


SCHEDULE / Tuesday, July 14, 2015

7:00 a.m. – 5:00 p.m.	Registration Open — <i>Lower Level Registration</i>				
7:30 a.m. – 8:30 a.m.	Networking Breakfast — <i>Grand Foyer</i>				
7:30 a.m. – 5:00 p.m.	Exhibition Open — <i>Grand Foyer</i>				
TECHNICAL SESSIONS	TOOLS FOR DESIGNING GREENER CHEMICAL PROCESSES SESSION 1	2015 PRESIDENTIAL GREEN CHEMISTRY CHALLENGE AWARD WINNERS	BIOBASED PLASTICS AND COMPOSITES	CHARTING A ROADMAP FOR GREEN CHEMISTRY AND ENGINEERING EDUCATION	GREEN ORGANOCATALYSIS
	Salon A	Salon B	Salon C	Brookside	Theatre
	<i>A. Voutchkova-Kostal, Organizer</i> <i>A. Lapkin, C. Jimenez-Gonzalez, Presiding</i>	<i>B. H. Lipshutz, Organizer</i> <i>B. A. Drake, J. P. Roberts, Presiding</i>	<i>J. F. Stanzione, Organizer</i> <i>J. La Scala, Presiding</i>	<i>J. E. Hutchison, Organizer</i> <i>E. J. Brush, Presiding</i>	<i>B. H. Lipshutz, Organizer</i> <i>L. V. Desai, Presiding</i>
8:30 a.m. – 8:50 a.m.	19. Demonstration of GREENSCOPE: A tool for green chemistry evaluations and life cycle inventory generation. <i>R. Smith</i> , G. Ruiz-Mercado, M.A. Gonzalez, W. Barrett, D. Young	 <p>Winners of this year's Presidential Green Chemistry Challenge Awards (PGCCA) will be honored and have an opportunity to present their award lectures at this special session.</p>	1. Helping bridge the conversations between the synthetic biology and materials development communities: Building a palette of new biobased building blocks for materials innovation. <i>A.L. Safir</i>	9. MoDRN: A multipronged, education and outreach plan for the dissemination of scientific principles related to the rational design of safer, next-generation chemicals. <i>K. Mellor</i> , M. Mullins, N. Simcox, G. Lasker, J.B. Zimmerman, P.T. Anastas	14. Activation of nucleophiles for asymmetric reactions with organic molecules. <i>L. Deng</i>
8:50 a.m. – 9:10 a.m.	20. GSK's solvent sustainability guide: The next generation. C. Alder, J.D. Hayler, R.K. Henderson, A.M. Redman, L. Shukla, <i>L.E. Shuster</i> , H. Sneddon		2. Bio based plasticizers for polyamides. <i>H.B. Sunkara</i>	10. Green chemistry education roadmap: Progress report. <i>J.E. Hutchison</i> , J. MacKellar	
9:10 a.m. – 9:30 a.m.	21. Design and evolution of the BMS process greenness scorecard. D.K. Leahy, <i>E. Simmons</i> , J. Sweeney, V. Hung, M. Miller, W. Fleming		3. Computational modeling of bio-based furan polyamides and furfuryl alcohol polymers. <i>I. Yeh</i> , C.B. Rinderspacher, J. Andzelm, J. La Scala	11. Green chemistry consultants: Facilitating innovation in architecture and general education science courses. <i>J.A. Haack</i>	15. Computational design of organocatalysts for asymmetric alkylations of aromatic aldehydes. <i>S.E. Wheeler</i>
9:30 a.m. – 9:50 a.m.	22. Integrating exposure information into a hazard-based screening tool for selection of chemical alternatives. <i>S.M. Arnold</i> , G.R. Thompson, K. Kennedy, B. Landenberger, A.M. Mason		4. Chemically modified tannic acid: A bioderived char forming additive for nylon 6. <i>Z. Xia</i> , W. Kiratitanavit, R. Mosurkal, J. Kumar, R. Nagarajan	12. Moving green chemistry forward: Networks as foundation. <i>T. Carter</i> , G. Lough	
9:50 a.m. – 10:10 a.m.	Networking Coffee Break — <i>Grand Foyer</i>				
10:10 a.m. – 10:30 a.m.	23. New insights about pollution prevention and green chemistry from EPA's Toxics Release Inventory. <i>D. Teitelbaum</i>		5. Diphenolate epoxy resins: Biobased replacements for bisphenol a diglycidyl ether. <i>A. Maiorana</i> , S. Spinella, R.A. Gross	13. Deconstruction and reconstruction of the green chemistry and engineering education highway. <i>P.G. Mahaffy</i>	16. Photochemical method for the selective radical dehalogenation of alkyl and aryl bromides. <i>J.J. Devery</i>
10:30 a.m. – 10:50 a.m.	24. Does pollution prevention work? Evidence from twenty years of TRI reporting data. <i>M. Ranson</i> , B. Cox, C. Keenan, D. Teitelbaum		6. A sustainable route for the green and clean production of commodity methacrylate <i>M.M. Lin</i> , J. Grinberg, W. Eng, F.M. Dautzenberg		
10:50 a.m. – 11:10 a.m.	25. Harmonisation of sustainability tools across processing industries, a European perspective. <i>A. Lapkin</i>		7. PLATech - A drop-in replacement for urea-formaldehyde in wood-based composites <i>A. Bakken</i> , B. Archambault, R. Ragains, R. Taleyarkhan, R. Peoples	Panel Discussion.	17. The use of organocatalysts in the development of efficient syntheses of drug candidates and intermediates. <i>G.R. Humphrey</i>
11:10 a.m. – 11:30 a.m.			8. Sustainable, renewable and recyclable: Programmed photodegradation of polymers/ oligomers derived from bioresources. R. Raghunathan, S. Rajendran, R. Krishnan, M.P. Sibi, D.C. Webster, <i>S. Jayaraman</i>		
11:45 a.m. – 12:15 p.m.	Special Session: Chris Coons, Senator from Delaware — <i>Ballroom D</i>				



Chris Coons
U.S. Senator
Delaware

SCHEDULE / Tuesday, July 14, 2015


Deborah Mielewski
Senior Technical Leader,
Materials Sustainability
Ford Motor Company

12:30 p.m. – 1:45 p.m. Lunch with keynote speaker Deborah Mielewski, Senior Technical Leader, Materials Sustainability, Ford Motor Company — Ballroom D					
TECHNICAL SESSIONS	TOOLS FOR DESIGNING GREENER CHEMICAL PROCESSES SESSION 2	PRIOR PRESIDENTIAL GREEN CHEMISTRY CHALLENGE AWARD WINNERS	LIGNIN BASED MATERIALS	EDUCATION WORKSHOP: DEFINING LEARNING OBJECTIVES THAT INFUSE GREEN CHEMISTRY AND ENGINEERING INTO THE CURRICULUM	FRONTIERS OF BASE METAL CATALYSIS
	Salon A	Salon B	Salon C	Brookside	Theatre
	<i>A. Voutchkova-Kostal, Organizer M. Eckelman, Presiding</i>	<i>B. H. Lipshutz, Organizer B. A. Drake, R. J. Fehir, Presiding</i>	<i>J. F. Stanzione, Organizer D. C. Webster, Presiding</i>	<i>J. E. Hutchison, Organizer J. A. Haack, P. G. Mahaffy, Presiding</i>	<i>B. H. Lipshutz, Organizer D. J. Weix, Presiding</i>
2:00 p.m. – 2:20 p.m.	46. Life cycle analysis of green engineering design for organic solvent and water reduction in the manufacture of resin precursors. <i>C. Slater</i> , M.J. Savelski, B. Pastore, F.A. Richetti, N.A. Uff	40. Mixed metal salts from the earth: Pd catalysis at essentially no cost. <i>B.H. Lipshutz</i>	30. Lignin as a source of aromatic building blocks for materials synthesis. <i>D.C. Webster</i>	A hands-on workshop where educators can learn about effective practices to: (a) map the correlation between core chemistry topics and green chemistry and engineering contexts; and (b) create content, evidential and contextual learning objectives that integrate those topics and contexts. We will then select several core chemistry topics and see how this works in practice with green chemistry and engineering contexts suggested by participants. Along the way we will explore the barriers that students and faculty may need to overcome to use green chemistry and engineering topics as a rich context for learning chemistry.	26. The emergence of base metal catalysis in Pharma. <i>J.C. McWilliams</i> , J. Magano, S. Monfette, E.C. Hansen, J.D. Nelson, T.M. Makowski, J. Mustakis, R.A. Singer, A. Morrell, R. Howard, S. Caron
2:20 p.m. – 2:40 p.m.	47. Trends in environmental releases and other waste management quantities of toxic chemicals from the automotive sector. <i>S. DeVito</i>	38. Aerobic oxidation methods for pharmaceutical synthesis. <i>S.S. Stahl</i>	31. Precision properties of polymers prepared from multicomponent Lignin-based bio-oils. <i>A.L. Holmberg</i> , M.G. Karavolias, K. Reno, R.P. Wool, T.H. Epps		27. Cross-electrophile coupling with non-precious metals. <i>D.J. Weix</i>
2:40 p.m. – 3:00 p.m.	48. Developing and analyzing green chemistry data for life cycle inventories. <i>R. Smith</i> , M.A. Gonzalez, G. Ruiz-Mercado, D. Meyer, J. Abraham	39. Getting to the target faster: How close are we to the Nth vision of synthetic biology? <i>D. McPhee</i>	32. New chemical platform of lignin-based aromatic building blocks for polymers. <i>S. Caillol</i>		
3:00 p.m. – 3:20 p.m.	50. Green chemistry in chemical reactions: Informatics by design. <i>A. Clark</i>	41. Now what? <i>S. Hansen</i>	33. Replacing styrene with bio-derived alternatives in polyesters. J.P. Youngblood, A.B. Sellars, A.J. Clark, <i>S.R. Coles</i>		
3:20 p.m. – 3:40 p.m.	Networking Break — Grand Foyer				
3:40 p.m. – 4:00 p.m.	51. 3E Green Cas Score: A powerful quantitative screening tool for chemical alternatives. <i>H. Plugge</i>	42. Continuing development of a trivalent chromium plating process for functional applications: A paradigm shift and case study in electrochemical innovation. <i>E.J. Taylor</i> , T.D. Hall, S. Snyder, S. Lucatero, M. Inman	34. Novel Poly(vinyl ether)s based on the renewable phenol, eugenol. D. Kalita, S. Alam, S. Samanta, M.P. Sibi, <i>B.J. Chisholm</i>		28. Recent advances in nickel-catalyzed cross-couplings. <i>N.K. Garg</i>
4:00 p.m. – 4:20 p.m.	52. Alternative analysis: What is this and what should it look like? <i>M. Schmeida</i>	43. Coatings with improved Eco-Profile enabled by EVOQUE™ pre-composite polymer technology. <i>J. Bohling</i> , J. Klier, D. Fasano, M.H. Keefe	35. High temperature thermosetting resins from renewable phenols. <i>B.G. Harvey</i> , A.J. Guenther, G.R. Yandek, M.C. Davis		29. Nickel-catalyzed stereospecific cross-coupling reactions. <i>E.R. Jarvo</i>
4:20 p.m. – 4:40 p.m.		44. Vegetable oil dielectric insulating liquid for high voltage transformers. <i>K. Rapp</i> , D. Bingenheimer	36. Thermosetting polyurethanes from chemically-unmodified lignin: Synthesis, characterization and prospective applications. <i>G. Griffini</i> , V. Passoni, R. Suriano, M. Levi, S. Turri		
4:40 p.m. – 5:00 p.m.			45. Development of green and sustainable solvent systems. <i>C.L. Liotta</i>		37. The role of polyethylene oxide and boric acid hydrogen-bonding interactions in hardwood and softwood reactively processed lignin polymer blends. <i>T. Bova</i> , J.H. Perkins, C.D. Tran, A.K. Naskar
5:30 p.m. – 7:30 p.m.	Welcome Reception – Kenneth G. Hancock Award Winners Announcement — Ballroom E				

SCHEDULE / Wednesday, July 15, 2015



Angela Belcher, PhD
W.M. Keck Professor of Energy
MIT

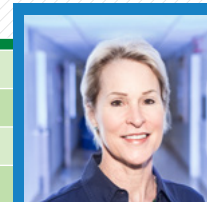
7:30 a.m. – 5:00 p.m.	Registration Open — <i>Lower Level Registration</i>					
7:30 a.m. – 8:30 a.m.	Networking Breakfast — <i>Grand Foyer</i>					
7:30 a.m. – 5:00 p.m.	Exhibition Open — <i>Grand Foyer</i>					
8:30 a.m. – 9:30 a.m.	Keynote Address. Presented by Angela Belcher, PhD, W.M. Keck Professor of Energy, MIT — <i>Ballroom D</i>					
9:30 a.m. – 9:50 a.m.	Networking Coffee Break — <i>Grand Foyer</i>					
TECHNICAL SESSIONS	THE NEXT 10 YEARS OF PHARMACEUTICAL GREEN CHEMISTRY	ENERGY, MATERIALS & CHEMISTRY	STATE-OF-THE-ART IN GREEN CHEMISTRY AND ENGINEERING EDUCATION: AT THE BACHELOR'S DEGREE-LEVEL AND BEYOND	GREEN REACTION MEDIA AND RELATED GREEN INITIATIVES	DEFINING GREENER MORE SUSTAINABLE CONSUMER PRODUCTS	BUSINESS PLAN COMPETITION
	Salon A	Salon B	Salon C	Brookside	Theatre	Linden Oak
	<i>D. K. Leahy, Organizer J. Tucker, Presiding</i>	<i>D. K. Leahy, B. H. Lipshutz, Organizers G. D. Stucky, Presiding</i>	<i>J. E. Hutchison, Organizer J. E. Wissinger, Presiding</i>	<i>D. K. Leahy, B. H. Lipshutz, Organizers N. K. Garg, Presiding</i>	<i>D. K. Leahy, X. Sun, Organizers T. J. Burns, P. Sliva, Presiding</i>	
9:50 a.m. – 10:10 a.m.	77. The ACS Green Chemistry Institute Pharmaceutical Roundtable: A perspective from one of its founders. <i>B.W. Cue</i>	61. The role of microbial electrochemical technologies in a resource positive wastewater treatment paradigm. <i>R.D. Cusick</i>	73. Education in sustainable chemistry in Spain for a broad public. <i>S.V. Luis</i> , B. Altava, M. Burguete, E. García-Verdugo	67. LED lighting as a sustainable alternative to perform Wolff rearrangements: Synthesis of amides and esters. <i>B. Bernardim</i> , A.M. Hardman-Baldwin, A. Burtoloso	53. Transparency in cleaning product formulation: What do we know about ingredients and potential for human exposure? <i>P.C. Deleo</i> , E.S. Williams, M. Ciarlo, C. Horne, W. Greggs	Semi-Finalists will be presenting their business plan.
10:10 a.m. – 10:30 a.m.			74. Introducing green chemistry concepts in inorganic chemistry: A special opportunity for Walsh University's chemistry majors. <i>A.J. Heston</i>			
10:30 a.m. – 10:50 a.m.	78. Green chemistry next. <i>P.T. Anastas</i>	62. Characterization of electrochemically active bacteria in microbial fuel cells. <i>S.F. Li</i> , L. Zhang, Y. Gao, L. Lai	76. Establishing regional student-faculty collaborations in green chemistry teaching, research and outreach education: Project GreenLab. <i>E.J. Brush</i>	69. Organometallic reagents in green solvents. <i>M. Cheplen</i>	55. Opportunities for greener alternatives in chemical formulations. P.G. Jessop, F. Ahmadvour, M.A. Buczynski, T.J. Burns, <i>N. Green</i> , R. Korwin, D.C. Long, S. Massad, J.B. Manley, N. Omidbakhsh, R. Pearl, S. Pereira, R.A. Predale, P. Sliva, S. Weller, M.H. Wolf, H. VanderBilt	
10:50 a.m. – 11:10 a.m.			63. Energy harvesting from marine sediments and long distance electron transport through microbial biofilms. <i>L. Tender</i>			
11:10 a.m. – 11:30 a.m.	79. Biosynthetics: Revving the engine of biology to unleash the power of green chemistry in the pharmaceutical industry. <i>V.G. Yadav</i>	64. Electrodeposition of lithium-ion battery active materials onto virus-templated three-dimensional current collectors. <i>A. Ransil</i> , A.M. Belcher	RECENT ADVANCES IN LABORATORY MATERIALS FOR GREEN CHEMISTRY AND ENGINEERING: RAPIDFIRE SESSION		57. Characterization of modified sophorolipid derivatives as green bio-based surfactants. <i>A. Koh</i> , R.A. Gross	
11:30 a.m. – 11:50 p.m.			<i>J. E. Hutchison, Organizer J. E. Wissinger, Presiding</i>			
11:50 p.m. – 12:10 p.m.	80. Regulatory strategies for going green in pharmaceuticals. <i>R. Raghavachari</i>	65. Development of polyoxometalate-ionic liquid compounds for processing cellulosic biomass. <i>J. Abia</i>	Introductory Remarks		58. Aluminum Glucarate – A novel builder system for automatic dishwashing detergents. <i>E. Johnston</i>	
12:10 p.m. – 12:30 p.m.			Panel Discussion (12:30 p.m.)			72. Safe and scalable aerobic oxidation reactions in organic solvents. <i>S.S. Stahl</i>
			81. (11:15 a.m.) Green synthesis of a tri-block co-polymer from renewable monomers. <i>M.T. Wentzel</i> , J.E. Wissinger, Z. Swingen	59. Formulating safer products in a changing regulatory environment. <i>C. Choy</i>	60. The Sustainability Consortium – Common chemical criteria task force, introduction and update. <i>C. Helt</i>	
			82. (11:25 a.m.) One-pot synthesis of chalcone epoxides: A green organic chemistry experiment developed through a senior capstone project. <i>R.N. Manchanayakage</i>			
			83. (11:35 a.m.) Implementation of group projects in green chemistry at Virginia Tech. <i>F.A. Etkorn</i>			
			84. (11:45 a.m.) Exploration of electrophilic aromatic substitution reactions using halide salts and oxone for greening the undergraduate laboratory. <i>J.E. Wissinger</i> , M. Haj, G. Fahnhorst			
			Panel Discussion (11:55 a.m.)			
			Concluding Remarks (12:15 p.m.)			

SCHEDULE / Wednesday, July 15, 2015

12:30 p.m. – 1:30 p.m.	Networking Luncheon — <i>Ballroom D</i>				
1:00 p.m. – 2:00 p.m.	Student Poster Session Student Poster Chair: Mark Mason — <i>White Oak</i>				
TECHNICAL SESSIONS	THE NEXT 10 YEARS OF PHARMACEUTICAL GREEN CHEMISTRY — SESSION 2	EXPLORING GREENER APPROACHES TO HYDRAULIC FRACTURING	IN HONOR OF DR. RICHARD WOOL: AFFORDABLE COMPOSITES FROM RENEWABLE RESOURCES	SAFER REAGENTS FOR SYNTHESIS	SUSTAINABLE APPAREL AND FOOTWEAR
	Salon A	Salon B	Salon C	Brookside	Theatre
	<i>D. K. Leahy, Organizer J. C. Colberg, Presiding</i>	<i>D. K. Leahy, B. H. Lipshutz, Organizers D. Maley, D. Woloch, Presiding</i>	<i>J. F. Stanzione, Organizer, Presiding D. C. Webster, Presiding</i>	<i>D. K. Leahy, B. H. Lipshutz, Organizers E. Ponnusamy, Presiding</i>	<i>D. K. Leahy, X. Sun, Organizers R. L. Watkins, Presiding</i>
2:00 p.m. – 2:20 p.m.	172. Asymmetric synthesis of a smoothed receptor inhibitor via enzymatic transamination with dynamic kinetic resolution. <i>J.W. Wong</i>	146. Methods for safe and responsible hydraulic fracturing operations. <i>B.M. Todd</i>	153. Bio-based thermosets inspired by Richard Wool, from plant oil-based resins to ligno-cellulose-derived polymers. <i>J. La Scala</i>	159. Recent advances in safe and sustainable chemical reagents. <i>S.A. Batcheller</i>	165. Renewably resourced durable water repellent technology. <i>J. Sworen</i> , G. Brown, R.C. Buck, S.H. Korzeniowski
2:20 p.m. – 2:40 p.m.					
2:40 p.m. – 3:00 p.m.	173. New design strategies for asymmetric catalysts. <i>E. Meggers</i>	147. Transformation and reactivity of hydraulic fracturing chemicals under downhole conditions: Focus on glutaraldehyde. <i>T. Borch</i> , G. Kahrilas, J. Blotevogel	154. Exploration of bisguaiacols derived from lignin as potential BPA alternatives. <i>K. Reno</i> , D. Hanemann-Rawlings, J.M. Sadler, E.D. Hernandez, J.F. Stanzione, J. La Scala, C. Jang, C. Wu, T.H. Epps, R.P. Wool	162. Elemental fluorine for the greener synthesis of life-science building blocks. <i>A. Harsanyi</i> , G. Sandford	166. Greener solutions: A biomimetic approach to cotton crosslinking. <i>L. Rubin Shen</i>
3:00 p.m. – 3:20 p.m.		148. Environmentally acceptable surfactants to replace nonylphenol ethoxylates for hydraulic fracturing application. <i>A. Kaiser</i> , H. ShamsiJazeyi, A. Miller, A. Mahmoudkhani	155. Vanillyl alcohol: A renewable epoxy resin building block. <i>J.F. Stanzione</i> , E. Hernandez, J.M. Sadler, J. La Scala	164. Aerobic organocatalysis: Biomimetics of flavoprotein monooxygenases and oxidases for catalytic Baeyer-Villiger oxidations, chiral epoxidations, and heteroaromatic synthesis. <i>F.W. Foss</i> , S. Chen, J.A. Gurak, M. Hossain, P. Thapa*	167. Bio based thermoplastic polyurethane. <i>G. Scholz</i>
3:20 p.m. – 3:40 p.m.	Networking Coffee Break				
3:40 p.m. – 4:00 p.m.	174. Streamlining pharmaceutical processes. <i>F. Gupton</i>	149. Glucamides for stimulation and enhanced oil recovery: A fresh look at an old sugar surfactant. <i>A. Mahmoudkhani</i> , A. Kaiser, J. Wylde, H. ShamsiJazeyi	156. Environmentally friendly high performance bio-based polymers for DoD applications. J.M. Sadler, <i>C. Paquette</i> , C. Annunziatto, F. Toulan, G.R. Palmese, J. La Scala	251. Production of valuable materials and chemicals from cashew nut shells. <i>E. Mubofu</i>	168. Incorporating recycled rubber into footwear. <i>G. Merrill</i>
4:00 p.m. – 4:20 p.m.		150. Toward environmentally friendly acid corrosion inhibitors. <i>D. Compton</i> , D. Woloch, G. Sutton, C. Vallejo	157. Carbon fibers derived from lignin-based precursors: UV-assisted stabilization. M. Zhang, J. Jin, <i>A.A. Ogale</i>		169. Hydrophilic coating with protein-based nanoparticles. <i>S. Kim</i>
4:20 p.m. – 4:40 p.m.	175. Development of a two-step, enantioselective synthesis of an amino alcohol drug candidate. <i>M. Schmidt</i>	151. Assessing hazards of hydraulic fracturing chemicals. <i>B. Penttila</i> , L. Heine	158. Oilseeds as a platform for sustainable chemicals and bioproducts. <i>X. Sun</i>		170. Developing a color matching database in supercritical CO₂ for waterless textile dyeing. <i>R. Schlake</i> , A. Lutz, N. Catic, M. Anand, P. Hobbs
4:40 p.m. – 5:00 p.m.		152. Stimuli-responsive rheoreversible fracturing fluids for enhanced geothermal systems. <i>C. Fernandez</i> , A. Bonneville, H. Shao, S. Kabilan, T. Varga, D. Hoyt, L. Zhong, J. Holladay			171. Bio TPU™ by Lubrizol. <i>E. Baena</i>
6:00 p.m. – 10:00 p.m.	ACS Careers Workshop (Advanced registration required) - <i>Linden Oak</i>				
6:00 p.m. – 9:00 p.m.	5th Annual ACS GCI Roundtable Poster Reception (Advanced registration required) - <i>Ballroom E</i>				

SCHEDULE / Thursday, July 16, 2015

7:30 a.m. – 3:00 p.m.	Registration Open — <i>Lower Level Registration</i>					
7:30 a.m. – 8:30 a.m.	Networking Breakfast — <i>Grand Foyer</i>					
7:30 a.m. – 3:00 p.m.	Exhibitions Open — <i>Grand Foyer</i>					
8:30 a.m. – 9:30 a.m.	Keynote Address: Innovation by evolution: Future biocatalysts presented by Frances Arnold, PhD, Dickinson Professor of Chemical Engineering, Caltech — <i>Ballroom D</i>					
9:30 a.m. – 9:50 a.m.	Networking Coffee Break — <i>Grand Foyer</i>					
TECHNICAL SESSIONS	GREEN CHEMISTRY THROUGH METABOLIC ENGINEERING AND SYNTHETIC BIOLOGY	BIO-RENEWABLE FEEDSTOCKS	SUSTAINABLE SEPARATION PROCESSES: DESIGNING LOW ENERGY INTENSITY ALTERNATIVES	STRATEGIC, SUSTAINABLE CHEMISTRIES FOR FUNCTIONAL MATERIALS — SESSION 1	DESIGNING SAFER CHEMICALS: INTERDISCIPLINARY RESEARCH FRONTIERS	SUSTAINABLE PROCESSES THROUGH GREEN CATALYSIS
	Salon A	Salon B	Salon C	Brookside	Theatre	Linden Oak
	<i>D. K. Leahy, Organizer Y. Tang, Presiding</i>	<i>X. Sun, Organizer J. F. Stanzione, Organizer, Presiding</i>	<i>D. K. Leahy, Organizer A. Sehgal, Presiding</i>	<i>J. E. Hutchison, Organizer M. D. Nyman, Presiding</i>	<i>A. Voutchkova-Kostal, Organizer, Presiding</i>	<i>B. H. Lipshutz, Organizer M. Schmidt, Presiding</i>
9:50 a.m. – 10:10 a.m.	191. Systematic construction of biosynthetic pathways for chemical production. <i>S. Atsumi</i>	176. Renewable chemicals, nomenclature, and TSCA: What you need to know to commercialize. <i>R. Engler</i>	207. Industrial needs for less energy-intensive separation processes. <i>R.J. Giraud</i>	195. Metal oxide coatings from aqueous metal-oxo clusters. <i>M.D. Nyman</i>	183. Molecular design research network: Towards design guidelines for chemicals with minimal potential for oxidative stress. <i>B.W. Brooks</i>	200. Science & engineering of pores, particles and interfaces in development green processes. <i>G.D. Yadav</i>
10:10 a.m. – 10:30 a.m.			208. Open Innovation is no more a competitive advantage; it has become a competitive necessity. <i>K. Ramdani</i>		184. Analysis of xenobiotic properties leading to electrophilic or radical activation of Nrf2-Keep1 pathway in ToxCast. <i>F. Melnikov</i> , J. Kostal, L. Shen, A. Voutchkova-Kostal, J.B. Zimmerman, P.T. Anastas	
10:30 a.m. – 10:50 a.m.	192. Development of novel biocatalysts for efficient chiral amine synthesis. <i>J.J. Lalonde</i> , O. Alvizo, C. Savile, J. Liang, J.C. Moore, D. Entwistle	177. Advances in renewable fuels and aromatic chemical production from Virent's novel catalytic bioforming process. <i>F. Liotta</i> , A. Held	209. Towards energy-friendly separation processes using theory and simulation. <i>V. Shen</i>	196. Soft-oxometalates (SOMs): Synthesis, catalysis and patterning. <i>S. Roy</i>	185. Pathways of toxicity: MPTP toxicity and estrogen stimulation as test cases of using high-content technologies to understand molecular mechanisms of toxicity. <i>A. Maertens</i> , T. Luechtefeld, T. Hartung	201. Diastereoselective preparation of cis-Diols from organic carbonates: Using CO₂ as a temporary protecting group. <i>A.W. Kleij</i> , C.J. Whiteoak, G. Fiorani, V. Laserna
10:50 a.m. – 11:10 a.m.		178. Soybean oil-modified, highly hydrophobic polyurethane dispersions. <i>W. Yu</i> , C. Chen, Z. Chen	210. Mesoporous organosilica with amidoxime groups for CO₂ sorption. <i>C. Gunathilake</i> , M. Jaroniec		186. Reverse engineering the PBT paradigm: Designing safer chemicals using the interdisciplinary approaches of an alternative assessment. <i>J.L. Tunkel</i>	202. Photoredox catalysis in green chemistry. <i>W. Li</i>
11:10 a.m. – 11:30 a.m.	193. Biobased production of mechanically tunable polyesters. M. Xiong, Y. Tai, <i>K. Zhang</i>	179. Pressure-sensitive adhesives and coatings from camelina oils. <i>Y. Li</i> , S. Sun	211. Drying solvents and EALs by pervaporation with perfluorinated membranes. <i>S. Nemser</i> , D. Campos, B.A. Simmons, S. Singh, R.D. Rogers, G. Gurau, <i>E. Sohodski</i>	197. Enhanced dehydration of AIPO thin films by a HfO₂ capping layer. <i>C.K. Perkins</i> , R. Mansergh, D. Park, Y. Huang, S. Decker, D.A. Keszler	187. Safer plasticizers by altering phthalate structural motif. <i>H.C. Erythropel</i> , M. Maric, J.A. Nicell, R.L. Leask	203. Silica decorated magnetically retrievable base metal nanocatalysts for various organic transformation reactions. <i>R.K. Sharma</i>
11:30 a.m. – 11:50 a.m.		180. Toward mechanistic modeling of Lignin deconstruction: A stochastic method to produce libraries of structural representations of Lignin. <i>A.J. Yanez</i> , L.J. Broadbelt	212. Membrane assisted vapor stripping: Hybrid process for separation of solvent-water mixtures. <i>L. Vane</i> , F. Alvarez	198. A single-component photocatalyst for gas-phase CO₂ reduction: Toward efficient solar fuel production. <i>L. Hoch</i> , T.E. Wood, P.G. O'Brien, K. Liao, L. Reyes, C. Mims, G.A. Ozin	188. Exempt polymers: Are they really non-hazardous? <i>J. Kneeland</i> , D.M. Pizzurro, J. Zhang	204. Advancing the catalysis of highly substituted oxiranes/CO₂ coupling reaction. <i>G. Fiorani</i> , A.W. Kleij
11:50 a.m. – 12:10 p.m.	194. Carbene transfer activity of P450-BM3: Formal synthesis of levomilnacipran, kinetic studies and identification of catalyst deactivation pathway. <i>H. Renata</i>	181. Nanocellulose and functional materials from agricultural and food wastes. <i>Y. Hsieh</i>	213. Opportunities and challenges for membrane technology in designing sustainable separation processes. <i>G.G. Lipscomb</i>	199. Precision synthesis of metal oxide nanocrystals for solution processing of transparent conductive thin films. <i>B. Crockett</i> , J.E. Hutchison, A.W. Jansons	189. Development of structure-toxicity correlations for complex engineered Ni/SiO₂ nanomaterials using high throughput zebrafish assays. <i>S.L. Mahoney</i> , M. Najera, Q. Bai, E. Burton, G. Veser	205. Deoxygenation of biomass-derived lactones to produce fuels and chemicals. <i>M. Haider</i> , S. Gupta, N. Sinha
12:10 p.m. – 12:30 p.m.		182. Ionosolv pretreatment of lignocellulosic biomass using low-cost ionic liquids. <i>A. Brandt-Talbot</i> , F. Gschwend, C. Chambon, S. Shinde, J.P. Hallett			190. Chemical promiscuity analysis using EPA ToxCast data and its inference to molecular design. <i>L.Q. Shen</i> , C. Li, F. Melnikov, R. Judson, A. Voutchkova-Kostal-Kostal, J.B. Zimmerman, P.T. Anastas	206. Polymer Supported Ionic Liquid-Like Phases (SILLPs) as efficient materials for the development of multicatalytic processes. <i>S.V. Luis</i> , M. Burguete, E. García-Verdugo, R. Porcar, E. Peris, S. Montolio, D. Nuevo
12:30 p.m. – 1:30 p.m.	Networking Lunch - <i>Ballroom D</i>					



Frances Arnold, PhD
Dickinson Professor of Chemical Engineering
Caltech

SCHEDULE / Thursday, July 16, 2015

12:30 p.m. – 1:30 p.m. Networking Lunch - Ballroom D						
1:00 p.m. – 2:00 p.m. Poster Session - White Oak						
TECHNICAL SESSIONS	ENZYMES: THE ULTIMATE GREEN CATALYSTS	FEEDSTOCK FROM CO ₂ AND NATURAL GAS	GOING GREEN WITH CONTINUOUS CHEMISTRY	STRATEGIC, SUSTAINABLE CHEMISTRIES FOR FUNCTIONAL MATERIALS — SESSION 2	DESIGNING SAFER CHEMICALS: PRACTITIONER'S WORKSHOP	LIVE WEBINAR
	Salon A	Salon B	Salon C	Brookside	Theatre	Linden Oak
	<i>D. K. Leahy, Organizer A. Goswami, Presiding</i>	<i>J. F. Stanzione, X. Sun, Organizers R. Zhang, Presiding</i>	<i>D. K. Leahy, Organizer M. Kopach, Presiding</i>	<i>J. E. Hutchison, Organizer D. Marsh, Presiding</i>	<i>A. Voutchkova-Kostal, Organizer J. Kostal, Presiding</i>	
2:00 p.m. – 2:20 p.m.	264. Evolving alkene reductases to meet the challenges of chemical synthesis. <i>J.D. Stewart</i>	270. Renewable natural gas production from food and other organic wastes. <i>R. Zhang</i>	277. Synthetic transformations employing continuous flow technologies. <i>C.L. Liotta</i>	281. Spray synthesis of functional, shape-controlled nanomaterials. <i>S.E. Skrabalak</i>	This case study will be set in context of two alternative assessment frameworks – GreenScreen and the National Research Council's Framework for Selection of Chemical Alternatives. The latter introduces a few new steps to the process, such as preliminary screening based on physicochemical properties and consideration of exposure. It also outlines steps that lead to de novo chemical design where an acceptable alternative is not available. Since filling data gaps and decision making hinges on understanding the uncertainty in the data used, we will discuss strategies for reconciling conflicting data and systematically quantifying uncertainty. Further, this year's workshop will provide participants with strategies for incorporating the underlying concepts in alternatives assessments into the undergraduate chemistry curriculum. Invited presenters include Dr. Scott Arnold from Dow, Prof. Jim Hutchison from University of Oregon, Prof. Adelina Voutchkova from The George Washington University and Dr. Jakub Kostal from DOT Consulting.	Live Webinar Session: Catalyzing Sustainable Innovation Through Sustainable Molecular Design and Synthesis. <i>B.B. Laird, A.K. Rappe</i>
2:20 p.m. – 2:40 p.m.	265. A scalable enzymatic process for N-substituted 3R-hydroxypyrrolidin-2-one. <i>A. Singh</i> , J. Falabella, T.L. Laporte, A. Goswami	272. Access to renewable biopolymers from limonene and carbon dioxide. <i>A.W. Kleij, C. Bo, L. Peña, J. Gonzalez, F. Castro-Gómez</i>	278. 3D printed flow reactors: The ideal industrial reactor for hazardous chemistry. <i>A. De Vries</i>			
2:40 p.m. – 3:00 p.m.	266. Launching a sustainable P450 oxygenation technology for synthesis of important intermediates. <i>I. Kaluzna</i> , T. Schmitges, H. Straatman, M. Muller, M. Schurmann, D. Mink	273. Dielectric barrier discharge plasma-based dry reforming: Determining the discharge characteristics and the optimum operating condition. <i>M. Khoshinat Nikoo</i> , N. Saidina Amin				
3:00 p.m. – 3:20 p.m.						
3:20 p.m. – 3:40 p.m. Networking Coffee Break						
3:40 p.m. – 4:00 p.m.	267. Rational engineering of a mesophilic carbonic anhydrase to an extreme halotolerant biocatalyst. A.C. Warden, M. Williams, T.S. Peat, S.A. Seabrook, J. Newman, G. Dojchinov, <i>V.S. Haritos</i>	274. CO₂ chemistry: Metal-catalyzed CO₂ transformation at ambient conditions. <i>L. He</i>	279. From process intensification to flow chemistry and back. <i>A. Lapkin</i>	283. Lanthanum aluminum oxide thin films from aqueous solution: Effect of precursor solution nitrate: Metal ratio on film properties. <i>P. Plassmeyer</i> , C.J. Page		
4:00 p.m. – 4:20 p.m.	268. Protease-catalyzed routes to peptides: Moving from chemically intensive to green synthetic methods. <i>R.A. Gross</i>	275. The correlation between the cellulose digestibility and the cellulose allomorphs changed by different pretreatments. <i>T. Cui</i> , J. Li, S. Li		284. Aqueous solution-processed thin films: Determining the chemistries and effects of interfacial regions in multilayer lanthanum zirconium oxide dielectrics. <i>K.N. Woods</i> , J. Ditto, D. Kayal, K. Frisella, D.C. Johnson, C.J. Page		
4:20 p.m. – 4:40 p.m.	268. Developing efficient biocatalytic processes for industrial applications. <i>R. Dicosimo</i>		280. Membrane-based flow reactors for catalytic aerobic partial oxidation chemistry in pharmaceuticals and specialty chemicals. <i>T.W. Root</i> , S.S. Stahl			
4:40 p.m. – 5:00 p.m.						