



AGORA PROGRAM GUIDE

MARCH 6–10, 2017 | HOUSTON, TEXAS

Level 4 Detail

technology
agora
@CERAWeek

LINK

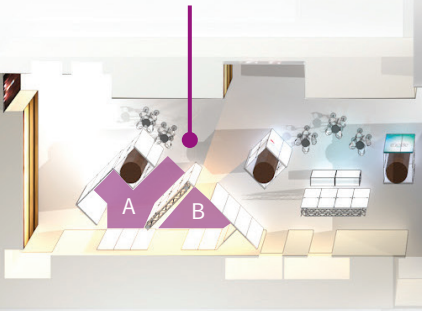
EXPLORATION
POD

SHOWCASES

STUDIO

THOUGHT
POD

DISCOVERY



Elevators

Information
Desk

Escalator up

Escalator down

Café



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WELCOME

to the inaugural Technology Agora @ CERAWEEK.

Inspired by ancient Greece, the Agora@CERAWEEK is an open marketplace for ideas, dialogue, and new experiences. Together we will explore the exciting world of innovation—from digital technology to e-mobility, robotics, and connected homes—and how these will transform the energy future.

The Agora, located on the fourth floor and running throughout the week, features a range of programs and experiences designed to engage and stimulate new thinking and build a special community dedicated to forward-looking dialogue on innovation and technology.

- **Agora Showcase and Discovery** features prototypes, demonstrations, and virtual and augmented reality—from the Factory of the Future to the Connected Home and a visit to Mars
- **Agora Exploration Pod** offers presentations throughout the week by technology thought leaders, Energy Innovation Pioneers, and CERAWEEK participants who responded to our open call for applications
- **Agora Link** is open throughout CERAWEEK for relaxed conversation, collaboration, and locally roasted coffee.

We want to acknowledge and thank our Agora Partners for their vision, commitment, and contributions to this new CERAWEEK initiative.

We hope you will make the Agora part of your CERAWEEK journey—and that you will contribute your own ideas and participate in this community.

Sincerely,



Jamey Rosenfield
Co-Chairman, CERAWEEK
Senior Vice President
IHS Markit



Susan Kish
Agora Curator, CERAWEEK
IHS Markit

WHEN &

WHERE

Monday 3/6 to Friday 3/10

Discovery & Technology Showcase

Industrial IoT with augmented reality. *Emerson*

Agora Discovery A: **Monday to Friday**

Energy in the extreme. Mars. *ABB*

Agora Discovery B: **Monday to Friday**

Virtual reality training techniques. *Honeywell*

Agora Showcase C: **Monday to Friday**

Drones, tethered unmanned aerial vehicles. *CyPhy Works*

Agora Showcase D: **Wednesday Afternoon**

Knowledge platform & analytics. *Maana*

Agora Showcase D: **Wednesday Afternoon**

Smarter pumping for crude oil pipelines: Optimizing the performance through data analytics. *Siemens*

Agora Showcase E: **Monday to Friday**

ContextCapture 3D modeling software from Bentley Systems. *Siemens, a Strategic Partner*

Agora Showcase E: **Monday to Friday**

Hive. *Centrica*

Agora Showcase F: **Wednesday & Thursday**

Panoramic power. *Centrica*

Agora Showcase F: **Wednesday & Thursday**

YuMi is the world's first truly collaborative robot. *ABB*

Agora Showcase G: **Monday to Friday**

Monday 3/6

Studio

3:45–4:45pm

Models of Innovation: Strategies for Growth

Paul Markwell (Chair), VP Energy, IHS Markit; **Lak Ananth**, CEO & Managing Partner, next47, Siemens; **Guido Jouret**, Chief Digital Officer, ABB; **Cory Steffek**, Managing Director, Aramco Energy Ventures

Tuesday 3/7

Studio

7:30-8:40am

Putting Carbon to Work: Leapfrogs for Carbon Capture, Utilization and Storage (CCUS)

Atul Arya (Chair), SVP & Business Leader, Energy, IHS Markit; **Dan Domeracki**, VP, Government and Industry Relations, Schlumberger; **Karthish Manthiram**, Assistant Professor, Dept. of Chemical Engineering, MIT; **Charles McConnell**, Executive Director, Energy & Environment Initiative, Rice University; **David Victor**, Professor, Co-Director, Laboratory on International Law and Regulation, University of California, San Diego.

11am-12:10pm

Ride Hailing and Driverless Technology: Oil's Friend or Foe?

Tom de Vleeschauwer (Chair), Senior Director Automotive Transport & Mobility Practice Leader, IHS Markit; **Jeremy Carlson**, Senior Analyst, Automotive Technology Group, IHS Markit; **Mateo Jaramillo**, Former VP, Tesla Energy; **Bill Morelli**, Senior Research Director, IT & Networking, IHS Technology, IHS Markit.

4:15-5:15pm

Agile, Autonomous and Additive: Reshaping the global energy supply chain

John Larson (Chair), VP Big Data & Analytics, Technology, IHS Markit; **James Bellingham**, Director, Center for Marine Robotics, Woodhole Oceanographic Institution; **Paul Bonner**, VP of Consulting & Analytics, Connected Plant, Honeywell; **Ric Fulop**, CEO & Co-Founder, Desktop Metal; **Jon Hirschtick**, CEO & Co-Founder, Onshape.

5:30pm-6:30pm

Today's Reality? The Digital Oilfield

Judson Jacobs (Chair), Sr Director Upstream Technology & Innovation, Energy, IHS Markit; **Vivek Chidambaram**, Managing Director, Global Digital Lead, Accenture; **Lisa Davis**, Member of Management Board & CEO, Siemens Energy; **Ahmed Hashmi**, Global Head of Upstream Tech, BP; **Qasem Al Kayoumi**, Manager, ADNOC Technical Center.

Exploration Pod

10am	Robots, data & autonomy: The subsea revolution James Bellingham, Ph. D., Director, Center for Marine Robotics, Woods Hole Oceanographic Institution
10:30am	High-efficiency ceramic power generator Gary Simon, President & CEO, Atrex Energy
11am	Journey to outer space: High energy management stakes in the harshest environment Michael Foreman, Former Astronaut, NASA
11:30am	Azima DLI Burt Hurlock, CEO, Azima DLI
12pm	Emergency response workshop Edward Mills, VP Global HSE, Honeywell
1pm	Digital roadmap: Disrupt or be disrupted Adeeb Gharzouzi, Senior Manager, Digital Practice, Accenture Strategy
1:30-2:30pm	Uberization of onshore: What if the well was the customer? Tom Bonny, Managing Director, Accenture Strategy
2:30pm	Nanotechnology-Enabled Water Treatment (NEWT): A vision to address grand challenges at the water-energy nexus Dr. Pedro Alvarez, George R. Brown Professor of Engineering, Rice University
3pm	A data-driven approach to equipment maintenance of offshore platforms Stig Olav Settemsdal, Global Head, Portfolio Management & Innovation, Offshore Solutions, Siemens
3:30pm	Who's afraid of the big bad cloud? Guido Jouret, Chief Digital Officer, ABB
4pm	Additive manufacturing Adam Boyle, Director, Global Additive Manufacturing Operations, Emerson
4:30pm	The new leading cost and risk in Permian completions: Water Josh Adler, Founder & CEO, Sourcewater
5pm	Disrupting oil & gas exploration and production with advanced micro sensors Dr. Aydin Babakhani, Assistant Professor, Rice University
5:30pm	Journey to outer space : High energy management stakes in the harshest environment Michael Foreman, Former Astronaut, NASA
6pm	Agile design powered by Cloud CAD Jon Hirschtick, Co-Founder & CEO, Onshape

Wednesday 3/8

Studio

7:30-8:40am	Innovation Pioneers (upstream) Leveraging Start-ups to meet the Challenges of the New Energy Landscape
Carolyn Seto (Chair), Director, Upstream Technology & Innovation Energy, IHS Markit; Helen Greiner , Founder & CTO, CyPhy Works; Idar Horstad , CEO, Magseis; Murat Ocalan , Founder & CEO, Rheidiant; Babuz Ozden , Founder & CEO, Maana.	
11:30am-12:40pm	Man + Machine: The Changing Workforce
Susan Kish (Chair), Agora Curator, CERAWEEK, IHS Markit; David Farr , CEO, Emerson; Dr. Antonio Merlo , Professor, Dean of the School of Social Sciences, Rice University; Jay Timmons , CEO, NAM.	
5:20-6:30pm	AI, Machine Learning and Energy: An Explosive Combination
John Larson (Chair), VP Big Data & Analytics, Technology, IHS Markit; Dr. Alec Gruss , Principal Data Scientist, Digital Factors, Siemens; Yaacov Mutnikas , EVP Financial Markets Technology, IHS Markit.	

Exploration Pod

9am	A data-driven approach to equipment maintenance of offshore platforms Stig Olav Settemsdal , Global Head, Portfolio Management & Innovation, Offshore Solutions, Siemens
11am	Maana Babuz Ozden , Founder & CEO, Maana
11:30am	CyPhy Works Helen Greiner , Founder & CTO, CyPhy Works
12pm	Rheidiant Murat Ocalan , Founder & CEO, Rheidiant
12:30pm	Magseis Idar Horstad , CEO, Magseis
2pm	Blockchain Technology: the coming digital revolution Jeffrey Billingham , VP, Business Development, IHS Markit
3pm	Additive manufacturing Adam Boyle , Director, Global Additive Manufacturing Operations, Emerson
3:30pm	Nanotechnology 3.0 transformative applications for the oil & gas industry Dr. Matteo Pasquali , Professor of Chemical Engineering, Rice University
4pm	Alion Energy Mark Kingsley , President & CEO, Alion Energy
4:30pm	NET Power update Bill Brown , CEO & Co-Founder, NET Power
5pm	Innovation by design: Engineering heat transfer for refinery energy efficiency Francesco Coletti , Director & CTO, Hexxcell

Thursday 3/9

Studio

7:30-8:40am

Next Door: The Connected Home of the Future

Roger Kranenburg (Chair), Senior Director, Global Power & Innovation, IHS Markit; **Mateo Jaramillo**, Former VP, Tesla Energy; **Eric Krauss**, Global Product Director, Connected Home, Accenture Digital; **Roy Vella**, VP/GM, Connected Home NA, Centrica.

HOSTED
by: 

11:25am-12:35pm

Next City: Power and Mobility in the Metropolis

Roger Kranenburg (Chair), Senior Director, Global Power & Innovation, IHS Markit; **Bryan Cox**, Director of Transmission & Distribution Operations, Avista; **Andrew Icken**, Chief Development Officer, City of Houston; **Anders Sjoelin**, NA Lead, Power Grids Division, ABB; **Stephen Zoepf**, Executive Director, Center for Automotive Research, Stanford.

5:00-6:15pm

Next Grid: Will the Real Digital Power Grid Please Stand Up?

Roger Kranenburg (Chair), Senior Director, Global Power & Innovation, IHS Markit; **Claudio Facchin**, President, Power Grids, ABB; **Jim Hughes**, Chairman, Eos Energy Storage; **Rob Powelson**, President, NARUC; **Daniel J. Oginsky**, EVP & Chief Administrative Officer, ITC Holdings.

Exploration Pod

10:30am

An integrated platform for digitalization of the power industry | Kim Dae Young, General Manager, KEPCO

11am

Opus One Solutions | Joshua Wong, Founder & CEO, Opus One Solutions

11:30pm

Hyllion | Thomas Healy, Founder & CEO, Hyllion

12pm

Aircuity Update | Daniel E. Diehl, CEO, Aircuity

12:30pm

Voice control in the home: The post-app era of managing the connected home | Roy Vella, VP/GM, Connected Home NA, Centrica

2pm

Fluidic Energy | Steve Scharnhorst, CEO, Fluidic Energy

2:30pm

Performance monitoring of high voltage power lines using fiber optics | Geoffroy Lacoïn, CEO, Omnisens

3pm

Project OptiWatt | Eugene Toh, Director, Policy & Planning, Energy Market Authority, Singapore

4:30pm

Hive, workshop: How to drive innovation from within a big business | Sudeep Maitra, Global Director, Strategy, Centrica

5pm

The role of gas in a distributed energy future | Matt Wheatley, VP Sales & Commercial, NA Distributed Energy, Centrica

5:30pm

A machine learning-enabled, design-for-economics framework for 3D printing drill bits | Dr. C. Fred Higgs III, John and Ann Doerr Professor of Mechanical Engineering, Rice University

WHAAT

▶ DISCOVERY &

SHOWCASES

AGORA DISCOVERY & TECHNOLOGY SESSIONS

Industrial IoT with Augmented Reality. *Emerson*

Agora Discovery A: Monday - Friday

Emerson provides a view of the future of operations powered by Industrial IoT with an oil & gas production supply chain, demonstrating how technology impacts wellhead, pipeline, and processing / terminal operations. The experience provides a variety of perspectives using augmented reality.

Energy in the Extreme, Mars. *ABB*

Agora Discovery B: Monday - Friday

With the Space X reusable rocket, Chinese and American plans for new unmanned Mars missions in 2020 and a European project for a “moon village,” space exploration is back in the news. Come with ABB on a virtual reality mission to Mars, imagining the ways that energy efficient, digitally connected technology would be used in a Mars colony—technology that is currently helping to make life on Earth more productive and sustainable.

Virtual reality training techniques. *Honeywell*

Agora Showcase C: Monday - Friday

Honeywell’s technology demonstrates a future in which virtual reality training can be implemented for competency management, emergency responses, and cloud-based SCADA. It showcases how cloud-based solutions, such as advanced diagnostics of pumps and other rotating equipment, enables asset managers and experts anywhere in the world to come together to solve complex process issues.

Drones, Tethered Unmanned Aerial Vehicles. *CyPhy Works*

Agora Showcase D: Wednesday Afternoon

Tethered drones can be used for incident response, security, communications, and inspection. The technology allows for unlimited flight duration and high speed data transmission. Energy Innovation Pioneers, Class of 2017.

Knowledge Platform & Analytics. *Maana*

Agora Showcase D: Wednesday Afternoon

Maana’s knowledge platform accelerates digital transformation by turning human expertise and data from across silos into digital knowledge, improving decision making with speed and quality. Energy Innovation Pioneers, Class of 2017.

Smarter Pumping for Crude Oil Pipelines: Optimizing the performance through data analytics. *Siemens*

Agora Showcase E: Monday - Friday

Pumping systems account for almost 20% of global energy consumption from electric motors and roughly 25 to 50% of electric energy usage in certain industrial facilities. Pump stations move crude oil through vast pipeline networks to key markets. Siemens is developing “Smart Pump,” a data-driven solution to enhance pump-station energy efficiency. The showcase will feature a “Smart Pump” demonstration and a virtual pump station tour. Representatives of Siemens and an award-winning team of Penn State University engineering students who contributed research for the project will be onsite.

ContextCapture 3D Modeling Software from Bentley Systems. *A Siemens strategic partner*

Agora Showcase E: Monday - Friday

Visit the ContextCapture Technology Showcase for an interactive live demonstration of advanced modeling software from Bentley Systems, a Siemens strategic partner. The software, in conjunction with a drone, produces highly detailed 3D reality models for design, construction, and operational applications.

Hive. *Centrica*

Agora Showcase F: Wednesday & Thursday

Centrica Connected Home, through its Hive brand, is helping to make the smart home a reality for everyone. Smart technology and services combine to give peace of mind, comfort, and control.

Panoramic Power. *Centrica*

Agora Showcase F: Wednesday & Thursday

The Panoramic Power energy management solution offers commercial and industrial business customers a unique wireless and self-powered circuit-level technology with cloud-based analytics. The solution is designed to give customers unmatched real-time visibility into their business operations through meaningful and actionable energy insights, enabling them to lower their energy consumption, reduce operating costs, and increase overall operational efficiency.

YuMi is the world’s first truly collaborative robot. *ABB*

Agora Showcase G: Monday - Friday

Designed to work safely and even share tasks with people, the precise YuMi robot is unlocking entirely new assembly applications. Today, many industries are producing smaller lots of greater variety in less time. Collaborative automation solutions, such as YuMi, combine the best of people and robots to give manufacturers the flexibility needed to keep pace with today’s fast-moving markets.

STUDIO

SESSIONS

AGORA STUDIO SESSIONS

Monday, March 6

3:35–4:45pm **Models of Innovation: Strategies for Growth** | As demands for energy technology evolve, how are companies taking an open, portfolio approach to innovation?

Tuesday, March 7

7:30-8:40am **Putting Carbon to Work: Leapfrogs for Carbon Capture, Utilization and Storage (CCUS)** | CCUS may be the bridge to a low carbon energy future, but only a handful of pilot projects are in operation. What's next?

11-12:10pm **Ride Hailing and Driverless Technology: Oil's Friend or Foe?** | Ride hailing services are providing millions of new rides per day. How will this new "mobility as a service" market, plus driverless technology, change the automotive ecosystem for oil and power demand?

4-5:15pm **Agile, Autonomous and Additive: Reshaping the global energy supply chain** | How will new technologies— autonomous intelligence, additive manufacturing and agile design—alter traditional supply chain concepts and realities?

5:30-6:30pm **Today's Reality? The Digital Oilfield** | The digital oil field has not quite lived up to the decade-old promise of the upstream industry. Can the concept evolve to deliver on its potential?

Wednesday, March 8

7:30-8:40am **Energy Innovation Pioneers (upstream) Leveraging Start-ups to meet the Challenges of the New Energy Landscape** | Members of the 2017 Energy Innovation Pioneers will share their experiences and introduce exciting, new, rapidly scalable solutions that could transform the energy industry.

11:30-12:40pm **Man + Machine: The Changing Workforce** | The changing role of robotics and accelerating adoption of emerging technologies such as AI and the cloud are transforming work, training, and education. How will the energy industry respond?

5:20-6:30pm **AI, Machine Learning, and Energy: An Explosive Combination** | AI and machine learning help us unravel massive, complex data to gain insight. This session demystifies AI & ML and explores how they will affect the energy world.

Thursday, March 9

7:30-8:40am **Next Door: The Connected Home of the Future** | Connected devices, combined with AI, enable new ways for home consumers and providers to interact and monitor appliances and energy. How will this change affect the interplay of retail energy, telecom, and consumer technology?

HOSTED
by: **centrica**

11:25-12:35pm **Next City: Power and Mobility in the Metropolis** | Electric vehicles are transforming traditional ideas about managing power demand. How are urban utilities rethinking power delivery and evaluating the impact of electric vehicles as a new mobile way to both draw and inject power into the grid?

5:00-6:15pm **Next Grid: Will the Real Digital Power Grid Please Stand Up?** | Cost reductions in sensors, improved reliability in high-performance networks, and advanced computer power allows broad deployment of these technologies in power grids. What is the potential to create new value for consumers, electricity providers, service companies, and OEMs?

▶ EXPLOSION

POD

AGORA EXPLORATION PODS

A machine learning-enabled, design-for-economics framework for 3D printing drill bits (Thurs., 5:30pm)

Dr. C. Fred Higgs, *John and Ann Doerr Professor of Mechanical Engineering, Rice University*

Currently, the oil and gas industry has a two-edge problem. Horizontal drilling and hydraulic fracturing enabled abundant resources, then global oversupply, then lower prices, which made extraction economically unviable. This work involves advanced drilling modeling simulation to predict the lifetime of a particular drill bit design, using 3D printing to test the design in a state-of-the-art drilling simulator test rig.

Additive manufacturing: Unlocking your highly engineered solution (Tues., 4pm; Weds., 3pm)

Adam Boyle, *Director, Global Additive Manufacturing Operations, Emerson*

Prior to the industrial revolution, products were designed and custom-built for each application by skilled craftsmen. Mass production and automation advances increased efficiency and volume, at the expense of tailored solutions. Additive manufacturing is set to unlock innovation and make application-specific solutions commercially viable through efficient, high-quality production.

Agile design powered by Cloud CAD (Tues., 6pm)

Jon Hirschtick, *Co-Founder & CEO, Onshape*

Agile design is a new process for fast, innovative design, including energy exploration and production equipment and energy-consuming products. We will discuss how agile emphasizes fast iteration and collaboration over structured processes. Traditional Computer Aided Design (CAD) tools are not suited for agile design, but a new generation of full-Cloud and mobile CAD tools, which we will demonstrate live, are perfect for agile.

Aircuity (Thurs., 12pm)

Daniel E. Diehl, *CEO, Aircuity*

Energy Innovation Pioneer Alumni update

Aircuity provides energy efficiency and improved indoor air quality for the commercial sector by optimizing building ventilation. The measurement system accurately measures critical ventilation parameters to provide intelligent inputs to the building's ventilation system to increase energy savings.

Alion Energy (Weds., 4pm)

Mark Kingsley, *President & CEO, Alion Energy*

Energy Innovation Pioneer

Alion Energy designs fix-tilt and single-axis mounting structures to survive harsh environmental conditions—high pollution, high dust levels, poor soil—often found in developing countries, where the solar industry expects future growth. The concrete-based mounting systems are fully ballasted to handle high winds and are corrosion resistant.

An integrated platform for digitalization of the power industry (Thurs., 10:30am)

Kim Dae Young, *General Manager, KEPCO*

Digital technologies, such as predictive analytics and sensor technology for real-time monitoring of the power grid, are transforming all aspects of the electricity value chain—power generation, transmission, transformation, and distribution. To fully reap the benefits of digitalization, an integrated approach is necessary. This discussion explores South Korea's approach to this challenge.

Azima DLI (Tues., 11:30am)

Burt Hurlock, *CEO, Azima DLI*

Energy Innovation Pioneer Alumni update

Azima DLI provides scalable, hosted, condition-based monitoring service to deliver peak reliability, availability, and uptime. Their solutions use flexible deployment models, proven diagnostic software, and analytics to deliver sustainable and cost-effective condition-based monitoring programs that reduce risk, improve safety, increase production, and optimize efficiency.

Blockchain technology: The coming digital revolution (Weds., 2pm)

Jeffrey Billingham, VP, Business Development, IHS Markit

Blockchain's promise is the ability to create unique, irrefutable, and tamper-proof digital records. Today's digital infrastructure relies on a few critical trusted entities to ensure data is real, accurate, and up to date. This hub-and-spoke structure incurs enormous maintenance costs, inhibits network upgrades, and requires reconciliations and redundant reporting. Blockchain favors peer-to-peer networking to synchronously operate protocols, which eliminates reliance on these centralized entities. What is the potential for blockchains across the energy industry?

CyPhy Works (Weds., 11:30am)

Helen Greiner, Founder & CTO, CyPhy Works

Energy Innovation Pioneer

CyPhy Works is developing tethered drones for extended operations and high mobility across a range of industries, including defense, agriculture, law enforcement, and mining. While unintuitive, tethered drones offer key advantages over other more-generalized fliers. These include ground-powered, ultra-long mission endurance; the ability to loft and transmit secure data from varied sensor payloads; and autonomously governed level flight.

Digital roadmap: Disrupt or be disrupted (Tues., 1pm)

Adeeb Gharzoui, Senior Manager, Digital Practice, Accenture Strategy

The energy industry is facing disruptive changes driven by digital shifts in supply and demand. Many other industries have faced similar challenges in the past. What can be learned from organizations that successfully managed this digital transition? How should oil and gas companies respond?

Disrupting oil & gas exploration and production with advanced micro-sensors

(Tues., 5pm)

Dr. Aydin Babakhani, Assistant Professor, Rice University

Advanced down-hole micro-sensors could revolutionize E&P in upstream energy by providing information from the subsurface that was previously unattainable. New capabilities to monitor fractures, cement properties, and chemical composition in the reservoir will transform how producers increase efficiency and reduce safety and environmental risk. Results from a recent on-line asphaltene monitoring field trial will be presented.

The role of gas in a distributed energy future (Thurs., 5pm)

Matt Wheatley, VP, Sales & Commercial, NA Distributed Energy, Centrica

What constitutes distributed generation in the new energy landscape? This session will explore the roles various generation technologies, such as renewables and combined heat and power, play in powering the future.

Emergency response workshop (Tues., 12pm)

Edward Mills, VP Global HSE, Honeywell

This workshop will explore best practices in emergency response in a world with assets increasingly spread over the globe while operational teams become leaner. What emerging technologies make operational teams more effective? What are the tools and approaches to ensure focused resolution of incidents and broad engagement of stakeholders?

Fluidic Energy (Thurs., 2pm)

Steve Scharnhorst, CEO, Fluidic Energy

Energy Innovation Pioneer

Fluidic Energy develops low-cost, long-duration, rechargeable zinc-air battery solutions to enable grid-scale energy storage and accelerate the widespread adoption of reliable renewable-powered energy. Fluidic Energy provides an integrated energy storage solution with worldwide remote monitoring and data reporting capabilities.

Project OptiWatt (Thurs., 3pm)

Eugene Toh, *Director of Policy and Planning, Energy Market Authority, Singapore*
Demand-side management has the potential to yield systemwide savings by helping consumers reduce their electricity bills and smooth out peaks in energy demand. Project OptiWatt, launched by the Energy Market Authority of Singapore, is a unique partnership between academia, government agencies, businesses, and electricity suppliers.

High-efficiency ceramic power generator (Tues., 10:30am)

Gary Simon, *President & CEO, Atrex Energy*

Energy Innovation Pioneer Alumni update

Atrex Energy manufactures an oxygen-based ceramic fuel cell that is used for small power generators up to 2,000 watts for off-grid and weak-grid applications for 24/7 prime power. The generators run on multiple conventional fuels and provide power at half the cost of other options.

Hive, workshop: How to drive innovation from within a big business (Thurs., 4:30pm)

Sudeep Maitra, *Global Director, Strategy, Centrica*

With their agility and nimbleness, startups are viewed as engines of innovation. However, with internal processes and cultural barriers, large companies and innovation are not typically synonymous. How can incumbents tap into this same energy to drive innovation in their organizations and remain competitive? This workshop will tell the story of incubating and growing the Hive.

Hyllion (Thurs., 11:30am)

Thomas Healy, *Founder & CEO, Hyllion*

Energy Innovation Pioneer

Hyllion develops add-on hybrid-electric trailer solutions to minimize fuel costs for long-haul, delivery fleets. Hyllion's Intelligent Electric Drive Axle system brings efficiencies to the trucking industry by replacing the trailer's passive axle. This system captures wasted energy and stores it in the battery pack, helping to propel the trailer down the road. With installation taking an hour, and all the technology residing on the trailer, any semi-truck can become an instant hybrid.

Innovation by design: Engineering heat transfer for refinery energy efficiency (Weds., 5pm)

Francesco Coletti, *CTO & Director, Hexxcell*

Hexxcell Ltd. is the outcome of an innovation program on energy efficiency for downstream oil and gas at Imperial College, London. The rapid development of innovative software (monitoring, diagnostics, predictive maintenance, operations optimization) to mitigate fouling in oil refineries and deliver energy efficiency improvements will be highlighted.

Journey to outer space: High energy management stakes in the harshest environment (Tues., 11am, 5:30pm)

Michael Foreman, *Former Astronaut, NASA*

In space, energy efficiency isn't a nice to have, but integral to survival in this no-fail zone. Former astronaut and veteran of 2 space shuttle missions to the International Space Station, Michael Foreman will share his out-of-this-world experiences, and reflect on the energy challenges we face on Earth and other planets.

Maana (Weds., 11am)

Babuz Ozden, *Founder & CEO, Maana*

Energy Innovation Pioneer

Maana's platform enables experts to make better decisions faster, while managing critical assets. Maana expedites knowledge extraction from data silos and information sources to reveal complex relationships in the context of optimizing assets and processes.

Magseis (Weds., 12:30pm)

Idar Horstad, CEO, Magseis

Energy Innovation Pioneer

Magseis enables low-cost, efficient ocean bottom seismic (OBS) operations. Their proprietary Marine Autonomous Seismic System is an OBS technology based on miniaturized autonomous node and onboard robots that provide automated handling and data download. Surveys have been conducted in harsh environments, areas with complex existing infrastructure, and challenging water depths.

Nanotechnology-Enabled Water Treatment (NEWT): A vision to address grand challenges at the water-energy nexus (Tues., 2:30pm)

Dr. Pedro Alvarez; *George R. Brown Professor of Engineering, Rice University*

Rice's NEWT Center develops next-generation modular treatment systems that turn wastewater from oil-production into a valuable commodity. Examples include nanophotonics for solar-driven membrane distillation of hypersaline waters, embedded nanoparticles for self-cleaning membranes, and photocatalysts and modified surfaces for prevention of biofouling.

Nanotechnology 3.0: Transformative applications for the oil and gas industry (Weds., 3:30pm)

Dr. Matteo Pasquali, *Professor of Chemical Engineering, Rice University*

Carbon nanotube fibers are strong, light, electrically and thermally conductive, flexible, and corrosion resistant. Applications include traditional (power systems, wearables, data connectivity, and transmission) and nontraditional (carbon sequestration). Nanotechnology 3.0 is about scalability and commercialization.

NETPower (Weds., 4:30pm)

Bill Brown, CEO & Co-Founder, NET Power

Energy Innovation Pioneer Alumni update

NET power is an emissions-free, natural gas power system. Using the Allam Cycle—an oxy-fuel supercritical CO2 power cycle—to produce electricity for the same cost as conventional power plants, the system's only byproducts are liquid water and pipeline-ready CO2. NET Power is constructing a 50 MW demonstration plant in Texas.

Opus One Solutions (Thurs., 11am)

Joshua Wong, *Founder & CEO, Opus One Solutions*

Energy Innovation Pioneer

Opus One Solutions is a software engineering and solutions company with the vision of a connected distributed energy network. GridOS®, its intelligent energy networking platform, optimizes complex power flows to deliver real-time energy management to utilities and managers of distributed energy assets. GridOS® also facilitates the management of microgrids—from homes to business to communities—for resiliency and value to the electricity customer.

Performance monitoring of high-voltage power line using fiber optics (Thurs., 2:30pm)

Geoffroy Lacoïn, CEO, Omnisens

Power supply and demand volatility are increasing. Using temperature monitoring and real-time rating systems, Omnisens enables grid operators to increase the capacity of existing underground high-voltage cable. This fiber optic-based technology provides information used to forecast capacity and to "overload" cables for short durations, resulting in smarter network use and consistent supply without additional infrastructure.

Rheidiant (Weds., 12pm)

Murat Ocalan, *Founder & CEO, Rheidiant*

Energy Innovation Pioneer

Rheidiant provides integrity management of aging oil and gas pipeline infrastructure. Its long-range connectivity platform provides end-to-end capability for remote monitoring and control. Coupled with an Integrity Management System, companies can detect and locate nascent leaks before they turn into large environmental spills.

Robots, data, and autonomy: The subsea revolution (Tues., 10am)

James Bellingham, Ph. D., Director, Center for Marine Robotics, Woods Hole Oceanographic Institution

Dramatic advances in autonomy, sensing, big data, through-water communications, and energy scavenging are enabling a new generation of marine robots. Robotic systems today are increasingly independent of ships, and deployed for weeks at a time. As they grow more capable, these untethered vehicles, operating with only sporadic human supervision, will function as integral elements of the offshore infrastructure.

Siemens: A data-driven approach to equipment maintenance of offshore platforms (Tues., 3pm; Weds., 9am)

Stig Olav Settemsdal, Global Head, Portfolio Management and Innovation, Offshore solutions, Siemens

Condition monitoring (CM) is a data-driven approach to optimizing equipment maintenance and increases equipment utilization rates. By determining the actual state of the equipment, companies can move from a calendar-based maintenance schedule and intervene when maintenance is needed. CM also allows crews to perform preventative maintenance, avoiding the higher costs of unplanned downtime or slowdowns.

The new leading cost and risk in Permian completions: Water (Tues., 4:30pm)

Josh Adler, Founder & CEO, Sourcewater Energy Innovation Pioneer Alumni update

Water used in a typical Permian completion has increased 5x in five years, up to one million barrels per frac. As a result, water has become the primary input and output—and major cost—of upstream energy. With rig counts rebounding, there is not enough freshwater or disposal capacity to meet industry needs. Mission-critical supply chain disruptions and price spikes appear inevitable. This online platform illuminates water services price and capacity, cuts costs, and ensures supply.

Uberization of onshore: What if the well was the customer? (Tues., 1:30-2:30pm)

Tom Bonny, Managing Director, Accenture Strategy

Uber transformed the taxi industry by using digital technologies to transform the customer experience. What if operators took a similar approach to intentionally disrupt how they manage onshore oil and gas operations? While a bold idea, the foundation is already in place.

Voice control in the home—The post-app era of managing the connected home (Thurs., 12:30pm)

Roy Vella, VP/GM, Connected Home North America, Centrica

Voice control is breaking into the smart home in a big way. Using voice as a device and an application interface gives people even greater choice in how to interact with their devices. This session addresses what role voice control will play as the ecosystem of devices, as well as competitors, grow and use cases expand.

Who's afraid of the big, bad cloud? (Tues., 3:30pm)

Guido Jouret, Chief Digital Officer, ABB

Are security concerns stopping the energy industry from adding significant value and business opportunities? What are the risks? How big are the benefits? Join a discussion to examine how these tradeoffs impact the energy industry.

GROUND BREAKERS

Groundbreaker	Program
Josh Adler, Founder & CEO, Sourcewater	Exploration Pod
Qasem Al Kayoumi, Manager, ADNOC Technical Centre	Studio
Dr. Pedro Alvarez, George R. Brown Professor of Engineering, Rice University	Exploration Pod
Lak Ananth, CEO & Managing Partner, next47, Siemens	Studio
Atul Arya, SVP & Business Leader, Energy, IHS Markit	Studio
Dr. Aydin Babakhani, Assistant Professor, Rice University	Exploration Pod
James Bellingham Ph.D., Director, Center for Marine Robotics, Woods Hole Oceanographic Institution	Studio / Exploration Pod
Jeffrey Billingham, VP, Business Development, IHS Markit	Exploration Pod
Paul Bonner, VP of Consulting & Analytics, Connected Home, Honeywell	Studio
Tom Bonny, Managing Director, Accenture Strategy	Exploration Pod
Adam Boyle, Director, Global Additive Manufacturing Operations, Emerson	Exploration Pod
Bill Brown, CEO & Co-Founder, NET Power	Exploration Pod
Jeremy Carlson, Senior Analyst Automotive Technology Group, IHS Markit	Studio
Vivek Chidambaram, Managing Director, Global Digital Lead, Accenture Strategy	Studio
Francesco Coletti, Director & CTO, Hexxcell	Exploration Pod
Bryan Cox, Director of Transmission & Distribution Operations, Avista	Studio
Lisa Davis, Member of Management Board & CEO, Siemens Energy	Studio
Tom de Vleeschauwer, Senior Director Automotive Transport & Mobility Practice Leader, IHS Markit	Studio
Daniel E. Diehl, CEO, Aircuity	Exploration Pod
Dan Domeracki, VP, Government and Industry Relations, Schlumberger	Studio
Claudio Facchin, President, Power Grids, ABB	Studio
David Farr, CEO, Emerson	Studio
Ric Fulop, CEO & Co-Founder, Desktop Metal	Studio
Michael Foreman, Former Astronaut, NASA	Exploration Pod
Adeeb Gharzouzi, Senior Manager, Digital Practice, Accenture Strategy	Exploration Pod
Helen Greiner, Founder & CTO, CyPhy Works	Studio / Exploration Pod
Dr. Alec Gruss, Principal Data Scientist, Digital Factory, Siemens	Studio
Ahmed Hashmi, Global Head of Upstream Technology, BP	Studio
Thomas Healy, Founder & CEO, Hyllion	Exploration Pod
Dr. C. Fred Higgs III, John and Ann Doerr Professor of Mechanical Engineering, Rice University	Exploration Pod
Jon Hirschtick, Co-Founder & CEO, OnShape	Studio / Exploration Pod
Idar Horstad, CEO, Magseis	Studio / Exploration Pod
Jim Hughes, Chairman, Eos Energy Storage	Studio
Burt Hurlock, CEO, Azima DLI	Exploration Pod
Andrew Icken, Chief Development Officer, City of Houston	Studio
Judson Jacobs, Senior Director, Upstream Technology & Innovation IHS Energy, IHS Markit	Studio

Groundbreaker (continued)	Program
Mateo Jaramillo, Former VP, Tesla Energy	Studio
Phil Jarrell, Director Product Development, Honeywell Chemicals	Exploration Pod
Guido Jouret, Chief Digital Officer, ABB	Studio / Exploration Pod
Mark Kingsley, President & CEO, Alion Energy	Exploration Pod
Susan Kish, Agora Curator, CERAWEEK, IHS Markit	Studio
Roger Kranenburg, Senior Director, Global Power & Innovation, IHS Markit	Studio
Eric Krauss, Global Product Director, Connected Home, Accenture Digital	Studio
Geoffroy Lacoïn, CEO, Omnisens	
John Larson, VP Big Data & Analytics, IHS Markit	Studio
Sudeep Maitra, Global Director, Strategy, Centrica	Exploration Pod
Karthish Manthiram, Assistant Professor, Department of Chemical Engineering, MIT	Studio
Paul Markwell, VP Energy, IHS Markit	Studio
Charles McConnell, Executive Director, Energy and Environment Initiative, Rice University	Studio
Antonio Merlo, Professor, Dean of the School of Social Sciences, Rice University	Studio
Edward Mills, VP Global HSE, Honeywell	
Bill Morelli, Senior Research Director IT & Networking, IHS Markit	Studio
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Dr. Matteo Pasquali, Professor of Chemical Engineering, Rice University	Exploration Pod
Rob Powelson, President, NARUC	Studio
Steve Scharnhorst, CEO, Fluidic Energy	Exploration Pod
Carolyn Seto, Director Upstream Technology and Innovation, Energy, IHS Markit	Studio
Stig Olav Settemsdal, Global Head, Portfolio Management & Innovation, Offshore Solutions, Siemens	Exploration Pod
Gary Simon, President & CEO, Atrex Energy	Exploration Pod
Anders Sjoelin, NA Lead, Power Grids Division, ABB	Studio
Cory Steffek, Managing Director, Aramco Energy Ventures	Studio
Jay Timmons, CEO, NAM	Studio
Eugene Toh, Director of Policy and Planning, Energy Market Authority, Singapore	Exploration Pod
Roy Vella, VP/GM, Connected Home NA, Centrica	
David Victor, Professor, Co-director, Laboratory on International Law and Regulation, University of California, San Diego	Studio
Matt Wheatley, VP Sales & Commercial, NA Distributed Energy, Centrica	
Joshua Wong, Founder & CEO, Opus One Solutions	Exploration Pod
Kim Dae Young, General Manager, KEPCO	Exploration Pod
Stephen Zoepf, Executive Director, Center for Automotive Research, Stanford	Studio



PARTNERS



Agora Partner

Leading the digital revolution in energy and industry, ABB is a pioneering technology leader in electrification products, robotics and motion, industrial automation and power grids. ABB serves customers in utilities, industry, and transport and infrastructure globally. Continuing a more than 125-year history of innovation, ABB today is writing the future of industrial digitalization and driving the Energy and Fourth Industrial Revolutions. ABB operates in more than 100 countries with about 132,000 employees. At a time when oil and gas producers are facing fluctuating prices and intense competition, digital technologies offer new opportunities to improve economies of scale and optimize production. From well head to refinery, ABB specializes in mastering the control loop and transforming client operations through actionable insights that optimize performance in real time. From a single production site to the entire enterprise, ABB technologies connect people with information to optimize performance, improve reliability, enhance efficiency and minimize environmental impact. As the market and technology leader in power transmission and distribution, ABB is the partner of choice for a stronger, smarter and greener grid. With unmatched application know-how and the broadest offering of products, systems, services and software, ABB is ideally positioned to help utility customers manage increasing grid complexity, integrate renewables and expand the grid to accommodate growing demand from rail, data centers, electric vehicles and industry. Through its ABB Ability™ digital offering, ABB offers an unrivalled portfolio of digital solutions and services to help its customers take advantage of the efficiency and performance improvements that digitalization delivers. Let's write the future.



Agora Partner

Accenture Strategy operates at the intersection of business and technology. We bring together our capabilities in business, technology, operations and function strategy to help our clients envision and execute industry-specific strategies that support enterprise-wide transformation. Our focus on issues related to digital disruption, competitiveness, global operating models, talent and leadership helps drive both efficiencies and growth. For more information, follow @AccentureStrat.

centrica

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Centrica is an international energy and services company. Everything we do is focused on satisfying the changing needs of our customers. We supply energy and energy-related services to around 28 million customer accounts mainly in the United Kingdom, Ireland and North America, through strong brands such as British Gas, Direct Energy and Bord Gáis Energy supported by around 12,000 engineers and technicians. We are developing new and innovative products and services for customers globally. Our Connected Home business has developed products such as the Hive Active Heating smart thermostat and Boiler IQ. Through our Distributed Energy & Power business, we are developing integrated energy solutions for commercial and industrial customers, including flexible generation, energy management systems and battery storage. Our Energy Marketing & Trading business operates in LNG trading optimization and risk management for customers. Exploration & Production continues to play an important role in our portfolio, delivering energy supplies and contributing to our financial strength, allowing us to manage risk as we supply energy to millions of customers. Centrica is a FTSE 50 company based in Windsor, UK.



Agora Partner

Emerson is a global automation engineering and technology leader, propelling the world's premier industrial companies into benchmark-setting performance throughout the lifecycle of their investments.

At Emerson, we call it Top Quartile. For decades, leaders in oil and gas, refining, power, chemical, mining, and other process industries have turned to Emerson's expertise and innovations to deliver predictable project success. Emerson has been called upon to provide services and technologies to the world's largest and most complex projects, helping customers eliminate unnecessary capital construction costs, reduce project complexity, and restore schedule certainty. Once an asset is up and running, our clients leverage Emerson's unparalleled automation technology portfolio to achieve Top Quartile operational performance through maximum production availability and throughput, lower energy costs, and reduced safety risk. Emerson's leadership extends from pervasive sensing technologies and the most reliable control elements to the industry's most advanced software platforms for operations management and asset health. Emerson's employees around the world wake up each day ready to take on our customers' toughest challenges, turning "never been done before" into "consider it solved."

Honeywell

Agora Partner

Honeywell is a highly diversified, technology-driven company that provides world-class products and services to the aerospace, industrial manufacturing, retail, transportation, and energy industries. A Fortune 100 company, we create solutions to improve the quality of life for people around the globe—generating clean, healthy energy; increasing safety and security; and enabling people to connect, communicate, and collaborate. With approximately 132,000 employees worldwide, Honeywell has built great positions in good industries.

The Honeywell Performance Materials and Technologies (PMT) and Honeywell UOP groups are diverse business units within Honeywell, which has been a leading supplier of process technology and equipment to the refining, petrochemicals, and gas-processing industries for over 100 years. Today, more than 60 percent of the world's gasoline and 90 percent of biodegradable detergents are made from UOP technology. PMT also includes multiple specialty chemical manufacturing sites and leading automation and control solution providers.

Honeywell has a vision of a self-optimizing and self-healing enterprise driven by

- **Interoperability**
- **Flexibility**
- **Virtualization**
- **Mobility**
- **Connectivity**
- **New business models**
- **Industrial Internet of Things (IIoT)**
- **Cloud-enabled technology**

These concepts enable solutions that improve plant and process performance, reduced asset management and maintenance costs, and ensure physical and cyber security. Honeywell is leading the way by deploying new technology and business models in our own plants, as well as those in energy and other industries.

SIEMENS

Ingenuity for life

Agora Partner

Siemens AG (Berlin and Munich) is a global technology powerhouse that has stood for engineering excellence, innovation, quality, reliability and internationality for more than 165 years. The company is active in more than 200 countries, focusing on the areas of electrification, automation and digitalization. One of the world's largest producers of energy-efficient, resource-saving technologies, Siemens is a leading supplier of efficient power generation and power transmission solutions and a pioneer in infrastructure solutions as well as automation, drive and software solutions for industry. The company is also a leading provider of medical imaging equipment—such as computed tomography and magnetic resonance imaging systems—and a leader in laboratory diagnostics as well as clinical IT. In fiscal 2016, which ended on September 30, 2016, Siemens generated revenue of €79.6 billion and net income of €5.6 billion. At the end of September 2016, the company had around 351,000 employees worldwide. Further information is available at www.siemens.com.



RICE

Energy and Environment Initiative

Agora Partner

Rice University is consistently ranked among the nation's top 20 universities by U.S. News & World Report. With an undergraduate student-to-faculty ratio of approximately 6-to-1 and a residential college system, there are many reasons why Rice is highly ranked for best quality of life by the Princeton Review and for best value among private universities by Kiplinger's Personal Finance. Set in the heart of Houston, Texas, the nation's fourth-largest city, Rice is a comprehensive research university that fosters diversity and an intellectual environment that produces the next generation of leaders and advances tomorrow's thinking.

Stanford | Natural Gas Initiative

Agora Partner

The Stanford Natural Gas Initiative (NGI) generates new research and sparks discussions to ensure that global gas resources are used to their greatest economic, social, and environmental benefits. Work by Stanford faculty, researchers, and students, in collaboration with the corporate members of the NGI industrial affiliates program, spans engineering, science, business, policy, and politics. Projects address the full range of the natural gas landscape, including resource development and production, uses of natural gas, markets, governance, policy, and environmental and social impacts. Currently, the greatest efforts of the initiative are in global gas markets and governance, improvement of recovery factors in shale reservoirs, conversion of methane to liquid fuels and chemical feedstocks, natural gas leak detection and mitigation, the role of natural gas in alleviating energy poverty in the developing world, and technology development for gas detection and handling. NGI is hosted at Stanford University by the School of Earth, Energy, and Environmental Sciences and the Precourt Institute for Energy and builds close relationships with corporate partners in all aspects of the natural gas industry through its industrial affiliates program. More information is available at ngi.stanford.edu, or by contacting Brad Ritts, Managing Director, at ritt@stanford.edu.

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IHS Markit (NASDAQ: INFO) is a world leader in critical information, analytics and solutions for the major industries and markets that drive economies worldwide. The company delivers next-generation information, analytics and solutions to customers in business, finance and government, improving their operational efficiency and providing deep insights that lead to well-informed, confident decisions. IHS Markit has more than 50,000 key business and government customers, including 85 percent of the Fortune Global 500 and the world's leading financial institutions.