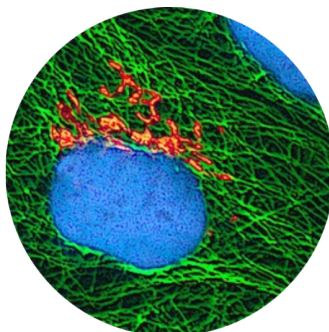




NATURAL GAS INDUSTRY DAY

October 25, 2016
Shell Auditorium



In cooperation with:



CHANGING WHAT'S POSSIBLE



WELCOME

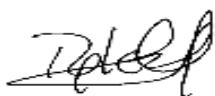
Dear Colleagues,

On behalf of Rice University's Advanced Biomanufacturing Initiative (iBIO), I would like to welcome you to the Natural Gas Industry Day.

Given its clean nature, abundance and accessibility, natural gas provides an unprecedented opportunity to address environmental, geographical, political and economic challenges associated with energy and manufacturing demands in the 21st century. Its sustainable exploitation, however, requires transformational technologies and represents a new frontier for the energy industry. The program for the Natural Gas Industry Day aims at identifying said technological "white space" and connecting potentially transformational R&D investments with interested parties within the existing petrochemical, utility and midstream industrial sectors. Alongside the showcase of transformational technologies, we will hear from Dr. Ellen Williams (Director, ARPA-E), Cindy Yeilding (Senior Vice President, BP America), and Dr. Scott Tinker (Director of BEG and State Geologist of Texas) on the role of public, private, academic partnerships in advancing scientific achievement. There will be more than 250 participants from industry, academia, and government—each providing different perspectives on the role natural gas can play in our energy future. These viewpoints will be highlighted in panel discussions focused on identifying future transformational R&D concepts and appropriate channels for productive and ongoing joint R&D.

The current slate of potentially transformative technologies and R&D efforts will be on display as part of the ARPA-E Technologies Exhibit, providing participants the chance to learn about the cutting-edge technologies on the cusp of commercial breakthrough. Throughout the day you will have the opportunity to network and interact with colleagues from all represented sectors, enabling new connections and potential partnerships to be established. Culminating with an open reception to close the day, we hope to provide all participants with a unique opportunity to learn, interact, and engage within this exciting new energy frontier.

Sincerely,



Ramon Gonzalez, Ph.D.
Founding Director, Advanced Biomanufacturing Initiative (iBIO)





AGENDA

Time	Workshop	Host/ Panelist(s)	Location
8:00-9:00 am	Registration and Light Breakfast		Anderson Family Commons
9:00-9:30 am	Welcome from Rice	Dr. Marie Lynn Miranda Provost, Rice University Dr. Ramon Gonzalez Founding Director, iBIO Director Rice University	Shell Auditorium
9:30 – 9:45 am	Workshop Background & Objectives	David Henshall ARPA-E	Shell Auditorium
9:45 – 10:30 am	Invited Presentations, Director of ARPA-E “Public/Private Partnerships and ARPA-E’s Ambitious Mission”	Dr. Ellen Williams Director ARPA-E	Shell Auditorium
10:30-11:00 am	Invited Presentations “Natural Gas: A key player in the transition to a lower carbon energy future”	Cindy Yeilding SVP, BP America	Shell Auditorium
11:00 – 11:30	Invited Presentations “Changing the Energy Conversation”	Dr. Scott W. Tinker State Geologist of Texas	Shell Auditorium
11:30 – 1:15 pm	Lunch and Networking		Anderson Family Commons
1:15 – 2:30 pm	Panel Discussion Identifying technological “white space” within the existing petrochemical, utility and midstream industrial sectors. What are potentially transformational R&D concepts that are not investable today by industry because they are either too high-risk or otherwise considered pre-competitive.	Alex Rozenfeld Climate impact Capital Jared Ciferno , U.S. DoE Dr. Kevin Todd , BASF Maurice Gunderson , Earth Energy Ventures David Greeson , NRG	Shell Auditorium
2:30 – 3:30 pm	Panel Discussion Connecting potentially transformational R&D investments with interested parties within the existing petrochemical, utility and midstream industrial sectors. What are the appropriate channels within your organizations for productive and ongoing joint development/research efforts alongside federally-funded R&D.	Nigel Jenvey , BP Jack Belcher , RPSEA Chip Stoicovy , Air Liquide Dr. Joseph King , ARPA-E James Unterreiner , Shell	Shell Auditorium
3:30 – 4:00 pm	Break and Networking		Rice Grand Hall
4:00 – 6:30 pm	ARPA-E Technologies Exhibit and Rice Reception		Rice Grand Hall





Marie Lynn Miranda, Ph.D.

*Howard R. Hughes Provost and Professor of Statistics,
Rice University
Adjunct Professor of Pediatrics,
Duke University, University of Michigan, and Baylor College of Medicine*

Dr. Marie Lynn Miranda became the Howard R. Hughes Provost and Professor of Statistics at Rice University in July 2015. She was previously the Samuel A. Graham Dean of the School of Natural Resources and Environment and Professor of Pediatrics and Obstetrics and Gynecology at the University of Michigan. Dr. Miranda also served for 21 years on the faculty of Duke University, with a primary appointment in the Nicholas School of the Environment.

Dr. Miranda specializes in research on environmental health, especially how the environment shapes health and well-being among children. She is the founding director of the Children's Environmental Health Initiative, a research, education and outreach program committed to fostering environments where all people can prosper. Dr. Miranda's educational background is rooted in economic and mathematical modeling; her professional experiences integrate environmental health sciences with sound social policies. She has taught courses and conducted research on children's environmental health, with a particular emphasis on reproductive and developmental toxicants, childhood lead exposure, and allergen and asthma triggers. Dr. Miranda is a leader in the evolving field of geospatial health informatics, and maintains a deep and abiding personal and professional interest in environmental and social justice.

She is a Phi Beta Kappa summa cum laude graduate of Duke University, where she earned an A.B. in Mathematics and Economics and was named a Truman Scholar. Dr. Miranda has a Ph.D. and a M.A., both in Economics, from Harvard University.

Ellen Williams, Ph.D.

*Director,
ARPA-E*



Dr. Ellen Williams is the Director of the Advanced Research Projects Agency–Energy (ARPA-E), responsible for oversight of the agency. Before joining ARPA-E, Dr. Williams served as the Senior Advisor to the Secretary of Energy and the Chief Scientist for BP. She is currently on a leave of absence from the University of Maryland, where she has served as a Distinguished University Professor in the Department of Physics and the Institute for Physical Science and Technology since 2000.

Dr. Williams has served as a professor in the Department of Physics at the University of Maryland since 1991. She founded the University of Maryland Materials Research Science and Engineering Center and served as its director from 1996 until 2009. Dr. Williams received a B.S. in Chemistry from Michigan State University and a Ph.D. in Chemistry from the California Institute of Technology.





Ramon Gonzalez, Ph.D.

*Professor, Departments of Chemical and Biomolecular Engineering and Bioengineering, Rice University
Founding Director, Advanced Biomanufacturing Initiative (iBIO)
Rice University*

Dr. Ramon Gonzalez leads the laboratory for Metabolic Engineering and Biomanufacturing with the goal of engineering biological platforms for the synthesis of organic molecules with applications in fuel, chemical and pharmaceutical production. Dr. Gonzalez is also the Founding Director of Rice's Advanced Biomanufacturing Initiative (iBIO).

Dr. Gonzalez has published over 67 articles in leading scientific journals, including Nature, Nature Biotechnology, Science, Nature Chemical Biology, Metabolic Engineering, ACS Synthetic Biology. He is the lead inventor in 22 patents or patent applications and has given over 90 invited talks. Dr. Gonzalez also serves as the Editor-in-Chief of the Journal of Industrial Microbiology & Biotechnology, and also a member of the editorial board of Science, Applied & Environmental Microbiology, Biotechnology Journal, Metabolic Engineering Communications, Applied Biochemistry & Biotechnology, and Food Biotechnology.

Dr. Gonzalez also served as the program chair of the Society for Industrial Microbiology and Biotechnology (SIMB) 2011 annual meeting, as well as, the director of the SIMB's Board of Directors and co-founder of Glycos Biotechnologies, Inc. He recently served as Program Director with the Advanced Research Projects Agency-Energy (ARPA-E) of the U.S. Department of Energy, and as director of the Rice Energy and Environment Initiative.

Dr. Gonzalez received a Ph.D. in Chemical Engineering from the University of Chile, a M.S. in Biochemical Engineering from the Pontifical Catholic University of Valparaíso in Chile, and a B.S. in Chemical Engineering from the Central University of Las Villas in Cuba.

Joseph King, Ph.D.

*Program Director,
ARPA-E*



Dr. Joseph A. King Jr. is currently a Program Director in the Department of Energy's Advance Research Projects Agency for Energy (ARPA-E). Dr. King comes to ARPA-E from DuPont where he was a Managing Director in DuPont's Corporate Venture Capital group responsible for their advanced materials investments. Prior to DuPont, Dr. King held a variety of positions within GE ranging from Liaison Scientist to Vice President of Risk Management and Capital Markets. Dr. King earned both his Ph.D. in Physical Organic Chemistry and his B.S. in Chemistry from the University of California, Berkeley.





David Henshall

*Deputy Director,
ARPA-E*

David Henshall is a successful entrepreneur with a 20 year career building and growing technology companies. Henshall currently serves as the Deputy Director for Commercialization at the Department of Energy's Advanced Research Projects Agency–Energy (ARPA-E). Henshall leads the Agency's Tech-to-Market organization which supports the commercialization and continued financing efforts of early stage energy technologies. His team provides resources, including market analysis, techno-economic analysis, customer discovery, and IP strategy to help ARPA-E's project teams move from the lab into the marketplace.

Prior to taking on the position as Deputy Director, Henshall served as a Technology-to-Market Advisor at ARPA-E where he was responsible for helping projects in the SWITCHES program with commercializing their technology. Before joining ARPA-E, Henshall joined Hexatech, Inc., a startup working to develop and commercialize aluminum nitride semiconductor devices. At Hexatech, Henshall served as the Director of Operations, building and managing corporate services. He also created and managed the Triangle Ceramics business by developing and marketing technology and tooling for semiconductor development.

Henshall started his career at Advanced Technology Materials, Inc. as a Development Engineer responsible for driving LED technology which was used as a platform for the company's initial public offering. He then moved to Cree, Inc., a leader in LED technology, where he held key leadership positions and was integral to the company's success as the company grew from 125 to 2,000+ employees and revenue grew from \$15 million to \$400+ million. Henshall spent over a decade at Cree, Inc., where he served as Engineering Manager, Manufacturing Manager, and Operations Manager leading a team of more than 200 employees.

Henshall received a M.S. and B.S. in Ceramic Engineering from the New York State College of Ceramics at Alfred University. He has also written or co-written over 20 published papers.

David Greeson

*Vice President of Development
NRG Energy*



David Greeson is the Vice President of Development for NRG Energy and leads NRG's carbon capture program. He led the NRG team that successfully financed the \$1 billion Petra Nova project. Before carbon capture, David's career has spanned 35 years: he started with customer relations at an electric utility; and for the last 25 years, he has developed major projects in the independent power industry.





Jack Belcher

*Executive Vice President,
HBW Resources, LLC*

Jack Belcher is Executive Vice President of HBW Resources, LLC where he consults energy and transportation clients on regulatory affairs, situational risk management, government relations, communication, coalition-building and stakeholder relations. He serves as Director of Business Development for Research Partnership to Secure Energy for America (RPSEA). He also serves as Managing Director of the National Ocean Policy Coalition and Vice President of the Consumer Energy Alliance, where he provides strategic and tactical advice to energy companies and financial institutions.

Mr. Belcher has over 25 years of experience in the energy industry, including five years as Regulatory Affairs and Policy Manager for Shell North America, Exploration & Production Division, where he lead efforts to obtain and maintain the company's license to operate and comply with regulations. While there, he managed a team of over 80 employees that was responsible for assessing current and emerging regulatory and public policy threats and opportunities and prioritizing them in terms of impact to Shell's business goals.

Previously, he served as Staff Director for the U.S. House of Representatives Subcommittee on Energy and Mineral Resources where he helped direct the work of the committee staff and planned and organized legislative and oversight hearings on issues pertaining to oil and gas development on federal lands. He directed the committee's oversight activities over the Interior Department (Minerals Management Service, Bureau of Land Management, and Office of Surface Mining Reclamation & Enforcement) for energy activities offshore and onshore. He also wrote several of the legislative provisions that were adopted as the oil and gas, mining, and geothermal energy provisions of the Energy Policy Act of 2005. Belcher has also worked for the Independent Petroleum Association of America, Hart Energy Publications and Texaco Gas Marketing Inc. He holds a B.A. in Government from the University of Texas at Austin.

Donald (Chip) Stoicovy

*Vice President,
Air Liquide Advanced Technologies U.S., LLC*



Chip Stoicovy has worked in the industry for 34 years, with 25 of those years spent at Air Liquide. During his tenure with Air Liquide, Mr. Stoicovy has held various positions with experience including Business Unit P&L responsibility, Business Development leadership, Corporate Planning and Commercial Management leadership. Mr. Stoicovy's current role involves the development of technology-driven offers aimed at improving the environmental footprint of Oil & Gas operations. The technologies involve either those available from the Air Liquide portfolio and/or those available through collaborative partnerships. Mr. Stoicovy holds a MBA from the University of Houston and a B.A. in Business Management and Finance.





Maurice Gunderson

*Managing Director,
Earth Energy Ventures*

Maurice Gunderson is a venture capitalist, entrepreneur, corporate director, engineer, and a lifelong aviator. He is Managing Director of Earth Energy Ventures, and Senior Advisor to AutoTech Ventures and Runway Capital Partners. Previously, he was a founder of Nth Power, one of the first energy venture capital firms.

Mr. Gunderson has served on boards of many VC-funded energy companies. He was the lead investor in NuScale Power, a developer of modular nuclear power plants. His present boards include Gentherm, Inc. (NASDAQ:THRM) and On-Board Dynamics, Inc. He is a member of the advisory boards of the Oregon Nanoscience and Microtechnologies Institute (ONAMI). He serves on the Contra Costa County Aviation Advisory Committee, and is President of the Mt. Diablo Pilots' Association. Prior to his VC career, Mr. Gunderson spent more than 20 years developing energy products and launched five successful companies.

Mr. Gunderson holds an MBA from Stanford University, a B.A. in Mechanical Engineering, and a M.S. in Thermodynamics, both from Oregon State University. He is a National Association of Corporate Directors Leadership Fellow, a Registered Professional Engineer, and a Fellow of the American Society of Mechanical Engineers.

Kevin Todd, Ph.D.

*Manager of Chemical & Process Engineering,
Americas*



Dr. Kevin Todd is currently Manager of Chemical & Process Engineering for the Americas. He has spent 32 years with BASF in Technology & Operations roles primarily in the Petrochemicals Division, which primarily has propylene & ethylene as feed stocks. Dr. Todd was recently part of the BASF shale gas project which included an Ammonia plant (under construction) and a Natural Gas to Propylene plant which is currently on-hold. Dr. Todd has had assignments at BASF's headquarters in Ludwigshafen Germany and in Kuantan, Malaysia. Dr. Todd earned a B.S. in Chemical Engineering from Missouri University of Science and Technology, and a Ph.D. in Chemical Engineering from the University of Arkansas.





Cindy Yeilding

*Senior Vice President,
BP America*

Cindy Yeilding is currently Senior Vice President at BP America. Her previous roles include Vice President of Exploration Technology and Assurance, Vice President of Gulf of Mexico Exploration & Appraisal, and Global Geoscience Research and Technology Manager. Ms. Yeilding's technical experience includes roles in research, exploration, production, appraisal and well site geoscience. She has held numerous leadership roles in Technology, R&D and Exploration. In these roles, she has developed and led courses, led panels and presented numerous technical, leadership and keynote talks for technical societies, universities and leadership forums.

Ms. Yeilding has served as an American Association of Petroleum Geologists (AAPG) Distinguished Lecturer and was named a "Legend in Exploration" by AAPG. She is a member of the Offshore Technology Conference Board of Directors and serves on BPX&P Board of Directors. She is BP's Executive Sponsor for Princeton University and is a member of the Greater Houston Partnership Board of Directors.

Ms. Yeilding is active in promoting STEM education and serves as the executive sponsor for BP's Women's Network and New Hire Network in Houston. She was a founding member of AAPG's Women's Committee, a member of Million Women's Mentors and initiated OTC Women's Networking Session. Ms. Yeilding was recently named one of Houston's top 15 businesswomen. She earned a B.S. in Geology from Southern Methodist University, and a M.S. in Geology from the University of North Carolina.

Alex Rozenfeld

*Founding Partner and Managing Director,
Climate Impact Partners*



Mr. Rozenfeld founded Climate Impact Partners to help fill the market gap for early stage companies and investors seeking to make an impact on climate change. With 20 years of energy and innovation experience, he has worked extensively internationally as an entrepreneur, angel investor and venture capitalist for Fortune 500 companies. Mr. Rozenfeld has been investing in energy technologies since 2001, including hydrogen, fuel cells and energy storage. Notable roles have included involvement in the earliest H2 vehicle station in California, and most recently the founding member and president of Shell Technology Ventures, LLC. He holds a B.S.E. in Mechanical Engineering magna cum laude, a Woodrow Wilson policy degree from Princeton University, and a MBA from the Sloan School of Management at Massachusetts Institute of Technology.





Scott W. Tinker, Ph.D.

*Director,
Bureau of Economic Geology*

Dr. Scott Tinker's passion—bringing academe, government, industry and NGOs together to address major societal issues in energy, environment and the economy—has led him to more than 50 countries where he has presented more than 600 keynote and invited lectures to government, industry, academia and the public. Scott is director of the 250 person Bureau of Economic Geology, the State Geologist of Texas, and a professor holding the Allday Endowed Chair in the Jackson School of Geosciences at the University of Texas at Austin.

Dr. Tinker has served as president of the American Association of Petroleum Geologists (AAPG), the Association of American State Geologists, the Gulf Coast Association of Geological Societies (GCAGS), and the American Geosciences Institute. He is an AAPG Halbouty Leadership Medalist, GCAGS Boyd Medalist, Fellow of the Geological Society of America, honorary member of the AAPG, and has been broadly awarded by AIPG, AGI, AAPG, TIPRO and others for his successful efforts to engage the public in science.

Dr. Tinker serves on many private, public, academic, and government boards and councils and co-produced and is featured in the award-winning energy documentary film, *Switch*, which has been seen by over 10 million viewers and screened on over 1,000 university and college campuses worldwide. He is a fourth generation University of Michigan graduate, with a Ph.D. from the University of Colorado, a M.S. from the University of Michigan and a B.S. from Trinity University.

Nigel Jenvey

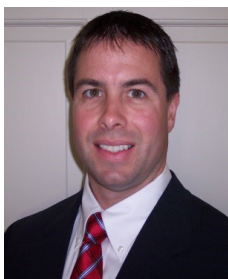
*Manager of Carbon Solutions,
BP Group Technology*



Nigel Jenvey is the Manager of Carbon Solutions within BP Group Technology, and also Program Chair of the Society of Petroleum Engineers CO₂ Capture Utilization and Storage Technical Section and Chairman of the North American CO₂ Capture and Storage Association. Mr. Jenvey was also previous chairman of the CO₂ Capture Project Phase 3, a joint industry project with government collaboration, which BP operates on behalf of a several oil and gas companies as in now in its 4th phase.

Mr. Jenvey has previously worked in other technology and operating areas for Shell, Texaco and Maersk Oil across the world. Nigel received his MSc in Petroleum Engineering from Imperial College London. He lives here in Houston with his wife and two children.





Jared Ciferno

*Technology Manager,
Natural Gas and Oil*

Jared Ciferno is the Technology Manager of National Energy Technology Laboratory's Natural Gas and Oil R&D program. In this capacity, Mr. Ciferno manages an R&D portfolio encompassing advanced technology projects ranging from basic energy science (modeling, materials development, sensors, controls) through large scale field demonstrations and includes natural gas (shale gas), enhanced oil recovery, deepwater oil and gas production, and methane hydrates.

Mr. Ciferno has 15 years of diversified engineering and management experience that spans a broad spectrum of technology areas including: electric power generation, advanced green- house gas control, process control, coal conversion processes (oxycombustion, gasification and chemical looping), thermoelectric water management and simulation/systems analysis.

Previously at NETL, Mr. Ciferno served as Director of the Office of Coal and Power R&D Program, Technology Manager of the Carbon Capture Program and Engineering Systems Analyst. Before joining NETL, he worked as a chemical engineer for Science Applications International Corporation (SAIC) and as a research/process engineer for Calgon Carbon Corporation. Mr. Ciferno holds a B.S. and M.S. degrees in Chemical Engineering from the University of Pittsburgh.

James Unterreiner

*GameChanger,
Shell*



James Unterreiner is a member of the GameChanger team at Shell. This team connects with innovators and creative communities to identify unproven ideas that have the potential to drastically impact the future of energy. Particularly focused on early stage technology and startups the team cooperates with entrepreneurs to prove the viability of their technology quickly and affordably. Prior to joining the GameChanger team, Mr. Unterreiner spent 15 years in Shell Trading as a Project Manager and Solution Architect, primarily focused on emerging technology and innovation.

Mr. Unterreiner lives in Houston, Texas and is married. Outside of work, he and his wife are actively involved with their church, enjoy raising their son and vacationing in the Caribbean. When time allows, Mr. Unterreiner enjoys completing do-it-yourself projects around the house, playing golf, watching and playing ice hockey and reading. Current GameChanger related pursuits include New Energies technologies particularly related to Solar Fuels.



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