

Arthur J. Ragauskas
Professor
2016

Governor's Chair in Biorefining
Fellow American Association for the Advancement of Science
Fulbright Chair of Alternative Energy
BioEnergy Science Center
Oak Ridge National Laboratory
Department of Chemical and Biomolecular Engineering
Department of Forestry, Wildlife, and Fisheries
University of Tennessee, Knoxville, Tennessee

Brief Biographical Sketch

Arthur Ragauskas held the first Fulbright Chair in Alternative Energy and is a Fellow of American Association for the Advancement of Science, the International Academy of Wood Science and TAPPI. In 2014, he assumed a Governor's Chair for Biorefining based in University of Tennessee's Department of Chemical and Biomolecular Engineering, with a complementary appointment in the UT Institute of Agriculture's Department of Forestry, Wildlife, and Fisheries and serves in the US Energy and Environmental Sciences Directorate, Biosciences Division, at ORNL. His research program is directed at understanding and exploiting innovative sustainable bioresources. This multifaceted program is targeted to develop new and improved applications for nature's premiere renewable biopolymers for biofuels, biopower, and bio-based materials and chemicals. His research program has been sponsored by NSF, DARPA, DOD, USDA, DOE, GA Traditional Industry Program, a consortium of industry partners, and several fellowship programs. His Fulbright sponsored activities at Chalmers University of Technology, Sweden were focused on the forest biorefinery and new biofuel conversion technologies for lignocellulosics. Currently, Dr. Ragauskas manages a research group of graduate students, postdoctoral research fellows, a research scientist, and visiting scientists. He is the recipient of the 2014 TAPPI Gunnar Nicholson Gold Medal Award and the ACS Affordable Green Chemistry award and his students have won several awards, including the ACS graduate research award.

Ragauskas is an Associate Editor for Biofuels, Bioproducts and Biorefining, Biofuels, BioEnergy Research, Industrial Biotechnology, Taiwan Journal of Forest Service, TAPPI J., Industrial Biotechnology, Holzforschung, Journal of Biobased Materials and Bioenergy, Journal of Petroleum Technology and Alternative Fuels, The Open Biotechnology Journal, Current Biotechnology, and J. Wood Chemistry and Technology. He is an editorial board member of Sustainability and Journal of Chemical Technology and Biotechnology. Ragauskas has served on several advisory boards and review panels including: Austrian Science Fund, European Commission Research Directorate, National Science Academy, J. Paul Getty Trust, NSF, USDA, DOE, ARAP-E, NSERC, BARD, FIRST, TAPPI Research Management Committee, Netherlands Organization for Scientific Research (NWO), Swedish Foundation for Strategic Research, Swedish VINN Excellence Center, Swedish Knowledge Foundation, VTT Technical Research Centre of Finland, ERA Chemistry, Swiss National Science Foundation, Finnish Academy of Science Norway Research Council, The Technology Foundation STW, Agence Nationale de la Recherche and Singapore Agency for Science, Technology and Research. Dr. Ragauskas has been an invited visiting professor at Universidade da Beira Interior, Portugal; Chalmers University of Technology, Sweden; Royal Institute of Technology/ STFi, Stockholm, Sweden; and South China University of Technology, China.

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**ARTHUR J. RAGAUSKAS
CURRICULUM VITAE**

RAGAUSKAS, ARTHUR JONAS, Professor /Governor's Chair
Department of Chemical and Biomolecular Engineering, University of Tennessee

Educational Background

Honors B.S. Chemistry, University of Western Ontario 1976 – 1980
Ph.D. Science, University of Western Ontario 1980 – 1985

EMPLOYMENT HISTORY

National Science and Engineering Research Council of Canada (NSERC) 1985 – 1986
Postdoctoral Fellow, University of Alberta, Canada

NSERC Postdoctoral Fellow, Colorado State University 1986 – 1987

National Research Council of Canada, Associate Research Scientist 1987 – 1989

Assistant Professor of Wood Chemistry 1989 – 1995
Institute of Paper Science and Technology (IPST)

Associate Professor of Wood Chemistry 1995 – 1998
Institute of Paper Science and Technology

Professor of Wood Chemistry 1998 – 2003
Institute of Paper Science and Technology

Associate Professor 2003 – 2007
School of Chemistry and Biochemistry
Georgia Institute of Technology (GA Tech)

Professor 2007 – 2014
School of Chemistry and Biochemistry
Georgia Institute of Technology (GA Tech)

Professor/Governor's Chair Biorefining
Department of Chemical and Biomolecular Engineering
Department of Forestry, Wildlife, and Fisheries, University of Tennessee
Oak Ridge National Laboratory 2014 -

CURRENT FIELDS OF EXPERTISE

BioRefining, BioFuels, Bio-Based Materials & Chemicals, BioComposites, BioPower, Fiber Modification, Nanobioterials, Sustainability/Green Chemistry, Pulping/Bleaching, Chemistry of Natural Biopolymers including Cellulose, Hemicellulose, and Lignin, Polysaccharides, Organic/Carbohydrate Chemistry

HONORS, AWARDS, AND RECOGNITIONS

- Governor's Chair Biorefining (2014)
- TAPPI Gunnar Nicholson Gold Medal Award (2014)
- ACS Award for Affordable Green Chemistry (2014)
- ORNL Visiting Fellow (2013)
- Elected American Association for the Advancement of Science Fellow (2012)
- Elected to Academy Board of International Academy of Wood Science (2012)
- Fulbright Distinguished Chair in Alternative Energy (2008-2009)
- Nominated to National Commission on Energy Policy (2008)
- Recipient of 2008 William H. Aiken Research Prize
- Served on the Committee on Technologies to Deter Currency Counterfeiting, Board on Manufacturing and Engineering Design, Division on Engineering and Physical Sciences, National Research Council of the National Academies (2005-2006)
- Elected Fellow to International Academy of Wood Science (2003)
- Elected TAPPI Fellow (2003)
- Receptiant of Luso-American Foundation teaching fellowship at Departamenta Ciencae Tecnologia do Papel Universidade da Beira Interior, Covilhã - Portugal (2003)
- Invited guest teaching professor at Chalmers University of Technology, Sweden (2001)
- Best Poster at International Pulp Bleaching Conference, Halifax (2000)
- 1999 IPST President's Award for Education
- 1999 IPST Teacher of the Year
- Cited in Marquis Who's Who in Science and Engineering (1999-present)
- Cited in Who's Who in Plastics and Polymers (2000-2002)
- Invited guest professor to Royal Institute of Technology/STFI, Stockholm, Sweden (1998)
- Invited guest professor South China University of Technology, Guangzhou, China (1996)
- Research Associate Fellowship, National Research Council Canada (1987-1989)
- National Science and Engineering Research Council Canada, Postdoc Fellowship(1985-1987)
- National Science and Engineering Research Council Canada, Graduate Fellowship (1980-1984)

PATENTS

- Chakar, F.S; Ragauskas, A.J., Methods for Reducing Fluorescence in Paper-Containing Samples. Patent # 6,294,047 B1 & 6,387,211 B1 (2001).
- Ragauskas, Arthur J.; Kim, Dong Ho., Metal Substituted Xerogels for Improved Peroxide Bleaching of Kraft Pulps. U.S. Pat. Appl. Publ. (2003), CODEN: USXXCO US 2003019596 A1 20030130 CAN 138:108518 AN 2003:77170.
- Deng, Y.; Yoon, S.Y.; Ragauskas, A.; White, D., Methods and Compositions for Papermaking. U.S. Pat. 7,964,063 B2 (2011).
- David K.; Muzzy, J.; Ragauskas, A.J., Catalytic Pyrolysis of Wood (provisional GT)
- Ziemer, C.J.; Arcidiacono, S.; Ragauskas, A.; Morrison, M., Novel fibro-biotic bacterium isolate. U.S. Pat. Appl. Publ. (2011), US 20110076356 A1 Application: US 2009-569572 20090929. Priority: US 2009-569572 20090929.
- Sannigrahi, P.; Ragauskas, A.J.; Miller, S. J. Chlorine dioxide treatment of biomass feedstock useful in production of biofuel ethanol. U.S. Pat. Appl. Publ. (2012), US 20120040413 A1 20120216; PCT Int. Appl. (2012), WO 2012021725 A1 20120216.

CURRENT MAJOR UT FUNDING PORTFOLIO

- BRDI – Integrated Biorefinery to Produce Ethanol, High Value Polymers, and Chemicals from Lignocellulosic Biomass
 - University of California Riverside/DOE/USDA - \$600,000.00
- Upgrading Lignin-containing Biorefinery Residues for Bioplastics
 - Texas A&M University/DOE ~ 500.000
- THF Co-Solvent Biomass Fractionation to Catalytic Fuel Precursors with High Yields
 - University of California Riverside/DOE - \$400,00.00
- Development of a Bio-Based, Inexpensive, Noncorrosive, Nonflammable Phenolic Foam for Building Insulation
 - Fraunhofer USA, Inc./DOE - \$231,487.50
- Chemical Pretreatment and Characterization of Biomass Samples for Dynamic Visualization of Lignocellulose Degradation by Integration of Neutron Scattering Imaging and Computer Simulation
 - DOE – ORNL - UT-Battelle – Oak Ridge National Laboratory/DOE - \$300,000.00
- Effect of Thermal Treatment on Biomass and Hydrocarbons Production using Catalytic Pyrolysis Process
 - US – NSF – National Science Foundation - \$125,000.00

ORNL

- BioEnergy Science Center
 - DOE, Biological and Environmental Research, Office of Science - \$3,400,000
- Governor’s Chair
 - ORNL: 382,932.00

REFEREED PUBLICATIONS

1. S
2. Revealing the Molecular Structural Transformation of Hardwood and Softwood in Dilute Acid. Zhang, L.; Pu, Y.; Cort, J.R.; Ragauskas, A.J.; Yang, B. *ACS Sustainable Chemistry & Engineering* (2016), Ahead of Print.
3. From Lignin Association to Nano-/Micro-particle Preparation: Extracting Higher Value of Lignin Zhao, W.; Simmons, B.; Singh, S.; Ragauskas, A.J.; Cheng, G. *Green Chemistry* (2016), Ahead of Print.
4. Characterization of cellulose structure of Populus plants modified in candidate cellulose biosynthesis genes. Bali, G.; Khunsupat, R.; Akinosho, H.; Payyavula, R.S.; Samuel, R.; Tuskan, G.A.; Kalluri, U.C.; Ragauskas, A.J. *Biomass and Bioenergy* (2016), 94, 146-154.
5. Conversion of lignin into value-added materials and chemicals via laccase-assisted copolymerization. Cannatelli, M.D.; Ragauskas, A.J. *Applied Microbiology and Biotechnology* (2016), 100(20), 8685-8691.
6. Review of NMR Characterization of Pyrolysis Oils. Hao, N.; Ben, H.; Yoo, C. G.; Adhikari, S.; Ragauskas, A.J. *Energy & Fuels* (2016), 30(9), 6863-6880.
7. Two Decades of Laccases: Advancing Sustainability in the Chemical Industry. Cannatelli, M.D.; Ragauskas, A.J. *Chemical Record* (2016), Ahead of Print.
Physicochemical Structural Changes of Poplar and Switchgrass during Biomass Pretreatment and Enzymatic Hydrolysis. Meng, X.; Sun, Q.; Kosa, M.; Huang, F.; Pu, Y.; Ragauskas, A.J. *ACS Sustainable Chemistry & Engineering* (2016), 4(9), 4563-4572.
8. Ecofriendly syntheses of phenothiazones and related structures facilitated by laccase - a comparative study. Cannatelli, M.D.; Ragauskas, A.J. *Tetrahedron Letters* (2016), (2016), 57(33), 3749-3753. |
9. A review of sugarcane bagasse for second-generation bioethanol and biopower production. Bezerra, T.L.; Ragauskas, A.J. *Biofuels, Bioproducts & Biorefining* (2016), 10(5), 634-647.
10. Systems Biology-Guided Biodesign of Consolidated Lignin Conversion. Lin, L.; Cheng, Y.; Pu, Y.; Sun, S.; Li, X.; Jin, M.; Pierson, E.A.; Gross, D.C.; Dale, B.E.; Dai, S.; Dai, S.; Ragauskas, A.J.; Yuan, J.S. *Green Chemistry* (2016), Ahead of Print.
11. Lignin Conversion: Opportunities and Challenges for the Integrated Biorefinery. Xie, S.; Ragauskas, A.J.; Yuan, J.S. *Industrial Biotechnology* (2016), 12(3), 161-167.
12. Determining the Syringyl/Guaiacyl Lignin Ratio in the Vessel and Fiber Cell Walls of Transgenic Populus Plants. Tolbert, A.K.; Ma, T.; Kalluri, U.C.; Ragauskas, A.J. *Energy & Fuels* (2016), 30(7), 5716-5720.
13. A study of poplar organosolv lignin after melt rheology treatment as carbon fiber precursors. Sun, Q.; Khunsupat, R.; Akato, K.; Tao, J.; Labbe, N.; Gallego, N.C.; Bozell, J.J.; Rials, T.G.; Tuskan, G.A.; Tschaplinski, Timothy J.; et al. *Green Chemistry* (2016), 18(18), 5015-5024.
14. Isolation and Characterization of New Lignin Streams Derived from Extractive Ammonia (EA) Pretreatment. Sousa, L. da C.; Foston, M.; Bokade, V.V.; Azarpira, A.; Lu, F.; Ragauskas, A.; Ralph, J.; Dale, B.E.; Balan, V. *From Green Chemistry* (2016), 18(15), 4205-4215.
15. Comparative study of lignin characteristics from wheat straw obtained by soda-AQ and kraft pretreatment and effect on the following enzymatic hydrolysis process. Yang, H.; Xie, Y.; Zheng, X.; Pu, Y.; Huang, F.; Meng, X.; Wu, W.; Ragauskas, A.; Yao, L. *Bioresource Technology* (2016), 207, 361-369.

16. Elucidating Structural Characteristics of Biomass using Solution-State 2 D NMR with a Mixture of Deuterated Dimethylsulfoxide and Hexamethylphosphoramide. Yoo, C.G.; Pu, Y.; Li, M.; Ragauskas, A.J., *ChemSusChem* (2016), 9(10), 1090-1095. |
17. The occurrence of triclin and its derivatives in plants By Li, Mi; Pu, Yunqiao; Yoo, Chang Geun; Ragauskas, Arthur J. *Green Chemistry* (2016), 18(6), 1439-1454.
18. Deconstructing Biomass. Ragauskas, A.J. *Nature Energy* (2016) 1, 5.
19. Application of a pyroprobe - Deuterium NMR system: deuterium tracing and mechanistic study of upgrading process for lignin model compounds. Ben, H.; Jarvis, M.W.; Nimlos, M.R.; Gjersing, E.L.; Sturgeon, M.R.; Foust, T.D.; Ragauskas, A.J.; Bidy, M.J. *Energy & Fuels* (2016), 30(4), 2968-2974.
20. A review of whole cell wall NMR by the direct-dissolution of biomass. Foston, M.; Samuel, R.; He, J.; Ragauskas, A.J. *Green Chemistry* (2016), 18(3), 6908-621.
21. Physicochemical Characterization of Lignocellulosic Biomass Dissolution by Flowthrough Pretreatment. Yan, L.; Pu, Y.; Bowden, M.; Ragauskas, A.J.; Yang, B. *ACS Sustainable Chemistry & Engineering* (2016), 4(1), 219-227.
22. Synergistic Enzymatic and Microbial Conversion of Lignin for Lipid. Zhao, C.; Xie, S.; Pu, Y.; Zhang, R.; Huang, F.; Ragauskas, A.; Yuan, J.S., *Green Chemistry* (2016), 18(5), 1306-1312.
23. Eucalyptus fiber modification using dielectric-barrier discharge. Jardim, C. M.; Oliveira, R. C.; Hsieh, J. S.; Ragauskas, A. J.; Elder, T. *Tappi Journal* (2015), 14(9), 585-591.
24. Value Added Biomaterials via Laccase-Mediated Surface Functionalization. Cannatelli, M.D.; Ragauskas, A.J., *J Biotechnol Biomater* (2015) 5:1.
25. Toxicological challenges to microbial bioethanol production and strategies for improved tolerance. Akinosho, H.; Rydzak, T.; Borole, A.; Ragauskas, A.; Close, D., *Ecotoxicology* (2015), 24(10), 2156-2174.
26. Characterization of micro fibrillation process of cellulose and mercerized cellulose pulp. Sharma, S.; Nair, S. S.; Zhang, Z.; Ragauskas, A.J.; Deng, Y. *RSC Advances* (2015), 5(77), 63111-63122.
27. Recalcitrance and structural analysis by water-only flowthrough pretreatment of ¹³C enriched corn stover stem. Foston, M.; Trajano, H.L.; Samuel, R.; Wyman, C.E.; He, J.; Ragauskas, A.J. *Bioresource Technology* (2015), 197, 128-136.
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29. Structural Transformation of Isolated Poplar and Switchgrass Lignins during Dilute Acid Treatment. Sun, Q.; Pu, Y.; Meng, X.; Wells, T.; Ragauskas, A.J., *ACS Sustainable Chemistry & Engineering* (2015), 3(9), 2203-2210.
30. Lignin Structural Alterations in Thermochemical Pretreatments with Limited Delignification. Pu, Y.; Hu, F.; Huang, F. Ragauskas, A.J., *BioEnergy Research* (2015), 8(3), 992-1003.
31. Insights into the effect of dilute acid, hot water or alkaline pretreatment on the cellulose accessible surface area and the overall porosity of Populus. Meng, X.; Wells, T.; Sun, Q.; Huang, F.; Ragauskas, A., *Green Chemistry* (2015), 17(8), 4239-4246.
32. Production of deuterated switchgrass by hydroponic cultivation. Evans, B. R.; Bali, G.; Foston, Ma.; Ragauskas, A.J.; O'Neill, H. M.; Shah, R.; McGaughey, J.; Reeves, D.; Rempe, C.S.; Davison, B.H. *Planta* (2015), 242(1), 215-222.
33. Laccase-catalyzed synthesis of 2,3-ethylenedithio-1,4-quinones. Cannatelli, M.D.; Ragauskas, A.J. *Journal of Molecular Catalysis B: Enzymatic* (2015), 119, 85-89.

34. Microbial lipid production by oleaginous Rhodococci cultured in lignocellulosic autohydrolysates. Wei, Z.; Zeng, G.; Huang, F.; Kosa, M.; Sun, Q.; Meng, X.; Huang, D.; Ragauskas, A.J., *Applied Microbiology and Biotechnology* (2015), 99(17), 7369-7377.
35. The emergence of *Clostridium thermocellum* as a high utility candidate for consolidated bioprocessing applications. Akinoshio, H.; Yee, K.; Close, D; Ragauskas, A. *Frontiers in Chemistry* (2014), 2, 1-18.
36. Silicon cantilever functionalization for cellulose-specific chemical force imaging of switchgrass. Lee, I.; Evans, B.R.; Foston, M.; Ragauskas, A.J., *Analytical Methods* (2015), 7(11), 4541-4545.
37. Bioconversion of oxygen-pretreated Kraft lignin to microbial lipid with oleaginous *Rhodococcus opacus* DSM 1069. Wei, Z.; Zeng, G.; Huang, F.; Kosa, M.; Huang, D.; Ragauskas, A.J., *Green Chemistry* (2015) 17(5), 2784-2789.
38. Effect of torrefaction on biomass structure and hydrocarbon production from fast pyrolysis. Neupane, S.; Adhikari, S.; Wang, Z.; Ragauskas, A. J.; Pu, Y., *Green Chemistry* (2015), 17(4), 2406-2417.
39. Vibrational spectral signatures of crystalline cellulose using high resolution broadband sum frequency generation vibrational spectroscopy (HR-BB-SFG-VS). Zhang, L.; Lu, Z.; Velarde, L.; Fu, L.; Pu, Y.; Ding, S.Y.; Ragauskas, A.J.; Wang, H.F.; Yang, B. *Cellulose* (2015), 22(3), 1469-1484.
40. Pinoreductase 1 impacts lignin distribution during secondary cell wall biosynthesis in *Arabidopsis*. Zhao, Q.; Zeng, Y.; Yin, Y.; Pu, Y.; Jackson, L.A.; Engle, N.L.; Martin, M.Z.; Tschaplinski, T.J.; Ding, S.Y.; Ragauskas, A.J.; Dixon, R.A. *Phytochemistry* (2015), 112, 170-178
41. The Effect of Alkaline Pretreatment Methods on Cellulose Structure and Accessibility. Bali, G.; Meng, X.; Deneff, J.I.; Sun, Q.; Ragauskas, A.J. *ChemSusChem* (2015), 8(2), 275-279.
42. Thermo-Responsive and Fluorescent Cellulose Nanocrystals Grafted with Polymer Brushes. Wu, W.; Huang, F.; Pan, S.; Mu, W.; Meng, X.; Yang, H. Xu, Z.; Ragauskas, A.J.; Deng, Y., *Journal of Materials Chemistry A: Materials for Energy and Sustainability* (2015), 3(5) 1995-2005.
43. Bioconversion of lignocellulosic pretreatment effluent via oleaginous *Rhodococcus opacus* DSM 1069. Wells, T., Jr.; Wei, Z.; Ragauskas, A., *Biomass and Bioenergy* (2015), 72, 200-205.
44. High Shear Homogenization of Lignin to Nanolignin and Thermal Stability of Nanolignin-Polyvinyl Alcohol Blends. Nair, S.S.; Sharma, S.; Pu, Y.; Sun, Q.; Pan, S.; Zhu, J. Y.; Deng, Y.; Ragauskas, A.J. *ChemSusChem* (2015), 7(12), 3513-3520.
45. Pyrolysis Oil-Based Lipid Production as Biodiesel Feedstock by *Rhodococcus opacus*. Wei, Z.; Zeng, G.; Kosa, M. Huang, D.; Ragauskas, A.J. *Applied Biochemistry and Biotechnology* (2015), 175(2), 1234-1246.
46. Laccase-catalyzed α -arylation of benzoylacetone nitrile with substituted hydroquinones. Cannatelli, M.D.; Ragauskas, A.J. *Chemical Engineering Research and Design* *Chemical Engineering Research and Design* (2015), 97, 128-134.
47. Recalcitrance and structural analysis by water-only flowthrough pretreatment of (13)C enriched corn stover stem. Foston M.; Trajano H.L; Samuel R.; Wyman C.E; He J.; Ragauskas A.J., *Bioresource technology* (2015), 197, 128-136.
48. Eucalyptus fiber modification using dielectric-barrier discharge. Jardim, C. M.; Oliveira, R. C.; Hsieh, J. S.; Ragauskas, A. J.; Elder, T., *Tappi Journal* (2015), 14(9), 585-591.
49. Effect of lignin content on changes occurring in poplar cellulose ultrastructure during dilute acid pretreatment. Sun, Q.; Foston, M.; Meng, X.; Sawada, D.; Pingali, S.V.; O'Neill, H.M.; Li, H.; Wyman, C.E.; Langan, P.; Ragauskas, Art J.; Kumar, R. *Biotechnology for Biofuels* (2014), 7, 150/1-150/14.

50. Changes in cell wall properties coincide with overexpression of extensin fusion proteins in suspension cultured tobacco cells. Tan, L.; Pu, Y.; Pattathil, S.; Avci, U.; Qian, J.; Arter, A.; Chen, L.; Hahn, M.G.; Ragauskas, A.; Kieliszewski, M.J. *PLoS One* (2014), 9(12), e115906/1-e115906/23.
51. High performance green barriers based on nanocellulose. Nair, S. S.; Zhu, J. Y.; Deng, Y.; Ragauskas, A. J., *Sustainable Chemical Processes* (2014), 2, 23/1-23/15.
52. The use of combination of zeolites to pursue integrated refined pyrolysis oil from kraft lignin. Huang, F.; Ben, H.; Pan, S.; Pu, Y.; Ragauskas, A. *Sustainable Chemical Processes* (2014), 2, 7/1-7/11
53. Lignin structure and aggregation behavior in a two-component ionic liquid solvent system. Bylin, S.; Wells, T.; Sun, Q.; Ragauskas, A.; Theliander, H. *BioResources* (2014), 9(4), 6002-6018.
54. Economic analysis of an organosolv process for bioethanol production. Kautto, J.; Realff, M.J.; Ragauskas, Arthur J.; Kassi, T. *BioResources* (2014), 9(4), 6041-6072.
55. Agave proves to be a low recalcitrant lignocellulosic feedstock for biofuels production on semi-arid lands. Li, H.; Pattathil, S.; Foston, M.B.; Ding, S. Y.; Kumar, R.; Gao, X.; Mittal, A.; Yarbrough, J.M.; Himmel, M.E.; Ragauskas, A.J. Hahn, M.G.; Wyman, C.E. *Biotechnology for Biofuels* (2014), 7, 50/1-50/11.
56. Preparation of aligned porous chitin nanowhisker foams by directional freeze-casting technique. Zhou, Y.; Fu, S.; Pu, Y.; Pan, S.; Ragauskas, A.J. *Carbohydrate Polymers* (2014), 112, 277-283.
57. Noble metal catalyzed aqueous phase hydrogenation and hydrodeoxygenation of lignin-derived pyrolysis oil and related model compounds. Mu, W.; Ben, H.; Du, X.; Zhang, X.; Hu, F.; Liu, W.; Ragauskas, A.J.; Deng, Y. *Bioresource Technology* (2014), 173, 6-10.
58. Physicochemical characterization of ethanol organosolv lignin (EOL) from *Eucalyptus globulus*: Effect of extraction conditions on the molecular structure. Yanez-S, Mauricio; Matsuhira, Betty; Nunez, Carolina; Pan, Shaobo; Hubbell, Christopher A.; Sannigrahi, Poulomi; Ragauskas, Arthur J. *Polymer Degradation and Stability* (2014), 110, 184-194.
59. Thermally enhanced high performance cellulose nano fibril barrier membranes Sharma, S.; Zhang, X.; Nair, S.S.; Ragauskas, A.; Zhu, J.; Deng, Y. *RSC Advances* (2014), 4(85), 45136-45142.
60. Enhancement of nanofibrillation of softwood cellulosic fibers by oxidation and sulfonation. Pan, S.; Ragauskas, A.J., *Carbohydrate Polymers* (2014), 111, 514-523.
61. Nanocomposite film prepared by depositing xylan on cellulose nanowhiskers matrix. Sun, Q.; Mandalika, A.; Elder, T.; Nair, S.S.; Meng, X.; Huang, F.; Ragauskas, A.J. *Green Chemistry* (2014), 16(7), 3458-3462.
62. Structure analysis of pine bark, residue and stem derived light oil and its hydrodeoxygenation products. Mu, W.; Ben, H.; Ragauskas, A.J.; Qiu, D.; Deng, Y. *Industrial & Engineering Chemistry Research* (2014), 53(28), 11269-11275.
63. Comparison of changes in cellulose ultrastructure during different pretreatments of poplar. Sun, Q.; Foston, M.; Sawada, D.; Pingali, S.V.; O'Neill, H.M.; Li, H.; Wyman, C.E.; Langan, P.; Pu, Y.; Ragauskas, A.J., *Cellulose* (2014), 21(4), 2419-2431.
64. Characterization and analysis of the molecular weight of lignin for biorefining studies. Tolbert, A.; Akinosho, H.; Khunsupat, R.; Naskar, A.K.; Ragauskas, A.J., *Biofuels, Bioproducts & Biorefining* (2014), 8(6), 836-856.
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67. Effect of D2O on Growth Properties and Chemical Structure of Annual Ryegrass (*Lolium multiflorum*). Evans, B.R.; Bali, G.; Reeves, D.T.; O'Neill, H.M.; Sun, Q.; Shah, R.; Ragauskas, A.J., J. Agricultural and Food Chemistry (2014), 62(12), 2595-2604.
68. The use of combination of zeolites to pursue integrated refined pyrolysis oil from kraft lignin. Huang, F.; Ben, H.; Pan, S.; Pu, Y.; Ragauskas, A. Sustainable Chemical Processes (2014) 2, 7/1-7/11
69. Characterization of cellulose nanofibrillation by micro grinding. Nair, S.S.; Zhu, J.Y.; Deng, Y.; Ragauskas, A.J. J. Nanoparticle Research (2014) 16:4, 2349-2347.
70. Preparation and characteristics of cellulose nanowhisker reinforced acrylic foams synthesized by freeze-casting. Xu, Z.; Sun, Q.; Huang, F.; Pu, Y.; Pan, S.; Ragauskas, A.J. RSC Advances (2014), 4(24), 12148-12153.
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72. Recent advances in understanding the role of cellulose accessibility in enzymatic hydrolysis of lignocellulosic substrates. Meng X.; Ragauskas A. J., Current opinion in biotechnology (2014), 27C, 150-158.
73. Synthesis of a co-cross-linked nanocomposite hydrogels from poly(methyl vinyl ether-co-maleic acid)-polyethylene glycol and nanofibrillated cellulose. Dash, R.; Cateto, C.A.; Ragauskas, A.J. Cellulose (2014) 21, 529–534.
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MEETINGS AND SYMPOSIA

HONORARY/PLENARY/INVITED SPEAKER

1. Nanocellulose: Bio-Inspired Polymers, Aalto University, Espoo, Finland, (Aug, 2016)
2. Bio-Inspired Polymers, Gordon Conference, Green Chemistry, VT (Aug, 2016)
3. 251 ACS National Meeting & Exposition, San Diego, CA (March, 2016)
 - Making room during pretreatment
 - Valorizing lignin
4. Biorefining and GlycoScience, Glycobiotechnology, Manchester, (April, 2016).
5. Lignin Biorefining, 2015 Metabolic Engineering and Green Manufacturing in Microorganisms, Beijing University Chemical Engineering, China (July, 2015)
6. Sustainable Biofuels from Laboratory Bench to the Gas-Tank, GA ACS Section Dinner Meeting (April, 2015).
7. Advances in Sustainable Fuels. International Conference on “Sustainable Fuel for IC Engines in Emerging Nations”, New Delhi, India (Feb., 2015).
8. Second-generation biofuels from the benchtop to the gas tank. Nordic Baltic BioEnergy Riga, Latvia (April, 2015).
9. Fundamentals of Biomass Recalcitrance. 2nd Solar Fuels Workshop. Royal Rimonim Hotel, Dead Sea, Israel (Feb., 2015).
10. Award Address (ACS Award for Affordable Green Chemistry sponsored by Dow Chemical Company and endowed by Rohm and Haas Company). Green chemistry, biofuels, and biorefineries. 247th ACS National Meeting & Exposition, Dallas, TX, (March, 2014).
11. Internationell utblick. Ekmandagarna, Stockholm Sweden, (Jan., 2014)
12. Biofuels: From the Field to the Fuel-Tank. USA Embassy, Vilnius, Lithuania (May, 2013).

13. Lignocellulosic 2nd and 3rd Generation Biofuels - Using Science to Accelerate Implementation. Natick Soldier Center, MA (March, 2013).
14. Using NMR to Characterize Recalcitrance Elements in Biomass at the Molecular Level. Pittcon, Philadelphia, PA (March, 2013).
15. Enabling Biopolymers through Green Chemistry, 2012 International Bioenergy Days (Oct., 2012).
16. Sustainable Nano-Materials - What is happening at the cellular level? DOE Workshop on Sustainable Nanomaterials, VA (June, 2012).
17. (i) Introduction to Biorefining Session; (ii) Biorefining Expanding the Envelope for Green Forest Products Manufacturing, IPST Members Meeting (April, 2012).
18. Organosolv Pretreatments. EBI Workshop on Pretreatment Strategies. University of California Berkeley (March, 2012).
19. Green Nanocellulosic Barriers, USDA Nanocellulose Program Review (March, 2012).
20. Lignin: The New Paradigm in Biofuels. Phytochemical Society of North America 50th Meeting, HI (December, 2011).
21. Biorefineries and Bioconversions: Current and Future Challenges. GA Tech Fall 2011 Transformational Energy Speaker Series.
22. BESC Research and Lessons in Pretreatment Chemistry. Ragauskas, A.J., NSERC Bioconversion Network, University of Toronto, Canada (June, 2011).
23. Fiber Modification: Strengthening Softwood Fibres with Hemicelluloses. Ragauskas, A.J., Pira 3rd biennial Fibre Engineering, Barcelona, Spain (May, 2011).
24. A Fresh Look at the Biorefinery Concept: What Works and What Doesn't. Ragauskas, A.J., Wood Science and Engineering, Oregon State University (April, 2011).
25. Creating Sustainable Chemical Solutions Essential to Converting Lignocellulosic Biomass resources to BioMaterials, BioFuels, BioChemicals and BioPower for People Everywhere. Ragauskas, A.J., Department of Energy, Washington, DC (April, 2011).
26. Organosolv Pretreatment: Reduced Recalcitrance and More. Ragauskas, A.J. Great lakes BioEnergy Research Center, Michigan State University (March, 2011).
27. BESC Research and Lessons in Pretreatment Chemistry. Ragauskas, A.J. Great lakes BioEnergy Research Center, Michigan State University (March, 2011).
28. Green Chemistry: Grand Challenges from Converting Biomass to Biofuels and Bio-based Materials, FOBI series. University of Copenhagen (January, 2011).
29. Hemicelluloses: The Good, The Bad, The Promising. Biomass Derived Pentoses: from Biotechnology to Fine Chemistry. Reims, France (November, 2010).
30. Recent Advances in Biorefining and Pretreatment Chemistry. Second International Symposium on Bioenergy And Biotechnology, Wahun, China (September, 2010).
31. Cellulose Whiskers, Gels, Films and Foams- New Composites and Applications XII IMC and the 7th Isnapol, Gramado, Brazil (September, 2010).
32. BioRefining Biomass to BioFuels
 - Renewable Energy Department, Research Center of Petrobras – CENPES, Rio de Janeiro, Brazil.
 - Shell Research Center, Amsterdam, Netherlands (2010).
33. New Energy Research – An Industry-Governmental Partnership, American Resource Center, Yliopistonkatu, Helsinki, Finland (2010).
34. A Perspective on Pre-Treatment Chemistry: Recent Advances and Future Challenges”, Jyväskylä University, Finland (2010).

35. BioRefining & Fiber Modification. Arauco Company, Concepción, Chile (2010).
36. BioRefining at IPST@GT, UPM Kymmene (2010).
37. Cu: Green Chemistry Oxidations from Laccase to Cu-complexes in Ionic Liquids. Auburn University, School of Chemistry. Auburn, AI (April, 2010).
38. Transformational Forest Biorefineries Opportunities and Challenges, KETJU (Sustainable Products and Production Conference, Finnish Academy Science (February, 2009).
39. Forest Biorefinery: Time to Be. Polysaccharides as a Source of Advanced Materials Conference, Abo Academia, Turku, Finland (September, 2009).
40. Forest BioRefinery Accomplishments, Latvian State Institute of Wood Chemistry (June, 2009).
41. BioFuels and Biomaterials: Forest BioRefinery, Lithuanian Seimas (Parliament) Committee on Environment Protection (June, 2009).
42. Alternative Energy in the US and State-of-the-Art Biological Conversion Technologies to Bioethanol, Lithuanian Confederation of Industrialists, Vilnius, Lithuanian (June, 2009).
43. US Forest Biofinery, Lithuanian Energy Institute, Kaunas, Lithuanian (June, 2009).
44. Recent Development in US Forest Biorefinery, Kaunas University of Technology, Lithuanian (June, 2009).
45. Transformational Forest BioRefinery Technologies, 10th Baltic Economic Forum, Riga, Latvia (June, 2009).
46. Recent Developments in US Forest Biorefinery, Novel Products and Fuels from Forest Trees Seminar Series, Umeå Plant Science Centre, Umeå University, Sweden (May, 2009).
47. The Biorefinery Concept: Opportunities, Challenges and Innovation, Chalmers University of Technology (May, 2009).
48. Securing Biofuels and Bioenergy from the Next Generation of Forest BioRefineries, House of Sweden/Swedish Embassy-Washington DC (May, 2009).
49. US Perspective on Biorefinery, Forest Products Industry Research College (FPIRC), Royal Institute of Technology, Stockholm (January, 2009).
50. Engineering the Next Generation of LignoCellulosic Fibers, Colloquium Wood Valorisation Epinal, France (January, 2009).
51. Forest Biorefineries Opportunities, Challenges and Innovation, Colloquium Wood Valorisation, Epinal, France (January, 2009).
52. Characterizing Lignocellulosics from Biomass to Bioethanol, Colloquium Wood Valorisation, Epinal, France (January, 2009).
53. Characterizing Lignocellulosics from Biomass to Bioethanol, Booregard, Sarpsborg, Norway (December, 2008).
54. Wood Chemistry in the Biorefinery, Booregard, Sarpsborg, Norway (December, 2008).
55. Putting Chemistry Back Into the Biorefinery, Imperial College London, London (December, 2008).
56. Review of Fiber Modification, Eka Chemicals, Sweden (December, 2008).
57. Seeing Fibers in a Pulp Forest. Joint SCA, Sodra, Chalmers meeting, Gothenburg, Sweden (October, 2008).
58. Energizing the Forest Biorefinery: Pulp-Paper-Fuels, TAPPI SuperCorrExpo conference, Atlanta. GA, (September, 2008).
59. Wanted: Technology Breakthroughs, International Bioenergy Days, MN. At request of the US State Department (September, 2008).

60. Forest Biorefinery: A Contribution to the One Big Thing Fulbright Chair in Alternative Energy. US- Swedish Science and Technology Review, Swedish Ministry of Education and Research Ministry, Stockholm (September, 2008).
61. Forest – Energy: One Big Thing. One Big Thing 2008 Retreat. Embassy of United States of America, Stockholm (September, 2008).
62. Forest Biorefineries Bridge to Future: FPRIC Sweden (August, 2008).
63. Developing the new lignocellulosic energy age. 235th ACS National Meeting, New Orleans, LA (April, 2008).
64. Fiber Modification/Fiber Fiber Bonding, Eka Chemical (June, 2008).
65. Advances in Fiber Modification, Aracruz, Brazil (March, 2008).
66. US Perspective on Biorefinery, STFI-Packforsk/KTH (January, 2008).
67. Forest Biorefinery at the Cross Roads of Science, Engineering and Innovation, Mid Sweden University (January, 2008).
68. The BioRefinery: The Next Green Revolution in Science, Engineering and Innovation, Berzeliusdagarna, University of Stockholm (January, 2008).
69. The New Lignocellulosic Age, Luleå University of Technology, Skellefteå Sweden (September, 2007).
70. Lignocellulose Chemistry: Lonesome BioPolymer to Key BioFuel Resource. School of Polymer, Textile and Fiber Engineering, GT (January, 2008).
71. Over View of Cellulosic Material Research. Industry Days IPST@GT (November, 2007)
72. Mission Possible: The Search for the New Forest Biorefinery. BioTechnology Institute - University of Minnesota (November, 2007).
73. BioEnergy Science Center a DOE BioEnergy Research Center. Bioproducts and Biosystem Engineering at the University of Minnesota (November, 2007).
74. Seeing Fibers in the Pulp Forest, Lectures at the Leading Edge, Department of Chemical Engineering and Applied Chemistry, University of Toronto (October, 2007).
75. Forest Biorefineries: Pulp-Lumber-Biofuels Third Leg of Forest Products Industry, TAPPI Gulf Coast Conference, Auburn University (October 2007).
76. BioEnergy Science Center: DOE Bioenergy Research Center, IPST@GT (September, 2007).
77. The New Lignocellulosic Age, Luleå University of Technology, Skellefteå, Sweden (September, 2007).
78. Universidade Beira Interior, Departamento de Ciência e Tecnologia do Papel; Covilhã, Portugal (June, 2007).
79. University of Aveiro, Department of Chemistry; Aveiro, Portugal (June, 2007).
80. Cacia Soporcel Kraft Pulp Mill, Research Department; Averio, Portugal (June, 2007).
81. RAIZ - Instituto de Investigacao da Floresta e Papel; Averio, Portugal (June, 2007).
 - Fiber Modification
 - Cellulose Microfibrills and Nanotechnology
 - Seeing Fibers in a Pulp Forest
 - Bio Fuels, Chemicals and Materials A Walk on the Green Side of Sustainability
82. Enhancing and Visualizing Fiber-Fiber Crossings. Södra Cell AB, Väröbacka, Sweden (2007).
83. Microfibrills and Nanotechnology, Pulp Paper 2007, Helsinki, Finland (June, 2007).
84. Forest Products Biofinery – US Perspective, Norwegian University of Science and Technology NTNU (April, 2007).

85. Engineering Fiber Charging and Barriers for Paper and Board, EU COST54 – “Characterization of the Fine Structure and Properties of Papermaking Fibres using New Technologies” Riga, Latvia (April, 2007).
86. BioFueling the Future. Challenges - Opportunities^{GT} Georgia Tech Advisory Board (April, 2007).
87. Biofuels, Clark Atlanta University (April, 2007).
88. Profiling Biomass Resources and Their Chemistries, Huntsman Houston (April, 2007).
89. Advanced Lignocellulosic Based Composite Materials, IPST Board of Trustees (April, 2007).
90. Biorefining the Future. 233rd ACS National Meeting, Chicago, IL, United States (March, 2007).
91. Biofueling the Future. National Academy of Engineering/GA Tech (March, 2007).
92. Seeing Fibers in a Pulp Forest, Royal Institute of Technology, Stockholm, Sweden (March, 2007).
93. Charging Fibers for New and Enhanced Strength Properties, Pira, Stockholm (March, 2007).
94. Biofuels and the Future, VTT Technical Research Centre of Finland (February, 2007).
95. Biofuels for the Future, Carlsberg Institute (February, 2007).
96. BioFuels: An Agenda for Research and Innovation. GTRC Board of Trustees (December, 2006).
97. The Path Forward for Biofuels and Biomaterials. Primer Congreso Latinoamericano sobre Biorefinerías: Oportunidades de innovación para el sector forestal, que se realizará los días Concepción, Chile (November, 2006).
98. L’Avenir des Biopolymères Renouvelables, Lorexpo Metz Congress, France (November, 2006).
99. Topochemistry of Renewable Biopolymers, University Nancy, Nancy France (November, 2006).
100. Food for Thought Seminar Series, Faculty of Agriculture and Environmental Sciences, McGill University (November, 2006).
101. Biofuels – Biochemicals Research Needs and Opportunities, Lyondell Symposium (October, 2006).
102. The Energy Challenge, GTRI: Seminar on Emerging Research Needs (October, 2006).
103. Biomass to Bioproducts, Biofuels and Biopower - B2B3, AtlanTICC Alliance Symposium, Imperial College London (2006).
104. BioFuels Research Opportunities/Needs, World Congress on Industrial Biotechnology and Bioprocessing, Toronto, Canada (2006).
105. The Challenges and Opportunities for Next Generation of Forest Product Biorefineries, World Congress on Industrial Biotechnology and Bioprocessing, Toronto, Canada (2006).
106. Profiling Biomass Resources and Their Chemistries, Shell, Amsterdam, Netherlands (2006).
107. Future of Topochemical Cellulosic Fiber Modification. Metsa-Botnia, Jyväskylä, Finland (2006).
108. Fiber Modification Chemistry, International Paper Cincinnati Technology Center, Loveland, OH (2006).
109. Biofinery of the Future, Now. Rendez-Vous Atlantic Biotech, Guest of Government of Canada. Moncton, New Brunswick (2006).
110. Chemistry of Fiber Modification, Nalco Chemical Company, IL (2006).
111. Biofuels, College of Science, Georgia Institute of Technology (2006).
112. Topochemistry of Fiber Modification, Hercules, Inc., DE (2006).
113. Profiling Biomass Resources and Their Chemistries, Chevron – Texaco, Richmond, CA (2006).

114. Over the Horizon View of Nano Coatings and Barriers for Paper. Pira's Ultra-thin Films and Nanocoatings Conference, Vienna, Austria (2006).
115. Chemicals from Biomass, Alberta Research Council, Canada (2005).
116. Platform Chemicals from Forest Biomass, Alberta Forestry Research Institute, Canada (2005).
117. Nanotechnology in Pulp and Paper, Stora-Enso OYJ, Stockholm (2005).
118. Platform Chemicals from Biomass. The World Congress on Industrial Biotechnology and Bioprocessing, ACS Orlando, FL (2005).
119. Fiber Modification, Weyerhaeuser Company (2005).
120. A Few Good Fibers. Pre-Symposium on Wood, Forestry, and Pulping Chemistry, Auckland, New Zealand (2005).
121. Nanotechnology Innovation Directed to Forest Products Industry. Forest Products Technobusiness Forum (2005).
122. The USA Forest Industry Nanotechnology Roadmap. Nano Harju Goes Global, Lohja, Finland (2005).
123. Nanotechnology Address from the USA. Jaakko Pöyry Consulting, Helsinki, Finland (2005)
124. Fiber Modification Chemistry. Metsa-Botnia, Helsinki, Finland (2005).
125. Cellulosic Fiber Chemistry. Hercules Company, USA (2005).
126. BioPower – BioMaterials Research, School of Chemistry, Imperial College London (2005). Platform Chemicals from Biomass, Alberta Research Council, Canada (2005).
127. NanoBioterials, Nanotechnology Forest Products Workshop, Washington, DC (2004).
128. Nanotechnology in the Pulp and Paper Industry, Lake States TAPPI/NC PIMA Conf. (2004).
129. Fiber Modification Chemistry. Taiwan Forestry Research Institute (2004).
130. Nanotechnology for Pulp and Paper. IPST/CPBIS Forest Products Techno-Business Forum, (2004).
131. Innovative Fiber Modification Chemistry:
 - i. Asian Institute of Technology, Department Pulp and Paper Technology
 - ii. Kasetsart University, Faculty of Forestry, Thailand (2004).
132. Biobleaching Chemistry of Laccase. Department of Chemistry, Mahidol University, Thailand (2004).
133. Nascent Nanotechnology in Pulp and Paper and Its Future. PIRA, Stockholm (2004).
134. Forest Products Biotechnology: Before and After. The World Congress on Industrial Biotechnology and Bioprocessing. ACS Orlando, FL (2004).
135. Fundamentals of Oxidative Laccase Chemistry, Departamento de Ciência e Tecnologia do Papel, Universidade Beira Interior, Covilhã, Portugal (2003).
136. Invited speaker at NSF, AAAS sponsored EMERGE Conference: Strengthening and Fostering Productive Partnerships-The Corporate Academic Role. Seminar titled “Fostering Academic-Industry Relationships”, Atlanta (2003).
137. Nanotechnology – Changing the Challenge in Pulp and Paper Research, presented at Nano All Around Us Conference, The University of Wisconsin's Inaugural Technical Conference and Public Expo on Nanotechnology (2003).
138. Future of Lignin Research, International Lignin Institute 6th Forum, Wageningen, Netherlands (2003).
139. Invited speaker at 2003 Gordon Conference Polysaccharide Chemistry, Redefining the Pulp and Paper Industry with New Chemo-Enzymatic Technologies. Ragauskas, A.J., Gordon Conference, Italy (2003).

140. Nano-Biotechnology Changing the Challenge in Pulp & Paper Research, TAPPI Fall Technical Conference: Engineering, Pulping & PCE&I, Oct., Chicago, IL (2003).
141. Back to The Future: How Current Pulp-Bleaching Research Will Influence Future Furnish Resources. 7th Pira Recycling Technology Conference, Brussels (2002).
142. Advances in Fiber Modification, Taiwan Forestry Research Institute, Taiwan (2002).
143. Chemoenzymatic Fiber Modification, Asian Institute of Technology and Department of Forest Products, Kasetsart University, Thailand (2002).
144. Decade of Pulp and Paper Research, Kaunas University of Technology, Lithuania (2002).
145. Biotechnology in the Pulp and Paper Industry: A Challenge for Change. Ragauskas, A.J., 8th International Conference on Biotechnology in the Pulp and Paper Industry, Helsinki, Finland (2001).
146. Pulp/Bleach Mill of the Future. Innovase hosted Mini-Symposium, San Diego, CA (2001).
147. Advances in Fiber Modification Topo-Chemistry present at:
 - a. Oji Technical Research Center, Nippon Paper Company, Japan
 - b. Cheng Loong Corp., Taiwan; Advanced Agro, Thailand; April, Singapore;
 - c. Riaupaper, Indonesia; Yuen Foong Yu Paper Mfg. Co. Ltd., Taiwan; Siam Pulp and Paper Public Company Ltd., Thailand (2000).
148. The Challenge of Change. Ferris, J.; Ragauskas, A.J., TAPPI Pulping Conference, Boston, MA (2000).
149. Developing New Pulp Fibers. Kimberly-Clark Corporation, Neenah, WI (2000).
150. Topofiber Chemistry. Argonne National Laboratory (2000).
151. Fundamentals of Laccase Mediator System Delignification. Hercules Incorporated, Wilmington, DE (2000).
152. Laccase Biobleaching Technologies. International Paper, Tuxedo Park, NY (2000).
153. Fundamentals of Pulping and Bleaching. Westvaco Corporation, Charleston Research Center (1998).
154. Fundamentals of Biobleaching. STFI, Stockholm, Sweden (1998).
155. Fundamental Chemistry of Kraft Pulping. Ahlstrom Corporation, Finland (1998).
156. Applications of NMR in Modern Pulping and Bleaching Research, Argonne National Laboratories (1998).
157. Fundamental Structural Analysis of Residual Lignin in Kraft Pulp. Ahlstrom Corporation, Glens Falls, NY (1997).
158. Peroxide Pulp Bleaching Challenges. Florida Catalysis Conference, Palm Coast, FL (1996).
159. Fundamentals of Brightness Reversion. Nalco Chemical Company, Naperville, IL (1996).
160. Fundamentals of Brightness Reversion. South China University of Technology, Guangzhou, China (1996).
161. Activated Peroxide Bleaching Chemistry. South China University of Technology, Guangzhou, China (1996).
162. Photostabilization for High-Yield Pulps. Kimberly-Clark Corporation, Neenah, WI (1996).
163. Chemical Activation of Peroxide. 1995 TAPPI/NC State Emerging Pulping and Bleaching Workshop (1995).

INVITED ON-SITE INDUSTRY RESEARCH PRESENTATIONS

AbitibiBowater; Advanced Agro/Thailand; Ahlstrom Corporation/Finland; Appleton Papers; April/Singapore; Aracruz/Brazil; Arauco/Chile; Booregard/Norway; Buckeye Technologies Inc;

Cheng Loong Corp./Taiwan; Chevron; Ciba Corporation; Consolidated Papers Incorporated; Eka-Chemical; Georgia Pacific; Hercules Incorporated; Hiroshima R&D Center/Japan; Imerys, Innovase Corporation; International Paper; Champion International Corporation; Kimberly-Clark Corporation; Korsnas AB/Sweden; LTD/Japan; MeadWestvaco; Mondi; Nalco Chemical Company; Novo-Nordisk; Mitsubishi Heavy Industries; NewPage Corp.; Nippon Paper Company/Japan; Oy Metsä-Botnia Ab/Finland; Oji Paper Co./Japan; Portucel Soporcel Group/Portugal; Potlatch Corporation; Rayonier Inc.; Riaupaper/Indonesia; SAPPI; Shell/Netherlands; SCA/Sweden; Schweitzer-Mauduit International; Siam Pulp and Paper Public Company Ltd./Thailand; Sodra/Sweden; Stora-Enso/Finland; UPM-Kymmene Group/Finland; Weyerhaeuser Company; Yuen Foong Yu Paper Mfg. Co. Ltd./Taiwan; Fibria/Brazil.

CONTRIBUTED PARTICIPATION

1. 252 ACS National Meeting & Exposition, Philadelphia, PA CA, (Aug, 2016)
 - Exploiting the oxidizing capabilities of laccases for green chemistry. Cannatelli, M.D.; Ragauskas, A.J.
 - Lignin S/G ratio facilitates Populus solubilization during consolidated bioprocessing. Dumitrache, A.; Akinosho, H.; Rodriguez, M.; Meng, X.; Yoo, C.G.; Natzke, J.; Engle, N.; Sykes, R.; Tschaplinski, T.; Muchero, W.; et al.
 - Characterization of Populus stems using time-of-flight secondary ion mass spectrometry. Tolbert, A.; Yoo, C.G.; Ragauskas, A.
2. The International Chemical Congress of Pacific Basin Societies 2015. December (2015).
 - Advances in low recalcitrance plants and tailored pretreatments, Ragauskas, A.
 - Advances in nanolignocellulosics for foams and fills, Ragauskas, A.; Sun, S.; Kohnke, T.
3. Investigation on the physicochemical properties of poplar lignin carbon precursors before and after melt rheology. Sun, Q.; Ragauskas, A.J. 250th ACS National Meeting & Exposition, Boston, MA, August, (2015).
4. USDA-DOE Plant Feedstock Genomics for Bioenergy Meeting, Washington (Feb., 2015)
 - a. Solid Residuals from Populus trichocarpa Demonstrate that Recalcitrance Persists During Consolidated Bioprocessing. Akinosho, H.; Yee, K.; Rodriguez, M.; Muchero, W.; Pu, Y.; Ragauskas, A.; Gilna, P.
 - b. Hydration Control of Cellulose Surface Structure and Dynamics, Petridis, L.; Pingali, S. V.; Sawada, D.; Urban, V.; O'Neill, H.M.; Ragauskas, A.J.; Evans, B.R.; Smith, J.C.; Langan, P.A., Davison, B.H.
5. NMR characterization of plant cell wall polymers and sugar release. Davis, M.; Foston, M.B.; Gjersing, E.; Katahira, R.; Happs, R.; Doepcke, C.; Sykes, R.; Ragauskas, A.J. 247th ACS National Meeting & Exposition, Dallas, TX, (March, 2014).
6. Genomic Science Contractor-Grantee Meeting XII, Maryland, (February, 2014)
 - Discovering Naturally Occurring Allelic Variants Associated with Biomass Recalcitrance in Populus trichocarpa, Wellington, M.; Yee, K.; Ranjan, P.; Ragauskas, A. J.; DiFazio, S. P.; Evans, L.; Slavov, G.; Rodgers-Melnick, E.; Bhagia, S.; Wyman, C. E.; Rokhsar, D.; Goodstein, D. M.; Martin, J.; Schackwitz, W.; Tuskan, G. A.

- Surface Characterization of Populus during *C. bescii* Growth: Understanding the Relationship between Biomass Degradation and *C. bescii* Penetration in Wood Sticks, Jung, S.; Chung, D.; Tolbert, A.; Westpheling, J.; Ragauskas, A. J.; Gilna, P.
 - Comparative Solubilization of Minimally Pretreated Lignocellulose as Impacted by Choice of Feedstock and Biocatalyst, Paye, J.; (Julie.Paye@Dartmouth.edu), Guseva, A.; Pattathil, S.; Pu, Y.; Meng, X.; Gjersing, E.; Ragauskas, A. J.; Hahn, M.; Davis, M.; Davison, B.; Lynd, L.; Gilna, P.
 - Fundamentals of Aqueous Pretreatment Chemistry and Cell Wall Cellular Structures of Low Recalcitrance Populus Lines for Enhanced Performance, Bhagia, S.; (sbhagia@enr.ucr.edu), Meng, X.; Yee, K.; Wellington, M.; Bali, G.; Pu, Y.; Kumar, R.; Tuskan, G. A.; Ragauskas, A. J.; Wyman, C. E.; Gilna, P.
 - Simulation and Structure of Cel7A during Binding and Hydrolysis of Cellulose, Pingali, S. V.; He, J.; O'Neill, H. M.; Urban, V. S.; Petridis, L.; Heller, W. T.; Foston, M.; Ragauskas, A. J.; Evans, B. R.; Smith, J. C.; Langan, P.; Davison, B. H.
 - Investigation of Pretreatment-specific Changes in Biomass Structure, Petridis, L.; Pingali, S. V.; Sawada, D.; Urban, V.; O'Neill, H. M.; Bali, G.; Ragauskas, A. J.; Evans, B. R.; Smith, J. C.; Langan, P. A.; Davison, B. H.
 - Production and Characterization of Deuterated Switchgrass and Annual Grasses for Neutron Studies, Evans, B. R.; (evansbr@ornl.gov), Bali, G.; Shah, R.; Ragauskas, A. J.; O'Neill, H. M.; Pingali, S. V.; Sawada, D.; Urban, V.; Langan, P. A.; Davison, B. H.
 - Neutron and X-Ray Experiments and Computational Modeling of Pretreatment of Biomass, Langan, P.; Petridis, L.; O'Neill, H.; Pingali, S. V.; Foston, M.; Schulz, R.; Lindner, B.; Urban, V.; Evans, B. R.; Ragauskas, A. J.; Smith, J. C.; Davison, B.
7. Recent progress in understanding the role of cellulose accessibility in biomass recalcitrance Meng, X.; Foston, M.; Wells, T.; Ragauskas, A. 247th ACS National Meeting & Exposition, Dallas, TX, (March, 2014).
 8. Effect of chemical pretreatment on lignocellulosic biomass. Pingali, S.V.; Urban, V.S.; O'Neill, H.M.; Heller, W.T.; Foston, M.; Evans, B.R.; Ragauskas, A.J.; Langan, P.; Davison, B. 247th ACS National Meeting & Exposition, Dallas, TX, (March, 2014).
 9. BESC Research. University of Georgia and Georgia Institute of Technology Biofuels Summit Dec 17, 2013 (Gwinnett, GA)
 10. 35th Symposium on Biotechnology for Fuels and Chemicals, April 29-May 2, 2013, Portland, OR:
 - Oral Presentation:
 - a. Insights into lignin in the reduced recalcitrance of transgenic switchgrass. Pu, Y.; Samuel, R.; Fu, C.; Shen, H.; Wang, Z.Y.; Dixon, R.A.; Ragauskas, A.
 - b. Surface characterization of transgenic poplar by TOF-SIMS. Ragauskas, A.; Ma, T.; Jung, S.; Bali, G.; Kalluri, Y.C.; Tuskan, G.
 - c. Biodesign of Rhodococci for Lignin Fuel: A Path from Systems to Synthetic Biology. Xie, S.; Xing, X.; Chen, H.; Li, X.; Wells, T., Dai, S.Y.; Ragauskas, A.; Yuan, J.S.
 - Post Presentation:

- a. Fungal Cellulase Activity is Affected More by Oxidation of Other Groups than Cellulose Reducing Ends - a Case of Enhanced Cellulose Recalcitrance without Change in Accessibility, Chain Length, or Crystallinity. Kumar, R.; Mittal, A.; Yarbrough, J.; Jung, S.; Himmel, M.; Ragauskas, A.; Wyman, C.E.
 - b. Characterization of GXMT1 reveals a new family of Co²⁺-dependent enzymes that catalyze the methylation of glucuronoxylan. Urbanowicz, B.; Pena, M.J.; Backe, J.; O'Neill, M.A.; Steet, H.F.; Avci, U.; Li, H.; Wyman, C.; Foston, M.; Ragauskas, A.; York, W.S.
 - c. Recalcitrance without Change in Accessibility, Chain Length, or Crystallinity. Kumar, R.; Mittal, A.; Yarbrough, J.; Jung, S.; Himmel, M.; Ragauskas, A.; Wyman, C.E.
11. High Barrier Films Made from Cellulosic Nanofibrils. Sharma, S.; Deng, Y.; Hu, Z.; Ragauskas, A.; Nair, S.S.; Zhu, J., PaperCon., Atlanta, GA (April, 2013).
 12. Pretreatment chemistry: What to expect and need. Ragauskas, A., 245th ACS National Meeting & Exposition, New Orleans, LA, United States, (April, 2013).
 13. Monitoring structural modification of biomass by small and wide scattering of X-ray and neutrons on oriented specimens. Nishiyama, Y.; Langan, P.; Foston, M.; O'Neill, H.; Pingali, S. V.; Horton, S.; Ragauskas, A., 245th ACS National Meeting & Exposition, New Orleans, LA, United States (April, 2013).
 14. Computer simulation of pretreatment of lignocellulosic biomass in cellulosic ethanol production. Smith, J.C.; O'Neill, H.; Langan, P.; Pingali, V.; Urban, V.; Petridis, L.; Evans, B.; Lindner, B.; Schulz, R.; Ragauskas, A.; Foston, M.; Cheng, X., 245th ACS National Meeting & Exposition, New Orleans, LA, United States (April, 2013).
 15. Influence of the deconstruction of the cell wall in the enzymatic saccharification of softwoods. Hoeger, I. C.; Nair, S.S.; Ragauskas, A.J.; Deng, Y.; Rojas, O.J.; Zhu, J., 245th ACS National Meeting & Exposition, New Orleans, LA, United States (April, 2013).
 16. Genome Science Program Contractor-Grantee Workshops, Washington (Feb., 2013):
 - Application of Chemical Imaging by TOF-SIMS to Understand Recalcitrance, Jung, S.; Foston, M.; Ma, T.; McKenzie, H.L.; Tetard, L.; Passian, A.; Kalluri, U.; Tuskan, G.A.; Wyman, C.E.; Davison, B.H.; Sullards, C.; Ragauskas, A.J.; Gilna, P.
 - Characterization of GXMT1 reveals a new family of Co²⁺-dependent enzymes that catalyze the methylation of glucuronoxylan. Urbanowicz, B.; Peña, M.J.; Backe, J.; O'Neill, M.A.; Li, H.; Wyman, C.A.; Steet, H.; Ratnaparkhe, S.; Gilbert, H.J.; Avci, U.; Foston, M.; Ragauskas, A.J.; Darvill, A.G.; York, W.S.; Gilna, P.
 - PvMYB4-overexpression switchgrass yields very high cellulosic ethanol levels without pretreatment. Shen, H.; Poovaiah, C.R.; Ziebell, A.; Tschaplinski, T.J.; Pattathil, S.; Gjersing, E.; Engle, N.; Katahira, R.; Pu, Y.; Sykes, R.; Chen, F.; Ragauskas, A.J.; Mielenz, J.R.; Hahn, M.G.; Davis, M.; Stewart, Jr. C.N.; Dixon, R.A.; Gilna, P.

17. Investigation of fate of poplar lignin during auto hydrolysis pretreatment to understand the biomass recalcitrance. Samuel, R.; Cao, S.; Das, B.; Hu, F.; Pu, Y.; Ragauskas, A.J., 244th ACS National Meeting, Philadelphia, PA (Aug., 2012).
18. 34th Symposium on Biotechnology for Fuels and Chemicals. New Orleans, (May, 2012).
- Assessing the cellulase accessibility of lignocellulosic substrate before and after pretreatment. Meng, X.; Foston, M.; Wyman, C.; DeMartini, J.; Ragauskas, A.
 - Investigation of lignin deposition on cellulose during hydrothermal pretreatment, its effect on cellulose hydrolysis, and underlying mechanisms, Li, H.; Kumar, R.; Pu, Y.; Ragauskas, A.J.; Wyman, C.E.
 - Impact of delignification of cellulosic biomass by common laboratory methods on lignin selectivity, cellulose molecular structure, and enzymatic digestibility. Kumar, R.; Hubbell, C.; Ragauskas, A.; Wyman, C.
 - Carbohydrates derived humins (pseudo-lignin) can retard cellulose biological conversion. Kumar, R.; Fan, H.; Sannigrahi, P.; Seokwon, J.; Ragauskas, A.J.; Wyman, C.
 - Investigation of lignin deposition on cellulose during hydrothermal pretreatment, its effect on cellulose hydrolysis, and underlying mechanisms. Li, H.; Kumar, R.; Pu, Y.; Ragauskas, A.J.; E. Wyman, C.E.
 - Extremely thermophilic bacteria exploit high temperature to deconstruct untreated plant biomass. Kataeva1, I.A.; Foston, M.B.; Yang, S-J.; Pattathil, S.; Biswal, A.K; Poole II, F.L.; Olman, V.; Safford, T.D.; Lewis, D.L.; Doepcke, C.; Tschaplinski, T.; York, W.S.; Davis, M.; Mohnen, D.; Xu, Y.; Ragauskas, A.J.; Kelly, R.M.; Hahn, M.G.; Adams, M.W.W.
 - Understanding how cell wall differences in agave, poplar, and switchgrass affect deconstruction in pretreatment and enzymatic hydrolysis. Li, H.; Pattathil, S.; Foston, M.; Samuel, M.; Kumar, R.; Ragauskas, A.J.; Hahn, M.G.; Wyman, C.E.
 - Effect of pretreatments and enzymatic deconstruction on the surface of biomass: chemical image analysis. Jung, S.; Foston, M.; McKenzie, H.L.; Avci, U.; Ding, S.Y.; Kalluri, U.C.; Tuskan, G. ; Hahn, M.; Wyman. C.; Ragauskas, A.
19. Characterization of transgenic and wild whole biomass before and after pretreatment by 31P NMR. Ben, H.; Ragauskas, A.J.; Jiang, N., 243rd ACS National Meeting & Exposition, San Diego, CA (March, 2012).
20. Surface characterization of biomass (tension wood and pretreated poplar stem) by imaging mass spectrometry: 2D and 3D ToF-SIMS. Jung, S.; Foston, M.; McKenzie, H. L.; Ding, S.Y.; Kalluri, U.; Tuskan, G. A.; Wyman, C.E.; Ragauskas, A.J., 243rd ACS National Meeting & Exposition, San Diego, CA (March, 2012).
21. Pyrolysis of biomass to biofuels. Ben, H.; Ragauskas, A.J., 243rd ACS National Meeting & Exposition, San Diego, CA (March, 2012).
22. Genomic Science Awardee, Meeting X, Bethesda, Maryland, (Feb., 2012)
- Characterizing the Mechanisms of Reduced Recalcitrance of Biomass, Ragauskas, A.

- C Labeling and NMR Analysis: Critical Tools in the Development of Next Generation Biofuel Platforms. Foston, M.; Samuels, R.; Katahira, R.; Gjersing, E.; Davis, M.; McKenzie, H.L.; Wyman, C.E.; Ragauskas, A.J.; Gilna, P.
 - Down-Regulation of the Caffeic Acid *O*-methyltransferase Gene in Switchgrass Reveals a Novel Monolignol Analog. Tschaplinski, T.J.; Standaert, T.F.; Engle, N.; Madhavi Z. Martin, M.Z.; Sangha, A.K.; Parks, J.M.; Smith, J.C.; Samuel, R.; Pu, Y.; Ragauskas, A.J.; Hamilton, C.Y.; Fu, C.; Zeng-Yu Wang, Z.-Y.; Davison, B.H.; Dixon, R.A.; Mielenz, J.R.J.; Gilna, P.
 - Flowthrough Pretreatment to Characterize Biomass Deconstruction. McKenzie, H.L.; Wyman, C.E.; Foston, M.B.; Seokwon, J.; Ragauskas, A.; Engle, N.L.; Emory, J.F.; Tomkins, B.A.; Tschaplinski, T.; Tuskan, G.; Van Berkel, G.J.; Gilna, P.
 - Production and NMR Analysis of Deuterated Cellulose and Lignocellulosic Biomass and Its Utilization for Neutron Scattering Studies. Evans, B.R.; Foston, M.; Ragauskas, A.; O'Neill, H.M.; He, J.; Pingali, S.V.; Urban, V.; Langan, P.A.; Davison, B.H.
 - *In situ* Small-Angle Neutron Scattering and Computer Simulation Investigate Lignin Aggregation During Biomass Pretreatment. Petridis, L.; Pingali, S.V.; Urban, V.; Heller, W.T.; O'Neill, H.M.; Foston, M.; Ragauskas, A.; Evans, B.R.; Langan, P.A.; Smith, J.C.; Davison, B.H.
23. Ice templated xylan-nanocrystalline cellulose aero/hydrogels. Kohnke, T.; Theliander, H.; Ragauskas, A.J. , 243rd ACS National Meeting & Exposition, San Diego, CA (March, 2012).
24. Lignin to Lipid Bioconversion by Rhodococci Bacteria. Kosa, M.; Ragauskas, A.J. 242nd ACS National Meeting & Exposition, Denver, CO (August, 2011).
25. Nuclear Magnetic Resonance Analysis of Deuterium Enriched Biomass. Foston, M.; McGaughey, J.; O'Neill, H.; Evans, B.R.; Ragauskas, A.J. 242nd ACS National Meeting & Exposition, Denver, CO (August, 2011).
26. Use of Advanced NMR Analysis on Water-only Flow-through Pretreated and Enzymatic Deconstructed ¹³C Enriched Corn Stover. Foston, M.B.; McKenzie, H.L.; Wyman, C.E.; Ragauskas, A., 242nd ACS National Meeting & Exposition, Denver, CO (August, 2011).
27. Nuclear Magnetic Resonance and Small-Angle Neutron Analysis of Native and Deuterium Enriched Biomass. Foston, M.; Ragauskas, A.J.; McGaughey, J.; O'Neill, H.; Evans, B.R.; Pingali, S.V.; Urban, V.; Heller, W.; Myles, D. AIChE National Meeting, Minneapolis, MN (October, 2011).
28. Cellulose Whiskers from the Forest. Ragauskas, A.J. TAPPI Intl Conference on Nano for Renewable Materials, Washington, DC (June, 2011).
29. 33rd Symposium on Biotechnology for Fuels and Chemicals Seattle, WA (May, 2011).
- Contribution of Thermal and Microbial Factors to Switchgrass Conversion by *Caldicellulosiruptor Bescii*. Kataeva, I.A.; Foston, M.; Pattathil, S.; Phuongan Dam, P.;

- Tschaplinski, T.J.; Doeppke, C.; Davis, M.; Ragauskas, A.J.; Hahn, M.G.; Xu Y.; Adams, M.W.
- Monitoring the Effects of Hydrothermal Pretreatment on the Chemistry and Structure of *Populus Trichocarpa* to Identify Characteristics that Affect Digestibility. DeMartini, J.D.; Pattathil, S.; Avci, U.; Mazumder, K.; Foston, M.; Ragauskas, A.J. Hahn, M.G.; Wyman, C.E.
 - Analysis of ¹³C Enriched Corn Stover by Water-only Flow-through Pretreatment. Foston, M.B.; McKenzie, H.L.; Wyman, C.E.; Ragauskas, A.J.
 - Characterization of Lignin after Water-only Pretreatment. McKenzie, H.L.; Foston, M.B.; Tschaplinski, T.; Ragauskas, A.J. Wyman, C.E.
30. A Perspective on Pretreatment Chemistry: What We Know and Need to Know. Ragauskas, A.J. Pira 4th annual Biorefining for the Pulp and Paper Industry 2011, Barcelo Sants, Barcelona, Spain (May, 2011).
31. Genomic Sciences Contractor-Grantee Meeting IX/USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee (2011):
- Understanding Cellulose Structure by Crowley, F.; Foston, M; Matthews, J.F; Brady, J.; Himmel, M.E.; Ragauskas, A.J.; Gilna, P.
 - Investigation of the Fate of Lignin Structures of Poplar and Switchgrass during Various Pretreatments to Understand Its Impact to Biomass Recalcitrance by Pu, Y.; Cao, S.; Samuel, R.; Jaing, N.; Foston, M.; Studer, M.; Wyman, C.; Ragauskas, A.J.; Gilna, P.
 - Redesigning Lignocellulosic Feedstocks: Genetic Modification of COMT in Switchgrass Significantly Reduces Recalcitrance and Improves Ethanol Production by Fu, C.; Mielenz, J.R.; Xiao, X.; Ge, Y.; Choo Y.; Miguel Rodriguez Jr., H.; Chen, F.; Foston, M.; Ragauskas, A.J.; Bouton, J.; Dixon, R.A.; Wang, Z-Y.; Gilna, P.
32. Lignin-based Rigid Polyurethane Foam Filled with Cellulose Whiskers. Ragauskas, A.J.; Li, Y. 241st ACS National Meeting & Exposition, Anaheim, CA (2011).
33. Cellulose Nanowhiskers as a Drug Delivery System. Dash, R.; Ragauskas, A.J. 241st ACS National Meeting & Exposition, Anaheim, CA (2011).
34. Cellulose Nanowhiskers Hydrolyzed from Oxygen/Organosolv Agricultural Cellulose. Witayakran, S.; Anapanurak, W.; Kongtud, W.; Yoksan, R.; Ragauskas, A.J. 241st ACS National Meeting & Exposition, Anaheim, CA (2011).
35. Comparison of Laboratory Delignification Methods, Their Selectivity, and Impacts on Physiochemical Characteristics of Cellulosic Biomass. Kumar, R.; Hubbell, C.A.; Ragauskas, A.; Wyman, C.E. 241st AIChE Annual Meeting, ACS National Meeting & Exposition, Anaheim, CA (2011).
36. Refining BioRefining. Ragauskas, A.J. 2011 TAPPI International Bioenergy & Bioproducts Conference, Atlanta (2011).
37. Catalytic Pyrolysis of Lignin for Bio-oils. Ben, H.; Ragauskas, A.J. 2011 TAPPI International Bioenergy & Bioproducts Conference, Atlanta (2011).

38. Towards An Improved Understanding of the Effects of Dilute Acid Pretreatment on Poplar Lignin. Ragauskas, A.J.; Cao, S.; Pu, Y.; Studer, M., Wyman, C. TAPPI PEERS Conf. (2010).
39. Structural Modifications of Cellulose and Lignin in Loblolly Pine Arising from the Ethanol Organosolv Pretreatment. Sannigrahi, P.; Ragauskas, A.J.; Miller, S.J. TAPPI PEERS Conf. (2010).
40. Chemical Modification of Cellulose Nanowhiskers through Periodate Oxidation. Ragauskas, A.J.; Dash, R.; Elder, T. Georgia Life Science Summit 2010, Atlanta, GA (2010).
41. Chemical Image of Poplar Stem using Imaging Mass Spectrometry: ToF-SIMS and MALDI-MS. Jung, S.; Chen, Y.; Sullards, M. C.; Ragauskas, A. J. Georgia Life Science Summit 2010, Atlanta, GA (2010).
42. Novel Polyurethane Nanocomposite Foam Reinforced with Cellulose Whiskers. Li, Y.; Ren, H.; Ragauskas, A.J. Georgia Life Sciences Summit 2010, Atlanta, GA (2010).
43. Pyrolysis of Kraft Lignin at Different Temperature. Ben, H.; Ragauskas, A. J. Georgia Life Sciences Summit 2010, Atlanta, GA (2010).
44. Advances in the use of NMR to Characterize Biomass in an Effort to Elucidate the Nature of Recalcitrance. AIChE National Meeting, Salt Lake City, UT (2010).
45. Chemical Characterization of Poplar after Hot Water Pretreatment. Pu, Y.; Cao, S.; Studer, M.; Wyman, C.; Ragauskas, A.J., 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater, FL (2010).
46. Imaging Matrix-assisted Laser Desorption/ionization Mass Spectrometry (MALDI-MS) of Poplar Stem. Jung, S.; Chen, Y.; Sullards, C.; Ragauskas, A.J. 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater, FL (2010).
47. Toward Understanding Fundamentals of Enzymatic Hydrolysis of Cellulose through a Restart Approach. Yang, B.; Pu, Y.; Ragauskas, A.J.; Shi, J.; Wyman, C. 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater, FL (2010).
48. Investigating the Anatomical Features of Ethanol Organosolv Pretreated *Buddleja Davidii*. Hallac, B.; Ray, M.; Murphy, R.; Ragauskas, A.J. 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater, FL (2010).
49. Recalcitrance: Will the Real Lignin Stand Up? Sannigrahi, P.; Kim, D.H.; David, K.; Ragauskas, A.J. 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater, FL (2010).
50. A Perspective on Pretreatment Chemistry: What We Know and Need to Know. Ragauskas, A.J.; Pu, Y.; Jung, S. Foston, M.; Sannigrahi, S.; Ziebell, A.; Davis, M.; Chen, F.; Dixon, R.A.; Davison, B.H.; Studer, M.; Wymann, C. E. 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater, FL (2010).

51. Biomass Characterization of Alamo Switchgrass. Hu, Z.; Ragauskas, A.J. 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater, FL (2010).
52. Copper-catalyzed Dehydration of Aldoximes into Nitriles at Room Temperature. Jiang, N.; Ragauskas, A.J. 239th ACS National Meeting, San Francisco, CA (2010).
53. Direct Dissolution and NMR Analysis of the Plant Cell Walls via Perdeuterated Pyridinium-based Ionic Liquid. Jiang, N.; Pu, Y.; Ragauskas, A.J.; Samuel, R. 239th ACS National Meeting, San Francisco, CA (2010).
54. All About Biorefining. Ragauskas, A.J. 239th ACS National Meeting, San Francisco, CA (2010).
55. ToF-SIMS Characterization of Chemical Differences on the Surface of Populus Deltoid between Different Treatments and Growth Stages. Jung, Seokwon; Sullards, M. Cameron; Ragauskas, A.J. 239th ACS National Meeting, San Francisco, CA (2010).
56. Solid-state NMR Analysis of Changes in the Supramolecular and Ultrastructure of the Cellulose Fiber Wall in Poplar during Dilute Acid Pretreatment. Foston, M.B.; Ragauskas, A.J. 239th ACS National Meeting, San Francisco, CA (2010).
57. Synthesis of Novel Cellulosics through Periodate Oxidation. Rajalaxmi, D.; Ragauskas, A.J. 239th ACS National Meeting, San Francisco, CA (2010).
58. Rigid Polyurethane Foam Reinforced with Cellulose Nano Whiskers. Li, Y.; Ren, H.; Ragauskas, A.J. 239th ACS National Meeting, San Francisco, CA (2010).
59. Study Cellulase-cellulose Interaction using FRET. Wang, L.; Ragauskas, A.J.; Wang, Yi. 239th ACS National Meeting, San Francisco, CA (2010).
60. Biomass Characterization of Switchgrass for Biofuel Production. Hu, Z.; Pu, Y.; Ragauskas, A.J. 239th ACS National Meeting, San Francisco, CA (2010).
61. Ethanol Organosolv Lignin: More than Just Boiler Fuel. Sannigrahi, P.; Ragauskas, A.J.; Miller, S.J. 239th ACS National Meeting, San Francisco, CA (2010).
62. Tango for Two: Biomass Recalcitrance - Enzymatic Deconstruction. Ragauskas, A.J. 239th ACS National Meeting, San Francisco, CA (2010).
63. Chemical Characterization of Poplar during Dilute Acid Pretreatment. Pu, Y.; Studer, M.; Ragauskas, A.J. 239th ACS National Meeting, San Francisco, CA (2010).
64. Investing in Biorefining Today for Tomorrow's Opportunities. Ragauskas, A.J. Biorefining for the Pulp and Paper Industry, Pira, Stockholm (2009).
65. Effects of Two-stage Dilute Acid Pretreatment on the Structure and Composition of Lignin and Cellulose in Loblolly. Sannigrahi, P.; Ragauskas, A.J.; Miller, S.J., 31st symposium on Biotechnology for Fuels and Chemicals, San Francisco, CA (2009).

66. Elucidation of Alfalfa Lignin Structures on Gene Down-regulation. Pu, Y.; Chen, F.; Dixon, R.; Davis, M.; Davison, B.; Ragauskas, A.J., 31st Symposium on Biotechnology for Fuels and Chemicals, San Francisco, CA (2009).
67. Biomass Characterization and Organosolv Pretreatment of *Buddleja Davidii*. Hallac, B.; Sannigrahi, P.; Pu, Y.; Ray, M.; Murphy, R.; Ragauskas, A.J., 237th ACS National Meeting, Salt Lake City, UT (2009).
68. New Energy: Fuel Resources from Kraft Pulping. Nagy, M.; Kosa, M.; Ragauskas, A.J.; Theliander, H., 237th ACS National Meeting, Salt Lake City, UT (2009).
69. Biomass Characterization of *Buddleja Davidii*: A Potential Feedstock for Biofuel Production. Hallac, B.; Sannigrahi, P.; Pu, Y.; Ray, M.; Murphy, R.; Ragauskas, A.J., 60th Southeastern Regional Meeting American Chemical Society, Nashville, TN (2008).
70. Unleashing Organosolv Lignin for Biofuels. Nagy, M.; Britovsek, G.J. P.; Ragauskas, A. J., 236th ACS National Meeting, PA (2008).
71. Developing the New Lignocellulosic Energy Age. Ragauskas, A.J., 235th ACS National Meeting, New Orleans, LA (2008).
72. Modification of Linerboard Softwood Kraft Pulp with Laccase and Amino Acids. Witayakran, S.; Ragauskas, A.J., 235th ACS National Meeting, New Orleans, LA (2008).
73. Tying Cellulose Whiskers Together. Goetz, L.A.; Ragauskas, A.J.; Mathew, A.; Oksman, K., 235th ACS National Meeting, New Orleans, LA (2008).
74. Structural Characteristics and In Vitro Fermentation of Various Dietary Fibers by Pig Fecal Bacteria. Pu, Y.; Ziemer, C.; Ragauskas, A.J., 235th ACS National Meeting, New Orleans, LA (2008).
75. Path Forward for NanoBiomaterials Derived from Lignocellulosics. Ragauskas, A.J.; Rials, T.G.; Ashurst, R.W.; Cullinan, H.T.; Wegner, T.H.; Holbery, J.D., TAPPI International Conference on Nanotechnology for the Forest Products Industry (2006).
76. Tunable Solvents for Fine Chemicals from the Biorefinery. Eckert, C.A.; Liotta, Charles L.; Ragauskas, A.J.; Hallett, J.P.; Kitchens, C.L.; Hill, E.M.; Draucker, L.C., 232nd ACS National Meeting, San Francisco, CA (2006).
77. The Synthesis of Carbohydrates in Ionic Liquids. Zhang, J.; Ragauskas, A.J., 231st ACS National Meeting, Atlanta, GA (2006).
78. Arboreal Nanotechnology. Ragauskas, A.J.; Rials, T.G.; Ashurt, R.W.; Cullinan, H.T.; Wegner, T.H.; Holbery, James D., 231st ACS National Meeting, Atlanta, GA (2006).

79. Probing Fiber-fiber Interfaces with Fluorescence Resonance Energy Transfer: Imaging Individual Fiber-fiber Crossings. Thomson, C.I.; Lowe, R.M.; Ragauskas, A.J., 231st ACS National Meeting, Atlanta, GA (2006).
80. The Dynamic Change of Fiber during Extended Oxygen Delignification of SW Kraft Pulps. Zhang, D.; Pu, Y.; Ragauskas, A.J., 231st ACS National Meeting, Atlanta, GA (2006).
81. Fiber Modification with Peroxide Bleaching on ECF Pulp. Dang, Z.; Elder, T.; Ragauskas, A.J., 231st ACS National Meeting, Atlanta, GA (2006).
82. Green Chemistry One-pot Synthesis of 1,4-naphthoquinones and Related Structures. Witayakran, S.; Ragauskas, A.J., 231st ACS National Meeting, Atlanta, GA (2006).
83. An Innovative Green Chemistry Methodology for Selective Aerobic Oxidation of Primary Alcohols. Jiang, N.; Ragauskas, A.J., 231st ACS National Meeting, Atlanta, GA (2006).
84. Fundamentals of Fiber Modification Chemistry. Ragauskas, A.J. Pu, Y., Allison, L., Pacifichem., HI (2005).
85. A Nano Perspective of Cellulose. Ragauskas, A.J., The Second Workshop on Regenerated Cellulose and Cellulose Derivatives, Karlstad University, Sweden (2005).
86. New Value Streams from Residuals and Spent Liquor. Ragauskas, A.J., Fall TAPPI Technical Conference, Atlanta, GA (2004).
87. Ratiocination for Laccase Biobleaching of Recycled Paper. Knutson, K.; Ragauskas, A.J., 227th ACS National Meeting, Anaheim, CA (2004).
88. Industrial Biotech Applications in the Pulp and Paper Industry. Ragauskas, A.J., World Congress on Industrial Biotechnology and Bioprocessing Orlando, FL (2004).
89. DBD A Palmary Approach to Fiber Modification. Vander Wielen, L.; Ragauskas, A.J., AIChE Annual Meeting, San Francisco, CA (2003).
90. Enzymatic Biobleaching of Recalcitrant Paper Dyes. Knutson, K.; Ragauskas, A.J., SERMACS, Atlanta, GA (2003).
91. Nanotechnology – Changing the Challenge in Pulp and Paper Research, presented at Nano All Around Us Conference, Ragauskas, A.J., The University of Wisconsin's Inaugural Technical Conference and Public Expo on Nanotechnology (2003).
92. Dielectric Discharge Initiated Grafting onto Cellulosic Fibers. Vander Wielen, L.; Ragauskas, A.J., Gordon Conference, Italy (2003).
93. Redefining the Pulp and Paper Industry with New Chemo-Enzymatic Technologies. Ragauskas, A.J., Gordon Polysaccharide Conference, Italy (2003).

94. Laccase: An Ancilla to Kraft Pulping. Dyer, T.; Kim, D.; Ragauskas, A.J., 225th ACS National Meeting, New Orleans, LA (2002).
95. Invigorating High Kappa Kraft Pulps with Laccase. Chandra, R.P.; Ragauskas, A.J., 225th ACS National Meeting, New Orleans, LA (2002).
96. Parlaying Dielectric Breakdown Discharge for Fiber Modification. Vander Wielen, L.C., Ragauskas, A.J., 225th ACS National Meeting, New Orleans, LA (2002).
97. Modifying the Color of Recycled Paper with Laccase. Knutson, K.; Ragauskas, A.J., 224th ACS National Meeting, Boston, MA (2002).
98. Enhanced Environmentally Compatible Pulp Bleaching Chemistry. Yang, R.; Lucia, L.; Ragauskas, A.J.; Jameel, H., Intern. Conf. Organic Synth., Baltic Organicum Syntheticum, Vilnius, Lithuania (2002).
99. Applications of Lignin NMR Techniques for Wood Resins. Dyer, T.; Ragauskas, A.J.; Nilvebrant, N.-O., 223rd ACS National Meeting, Orlando, FL (2002).
100. Fiber Modification with Laccase: You Say You Want a Revolution? Chandra, R.P.; Wolfaardt, F.; Ragauskas, A.J., 223rd ACS National Meeting, Orlando, FL (2002).
101. Fundamental Delignification Chemistry of Laccase-Mediator Systems on High-Lignin Content Kraft Pulps-A Synopsis of Contributions. Chakar, F.S.; Ragauskas, A.J., 125th ACS National Meeting, San Diego, CA (2001).
102. Defining the Photostabilization Succor Properties of Acetylated Lignin. Ragauskas, A.J.; Pu, Y.; Lucia, L., 125th ACS National Meeting, San Diego, CA (2001).
103. Laccase-Lignin Oxidative Chemistry. Ragauskas, A.J.; Allison, L.; Chakar, F.S., International Chemical Congress of Pacific Basin Societies, Honolulu, HI (2000).
104. Parsing Laccase's Effect on Modifying Lignin. Chandra, R.; Ragauskas, A.J., International Chemical Congress of Pacific Basin Societies, Honolulu, HI (2000).
105. Structural Enhancement of Laccase-Lignin Reactions. Chakar, F.S., Ragauskas, A.J., 219th ACS National Meeting, San Francisco, CA (2000).
106. Provenience of Lignin Reactivity in Extended Oxygen Delignification, Lucia, L.; Ragauskas, A.J.; Yang, R., International Chemical Congress of Pacific Basin Societies, HI (2000).
107. Breaking the Oxygen Delignification Barrier: Lignin Reactivity and Inactivity. Lucia, L.A.; Boasman, A.; Ragauskas, A.J., 219th ACS National Meeting, CA (2000).
108. Insight into Laccase-Mediator Delignification of Softwood Kraft Pulps. Chakar, F.S.; Ragauskas, A.J., 1999 217th ACS National Meeting, Anaheim, CA (1999).

109. New NMR Applications for Old Spectroscopic Techniques: Detection of Lignin-Quinone Structures by ³¹P-NMR. Zawadzki, M.; Ragauskas, A.J., 217th ACS National Meeting, Anaheim, CA (1999).
110. Fundamental chemistry involved in chromophore removal of chemical pulps. Zawadzki, M.; Runge, T.; Ragauskas, A., 215th ACS National Meeting, Dallas (1998).
111. Analysis of residual lignin structure from modern pulping technologies. Froass, P.M.; Jiang, J.E.; Ragauskas, A.J., 211th ACS National Meeting, New Orleans, LA (1996).
112. Mercapto photostabilization mechanisms for mechanical pulp. Ragauskas, A.J.; Cook, C.M., 211th ACS National Meeting, New Orleans, LA (1996).

PROFESSIONAL SERVICES

UTK Professional Service

- Associate Vice Chancellor for Research Search Committee Member (20126)
- Director, Research Development Team, Search Committee Member (20126)
- ChBE Tenure Committee (2014 -)
- Presentation to UTK ChBE Assistant Professor, External Funding (2016)
- Presentation to UTK ChBE Assistant Professor, External Funding (2016)

OUTSIDE PROFESSIONAL SERVICE

- Organizing Committee, University of Georgia and Georgia Institute of Technology Biofuels Summit Dec 17, 2013
- Organizing Committee, GTMI workshop of Opportunities for Innovation in lignocellulosic Materials, Dec 13, 2013, IPST.
- Scientific Committee of the International Symposium on Lignocellulosic Materials, held in the context of the 13th International Congress on Science and Technology of Metallurgy and Materials, in Puerto Iguazu, Argentina (2013)
- Convener (April 30), 35th Symposium on Biotechnology for Fuels and Chemicals, April 29-May 2, 2013, Portland, OR.
- ACS Session, Chair. American Chemical Society, Division of Cellulose and Renewable Materials, Improving Efficiency at Biorefineries, San Diego (2012).
- Organizing Committee, TAPPI International Conference on Nanotechnology for Renewable Materials, Washington (2011).
- ACS Session, co-Session Chair: Nanolignocellulosics, Honolulu, HI (2009).
- Participant for AFPA Forest Products Industry Technology Roadmap Workshop, held at IPST@GT (2009).
- Organizing Committee, International Conference on Nanotechnology for the Forest Products Industry, Edmonton, Alberta (2009).
- International Pulp Bleaching Conference, Program Committee, Quebec, Canada (2008).

- ACS Session Presiding Chair, 2008 Engineering the Transition to the Bioeconomy, 235th ACS National Meeting, New Orleans, LA (2008).
- Organizing Committee, International Conference on Nanotechnology for the Forest Products Industry, St. Louis, MO (2008).
- Invited participant in Fourth Meeting of the U.S. and Sweden Science and Technology Committees, Invited by State Department, and presented a seminar titled “Forest Biorefinery A Contribution to the One Big Thing Fulbright Chair in Alternative Energy” (2008).
- Invited participant in USA Embassy One Big Thing review and presented a seminar titled “Forest Biorefinery a Contribution to the One Big Thing Fulbright Chair in Alternative Energy” (2008).
- Invited participant in Fulbright Grantee Day (2008).
- Invited participant in Bioenergy Meeting at American Embassy, involving high-level forestry professionals and officials from Minnesota as part of their Nordic tour organized by the Blandin Foundation, Ragauskas reviewed research in US/Swedish biofuel technologies (2008).
- Invited participant in Assistant Sec, DOE David Rodger visit to US Embassy, Stockholm for a review of Swedish companies contributing to One Big Thing (2008).
- International Pulp Bleaching Conference, Program Committee, Quebec, Canada (2008).
- ACS Session Presiding Chair, 2008 Engineering the Transition to the Bioeconomy, 235th ACS National Meeting, New Orleans, LA (2008).
- Organizing Committee, International Conference on Nanotechnology for the Forest Products Industry, St. Louis, MO (2008).
- Organizing Committee, International Conference on Nanotechnology for the Forest Products Industry Knoxville, TN (2007).
- Organizing Committee/Session Chair TAPPI International Conference on Renewable Energy, Atlanta, GA (2007).
- Session Chair Pira International Fiber Engineering for Papermakers Conference, Stockholm, Sweden (2007).
- Invited participant to NSF Chemistry Workshop on Sustainability (2006).
- Session Co-Chair 28th Symposium on Biotechnology for Fuels and Chemicals, Nashville, TN (2006).
- ACS Session Co-Chair/Organizer, 2006 Topochemical Modification of Lignocellulosic Fibers, Atlanta, GA (2006).
- Session Chair Pira International Ultra-thin Films and Nanocoatings Conference, Vienna, Austria (2006).
- TAPPI International Conference on Nanotechnology for the Forest Products Industry, Program Committee Member and Session Chair (2006).
- Session Chair 2005 Pacifichem. Agrochemistry: Characterization, Photostabilization and Usage of Lignocellulosic Materials (2005).
- Pira International, Workshop Chair, Future Developments in Starch for Paper Manufacture, Atlanta, GA (2005).
- Program Committee Member for 2005 International Pulp Bleaching Conference, Stockholm (2005).
- Program Committee Member for Workshop on Cellulose and Cellulose Derivatives, Karlstad University, Karlstad, Sweden (2005).

- Program Committee Member GT-ORNL-ICL Biofuels – Biomaterials Program Review (Dec., 2004); Workshop (April, 2005); Strategic Review (June, 2005).
- Program Chair for Workshop on Defining the Opportunities, Challenges, and Research Needs for NanoBiomaterials Derived from Lignocellulosics, Atlanta, GA (September, 2005).
- Program Committee Member for Nanotechnology Workshop for the Forest Products Industry, Washington, DC (2004).
- Session Chair 2003 TAPPI Fall Technical Conference: Engineering, Pulping & PCE&I, Chicago, IL (October, 2003).
- Poster Session Chair, 2002 International Pulp Bleaching Conference, Portland, OR (2002).
- 11th International Symp. Wood and Pulping Chemistry, Nice, France, Session Chair (2001).
- 10th International Symp. Wood Chemistry and Pulping, Japan, Session Chair (1999).
- 1998 International Symposium on Emerging Technologies of Pulping and Papermaking of Fast-Growing Wood, Session Chair, South China University of Technology, P.R. China (1998).
- 1997 TAPPI Biological Sciences Symposium, San Francisco, CA (1997).
- 211th American Chemical Society National Meeting, New Orleans, Cellulose, Paper and Textile Division, Session Chair (1996).

EDITORIAL ADVISORY BOARD SERVICE

- Global Journal of Organic Chemistry (2010-)
- Journal of Petroleum & Environmental Biotechnology (2010-)
- The Open Biotechnology Journal (2009-)
- Journal of Biobased Materials and Bioenergy (2009-)
- Journal of Petroleum Technology and Alternative Fuels (2010-)
- Journal Wood Chemistry and Technology (2000-)
- Journal of Pulp and Paper Science (2000-2008)
- Holzforschung (2003-)
- Biofuels (2009-)
- Biofuels, Bioproducts and Biorefining (2007-)
- Industrial Biotechnology (2007-)
- BioEnergy Research (2007-)
- Sustainability (2009-)
- Journal of Chemical Technology and Biotechnology (2009-)
- TAPPI Journal (2010-)
- Frontiers in Cellulose Biotechnology/Frontiers in Biotechnology (2011-)
- Current Biotechnology (2011-)
- Energies (2011 – current)
- ISRN Chemical Engineering (2011 -)
- Organic Chemistry: Current Research (2011 -)
- ChemSusChem (2011 -)
- Open Journal of Organic Polymer Materials (2012 -)
- Physiobiochemical Metabolism (2012 -)
- Modern Research in Catalyst (2012 -)
- Technologies (2012 -)
- International Journal of Bioorganic Chemistry & Molecular Biology (2012 -)

- Emirates Journal of Food and Agriculture (2012 -)
- Energy Conversion and Management (2013 -)
- GSTF Journal of Chemical Science (JChem; 2013 -)
- Academic and Scientific Publishing (2013 -)
- Microscopy Research (2013 -)
- Journal of Materials Science and Engineering with Advanced Technology (2013 -)
- J Sci Med Chemistry (2013 -)
- Frontiers in Energy (2013 -)
- Review Editorial Board of Frontiers in Bioenergy and Biofuel (2013 -)
- Innovative Energy Policies (2013 -)
- International Journal of Renewable Energy Research and Development (2013 -)
- Journal of Current Reports on Energy (2014 -)
- International Editorial Board Member of Journal of The Korean Wood Science and Technology (2014 -)
- Journal of Chemical Engineering Research Studies (2014 -)
- Journal of Environmental Sciences (2014 -)
- International Journal of Polymer Science (2014 -)
- SOJ Biotechnology (2014 -)
- EC Chemistry Journal (2014 -)
- Aperito Journal of Advanced Plant Biology (2014 -)
- Food Science and Nutrition (2014 -)
- Annals of Chromatography and Separation Techniques (2015 -)
- Journal of Oil and Gas Research (2015 -)
- Journal of Modern Engineering (2015 -)
- AIMS Bioengineering (2016 -)
- Bioethanol Journal (2016 -)
- Mini-Reviews in Organic Chemistry (2016 -)
- BioAccent BAOJ Chemistry (2016 -)
- Energy (2016 -)
- The Scientific Pages of Crop Science (2016 -)
- Innovative Techniques in Agriculture (2016 -)
- Green Energy & Environment (2016 -)
- SciFed Journal of Chemical Research (2016 -)
- The Open Biotechnology Journal (2016 -)
- Advances in Biochemistry and Biotechnology (2016 -)
- Current Biotechnology (2016 -)

Scientific Advisory Board

- NSERC Bioconversion Network, Canada

- National Commission on Energy Policy
- Scientific Advisory Committee, Arauco Company, Chile
- UCLA DOE External Advisory Committee member
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- BondX Technologies Ltd., Israel
- BioFuelNet Canada's Independent Scientific Advisory/Management Board, Canada
- Latvian State Institute of Wood Chemistry International Advisory Board

NATIONAL/INTERNATIONAL FUNDING REVIEW PANELS AND COMMITTEES

- Natural Sciences and Engineering Research Council of Canada
- GA One Stop Shop
- Canadian Foundation for Innovation
- Consortium for Plant Biotechnology Research Incorporated
- United States Department of Agriculture
 - National Research Initiative Competitive Grants Program (NRI)
 - Small Business Grants
- National Science Foundation
- Department of Energy
- ACS - Petroleum Research Fund
- ARPA-E
- Louisiana Board of Regents Support Fund
- Kansas Bioscience Eminent Scholars Program Review
- Austrian Science Fund
- European Commission Research Directorate-General Invitation to the evaluation of proposals to "Quality of Life and Management of Living Resources" RTD program (2001).
- J. Paul Getty Museum/Foundation to review research needs for photostabilization technologies/protocols for the Great Masters museum holdings (2002).
- National Renewable Energy Laboratory, Golden, CO, Stage-Gate Program review of Cellulose/Hemicellulose Biorefiner Research Programs
- U.S. Civilian Research and Development Foundation
- National Nanotechnology Committee for Forest Products Industry
- National Research Foundation, South Africa
- Swedish The Knowledge Foundation: The KK-foundation
- Swedish Foundation for Strategic Research - Strategic Research Centres
- VINN Excellence Center/Swedish Agency for Innovation Systems
- Finnish Academy of Science
- VTT Technical Research Centre of Finland, Clean world Program
- Netherlands Organization for Scientific Research
- Norway Research Council
- The Technology Foundation STW
- ERA Chemistry
- Israel Science Foundation's FIRST: Focal Initiatives in Research in Science and Technology
- BARD: The United States - Israel
Binational Agricultural Research and Development Fund

- Swiss National Science Foundation
- Singapore Agency for Science, Technology and Research
- UBC Center Review Committee for Pulp and Paper Center, Canada
- Agence Nationale de la Recherche, France
- Danish National Advanced Technology Foundation
- Danish Council for Strategic Research
- Netherlands Organisation for Scientific Research (NWO), Division for Chemical Sciences
- National Research Foundation, South Africa
- Romanian National Council for Scientific Research
- King Fahd University of Petroleum & Minerals, Saudi Arabia
- TEKES Strategic Centres for Science, Technology and Innovation (*SHOK*) Program, Forest Cluster, Finland
- OTKA - Hungarian Scientific Research Fund
- Chair of CONICYT and Academy of Finland Sustainable Energy review panel in Santiago, Chile
- FONDECYT - CHILE
- European Research Council Executive Agency (2015)
- Academy of Finland/Biomass Conversion (2015)
- European Commission (2015)
- María de Maeztu Units of Excellence Programme, by the Spanish Government to promote and support outstanding research units (2015)
- Agenda 2020 pulping and nanocellulose subcommittee (2014-15)
- Czech Science Foundation (2016)
- SBIR National Program Review Panel Leader (2016)
- Iowa Energy Center (2016)

JOURNAL REVIEWER

- Carbohydrate Research, Carbohydrate Polymers, Canadian J. Chemistry, J. Organic Chemistry Nature, Science, Tetrahedron Letters, Organic Letters, Cellulose, Journal of Photochemistry and Photobiology, A: Chemistry, Langmuir, Green Chemistry, Energy Environmental Science, Bioresource Technology, BioEnergy, BioFuels, BioFuels Journal, BioFuels, Bioproducts and Biorefining, Biomass and Bioenergy, ChemSusChem, , Energy and Fuels, Fuels, Nature, Science, J. Am. Chem. Soc., Angewandte Chemie International Edition, eXPRESS Polymer Letters
- Enzyme and Microbial Technology, Applied Microbiology Biotechnology, Biotechnology Letters, Industrial Biotechnology, Applied Biochemistry and Biotechnology
- Industrial & Engineering Chemistry Research, Journal of Applied Polymer Science,
- Holzforschung, Nordic Pulp & Paper Research Journal, Journal of Pulp and Paper Science, Journal of Wood Chemistry Technology, Tappi Journal

MEMBERSHIP IN PROFESSIONAL AND HONOR SOCIETIES

- ASEE - American Society for Engineering Education (2014 -)
- American Nano Society (2011-present)
- Invited International Academy of Wood Science (2003-present)
- National Academy of Science, Committee Member for Technologies to Deter Currency Counterfeiting (2005-06)
- American Association of the Advancement of Science (2005-present)
- The Society Of Chemical Industry (2011-present)
- American Chemical Society (1985-present)
 - Cellulose, Paper and Textile Division (1991-present)
 - Assistant Program Chair (1996-98)
 - Student Activities Chair (1996-98)
- TAPPI – Technical Association of Pulp and Paper Industry (1993-present)

DIVISION COMMITTEES

Pulp Manufacture Division

	<u>Effective Date</u>	<u>Thru Date</u>
Alkaline Pulping and Bleaching Committee	9/2/1997	
Alkaline Pulping Committee	9/2/1997	5/14/2007
Color Stabilization Subcommittee	5/4/1998	5/14/2007
Pulp Bleaching Committee	9/2/1997	5/14/2007
Wood Chemistry and Biotechnology	5/26/1995	8/2/2009

Independent Technical Committee

Biochemical/Yeast & Microorganisms	10/29/2009	
Biorefinery Committee	1/2/2009	
International Research Management Committee	9/8/2009	
Paper Physics Committee	6/7/2004	
Thermochemical/Chemical Catalytic	10/29/2009	

Nonwovens Division

Nonwovens Binders and Additives Committee	2/1/2000	
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Communities

Nanotechnology Steering Committee	9/1/2004	
Renewable Energy Conference Committee	2/6/2007	1/7/2009

Board Committees

TAPPI Journal Editorial Board	4/21/2010	
TAPPI Past & Current FELLOWS	3/1/2004	

Local Section Committees

- | | | |
|--------------------|----------|-----------|
| Southeastern TAPPI | 2/2/2000 | 8/31/2000 |
|--------------------|----------|-----------|
- PAPTAC - Pulp and Paper Association of Canada (2000-2003).

ACADEMIC ACCOMPLISHMENTS

Ragauskas Pedagogical Prizes Awarded

- GT Thank a Teacher Certificate (2011)
- 1999 IPST President's Award for Education
- 1999 Teacher of the Year, selected by IPST graduate students

Student Awards Achieved under Ragauskas' Supervision

- | | |
|--------------------------|--|
| • James E. Sealey II | Best IPST Ph.D. Student – 1997 |
| • Troy M. Runge | Best IPST Ph.D. Student – 1998 |
| • Fadi S. Chakar | Best IPST Ph.D. Student – 1999 |
| • Fadi S. Chakar | Best Poster at Int. Pulp Bleaching Conference – 2000. |
| • Fadi S. Chakar | ACS Graduate Student Award – 2000 |
| • Richard Chandra | ACS Graduate Student Award – 2003 |
| • Lorraine Vander Wielen | Best IPST Ph.D. Student – 2004 |
| • Qining Sun | GT Research and Innovation Conference, IPC Foundation
Innovation Award - 2013 |

TEACHING ACCOMPLISHMENTS

Undergraduate and graduate courses developed and presented:

GA Tech: FY 2003 - 2015

- Organic Chemistry II/Georgia Institute of Technology Chemistry 2312
- Spectroscopy in Organic Chemistry 6222/5020
- Pulping and Bleaching Chemistry: Georgia Institute of Technology Chemistry 8833A
 - Teaching Effectiveness 4.2/5.0 (2012); 4.9/5.0 (2011)
- Biorenewable Polymers: Georgia Institute of Technology Chemistry 8833A
 - Teaching Effectiveness 4.2/5.0 (2010)

Guest GA Tech Professor

- The Science of Alternative Energy: GT Chem. 2803 HP1

IPST: FY 1989 - 2002

- Introduction to Organic Chemistry/IPST CHEM 5020
- Carbohydrate Chemistry/IPST CHEM 6221
- Lignin Chemistry/IPST CHEM 6220
- Spectroscopy in Organic Chemistry/IPST CHEM 6222
- Advanced Pulping and Bleaching Chemistry/IPST CHEM 6223

Invited Teaching Visit - Chalmers University Of Technology (2001)

Dr. Ragauskas was invited by the Department of Forest Products and Chemical Engineering, Chalmers University of Technology (Goteburg, Sweden), to present a 2-credit graduate course on pulping and bleaching titled: Fiber Line Bleaching, Department of Forest Products and Chemical Engineering.

Course Summary: The course is directed at reviewing recent developments in advanced pulp bleaching. Students are introduced to advanced concepts in lignin/carbohydrate structure and pulp bleachability. State-of-the-art pulp bleaching equipment, chemistry, and environmental issues are explored.

Course Objectives:

1. To provide a review of how lignin/carbohydrate structure influences pulp bleachability.
2. To establish the relationship between basic pulp bleaching chemistry and modern bleach plant operations.

FULBRIGHT TEACHING ACCOMPLISHMENTS (2008-09)

During my Fulbright tenure at Chemical and Biological Engineering Department, Chalmers University of Technology, I participated in several classes on alternative energy and the forest biorefinery, including:

KBT145: Biorefinery

- **Aim:** Within the next 50 years we will see a gradual transition from an oil based society to a biobased society. In this transition there will be a necessity to find new process routes to produce some of the materials used today as well as new materials that can replace some of the materials normally used today. The aim of this course is to give basic knowledge needed to understand how biomaterial can be used and how different biorefinery concepts can be developed based on both environmental and economic criteria.
- **Learning outcome:** After this course the students should have knowledge in: The chemical composition of the most common sources of biomaterial; methods of extracting components; the most important chemical reactions; the most common processes for extracting components and post treatment of extracted materials.

KBT130: Cellulose Technology

- **Aim:** The purpose of the course is to give the students knowledge of the different processes for paper pulp production from wood. Some important operations are highlighted in the laboratory sessions (kraft pulping, bleaching and mechanical pulp production). In a minor project work, the students are introduced to a flow-sheeting program.
- **Learning outcome:** Describe the macroscopic and morphological structure of wood and give a basic description of the chemical structure of the wood constituents (cellulose, hemicelluloses, lignin and extractives). Understand the conversion technologies used to convert wood to sulfite and sulfate chemical pulps in an environmentally compatible manner.

Both courses were offered in the Chemical Engineering Department.

In addition, I presented teaching material to students at Forest Products Industry Research College (FPIRC).

- Forest Biorefineries Bridge to Future: FPRIC Sweden (August, 2008).
- US Perspective on Biorefinery, Royal Institute of Technology, Stockholm (January, 2009)

GUEST CLASS SEMINARS

- The BioRefinery: The Next Green Revolution in Science, Engineering and Innovation, Berzeliusdagarna, (Top Swedish High School Science Students) University of Stockholm (January, 2008)
- Biomass-Biofuels-Biomaterials, Mill Creek High School in Hoschton, GA on May 18th 2007 (Note: 1-day presentations to grade 10 students on the fundamentals of biomass, biofuels, and conversion chemistry-biochemistry)
- Future of Integrated Biofineries, GA Tech Honors Energy Class (September, 2006).
- GA Tech- Chem. 2803 HP1 - The Science of Alternative Energy (2010)
- Course Description: This course will give a general overview of the most popular alternative energy sources which are currently being used or developed to help relieve the world dependence on fossil fuels. The basic scientific principles governing the current and future approaches in solar photo-voltaics, fuel cells, biomass conversion, nuclear energy and wind power will be presented. Though the course will focus on the basic principles and fundamental science underpinning the current advancements in energy technologies, there will also be an emphasis on understanding the efficiency and general sustainability issues associated with the most popular alternate energy options.

GRADUATE AND UNDERGRADUATE STUDENTS SUPERVISED

Undergraduate Students

- A.J. Cesternino GA State, Chemistry Department (1992)
- J. Szwec GA State, Chemistry Department (1993)
- C. Qui Clark Atlanta University, Chemistry Department (1994)
- D. Johnson Clark Atlanta University, Chemistry Department (1996)
- V. Goel Emory University, Chemistry Department (2000)
- S. Anderson Clark Atlanta University, Chemistry Department (2001)
- S. Krizan Chemical Engineering, McMaster University (2002)
- G. K. Feld School of Chemistry and Biochemistry, GA Tech (2005-06)
- J. Slady School of Chemistry and Biochemistry, GA Tech (2005-06)
- N. Cheluka Department Paper Technology, Indian Institute of Technology, (2006)
- A. Zettili Chemistry Department, Jacksonville State University, AL (2006)

GRADUATE COMMITTEES - GEORGIA TECH:

GT PhD Proposal Committee

- Susnata Samanta, School of Chemistry and Biochemistry (2004)
- Huina Guo, School of Polymer, Textile and Fiber Engineering (2004)
- Kimberly L. Nelson, School of Chemical and Biomolecular Engineering (2006)
- Bradley E. Carson, School of Chemistry and Biochemistry (2006)
- Kane Barker, School of Chemistry and Biochemistry (2006)
- Wei Mu, School of Chemical Biomolecular Engineering (2011)

GT PhD Committee

Courtney Sorrell, School of Chemistry and Biochemistry (2005)
 Se-Young Yoon, School of Chemical Biomolecular Engineering (2005)
 Ayanna M. Bernard, School of Chemical Biomolecular Engineering (2005)
 Jenny Raynor, School of Chemistry and Biochemistry (2006)
 Mariefel Olarte, School of Chemical Biomolecular Engineering (2011)
 Pranav Kalelkar, School of Chemistry and Biochemistry (2013)

GT PhD Defense Committee

Se-Young Yoon, School of Chemical Biomolecular Engineering (2007)
 Susnata Samanta, School of Chemistry and Biochemistry (2007)
 Patrick E. Hazlewood, School of Materials Science and Engineering (2006)
 Mariefel B. Valenzuela, School of Chemical Biomolecular Engineering (2005)
 Jihoon Lee, School of Chemical Biomolecular Engineering (2010)

M.S. Graduate Supervising Activities

Student and Research Topic/Report	Graduation Date	Post-Graduate Position
Peter M. Froass	1993	IPST Ph.D.
Brian Boyer	1993	Patent Lawyer
Eric J. Draheim	1994	Kimberly-Clark Corporation
Fadi Chakar	1995	Appleton Papers Inc.
Coray Harper	1995	GE Company
Thomas Bales	1996	Booz Allen and Hamilton
John Werner	1999	Kimberly-Clark Corporation
Andrew Kulchin	2000	Samoa Pacific Cellulose
Daniel Johnston	2001	UPM
Jason Montegna	2002	IPST graduate
Kendric Nelson	2002	IPST graduate
W. Widiatmoko (ChBE)	2006	April, Indonesia

Tech Co-Supervisor Research Accomplished in Ragauskas Laboratory

Asmeron Hagos – Visiting student	1998	GA Tech Ph.D. graduate
Magnus Melander – Visiting:Licentiate Student	1998-1999	Stora-Enso

Ph.D. Students Supervised	Graduation Date	Post-Graduate Employment
Peter M. Froass	1997	International Paper
David Barzyk	1997	Georgia Pacific Company
Jim Sealey	1998	First Quality
Troy Runge	1998	University of Wisconsin
Kaaren Haynes	1999	Hollingsworth & Vose, Co.
Michael Zawadzki	1999	Lorillard Tobacco Co.
Fadi S. Chakar	2000	Appleton Ideas Company
Richard Chandra	2003	University of British Columbia
Lorraine C. Vander Wielen	2004	Appleton Ideas Company
Thomas Dyer	2004	Kimberly Clark Corporation
Kristina Knutson	2004	GA Tech Post Doctoral Fellow
Bassem Hallac	2011	HCI Cleantech
Mate Nagy	2009	Hollingsworth & Vose, Co.
Suteera Witayakran	2008	Kasetsart University
Dongcheng Zhang	2006	Agrivida
Rob Lowe	2007	Nalco Company
Cameron Thomson	2007	MeadWestvaco
Zheng Dang	2007	American Process
Zhoujian Hu	2012	Postdoc Fellow NCSU
Yang Li	2012	Research Associate at NanoTech Institute at University of Texas
Kósa Mátyás	2012	Renmatix
Dash Rajalaxmi	2012	KCC

Lee Goetz	2012	Contact Technologies, Inc.
Seokwon Jung	2012	Samsung, S. Korea
Amit Saxena	2013	Post-Doctoral Fellow, India
Ben Haoxi	2013	Post-Doctoral Fellow, NREL
Fan Hu	2014	Research Chemist, Revlon
Qining Sun	2015	Post-Doctoral Fellow, UTK
Xianzhi, Meng	2015	Post-Doctoral Fellow, UTK
Tyrone Wells	2015	Post-Doctoral Fellow, UTK

Current GA Tech Doctoral Chemistry Students Supervised

	Proposed Graduation Date
• Allison Tolbert	2016
• Hannah Akinosho	2016
• Mark Cannatelli	2016

UTK MS Graduate Supervising Activities

Student and Research Topic/Report	Graduation Date	Post-Graduate Position
• Tais Lacerda Bezerra	2016	Consultant

Current UTK Tech Doctoral/MS Students Supervised

- Najjia Hao 2019

Ragauskas Invited as Public Ph.D. Examiner/Opponent

- Invited by Professor Tapani Vuorinen/Aalto University, to be an external opponent to the Ph.D. defense of Ville Pihlajaniemi titled "Pretreatment categories, process alternatives and material characteristics in enzymatic hydrolysis of lignocellulose" (2016).
- External Ph.D. thesis reviewer for Amit Kumar" for the award of Ph.D. degree in Department of Paper Technology, Indian Institute of Technology Roorkee, ROORKEE - 247 667, Uttarakhand, India (2015)
- Invited by Professor H. Theliander/Chalmers University of Technology, to be an external opponent to the Ph.D. defense of Kristoffer Lund titled "Pulp fibres in absorption applications Modifications and properties (2013).

- Invited by Professor G. Gunnar Henriksson to be an external opponent to the Ph.D. defense of Dimitri Areskoghs thesis title “Structural Modifications of Lignosulphonates ” at the Royal Institute of Technology, School of Chemical Science and Engineering, Stockholm, Sweden (2011).
- Invited by Professor J. Saddler, University of British Columbia, Canada to be member of external reviewer board for Ph.D. thesis by Seiji Nakagame, titled “The Influence of Lignin on the Enzymatic Hydrolysis of Pretreated Biomass Substrates.” (2010).
- Invited by Professor Eva Malmström, Royal Institute of Technology, Fibre and Polymer Technology, Stockholm, Sweden KTH as member of external reviewer board for Ph.D. thesis by Hanna Lönnberg, titled “Ring-Opening Polymerization from Cellulose for Biocomposites Applications.” (2009).
- Ph.D. opponent for Ali Moosavifar, thesis titled: “Lignin Extraction from Black Liquor: Properties of the Liquors and Sulphur Content in the Lignin”, Chalmers University of Technology, Forest Products and Chemical Engineering Dept Chemical and Biological Engineering (2008).
- Participated in PhD defence of Henrik Wallmo, thesis titled “Lignin Extraction from Black Liquor: Precipitation, Filtration and Washing”; and PhD defence of Johannes Bogren, thesis titled “Further Insights into Kraft Cooking Kinetics,” Chalmers University of Technology, Forest Products and Chemical Engineering Dept Chemical and Biological Engineering (2008).
- Invited by Professor Kristina Oksman as opponent for Ph.D. thesis by L. T. Petersson, titled “Biopolymer-Based Nanocomposites – A Comparison between Renewable Cellulose Reinforcements and Layered Silicates” Department of Engineering and Design and Materials, Norwegian University of Science and Technology (2007).
- Invited by Associate Professor J.F. Kadla as external reviewer for Ph.D. thesis by Yong Sik Kim titled “Study of Polyoxometalate (POM) Reaction Mechanism and Kinetics with Lignin and Model Compounds” Department of Forestry, University of British Columbia (2007).
- Invited by Professor W.F. Boman to be external opponent to Licentiate defense of Lotta Utterberg, thesis title “Oxidative Degradation of Diastereomers of β -O-4 Lignin Model Compound and Heterologous Expression of Trametes versicolor Laccase” at Karlstad University, Karlstad, Sweden (2006).
- Invited by Professor G. Gellerstedt to be an external opponent to the Ph.D. defense of Waleed Wafa Al-Dajani, thesis title “Bleachability of Alkaline Pulps” at the Royal Institute of Technology, Department of Pulp and Paper Chemistry and Technology, Stockholm, Sweden (2001).
- Invited by Professor R. Ede to be external opponent to the Ph.D. defense of Nicole More, thesis title “Structural Changes to Pinus Radiata Wood Lignin during Kraft Pulping and Bleaching” at the University of Waikato, Chemistry Department, Hamilton, New Zealand (1999).
- Invited by Professor G. Gellerstedt to be an external opponent to the Ph.D. defense of Eva Johansson, thesis title “The Effect of Oxygen on the Degradation of Lignin Model Compounds and Residual Lignin” at the Royal Institute of Technology, Department of Pulp and Paper Chemistry and Technology, Stockholm, Sweden (1997).

Postdoctoral Research Fellows Supervised by Ragauskas

Postdoctoral Fellow	Period of Residence	Current Status
• Dr. D. Santiago	1993-94	Research Scientist, FDA
• Dr. L. C. Harvey	1993-94	Associate Professor Agnes Scott College
• Dr. X. Pan	1992-95	Researcher Alberta Research Council
• Dr. J. Brambila	1994-95	--
• Dr. M. Hogjat	1994-95	--
• Dr. C. Cook	1995-97	Researcher, Oxychem, NY
• Dr. W. Lin	1996-97	Researcher, NREL, CO
• Dr. B. Dhasmana	1997-98	Assistant Professor Halifax Community College, NC
• Dr. C. Li	1997-99	Research Supervisor, Selecto Inc.
• Dr. P. Agrawal	1998-99	ACS Abstract Services
• Dr. A. Boasman	1999-2000	SP Newsprint Co.
• Dr. R. Yang	1999-2001	IPST@GT Research Services
• Dr. Y. Pu	2000-2014 2015	IPST@GT ORNL
• Dr. D. Kim	2002-current	IPST@GT
• Dr. Z. Feng	2001-2003	Researcher, McMaster University
• Dr. Q. Hoe	2003-2004	Professor and Director of Tianjin Key Laboratory of Pulp & Paper Engineering, Tianjin University of Science and Technology, Tianjin, China
• Dr. E. Johansson	2004-2005	Sweden Consultant
• Dr. K. Knutson	2005-2008	Gwinnett Technical College
• Dr. J. Zhang	2004-2010	Consultant
• Dr. J. Nan	2004-2011	Baze Chemical
• Dr. R. Ou	2005-2006	GT – MSE
• Dr. W. Ban	2006	Assistant Professor, Dalian Institute of Light Industry, Dalian, China
• Dr. P. Sannigrahi	2006-2011	Conoco Phillips
• Dr. K. David	2007-2011	Postdoctoral Fellow, CAU
• Dr. R. Samuel	2008-12	Research Associate at Polyglass USA
• Dr. H. Li	2008	Chemistry, CAU,
• Dr. M. Foston	2008-2012	University of Washington, Assist Prof
• Dr. C. Hubble	2009-current	Ciba
• Dr. L. Wang	2009-2011	FDA

• Dr. C. Shilin	2009-2011	Chemistry, GA Tech
• Dr. G. Hu	2010-2011	Postdoctoral Fellow, CAU
• Dr. C. Cateto	2010-2012	Consultant, France
• Dr. F. Hunang	2010-2014	Chemistry, GA Tech
• Dr. S. Nair	2012- 2014	Chemistry, GA Tech/FPL USDA
• Dr. G. Bali	2012 – 2014	Chemistry, GA Tech
• Dr. J. Seokwon	2013 – 2014	Chemistry, GA Tech
• Dr. T. Moore	2015- present	ChBE, UTK
• Dr. S. Tanneru	2015	ChBE, UTK
• Dr. Q. Sun	2015 – 2016	ChBE, UTK
• Dr. M. Li	2015-present	ORNL
• Dr. C. G. Yoo	2015-present	ORNL
• Dr. R. Le	2015-present	ChBE, UTK
• Dr. P. Das	2015-present	ChBE, UTK
• Dr. R. Le	2015-present	ChBE, UTK
• Dr. X. Meng	2016-present	ChBE, UTK
• Dr. T. Wells	2015-2016	ChBE, UTK

RESEARCHERS/STUDENTS

Researcher	Visiting Date	Current Status
Dr. S. Moe	1996-97	Associate Professor, Norwegian University of Science and Technology, Norway
Dr. M. Paulsson	1997-98	Researcher Eka Chemicals, Sweden
Dr. A. Suurnakki	1999	Researcher, VTT, Finland
Dr. D.H. Kim	1999-current	Researcher, IPST
Martin Lund Visiting student	2001	The Royal Veterinary and Agricultural University Chemistry Department, Denmark
Dr. F. Wolfaardt	2001	Research Officer Department of Microbiology and Biochemistry, University of Orange Free State, South Africa
Dr. S. Wang	2001	Professor, Depart. Bio-Technology Sugar Engineering Industry, Guangxi University, Nanning, Guangxi, China
Dr. P. Gatenholm	2005-06	Professor, Department of Materials and Surface Chemistry, Chalmers University of Technology, Gothenburg, Sweden
A. Oudia	2005	Graduate Student, Departamento de Ciência, Universidade Beira Interior, Covilhã Portugal
Dr. C. Mohandass	2006-07	Biological Oceanography Division National Institute of Oceanography Dona Paula, Goa-403004, India
Dr. J. Yan	2007	Department of Pulp and Papermaking, Guangdong Industry Technical College, Guangzhou 510300, P.R. China
Assist. Prof. N. Brosse	2008	Laboratoire d'Etude et de Recherche sur le Matériau Bois, Faculté des Sciences et Techniques, Nancy-

		Université, Bld des Aiguillettes, F-54500 Vandoeuvre-lès-Nancy, France
Carolina Jardim, Visiting student	2008-2009	Química da Madeira e Branqueamento Da Celulose, Laboratório de Celulose Papel Departamento de Engenharia Florestal Universidade Federal de Viçosa - MG Brasil
Elisabetta Aracr Visiting student	2009	Universitat Politècnica de Catalunya School of Industrial Aeronautic Eng. of Terrassa, Depart. Textile and Paper Engineering, Campus de Terrassa, Edifici TR4. C/Colom, 11. 08222 Terrassa, Spain
Wenjia Han Visiting student	2010	State Key Laboratory of Pulp and Paper Engineering, College of Light Industry & Food Sciences, South China University of Technology, Guangzhou, Guangdong Province, China
Yangmei Chen Visiting student	2010	State Key Laboratory of Pulp and Paper Engineering, College of Light Industry & Food Sciences, South China University of Technology, Guangzhou, Guangdong Province, China
Christopher M. Conifer	2011	School of Chemistry Imperial College London London, England
Dr. Tobias Köhnke	2011-2012	Assistant Professor Chalmers University of Technology
Prof. Birinchi Kumar Das	2011-2012	Fulbright-Nehru Senior Res. Fellow Gauhati University, India
Dr. Monideepa Chakraborty	2011-2012	Fulbright-Nehru Senior Res. Fellow Gauhati University, India
Yandan Chen	2011-2012	Fujian Agriculture and Forestry University, China
Guo Chen	2011-2012	Department of Bioengineering and Biotechnology, Huaqiao University,

		Jimei AVE. 668, Xiamen, 361021, China
Jiebin Tang	2011 – 2012	China
Magdalena Parra Carrillo	2012	GENZ: Grupo de investigacion Enzimologia, Departamento de Bioquimica y Biologia Molecular-A Universidad de Murcia E-30071 Murcia, Spain
Qianjun Shaw	2012-13	Professor, National Engineering Research Center of Wood-based Resource Utilization, China Dean of Undergraduate Academic Affairs, Zhejiang A&F University, China
Yiming Zhou	2012-13	Ms. Yiming Zhou State Key Laboratory of Pulp and Paper Engineering, South China University of Technology, Guangzhou, China
Zhen Wei	2012-13	College of Environmental Science and Engineering Hunan University No.2, Changsha, Hunan, 410082, China
Nagarajan Ponnurengam	2013-2014	Annamalai University, India Assistant Professor, Depart. Chem. Eng.
Weibing Wu	2014	College of Light Industry Science and Engineering, Nanjing Forestry University, China
Muzna Hashmi	2015	PhD Research Scholar, Department of Microbiology, Quaid-i-Azam University. Islamabad, Pakistan.

Tenure Review Applications:

- Sandeep Kumar: Department of Civil & Environmental Engineering, Old Dominion University, Norfolk, VA (2015)
- Paul Frymier and Paul Dalhaimer, Chemical Biomolecular Engineering, University Tennessee (2015)
- Jeff Catchmark: External Evaluation for Dr. Jeffrey Catchmark Associate Professor of Agricultural and Biological Engineering Promotion to Professor (2015)
- Emma Master, Department of Chemical Engineering & Applied Chemistry, University of Toronto (2016)
- Sushil Adhikari, Associate Professor, Department of Biosystems Engineering, Auburn University. AL (2016)
- Warren Mabee, Associate Professor and Head. Department of Geography and Planning, Queen's University, Ontario, Canada (2016)

- **Evidence of Teaching Effectiveness**



Review of Teaching Effectiveness at Chalmers University – May/July 2001

Dr. Magnus Paulsson

Assistant Professor

August 2, 2001

Professor Arthur J. Ragauskas visit to Chalmers University of Technology

Professor Arthur J. Ragauskas, Institute of Paper Science and Technology, was invited to be a guest lecturer for the Ph.D. course “Fibre Line”, held at the Department of Forest Products and Chemical Engineering, Chalmers University of Technology. The objective of the Ph.D. course was to give in-depth knowledge about modern pulping and bleaching processes with respect to process chemistry as well as chemical engineering principles of fiber line operations. Professor Ragauskas gave lectures dealing with the following topics:

- Structure of residual lignin in paper pulps after kraft pulping;
- Chemistry of lignin-removing and lignin-retaining bleaching;
- Kinetics of delignification;
- Process descriptions (layouts);
- Equipment used in bleaching plants;
- Environmental aspects of bleaching;
- New bleaching technologies (e.g., enzymes);
- Characterization of pulp.

The students also prepared reports under the supervision of Professor Ragauskas dealing with one of the topics above. Professor Ragauskas gave, as one of the leading researchers in the field of bleaching of paper pulps, an extensive coverage of the chemistry and physics of lignin-removing and lignin-retaining bleaching. Professor Ragauskas’ lectures were well planned, logical, and very informative. The students greatly appreciated that Professor Ragauskas always had time to answer questions dealing with the topics of the Ph.D. course as well as questions related to the Ph.D. student’s research interests. Professor Ragauskas’ visit to the Department of Forest Products and Chemical Engineering has been a great success and it is an honour for us that Professor Ragauskas had the opportunity to share his extensive knowledge, in this and other research fields, with both students and faculty. We hope that Professor Ragauskas’ visit will strengthen the bond between Chalmers University of Technology and the Institute of Paper Science and Technology.

Sincerely,

Dr. Magnus Paulsson

General Public Articles: Our biorefinery studies have been highlighted by +500 news agencies announcements. This outreach provides a touchstone from which students, the general public and business/policy makers can be engaged in the science and engineering of renewable energy and materials.

[Addressing the Food or Fuel Challenge of Bioethanol - The Wall Street Journal - Tuesday January 16th 2007](#)

Ethanol Could Fuel Rise in Corn

Growing Demand May Limit Supply For Poor Countries

By PRASENJIT BHATTACHARYA

Corn prices are likely to reach unprecedented highs in the next two to three years, as an ethanol boom in the U.S. is likely to limit corn's availability for food and feed use.

This has fueled concerns that corn, a staple food ingredient in many countries and widely used as feed in the poultry and livestock sectors, might become out of reach for poorer consumers, boosting food prices in general.

Soaring food prices could cause urban riots in scores of low-income countries that rely on grain imports, such as Indonesia, Egypt, Algeria, Nigeria and Mexico, said Lester Brown, founder of the Earth Policy Institute and author of a recent report about potential corn demand from the ethanol industry.

The report said the ethanol distilleries being built in the U.S. will need 139 million metric tons of corn by the 2008 harvest, far more than a U.S. Department of Agriculture estimate of the requirement, pegged at around 60 million tons.

"If the Earth Policy Institute estimate is at all close to the mark, the emerging competition between cars and people for grain will likely drive grain prices to levels never seen before," Mr. Brown said.

Apart from being the biggest corn grower, the U.S. is also the leading corn exporter. Since 2006, corn-importing countries

have become more dependent on U.S. corn as China cut back on exports amid increased domestic demand from its own ethanol industry and fears of a supply shortage.

Mr. Brown isn't alone in warning that an ethanol boom might lead to sharp rise in corn prices by creating a supply squeeze.

"If biofuels continue to expand globally, you can expect grain prices to move to their energy equivalent, until cellulose and other alternative-energy sources become commercially available," said Simon Bentley, analyst with LMC International, a commodities research firm based in the United Kingdom.

Mr. Bentley said that while sufficient land is available to expand corn output in the U.S. and Brazil, how such expansion will affect output of other crops, especially soybean, and corn prices, remains the key question.

According to a recent report by J.P. Morgan, average corn prices are expected to be about \$4.03 a bushel in 2007, up 61% from \$2.51 a bushel in 2006.

The most-active March contract on the Chicago Board of Trade closed at \$3.9650 a bushel Friday, up 55% from the \$2.5525 a bushel the contract traded at on the same day last year.

The J.P. Morgan report said the ethanol industry's growth calls for an additional 500 million to one billion bushels of corn every year.

While such a rapid rise in demand in itself will ensure high corn prices, the study added that any weather threat to the corn crop this year will be "met with record high prices."

China, a large producer and consumer of corn, is already taking measures to ensure domestic availability.

In December, the Chinese government stopped approving new corn-based ethanol plants.

ence, said the key to a sustainable biofuels industry is cheaper feedstock, not expensive corn.

"As demand for corn increases, so too will its prices. This will drive the ethanol industry to look for lower-cost feedstock and as these alternatives develop, price and demand will stabilize," Mr. Ragauskas said.

He said the food-versus-fuel



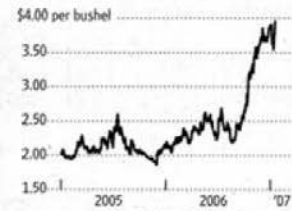
Corn Futures

Daily settlement price on the continuous front-month contract

Friday's close: \$3.965

Change since start of 2005, up 94%

Change since start of 2006, up 84%



Source: CBOT via Thomson Datastream

An Iowa cornfield

"As of now, it seems the government is reluctant to permit additional capacity for corn-based ethanol production, though existing corn-based ethanol plants are functioning normally," said Gu Lifeng, manager of the maize division at the state-run Cofco Maize Co., based in Beijing.

Meanwhile, Chinese corn processors are ramping up their alcohol-production capacity, which can be converted into ethanol plants if the government relaxes its stance.

Arthur Ragauskas, associate professor at the Georgia Institute of Technology, who recently co-wrote a paper on biofuels in the industry journal Sci-

debate can generate new ideas if there is increased collaboration among academia, governments and the private sector to develop nonfood biomass—such as switchgrass, recycled waste materials and corn stovers, which is the part of the corn plant that is left over after harvest—into viable resources for biofuels.

The corn growers' lobby in the U.S., however, continues to argue that there will be enough corn in the long term to meet food, fuel and feed needs.

"All demand for corn—food, feed, fuel and exports—are being met. Farmers have always responded to price signals from the marketplace and historically we have had much more challenge with overproduction than shortage," said Rick Tolman, chief executive of the National Corn Growers Association.

"Market forces, not broad assumptions, are driving ethanol and corn markets...There is no conflict between [corn use for food and fuel], nor any pending crisis," Mr. Tolman said.



[Home](#) | [Inside Washington](#)

Bush Goes Into High Gear on Energy

By Bret Schulte Posted 1/24/07

President Bush laid out his most aggressive energy and environmental agenda to date—mentioning global warming for the first time in a State of the Union address, or any major speech.

According to the president, his plan "will help us to confront the challenge of global climate change." Though such words mark a dramatic step for Bush, energy analysts and environmentalists have responded with as much skepticism as encouragement.

Bush laid out an ambitious goal to, in his words, "reduce our dependence on foreign oil" while simultaneously reducing greenhouse gas emissions.

The White House is labeling the plan "20 in 10"—establishing a goal of reducing gasoline consumption by 20 percent in the next 10 years, which would be accomplished primarily by two acts.

The first is to reform fuel economy standards for cars to conserve 8.5 billion gallons of gasoline. The proposal has gotten muted applause from environmentalists, who are calling it a move in the right direction, though many believe the plan gives too much flexibility to automakers and could allow loopholes. The second is by far the more ambitious, calling for a major ratcheting-up of the Renewable Fuels Standard, the popular centerpiece of his Energy Policy Act of 2005.

In 2006, RFS mandated production of 4 billion gallons of ethanol, a goal that was handily topped by about a billion gallons. Benchmarks for coming years, analysts say, will be easily surpassed as well. The success of ethanol has policymakers giddy. For one, it has proved to be an economic boon to the American heartland.

Several members of Congress, including Senate Agriculture Committee stalwarts Tom Harkin of Iowa and Dick Lugar of Indiana, are calling for increased ethanol production to a staggering 60 billion gallons by 2030. Rumors swirled in Washington that Bush would call for the same in his State of the Union address last night.

Instead, he targeted a no less ambitious but shorter-term goal of 35 billion gallons of ethanol by 2017, displacing 15 percent of projected annual gasoline consumption. But that proposal faces the same challenges, and on an accelerated timeline. Industry experts believe this country can produce about 15 billion gallons of ethanol from corn without disrupting other sectors of the economy, notably livestock producers that use corn and other feed.

Already, agricultural economist Lester Brown sees escalating food prices as a result of last year's record ethanol sales and predicts graver outcomes in the near future. Even if the market stabilizes, that leaves a 20 billion-gallon shortfall in ethanol supplies, which will have to be made up for with cellulosic ethanol, an alternative derived by other feedstocks such as switch grass, wood, and other plant matter. The problem is that for all intents and purposes, cellulosic ethanol doesn't exist yet, at least not commercially.

It can be produced with success in labs, but according to [Arthur Ragauskas](#), a biofuels expert at Georgia Tech, "there are still significant challenges" to bringing it to market, namely cost and efficiency. While converting a starch like corn or sugar to ethanol is relatively simple, cellulosic matter poses a greater challenge because it requires "pretreatment" to make the material more reactive to the deconstruction enzymes that turn starch to glucose, which is easily turned into

ethanol. make this cost effective. Ragauskas says new technology looks promising, but many experts believe it's unlikely that the fuel will go from zero to 20 billion in 10 years. It took the corn industry more than a decade to get to 1 billion gallons of ethanol capacity.

Ethanol Demand Could Fuel Sharp Spike In Corn Prices

REPORT GOES AGAINST GRAIN OF USDA FORECAST

By PRASENJIT BHATTACHARYA
The Wall Street Journal

Corn prices are likely to reach unprecedented highs in the next two to three years, as an ethanol boom in the United States is likely to limit corn's availability for food and feed use.

This has fueled concerns that corn, a staple food ingredient in many countries and widely used as feed in the poultry and livestock sectors, might become out of reach for poorer consumers, boosting food prices in general.

Soaring food prices could cause urban riots in low-income countries that rely on grain imports, such as Indonesia, Egypt, Algeria, Nigeria and Mexico, said Lester Brown, founder of the Earth Policy Institute and author of a recent report about potential corn demand from the ethanol industry.

The report said ethanol distilleries being built in the United States will need 139 million metric tons of corn by the 2008 harvest, far more than a U.S. Department of Agriculture estimate of the requirement, pegged at 60 million tons.

"If the Earth Policy Institute estimate is at all close to the mark, the emerging competition between cars and people for grain will likely drive

grain prices to levels never seen before," Brown said.

Apart from being the biggest corn grower, the United States also is the leading corn exporter. Since 2006, corn-importing countries have become more dependent on U.S. corn as China cut back on exports amid increased domestic demand from its own ethanol industry and fears of a supply shortage.

"If biofuels continue to expand globally, you can expect grain prices to move to their energy equivalent, until cellulose and other alternative-

energy sources become commercially available," said Simon Bentley, analyst with LMC International, a commodities research firm based in the United Kingdom.

Contracts Trading Up 55 Percent

Sufficient land is available to expand corn output in the United States and Brazil, Bentley said, but how such expansion will affect corn prices and the output of other crops, especially soybean, remains the key question.

According to a recent report by JP Morgan, average corn prices are expected to be about \$4.03 a bushel in 2007, up 61 percent from \$2.51 a bushel in 2006.

The most-active March contract on the Chicago Board of Trade closed at \$3.9650 a bushel Friday, up 55 percent from the \$2.5525 a bushel the contract traded at the same day last year.

The J.P. Morgan report said the ethanol industry's growth calls for an additional 500 million to 1 billion bushels of corn every year.

While such a rapid rise in demand will ensure high corn prices, the study added that any weather threat to the corn crop this year will be "met with record-high prices."

China, a large producer and consumer of corn, is taking measures to ensure domestic availability.

In December, the Chinese government stopped approving new corn-based ethanol plants.

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Meanwhile, Chinese corn processors are ramping up their alcohol-production capacity. They can be

converted into ethanol plants if the government relaxes its stance.

Arthur Ragauskas, associate professor at the Georgia Institute of Technology, who recently co-wrote a paper on biofuels in the industry journal Science, said the key to a sustainable biofuels industry is cheaper feedstock, not expensive corn.

"As demand for corn increases, so too will its prices. This will drive the ethanol industry to look for lower-cost feedstock and as these alternatives develop, price and demand will stabilize," Ragauskas said.

'There Is No ... Pending Crisis'

He said the food-versus-fuel debate can generate new ideas if there is increased collaboration among academia, governments and the private sector to develop nonfood biomass — such as switchgrass, recycled waste materials and corn stovers, which is the part of the corn plant left over after harvest — into viable resources for biofuels.

The corn growers' lobby in the United States, however, continues to argue that there will be enough corn in the long term to meet food, fuel and feed needs.

"Farmers have always responded to price signals from the marketplace, and historically we have had much more challenge with overproduction than shortage," said Rick Tolman, chief executive of the National Corn Growers Association.

"Market forces, not broad assumptions, are driving ethanol and corn markets. ... There is no conflict between [corn use for food and fuel], nor any pending crisis," Tolman said.



McGill REPORTER

Global warming needs global learning



Some of the world-class scientists who participated in the Macdonald Centenary Symposium included Rickey Yada, University of Guelph; Wes Warren, Washington University; Bert Drake, Smithsonian Environmental Research Center; Arthur Ragauskas, Georgia Institute of Technology; Gordon Young, UN Water Assessment Program; and Don Smith, Chair of McGill's Plant Science Department.

The most powerful tool available to combat global warming is not being used adequately, according to a panel of world-class environmental scientists. That tool is education. Without more education and public awareness the threat of global warming will not be adequately addressed, experts agree.

Six experts in fields such as water management, biofuels and animal-borne viruses (such as West Nile and Monkey Pox) were invited to Macdonald Campus on Nov. 3 for the symposium "A Biorevolution in the Next 100 Years," organized by Don Smith, James McGill Professor and chair of the Plant Science Department. The goal of the Macdonald Centenary Symposium was to look ahead to the environmental research challenges of the next 100 years.

Minister
of Natural Resources Canada



Ministre
des Ressources naturelles Canada

Ottawa, Canada K1A 0E4

OCT - 4 2006

Dr. Arthur J. Ragauskas
Professor
School of Chemistry and Biochemistry
Institute of Paper Science and Technology
Georgia Institute of Technology
500-10th Street North West
Atlanta, Georgia 30332-0620
U.S.A.

Dear Professor Ragauskas:

The Prime Minister's Office has forwarded to my attention a copy of your correspondence of May 23, 2006, regarding the article on use of wood products to produce biofuels.

Your article is of great interest to my department from both energy and forestry perspectives, and it comes at an important time as Canada is developing a national framework on renewable fuels. Canada's new government is committed to expanding the production and use of renewable transportation fuels such as ethanol and biodiesel. These fuels can diversify our energy mix, reduce harmful emissions and create new opportunities for both the agricultural and forestry sectors.

In Budget 2006, the new Government announced accelerating the Capital Cost Allowance for Forestry Bioenergy, by implementing an incentive for cogeneration systems in the pulp and paper industry that produce both thermal energy and electricity using a biomass residue from the pulping process referred to as "black liquor."

Looking forward, we have announced our intention to require an average of five percent renewable content in Canadian fuel by 2010. We are working closely with the provinces, territories and stakeholders on this initiative.

Canada

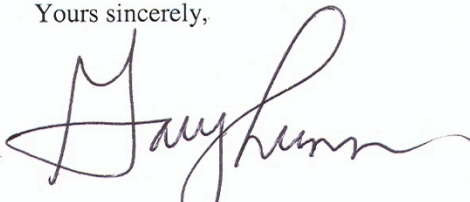
- 2 -

A historic meeting of Canada's ministers of environment, energy and agriculture took place in Regina on May 23, 2006. For the first time, federal, provincial and territorial ministers assembled for a dedicated meeting on this important subject. We discussed the opportunities this sector presents for Canadians and the path forward. This was a key step towards achieving our goal of five percent renewable content in Canadian fuels and we plan to hold another meeting on the national strategy in fall 2006. We have set an ambitious agenda, but working together, we know it can be achieved.

I have forwarded your article to officials in my department who work on renewable fuels, for their further consideration.

Thank you for writing on this important matter.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Gary Lunn". The signature is fluid and cursive, with a large initial "G" and "L".

The Honourable Gary Lunn, P.C., M.P.

[Chemical & Engineering News](#)

Biotech's 'Perfect Storm'

April 30, 2007

Volume 85, Number 18

pp. 38-40

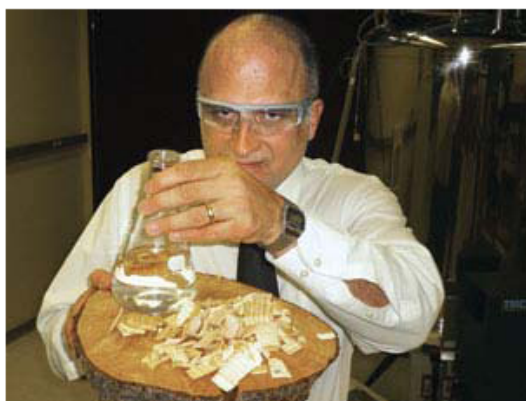
Opportunities for 2007 and Beyond

Biotech's 'Perfect Storm'

The push for energy independence may yield more bioenergy-related jobs

[Corinne A. Marasco](#)

The pursuit of biofuels has become a red-hot area for research, fed by a fervor that rivals the California Gold Rush. Academia, government, and industry are collaborating to find practical and affordable ways to produce and use biomass for energy. These R&D and production efforts cut a swath across specialties: chemistry, agricultural science, microbiology, materials science, biochemistry, and engineering, just to name a few.



Courtesy of Art Ragauskas

Chip power Cellulosic feedstocks such as wood chips can be used to produce ethanol.

In the 10 years since the publication of Sebastian Junger's book "The Perfect Storm," that term has come to refer to a set of factors that combine simultaneously to create a powerful event. Biotechnology appears to be brewing its own perfect storm—biotechnology breakthroughs, geopolitical tensions, falling inventories, and soaring oil prices are working together, creating conditions that just might churn out a more energy-independent nation.

The momentum behind the demand for alternative energy sources is strong, but what does it mean in terms of job opportunities for chemists? It seemed like a good time to ask the question, so C&EN contacted representatives from industry, government, and academia to find out what they see on the employment horizon. The early verdict: Biotechnology is entering an exciting time, and the employment opportunities in biofuels are about as good as they could be.

[Art Ragauskas](#), a professor in the [School of Chemistry & Biochemistry](#) at Georgia Institute of Technology, remembers that not too long ago, biomass chemistry wasn't so attractive. "Around 2000, there was a passionate subgroup interested in this field, but it wasn't mainstream science," he recalls.

United States Embassy Stockholm

Press Release



2nd Generation Ethanol Expert Selected to Hold Inaugural Alternative Energy Chair at Chalmers University

May 23, 2008

Arthur Ragauskas, Professor at the Georgia Institute of Technology, has been selected as the first holder of the Fulbright Distinguished Chair in Alternative Energy Technology at Chalmers University. The award includes a stipend of \$125,000, one of the largest in the 60-year history of the Fulbright Program. Funding support for the Distinguished Chair is being provided to the Fulbright Commission for Educational Exchange between the United States and Sweden by Marianne och Marcus Wallenbergs Stiftelse.

The Fulbright Distinguished Chair in Alternative Energy Technology has been created as part of the U.S. Embassy's One Big Thing initiative, fostering alternative energy cooperation between the U.S. and Sweden. "My work will contribute to innovative green chemistry sustainable technologies for the conversion of woody biomass to biofuels, bioenergy and in the next generation of biorefineries," said Dr. Ragauskas. "This will be accomplished by bringing together the best students, businesses, and academicians in the United States and Sweden to address the global bioenergy challenge of this millennium."

Chalmers University was selected to host the new position because the University is increasing its efforts in the area of developing fuels and chemicals from renewable resources. This development is driven by the need to conserve energy and a desire to produce more value-added products from wood and wood waste. Wood can be a source for fuel, plastics and advanced chemicals, as well as paper and lumber.

Michael Wood, U.S. Ambassador to Sweden, and Chalmers President Karin Markides led the effort to create the new Fulbright Chair. Ambassador Wood said, "Senator Fulbright's intention was to promote international good will through the exchange of students and professors. He may not have foreseen the issue of global warming or the importance of bioethanol, but his vision is alive and well in this new program. Dr. Ragauskas was selected from among a field of highly qualified applicants. I'm excited about the possibility that while at Chalmers, Professor Ragauskas may work on a technology breakthrough that allows people to drive cars on 2nd generation ethanol from non-food sources."

This Fulbright Chair will provide Dr. Art Ragauskas the opportunity to share his internationally recognized expertise in lignocellulosic biofuels with Swedish and international students, postdoctoral research fellows and faculty. He will develop a Swedish-American network to address society's need to develop sustainable cellulosic biofuels and bioenergy. These interactions will be pursued by participating in formal classroom discussions, industry workshops, school presentations, and the development of unique web-based learning resources, including pod-casts. Dr. Ragauskas will be based in the Forest Products and Chemical Engineering department at Chalmers.

"My academic and research career has benefited from President Bush and his administration's vision and support of bioethanol," said Professor Ragauskas. "I am honored and humbled to now be able to expand this vision beyond Georgia Tech and the southeast U.S. to Sweden and Scandinavia."

Arthur Ragauskas is a Fellow of the International Academy of Wood Science and TAPPI. His research program at Georgia Tech is seeking to understand and exploit innovative sustainable bioresources. This multifaceted program seeks to develop new and improved applications for nature's premiere renewable biopolymers for biofuels, biopower and biomaterials. Ragauskas has published more than 220 papers, patents and conference proceedings. He has served on several advisory boards and review panels, including: European Commission Research Directorate; National Science Academy; J. Paul Getty Trust; Swedish Foundation for Strategic Research; VTT Technical Research Center of Finland; the Finnish Academy of Sciences; Research Council of Norway; and the National Science Foundation.

Redaktör: Marie Sundberg, debatt@dls.se. Telefon: 08-573000 98

Miljö- och energisamarbetet mellan USA och Sverige är redan framgångsrikt. Företags- och universitetsutbyten leverar nu resultat som gör att ekonomisk utveckling också kan avhjälpa mänsklighetens mest akuta klimat- och miljöproblem, skriver Art J Ragauskas, gästprofessor i alternativ energi på Chalmers i Göteborg.

Den gröna vågen leder till ekonomisk återhämtning

Precis som årstiderna växlar, har dagens ekonomi också genomgått enorma förändringar som har påverkat många av oss på ett personligt plan.

Dessa förändringar har börjat staka ut nya möjligheter och utmaningar för framtiden. Ett stort antal industri-sektorer berörs av ett ökande intresse och behov av miljöteknik. Företags-utvecklingen sträcker sig över hela spektret från vindkraft, biokraft och solceller till nästa generations batterier, hållbara biomaterial och förnybara bränslen för bil och flygtransporter.

Under några dagar denna vecka har Savannah, Georgia, stått värd för Svensk-amerikanska handelskammarens E-dagar som stöttar miljö-samarbetet mellan USA och Sverige.

Som vid varje större förändring kommer många människor att ifrågasätta tron på att ekonomisk utveckling ska klara att möta miljöorn på ett hållbart sätt. Svenska myndigheter och företag har bevisat att det går att både äta kakan och ha den kvar.

Under det förra århundret ökade Sveriges BNP med 42 procent sam-



Art J. Ragauskas
the Distinguished Fulbright
Chair in Alternative Energy,
Chalmers tekniska högskola,
professor, Georgia Institute of
Technology.

tidigt som de totala svenska koldioxid-utsläppen minskade med 9 procent. Resultatet är ett verkligt bevis på att länder kan öka sin levnadstandard och samtidigt minska sina koldioxid-utsläpp.

I ett försök att lära av den gröna erfarenheten i Skandinavien har amerikanska ambassaden i Stockholm förpliktigt sig till en grön standard. Ambassaden arbetar med att identifiera potentiella svensk-amerikanska samarbeten inom grön energi och biobränslen. Ansträngningar har lett till klara framgångar på flera områden inom företagssektorn, på regeringsnivå och inom forskningen.

Nya svensk-amerikanska företags-samarbeten om miljö och energi omfattar ett avtal mellan New Pages massa- och pappersfabrik i Escanaba, Michigan och det svenska företaget Chemree, som ska överföra sin förgasningsteknik till den amerikanska fabriken. Swedish Biogas och staden Flint i Michigan samarbetar om att tillverka biogas från stadens avlopps-anläggning till stadens bussar och till att framställa biogödsel.

För att upprätthålla det svensk-amerikanska samarbetet inom miljöteknik,

inrättade den amerikanska Fulbright-kommissionen en gästprofessor i alternativ energi vid Chalmers tekniska högskola i Göteborg.

Jag fick äran att bli den första professorn. Sedan jag kom till Sverige i augusti förra året har jag varit aktiv i att utbilda en ny generation studenter som är intresserade av att främja den gröna industrirevolutionen. Jag har också fortsatt med forskningen inom innovativ teknik för att konvertera trämassa till biobränslen och biomaterial i framtidens integrerade skogsbiorefinaderier.

Under dessa dagar har fokus legat på svensk-amerikanska möjligheter för miljöföretagen inom områden som logistik, förnybar energi och industrial design. Det är särskilt aktuellt med tanke på de globala ansträngningarna som pågår från regeringarna att stimulera ekonomin och minska koldioxidutsläppen.

Dessa företagsutbyten bygger på det bilaterala avtal om samarbete kring alternativ energi som slöts mellan USA och Sverige 2007. Det främjar gemensam forskning om biobränslen, samarbete kring biomassaproduktion, transport och forskning inom bil-

industrin, minskande av kostnader för alternativ energi och förbättrad energi-användning.

Det går redan att se lovande tecken av samarbetet mellan Sverige och Georgia. Silvaro, ett svensk träbehandlingsföretag, utforskar möjligheten att öppna sitt första försäljningskontor i Georgia för att dra nytta av skogs- och biobränsleindustrin där. Woodlands Alternative Fuels planerar att bygga en fabrik för att tillverka träpellets och flis i Thomas County, en investering på 126 miljoner kronor som ska skapa 50 nya arbetstillfällen. Slutligen planerar Ogletheorpe Power Corp att investera ungefär 8,5 miljarder kronor i fabriker som konverterar massa till elektricitet, vilket kräver ett stort antal investeringar i "trä till biobränsleindustrin", ett område som flera svenska företag är ledande inom.

I en alltmer sammankopplad värld där länder är beroende av varandra, ger de miljö-samarbeten som svenska och amerikanska myndigheter uppmuntrar – och som företag och universitet levererar – nya ekonomiska utvecklingsmöjligheter. Det bidrar till att möta en del av mänsklighetens mest akuta klimat och miljöfrågor.

For Additional Details, See

http://www.ipst.gatech.edu/faculty_new/faculty_bios/ragauskas/ragauskas_news_articles.html

- Georgia's first wood-to-ethanol plant opens, in Atlanta Business Chronicle - by Dave Williams (Aug., 2010)
- Going Green with Sweden Should Boost U.S.
- According to Reuters Special Topics analysis on Biofuels, one of the most-cited papers in the Research Front Map on Ethanol Biofuels is "The Path Forward for Biofuels and Biomaterials" (Ragauskas AJ, et al., Science 311[5760]: 484-9, 27 January 2006). For more information see:
 - <http://sciencewatch.com/sciencewatch/ana/st/biofuels/08octSTbioRag/>
 - GA Tech Fulbright Announcement
 - Ragauskas Award in GA Tech, The Whistle Vol. 33, No. 20, June 2, 2008
 - Dr. Art Ragauskas Wins Prestigious Research Management Award
 - Fulbright Distinguished Chair in Alternative Energy Technology/TAPPI News
 - CSREES NRI Grant Recipient Receives Fulbright Award
 - Georgia Pines May Play Role in Fuel of the Future
 - Advancing the Kraft BioRefinery in Biomass Magazine - Oct 2007
 - Update of Biomass to Biofuels Research: GA Tech - Ragauskas
 - Ragauskas Nanobioterials in Process Nordic
 - Georgia Tech Part of New Biofuel Research Center

TV/RADIO INTERVIEWS

- News interview on GA PBS: "Georgia Weekly" Biofuels - Alternative Energy is Big Business these Days and Biofuels are Receiving a Lot of Attention. Dr. Arthur Ragauskas, Professor, Georgia Tech School of Chemistry and Biochemistry
 - See http://www.ipst.gatech.edu/faculty_new/faculty_bios/ragauskas/news_articles/georgia_weekly.html
- NBC News Footage of Art Ragauskas on the Subject of Biofuels from Wood Pulp
 - See http://www.ipst.gatech.edu/faculty_new/faculty_bios/ragauskas/ragauskas_news_articles.html