Parvin Golbayani, PhD, (Dr. P. Arce) replaced by Dr. J. Pascal 1-2014.
16. Shilpa Beravelli, PhD (Dr. P. Arce) transferred to another University
17. Antonio Pistono, PhD (Dr. C. Rice-York) grad 12-2015.
18. Aaron Lane, PhD (Dr. C. Wilson), graduated 12-2016.
19. Chinyere Mbachu, PhD (Dr. P. Arce)
20. Brook Abegaz, PhD (Dr. S. Mahajan)
21. Ojas Chaudhari, PhD (Dr. J. Biernacki) graduated 5-2017.
22. Jonathan Dugas, MS (Dr. S. Mahajan) graduated 8-2017.

a. Undergraduate Research

1. Jason Miller, Fall 2005.
2. Fred Uphoff, Spring 2006.
3. Haley Hunter, Summer 2006.
4. Hope Sederick (Holt), Spring 2006, Fall 2007, Spring 2007 **NIST Fellowship, Research Day Award 2007.**
5. Jennifer Bollig, Fall 2006, Spring 2007.
6. Eric Weber, Spring 2007.
7. Clint Robinette, Spring 2006, Summer 2006.
8. Mike Hicks, Spring 2007.
9. Jeffery Thompson, Spring 2007, Summer 2007, Fall 2007, Spring 2008, Summer 2008. **Distinction in the Major. Accepted PhD, Tennessee Technological Univ. Research Day Award 2008.**
10. Heather DeBord, Fall 2007.
11. Johnathan Wheeler, Fall 2007, Spring 2008, Spring 2009.
12. Kendra Bailey, Fall 2007.
13. Nancy (Mandi) Burns. Spring 2007, Summer 2007, Fall 2007. **Accepted PhD, NC State Univ.**
14. Melissa Taylor, Spring 2008, Spring 2009, **Research Day Award 2009.**
15. Phillip Schmidt, Spring 2008.
16. Zach Seibers, Spring 2008, Spring 2009. **Accepted (Fellowship) PhD, University of Tennessee - Knoxville.**

17. Martin Bijou, Spring 2009.
18. Andrew Miller, Fall 2008.
19. Azurae Redmond Johnson, Fall 2008, Spring 2009. **NIST Fellowship, Research Day Award 2009.**
20. Franklin Angulo, Fall 2009, Spring 2010.
21. Julie Shell, Summer 2009, Fall 2009, Spring 2010, Fall 2010.
22. Dustin Cannon, Fall 2010.
23. Torrey Wester, Fall 2010.
24. Julian Lyon, Spring 2011.
25. Hardik Patel, Spring 2011, Summer 2011.
26. Ryan Roman, Fall 2011, Spring 2012.
27. Renaldo Erskine, Spring, 2012, Summer 2012, Fall 2012, **Research Day Award 2012.**
28. Jaime Morrison, Fall 2012, Spring 2013.
29. Minjun Song, Spring 2012.
30. Brian Daniels, Spring 2012, Summer 2012, Fall 2012, Spring 2013.
31. Luke Mirtes, Spring 2012, Fall 2012, Spring 2013, **Research Day Award 2013.**
32. Sierra Garbett, Spring 2012, Fall 2012. **AICHE National Poster Competition Award.**
33. Monroe (Trey) M. Brooks, Fall 2011, Spring 2012.
34. Kathryn Shpik, Spring 2013, Summer 2013. **URECA Summer 2013.**
35. Stanton Hornsby, Summer 2013. **URECA Summer 2013.**
36. George (Alex) Holburn, Fall 2013.
37. Lance Montgomery, Fall 2014. (co-advised Dr. L. Arias-Chavez)
38. Doug Huttes, Spring 2014.
39. Enis Cirak, Spring 2014, Fall 2015. **(UIF)**
40. Nadia Amro, Fall 2014.
41. Eric Gilmer, Fall 2014.
42. Savannah Tinch, Fall 2014. (co-advised Dr. C. Rice)
43. Michael Parkes, Spring 2014.
44. Tessa Eskander, Spring 2015, Summer 2015, Spring 2016 (co-advised with L.Zhang), Summer 2018 **(CISE)** .
45. Landon Tyler, Fall 2014, Spring 2015, Summer 2015, Fall 2015, Spring 2016. **(published w/ Esfahani, accepted PhD, University of Tennessee – Knoxville).**
46. Chris Hillebrand, Summer 2014.
47. Seth Anderson, Summer 2015.
48. Erik Skottgard, Spring 2015, Summer 2015, Summer 2016, Fall 2016, Summer 2017, Fall 2017. **AICHE National Poster Competition – 3rd)**
49. Elizabeth Bickel, Summer 2015 **(NSF REU)**, Fall 2015, Spring 2016, Fall 2016, Spring 2017. **AICHE national student poster competition, 3rd; COE Eminence Award, Distinction in the Major, Rising Renaissance Engineer Award 2017, AICHE Southern Regional Oral Research Presentation - Third Place.**
50. Emily Parsons, Summer 2015, Spring 2016, Fall 2016.
51. Logan Boles, Spring 2015, Summer 2015, Fall 2015.
52. Melea Gilmore, Summer 2015.
53. Elizabeth Terranova, Summer 2016.
54. Oliver Kisielius, Summer 2016 **(NSF REU).**
55. Haley Finegan, Summer 2016 **(NSF REU).**

56. Marsalis Pullen, Summer 2016 (**NSF REU**) (**NSF Undergraduate Research's Research Experiences for Undergraduates Symposium Fellow, accepted PhD Vanderbilt Univ. Fall 2017**).
57. Luce Crimm, Summer 2016, Spring 2017.
58. Parker Lusk, Fall 2016, Spring 2017, Summer 2017, Fall 2017, Spring 2018 (**TTU CISE Research Award, AICHE National Poster competition – 2nd, Posters at the Capitol 2018, TTU CISE HONOR 2018**).
59. William Chaney, Fall 2016.
60. Abdulaziz Abed, Fall 2016, Spring 2017.
61. Tommy Lane (EE undergrad), Fall 2016.
62. Charles Davies (ME undergrad), Fall 2016, Summer 2017, Fall 2017.
63. Cody S. Long (ME undergrad), Fall 2016, Summer 2017, Fall 2017.
64. Christopher Brightwell, Spring 2017.
65. Samantha Long, Summer 2017 (**NSF REU, AICHE National Poster Competition – 3rd**).
66. Christian Bossio, Summer 2017 (**NSF REU**).
67. Chantz Hiroshi Yanagida, Summer 2017 (**NSF REU, AICHE National Poster Competition -3rd**).
68. Shelby Williams, Fall 2017 (**UIF**).
69. Caroline Timpson, Fall 2017, Spring 2018 (**UIF**).
70. Alicen Long, Fall 2017, Spring 2018 (**UIF**).
71. Justin Medley, Fall 2017, Spring 2018 (**UIF**).
72. Abigail Collins, Fall 2017, Spring 2018 (**UIF, COE Spectrum Award**).
73. Corey Stephenson, Spring 2018, Summer 2018 (**CISE**).
74. Erik Kapamas, Spring 2018.
75. Ryan Johnson, Spring 2018.
76. Casey McCormick, Spring 2018, Summer 2018. (**URECA**).
77. Zachary Garner, Summer 2018. (**NSF REU**).

LABORATORIES UNDER DEVELOPMENT:

1. Nanocomposite Materials Laboratory, Department of Chemical Engineering (Prescott Hall 446, 351 and 444). Objectives are to provide an interactive area for graduate and undergraduate researchers to process nanoparticle composites in structured hierarchies. Capabilities include DSM twin screw microcompounder, benchtop injection molder, supercritical CO₂ heated reactor using dual ISCO high pressure syringe pumps, gel electrophoresis, sonication, TA ARES 550 dynamic rheometer (cone and plate), Perkin Elmer near/mid IR spectroscopy, small platen press, rotary evaporator, spin coater.
2. Cryogenic Electronics Laboratory, Department of Electrical Engineering (Brown Hall 221). Objectives are to provide an area for graduate and undergraduate research students to investigate liquid nitrogen-cooled material properties, especially materials used to package CMOS and Josephson-Junction-based computer chips. TA Instruments Q800 dynamic mechanical analysis with liquid nitrogen cooling system.
3. Chemical Engineering Department Analytical Lab. (Clement 351) Perkin Elmer FTIR with ATR, TA Instruments cone and plate rheometer.
4. Extreme Electronics, Department of Electrical Engineering. (Brown Hall 221 and Clement 122G) – co-advising on upgrades with Dr. W. Johnson and Dr. C. Wilson as the leads. TA Instruments Q800 dynamic mechanical analysis.

SERVICE:

a. Professional Service:

1. ASEE Southeast Regional Secretary, elected, 4-2016 to present. Symposium chair, 6-2017.

2. Tennessee University Faculty Senates (TUFS), elected, Executive Committee, Secretary, 8-2014 to 1-2015.
3. ASEE New Faculty Research Award Committee, Southeast Region. 02-2013, 03-2015.
4. First SAMPE Women's Panel Chair, Fall 2012 (Charlotte, NC.) co-moderator for SAMPE Women's Panel Fall 2013. SAMPE National Conference, Session Chair or Technical Reviewer, 2008-2013.
5. AIChE National Programming, Materials Engineering Sciences Division Director (elected), 2009-2011. Division poster session chair 2009-2013.
6. Sigma Xi elected Secretary/Treasurer, TTU Chapter, 2009-2012.
7. AIChE National Meeting, Composites Area 08f, Area programming chair/vice chair 2006-2008. Symposia chair 11-2006 to present. Area 08f programming chair 2015-2017.
8. Adventure Science Museum, Nashville, TN. Panel Discussion "Advances in Material Science". 02-2011.
9. SWE Panelist at National Conference for Engineering Women Future Faculty, 10-2007.
10. Journal review: Macromolecules, Small, Advanced Materials, Industrial & Engineering Chemistry Research, AIChE Journal, Langmuir, Thermochemica Acta, Environmental Science and Technology, Applied Clay Science, Water Research, Polymer, etc.
11. Proposal review: National Science Foundation Environmental Chemical Sciences, Bucknall University Tenure Committee, Petroleum Research Foundation, National Science Foundation, Defense Threat Reduction Agency, NIST, US-Israeli Binational Science Foundation, Oak Ridge National Lab Power Award.

b. University, College and Department Service:

1. TTU Department of Electric Engineering Chair Search Committee. 8-2017
2. TTU College of Engineering Budget Committee. 10-2016 to 12-2016.
3. TTU College of Engineering, elected Academic Council. 5-2015. Special projects: Chair of nominating committee for new Faculty Board of Advisors, Summer and Fall 2016. Hood Infrastructure Improvement Facilitator, Fall 2016 and Spring 2017.
4. TTU College of Engineering and University Innovation and Entrepreneurship Committee, (IDLI, University Innovation Fellow Sponsor, Society of Entrepreneurship Sponsor, Sponsor for Peerspace Provost's Mico-Grant Student Team, I&E Certificate, Eagleworks Competition), 01-2014 to present.
5. TTU University Flight Plan Strategic Planning Committee, Distinctiveness Focus, co-chair. 02-2013 to 09-01-2017.
6. TTU University Research Advisory Committee. 1-2012 to 5-2013.
7. TTU College of Engineering, elected Faculty Senate. 2012 – present.
8. TTU Faculty Search Committees (Chemical and Electrical Engineering), 2010-present.(6 hires)
9. TTU College of Engineering Strategic Planning Committee, 2011-2015.

10. TTU College of Engineering, Library Liaison, 2011-2013.
11. TTU College of Engineering Renaissance Spectrum Awards Committee. 2012 to 2014.
12. TTU College of Engineering Advanced Methods for Manufacturing Sensors, Design and Controls and Nanoparticles and Proteomics in Aquatic Environments Research Focus Committees. 2012 to present.
13. TTU Technology Institute Tablet Initiative, 2007-2013.
14. TTU CAT Scoring Team, 2007-present.
15. TTU Dept. CHE ABET Safety Coordinator and co-CoCoordinator, 8-2013 to 12-2016.
16. TTU Dept. CHE Graduate Coordinator, 1-2010 to 2013.
17. TTU Dept. CHE Undergraduate Coordinator, 1-2008 to 1-2010.
18. TTU Dept. CHE AIChE student chapter faculty mentor. 9-2005 to 1-2008.
19. TTU Dept. CHE Laboratory Safety and Resource Management Committee. 9-2005 to present.
20. TTU Dept. CHE Women's Mentoring Program. 9-2008 to present.
21. TTU Associate Member of the Center for the Management, Utilization and Protection of Water Resources.

c. Outreach Efforts:

1. NSF REU site: Innovation and Techno-Entrepreneurship in Advanced Manufacturing (ITAM). Senior Personnel (PI=Dr. J. Rencis 3-2015 to 3-2018.)
2. SWE "Engineering A Future" Upper Cumberland Section Workshop, Activity leader, 2-2006 annually to present. (~100 girls 5th and 6th grade every year)
3. NSF RET Site: Research Experience for Teachers in Manufacturing for Competitiveness in the United States (RETainUS)," Senior Personnel [PI – Dr. M. Abdelrahman] June 2009 – May 2012. Faculty Mentor and Research Trainer.
4. Tennessee Governor's School on Emerging Technologies at TTU, Instructor of Nanotechnology: (6 weeks outreach with high school students) Summer 2010, Summer 2011, Summer 2012. (~55 students) (10 teachers)
5. TTU President's Academy Instructor: (2 weeks outreach with high school students) Summer 2009, Summer 2008. (36 students)

i. TTU Press releases:

- Summer 2016 Tennessee Tech hosts summer Engineering a Future
- Spring 2016 Gigamunch launches beta version of online food ordering app
- Spring 2016 Two Tech students name university innovation fellows
- Spring 2015 TN-SCORE celebrates five years of statewide collaboration

- In energy research
- Spring 2014 Eagleworks competition awards student innovators
 - Spring 2014 Chemical engineering student engaged in research at Oak Ridge
 - Spring 2014 Chemical engineering welcomes new faculty
 - Fall 2014 Team Alchemy guides planning process at TTU College of Engineering
 - Spring 2014 Cirak named university innovation fellow by NSF-funded Pathways to Innovation
 - Spring 2014 TTU with Launch TN in Washington, D.C.
 - Spring 2014 TTU selected to join national leaders in engineering education
 - Fall 2013 Nanotechnology can provide less expensive cleaner water
 - Fall 2013 TTU chemical engineering student test entrepreneurial talents
 - Fall 2013 College of Engineering faculty pitch ideas to investors
 - Fall 2013 Promethia Emerges from the perfect storm
 - Spring 2013 Faculty Senate Supports Benefit Equality for All Employees
 - Fall 2012 Students Build Wacky Machines to Explore Chemical Engineering
 - Fall 2012 Chemical Engineering Professor Stretz leads historic first career coaching for women in engineering
 - Spring 2011 Chemical Engineering's Holly Stretz named ASEE Outstanding New Faculty
 - Summer 2010 Visions: Engineers in Paris: Spring Break 2010
 - Summer 2009 TN House Joint Resolution 205 honoring A. Johnson
 - Summer 2009 Visions: All about learning
 - Summer 2009 Visions: Teaching and research balance

- June 2009 TTU engineering labs help high schools, RETainUS
- March 9, 2009 NIST National Fellowship to Azurae Johnson
- Summer 2008 *Chemical Engineering Education*, 42, no. 3, 118-124.
- May 2, 2007 Research Day Awards to J. Bollig and H. Sedrick
- April 13, 2007 Kinslow Award

FACULTY DEVELOPMENT WORKSHOPS ATTENDED:

1. Lunch and Learn: Resources for Entrepreneurial Researchers, Volpe Library, Tennessee Technological University, 11-14-2017.
2. Leading Green LEED Associate V4 Workshop, Lorne Mlotek, Vanderbilt University, Nashville, TN, 10-22-2017.
3. TA Instruments: Dynamic Mechanical Analysis Theory and Applications, Dynamic Mechanical Analysis Hands on Course, TA Instruments On-Site Facilitator Dr. Lexie Niemoeller, Tennessee Technological University, 1-12-2017.
4. National Effective Teaching Institute, American Association of Engineering Educators, San Diego, CA, 1-7-2017.
5. Team Alchemy Train the Trainer, 09-2013, TTU College of Engineering.
6. Principal investigator and manager faculty workshop for all disciplines, TTU Office of Sponsored Research, 03-22-14.
7. NSF science: Becoming the Messenger 2 day communications workshop, Knoxville, TN. 11-07-2012.
8. Oak Ridge National Laboratory 2nd Annual Neutron Scattering for Novices Workshop, 05-2012.
9. Rigaku On-Site SAXS Training, Tennessee Technological University, 01-2011.
10. Rigaku On-Site XRD Training, Tennessee Technological University, 07-06 thro 07-09-2009.
11. Tennessee Technological University. ½ Day, "Engineering Education in the College of Engineering: A Workshop for Young Faculty," 08-22-2005.
12. Tennessee Technological University. ½ Day. "Quality Enhancement Plan Legacy Cycle Workshop," 03-30-2007.
13. "2007 ASEE Chemical Engineering Summer School," Washington State University, July28-August 2, 2008.
14. Tennessee Technological University QEP Fostering Critical Thinking Skills Workshop, March 12, 2008.
15. Tennessee Technological University Training for Tablet-PC and Elluminate, "Effects of Teaching with Tablet PCs with Asynchronous Student Access in Post-Secondary STEM Courses on Students with Learning Disabilities."
16. NIST Center for Neutron Research Hands-On Small Angle Scattering Neutron Science Workshop, February 25, 2008. ORNL Scattering Workshops Fall 2010.