

# BREAKOUT SESSIONS



## FUTURE BIOTECH, FUTURE LAW

A glimpse into the future of global security, rogue technologies, and the law

Hosted by DARPA's Biological Technologies Office (BTO)

Revolutionary advances in the biological sciences promise a host of new capabilities, from programmable microbes to brain-machine interfaces that interpret and correct disruptive neural wave forms or allow direct control of devices through thought alone. But advances like these are poised to raise difficult ethical and legal quandaries. Join us for a discussion that will use episodes from *Star Trek* and other popular culture references to help us think through some of the privacy, personal autonomy, environmental stewardship and other societal issues raised by work being pursued or considered by DARPA's Biological Technologies Office.



### R. Alta Charo

R. Alta Charo is the Warren P. Knowles Professor of Law and Bioethics at the law and medical schools of the University of Wisconsin. Her expertise includes biotechnology regulation, bioethics, public health law, food and drug law, stem cell policy, torts and legislative drafting. Charo served on President Obama's transition team, where she was a member of the HHS review team, focusing her attention particularly on transition issues related to the National Institutes of Health (NIH), the Food and Drug Administration (FDA), bioethics, stem cell policy and women's reproductive health. From 2009 to 2011, she served as a senior policy advisor on emerging technology issues in the Office of the Commissioner at the U.S. Food & Drug Administration. A member of the National Academy of Science's Institute of Medicine (IOM) and Committee on Science, Technology and Law, she co-chaired the committee that drafted the National Academies' Guidelines for Embryonic Stem Cell Research. Charo has a J.D. from Columbia University and a B.A. in biology from Harvard University.



### Geoff Ling

Dr. Geoffrey Ling is the founding director of the Biological Technologies Office. He began his DARPA service in 2004 as a Program Manager in the Defense Sciences Office (DSO). He created and managed a broad research portfolio, spanning neuroscience, infectious disease, pharmacology, and battlefield medicine. His Revolutionizing Prosthetics program developed advanced arm prostheses controlled either non-invasively or directly by a user's brain. His Preventing Violent Explosive Neuro Trauma program developed new understanding and treatment of blast-induced traumatic brain injury (TBI). He was the 2009 DARPA Program Manager of the Year and served as the DSO Deputy Director from 2013-2014.

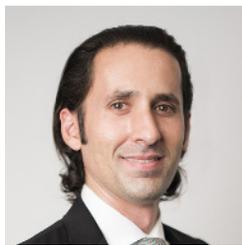
Dr. Ling has spent his career providing critical care to patients suffering from neurological trauma. He served as an officer in the United States Army Medical Corps for 27 years before retiring as a Colonel in 2012. As a military neurointensive care physician, he deployed As of August 4, 2015

with the 44th Medical Command (Airborne) to Afghanistan in 2003 and Iraq in 2005. At the direction of the Chairman, Joint Chiefs of Staff, COL Ling deployed on four “Gray Team” missions to Iraq and Afghanistan from 2009–2012 to evaluate and recommend improvements to war-theater TBI care.

Dr. Ling received his medical degree from Georgetown University and his Doctor of Philosophy in pharmacology from Cornell University’s Graduate School of Medical Sciences. He completed his residency at Walter Reed Army Medical Center, a neuropharmacology research fellowship at Sloan–Kettering Cancer Center, and a neurointensive care fellowship at Johns Hopkins Hospital. He received a Bachelor of Science in Biology and Bachelor of Arts in History from Washington University in St. Louis.

In addition to his role at DARPA, Dr. Ling serves as a Professor of Neurology, Anesthesiology, and Neuroscience at the Uniformed Services University of the Health Sciences. He is an attending neurocritical care physician at Johns Hopkins Hospital and is board certified in both neurology and neurocritical care. From 2012–2013, he served as the Assistant Director for Medical Innovation of the Science Division at the White House Office of Science and Technology Policy.

Dr. Ling has published more than 150 peer-reviewed journal articles, reviews and book chapters, including the TBI chapter in Cecil’s Textbook of Medicine and several DoD Guidelines for managing head injury. He is a fellow of the American Neurological Association, the American Academy of Neurology, the Neurocritical Care Society, and the Society for Neuroscience. He is a member of the Order of Military Medical Merit and an “A” designated neurologist.



### **Justin Sanchez**

Justin Sanchez joined DARPA as a program manager in 2013 to explore neurotechnology, brain science and systems neurobiology. Before coming to DARPA, Sanchez was at the University of Miami, where he served as an associate professor of biomedical engineering and neuroscience and a faculty member of the Miami Project to Cure Paralysis. He directed the university’s Neuroprosthetics Research Group, where he oversaw development of neural–interface medical

treatments and neurotechnology for treating paralysis and stroke, and for deep–brain stimulation for movement disorders, Tourette’s syndrome and obsessive–compulsive disorder. He is an elected member of the Administrative Committee of the IEEE Engineering in Medicine and Biology Society. He has published more than 75 peer–reviewed papers, holds seven patents in neuroprosthetic design and authored a book on the design of brain–machine interfaces. Sanchez holds a Ph.D. and an M.Eng. in biomedical engineering, and a B.S. in engineering science, all from the University of Florida.



### **Doug Weber**

Doug Weber joined DARPA as a program manager in 2013. His interests are in neural engineering, specifically neural interface systems and how to apply them to acquiring and decoding neural signals for controlling assistive and prosthetic devices; and neural stimulation technologies for restoring or retraining sensory, motor and autonomic functions. Weber came to DARPA from the University of Pittsburgh, where he was an associate professor in the Department

of Bioengineering and the Department of Physical Medicine and Rehabilitation. He also served the U.S. Department of Veterans Affairs (VA) as a research biomedical engineer in the VA Pittsburgh Health System. He is a member of the Society for Neuroscience and a senior member of the Institute for Electrical and Electronics Engineers. Weber holds a Ph.D. and an M.S., both in biomedical engineering, from Arizona State University and a B.S. in biomedical engineering from the Milwaukee School of Engineering.

## SCIENCE, DISRUPTED

### Beyond the limits of intuition, computation, and measurement

Hosted by DARPA's Defense Sciences Office (DSO)

Advances in physical sensing, leaps in computing power, an abundance of data and a host of other capabilities are advancing a revolution in science unlike any in the last 400 years, and are allowing us to tackle wicked problems that were intractable just a few years ago. New materials are being designed and constructed one atom at a time, for example, and intelligent computers are becoming active partners in scientific discovery, reading scientific papers and generating new hypotheses. Scientists are using lasers to chill individual atoms to ultracold temperatures and capturing those atoms in predefined lattices to uncover the deepest mysteries of matter, including superconductivity. Such advances, in turn, are disrupting long-held scientific intuitions and the conduct of science itself—the discoveries, the communities, the fundamental theories. Join us in planning the revolution as we discuss new opportunities—and perhaps some new limits—that await us at the scientific frontier.



#### Ivan Amato (Moderator)

For almost 30 years, Ivan Amato has chronicled the story of some of the most influential drivers of our times: science and technology. He is the author of three books—*Super Vision: A New View of Nature* (2003), *Pushing the Horizon: Seventy-Five Years of High Stakes Science and Technology at the Naval Research Laboratory* (1998), and *Stuff: The Materials The World Is Made Of* (1997). A fourth book about the Navy's historic role in the U.S. space program is scheduled

for publication in 2016. Amato's career has included writing and editing positions at publications including *Science* and *Chemical & Engineering News*. He has been a correspondent for National Public Radio and contributed to media outlets including *Time*, *Fortune*, the *Washington Post*, *Nature*, *Technology Review* and the Discovery Channel. He has also served as an editorial consultant to the President's Council of Advisors for Science and Technology at the White House Office of Science and Technology Policy (OSTP), and the Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation at the National Museum of American History.

## AI ASCENDANT

### Designing AIs to do the right thing

Hosted by DARPA's Information Innovation Office (I2O)

Computer scientist John McCarthy summarized the central conjecture of artificial intelligence (AI) in a proposal for a two-month conference held at Dartmouth College in 1956: “[E]very aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it.” Sixty years of research has produced remarkable progress in every aspect of artificial intelligence: speech understanding, language translation, computer vision, machine learning, robotics, text mining, neuromorphic systems and much more. AI technologies pervade web search engines, advertising, recommendation services, social media, fraud detection and drug discovery. AI programs beat the world champions of chess and “Jeopardy!,” but more importantly, AI technology is starting to be integrated into our critical infrastructure, our economy and our defense. This panel will explore the issues that these changes raise. What new AI capabilities will be required? What safety and cybersecurity challenges must be addressed? What are the potential economic and strategic impacts? Join us to help shape the future of AI.



#### **Trevor Darrell**

Trevor Darrell is on the faculty of the computer science division of the electrical engineering and computer science department at the University of California, Berkeley. He is also head of the Computer Vision Group at the International Computer Science Institute (ICSI) affiliated with the university. Darrell's group develops algorithms for large-scale perceptual learning, including object and activity recognition and detection, for a variety of applications including multimodal interaction with robots and mobile devices. His interests include computer vision, machine learning, computer graphics and perception-based human-computer interfaces. Darrell was previously on the faculty of the electrical engineering and computer science department at MIT, where he directed the Vision Interface Group. He received his Ph.D. and S.M. from MIT and his B.S.E. from the University of Pennsylvania.



#### **Tom Dietterich**

Tom Dietterich is president of the Association for the Advancement of Artificial Intelligence (AAAI) and Distinguished Professor of Computer Science at Oregon State University. As one of the earliest researchers in machine learning, he has made contributions to many aspects of the field including multiple-instance learning, multi-class learning, structured prediction, hierarchical reinforcement learning and end-to-end learning in AI systems. Dietterich earned his Ph.D. in computer science from Stanford, an M.S. in computer science from the University of Illinois and an A.B. in mathematics from Oberlin College. He is a Fellow of AAAI, the Association for Computing Machinery (ACM) and the American Association for the Advancement of Science (AAAS).



### **Yolanda Gil**

Yolanda Gil is director of knowledge technologies and associate division director at the Information Sciences Institute of the University of Southern California, and research professor in the university's computer science department. She leads a group that conducts research on various aspects of interactive knowledge capture. Her research interests include intelligent user interfaces, knowledge-rich problem solving, and the semantic web. She initiated and

chaired the World Wide Web Consortium (W3C) Provenance Working Group that led to a community standard for establishing the authenticity and trustworthiness of web-related processes and data. Gil has served in the Advisory Committee of the Computer Science and Engineering Directorate of the National Science Foundation. She is chair of ACM's Special Interest Group on Artificial Intelligence (SIGAI) and was elected Fellow of the AAAI in 2012. She received her Ph.D. and M.S., both in computer science, from Carnegie Mellon University.



### **Hadas Kress-Gazit**

Hadas Kress-Gazit is an associate professor at the Sibley School of Mechanical and Aerospace Engineering at Cornell University. Her research focuses on formal methods for robotics and automation and more specifically on creating verifiable robot controllers for complex high-level tasks using logic, verification, synthesis, hybrid systems theory and computational linguistics. She received a Faculty Early Career Development (CAREER) award from the National Science

Foundation in 2010 and a DARPA Young Faculty Award in 2012. Kress-Gazit received her Ph.D. and M.Sc. in electrical and systems engineering from the University of Pennsylvania, and a B.Sc. in electrical engineering from the Technion in Haifa, Israel.



### **Steve Lohr (Moderator)**

Steve Lohr has covered technology, business and economics for the *New York Times* for more than 20 years. In 2013, he was part of the team awarded the Pulitzer Prize for Explanatory Reporting. He was a foreign correspondent for a decade and served as an editor, and has written for magazines including the *New York Times Magazine*, *The Atlantic* and *Washington Monthly*. Lohr is the author of *Data-ism*, which examines the field of data science and decision-making (2015).

He is also the author of a history of software and computer programming, *Go To* (2001).

# TECHNOLOGY BY THE PEOPLE, FOR THE PEOPLE

Hosted by DARPA's Microsystems Technology Office (MTO)

Start with the creative and collaborative mentality of the burgeoning do-it-yourself and maker movements. Add to that the powerful electronics and manufacturing technologies previously accessible only in the rarified high-tech sector. What might you get? How about innovation in innovation itself, in which the opportunity to develop far-reaching capabilities opens up to millions, even billions more people? It's all about expanding the open-source software model—in which code is openly shared with others for iterative improvements—and applying it to hardware and brainware. Imagine what could quickly erupt in such an open ecosystem: cameras that could track and recognize thousands of objects simultaneously; miniature sensors that could help us integrate, learn and communicate with our environment; circuits that would allow for extracting information from mounds of tangled, unstructured data; and algorithms that could be readily embodied in efficient, specialized hardware. Now, overlay on all of that today's global connectivity to get the biggest innovation multiplier of all: the ability of kindred brains to find and work with each other wherever in the world they might be. Where and how will this revved-up open-source ethic prove most consequential? What kinds of standards, protocols and technical giveaways might best encourage creativity and success? Join us as we explore the potential implications of an unleashed open-source technology movement.



## **Tom Kalil (Moderator)**

Tom Kalil is deputy director for technology and innovation at the White House Office of Science and Technology Policy (OSTP) and senior advisor for Science, Technology and Innovation for the National Economic Council. In these roles, he serves as a senior White House staffer charged with coordinating the government's technology and innovation agenda. Prior to serving in the Obama Administration, Kalil was special assistant to the chancellor for science and technology at the University of California, Berkeley. In 2007 and 2008, he was chair of the Global Health Working Group for the Clinton Global Initiative. Previously, he served for eight years in the Clinton White House, ultimately as the deputy assistant to the president for technology and economic policy and the deputy director of the National Economic Council. Kalil received a B.A. in political science and international economics from the University of Wisconsin, Madison, and completed graduate work at Tufts University's Fletcher School.

## **Session 1 - Platforms to enhance innovation: Circuits**



## **Prabal Dutta**

Prabal Dutta is a Morris Wellman Faculty Development Assistant Professor of Electrical Engineering and Computer Science at the University of Michigan. He enjoys building real systems that attack challenging societal problems. His work has yielded dozens of hardware and software systems, has won four best paper awards, has received several design awards, has been directly commercialized by a dozen companies and indirectly by many dozens more, and has been utilized by thousands of researchers and practitioners worldwide. Dutta's work has been recognized with an NSF CAREER award, an Alfred P. Sloan Research Fellowship, an Intel Early Career Award, and a Popular Science Brilliant Ten of 2014 Award. He served

on DARPA's Information Science and Technology (ISAT) study group from 2012 to 2015, where he co-organized a number of ISAT workshops. Dutta holds a Ph.D. in computer science from the University of California, Berkeley, and an M.S. in electrical engineering and a B.S. in electrical and computer engineering from Ohio State University.



### **Andreas Olofsson**

Andreas Olofsson founded Adapteva in 2008 with a mission to create a new class of massively parallel processors to increase computing energy efficiency by an order of magnitude. Since its inception, Adapteva as a semiconductor company has achieved two world firsts: first to build a microprocessor with 50 gigaflops-per-watt processing efficiency and first to successfully crowdfund a chip. Starting in 1996, Olofsson has worked in silicon process flow development all the way up to system-level definition. Prior to starting Adapteva, he worked at Analog Devices for 10 years, developing the TigerSHARC microprocessor for wireless communication and low-cost, mixed-signal system-on-a-chip (SOC) imaging applications. Olofsson holds an M.S. in electrical engineering, a B.S. in electrical engineering and a B.S. in physics, all from the University of Pennsylvania.



### **Nigel Paver**

Nigel Paver is vice president of engineering at ARM Research, a division of ARM Ltd, a global semiconductor and software design company. He is responsible for driving innovative research programs in diverse areas, from silicon technologies and sensors to IT architecture and high-performance computing. Nigel is an ARM Fellow with more than 25 years of experience in and around the ARM architecture and ecosystem. He holds 31 U.S. patents and has published more than 30 papers and received the British Computer Society (BCS) Award. Paver received his Ph.D. in computer science and an M.S. in systems design, both from the University of Manchester (UK), and a B.S. in electronics from the University of Manchester Institute of Technology (UK).

## **Session 2 - Platforms to enhance innovation: Spectrum**



### **Elad Alon**

Elad Alon is an associate professor of electrical engineering and computer sciences at the University of California, Berkeley, and co-director of the Berkeley Wireless Research Center. His research focuses on energy-efficient integrated systems, including the circuit, device and communications techniques used to design them. Previously, he held positions with Lion Semiconductor, Wilocity, Cadence, Xilinx, Oracle, Intel, AMD, Rambus and IBM, working on integrated circuits for a range of applications. He received the IBM Faculty Award in 2008, the 2009 Hellman Family Faculty Fund Award, the 2010 UC Berkeley Electrical Engineering Outstanding Teaching Award, the 2010 ISSCC Jack Raper Award for Outstanding Technology Directions Paper, the 2011 Symposium on VLSI Circuits Best Student Paper Award, and the 2012 and 2013 Custom Integrated Circuits Conference Best Student Paper Award. Alon received his B.S., M.S. and Ph.D., all in electrical engineering, from Stanford University.



### **Matt Ettus**

Matt Ettus is president and founder of Ettus Research, a division of National Instruments. He was a core contributor to the GNU Radio project, a free framework for software-defined radio, and the creator of the Universal Software Radio Peripheral (USRP). USRPs are in use in more than 110 countries for everything from cellular and satellite communications to radio astronomy, medical imaging and wildlife tracking. In 2010, the USRP family won the Technology of the Year

award from the Wireless Innovation Forum. In the past, Ettus has designed Bluetooth chips, GPS systems and high-performance microprocessors. Before that, he received an M.S. in electrical and computer engineering from Carnegie Mellon University and a B.S. in electrical engineering and a B.S. in computer science from Washington University in St. Louis. In 2011, Ettus was named an eminent member of Eta Kappa Nu, the IEEE's honor society for electrical and computer engineering, and was awarded the Wireless Innovation Forum International Achievement Award in 2015.



### **Tom Rondeau**

Tom Rondeau is the maintainer and lead developer of the GNU Radio project and a consultant on signal processing and wireless communications. Rondeau is active in many conferences and workshops around the world to help further research and technology in these areas, and he has consulted with many companies and government organizations on new techniques in wireless signal processing. He is also a visiting researcher with the University of

Pennsylvania and has published widely in the fields of wireless communications, software radio and cognitive radio. Rondeau holds a Ph.D. in electrical engineering from Virginia Tech and won the 2007 Outstanding Dissertation Award in math, science and engineering from the Council of Graduate Schools for his work in artificial intelligence in wireless communications.

## **WRANGLING COMPLEXITY**

### **Designing systems that work**

Hosted by DARPA's Strategic Technology Office (STO)

Today's complex and sophisticated technologies are built from components that assemble into mid-level systems that, in turn, integrate into systems of systems. Automobiles... civilian and military aircraft...the Internet...the Global Positioning System...the power grid...communications satellites.... All are systems of systems, embodying this architecture's disadvantages (including intense complexity and a need for unprecedented coordination) and advantages (including the potential for synergistic effects and smaller odds of catastrophic failure if one of several components fails or is lost). As we as individuals and a Nation come to rely increasingly on these systems of systems, we need to develop new design principles and methods that help us maximize their potential benefits and minimize their risks. Join us for a discussion about the technical, design, logistical, operational and other challenges associated with systems of systems in both civilian and military contexts.



### **John G. Clark**

John G. Clark is director of the Focused Technology Roadmaps organization within Lockheed Martin Aeronautics, Advanced Development Programs (Skunk Works). He is responsible for identifying, maturing, demonstrating and transitioning technology to address the needs for all Lockheed Martin aeronautics platforms. He directs a portfolio of technology roadmaps to implement business strategy and meet near-term R&D needs and platform pursuits. His portfolio comprises the Survivability, Software Systems, Electronic Warfare, Weapons, Sensors, Cyber, and Anti-Tamper Technology teams. Clark also previously served as the program manager of the Open System Architecture and Software Technology Roadmap for Skunk Works, where he worked on multiple command-and-control and autonomy program activities related to unmanned air vehicles (UAVs). Clark holds an M.B.A. from Texas Christian University and a B.S. in chemical engineering from the University of Colorado at Boulder.



### **Kathleen Fisher**

Kathleen Fisher is a professor of computer science at Tufts University. Previously, she was a principal member of the technical staff at AT&T Labs Research, a consulting faculty member in the computer science department at Stanford University, and a program manager at DARPA. Fisher's research focuses on advancing the theory and practice of programming languages and on applying ideas from the programming language community to the problem of ad hoc data management. Recently, she has been exploring synergies between machine learning and programming languages and studying how to apply advances in programming languages to the problem of building more secure systems. Fisher is an ACM Fellow and is past chair of the ACM Special Interest Group in Programming Languages (SIGPLAN), past co-chair of CRA's Committee on the Status of Women (CRA-W) and a former editor of the *Journal of Functional Programming*. Fisher earned her Ph.D. in computer science and B.Sc. in math and computational science from Stanford University.



### **Evan Fortunato**

Evan Fortunato is the co-owner of Apogee Research, a small business focused on research and development in areas of national security. Fortunato leads a number of efforts associated with the development of adaptive and resilient cyber-physical systems by combining techniques from a range of technical fields including: information theory, stochastic control systems, program analysis, multi-modal data estimation, statistical analysis and optimization. One of his current research interests is in managing complex systems by understanding their underlying algebraic symmetries. Fortunato received his Ph.D. in nuclear engineering and a B.S. in physics from MIT.



### **Richard Murray**

Richard Murray is currently the Thomas E. and Doris Everhart Professor of Control & Dynamical Systems and Bioengineering at the Caltech. Murray's research is in the application of feedback and control to networked systems, with applications in biology and autonomy. Current projects include analysis and design biomolecular feedback circuits; specification, design and synthesis of networked control systems; and novel architectures for control using slow computing.

Murray earned his Ph.D. and M.S., both in electrical engineering and computer sciences, from the University of California, Berkeley, and a B.S. in electrical engineering from Caltech.



### **Nan Mattai (Moderator)**

Nan Mattai serves as senior vice president of engineering & technology of Rockwell Collins, where she guides the corporation's technology vision and provides strategic leadership. She also leads the corporation's Advanced Technology Center. She is a member of the Advisory Board for Aviation Week Strategic Media & Conferences, an external research panel at Sandia National Laboratories' Defense Systems and Assessments, and the Stevens Institute of Technology's

School of Systems and Enterprises. She was named a 2014 influential woman in Defense Electronics and to the Army Technology Top 10 list of the Defense Industry's most powerful women in 2015. Mattai graduated from the University of Windsor, Canada with an M.S. in nuclear physics and completed all graduate courses for a Ph.D. in physics.

## **LAUNCHING NEW TRAJECTORIES IN SPACE**

### **New capabilities, new cost curves**

Hosted by DARPA's Tactical Technology Office (TTO)

For the half-century since the Soviets launched Sputnik, space has been largely the domain of government entities. Launch sites and opportunities have been limited, and operating in space has been exquisitely expensive. However, evolving business models are opening the field to new entrants, and new technologies are enabling unprecedented capabilities. Advances in electronics, for example, have led to expanded functionalities in smaller satellites. Advanced manufacturing techniques have facilitated lower-cost rocket launches. How will this proliferation of new capabilities in launch and on-orbit operations, and today's bending of the cost curve, change the way we use and operate space? Join us as we consider the expanding universe of possibilities in space.



### **Craig Clark**

Clark is the founder/CEO of Clyde Space Ltd and regarded by many as a pioneer of the 'Newspace' revolution that is currently changing the face of the space industry. In 2005, and after 11 years designing and building small satellites with Surrey Satellite Technology Ltd, Clark founded Clyde Space Ltd., which focuses on the development of cutting-edge products for the space market, particularly in the area of tiny satellites called CubeSats. The company's successes include

the design, launch and operation of Scotland's first satellite, UKube-1. He is a member of the American Institute of Aeronautics and Astronautics (AIAA), the United Kingdom's

Space Leadership Council and the British Interplanetary Society. Clark earned his M.Sc. in satellite engineering from the University of Surrey, UK, and a B.Eng. in power engineering from the University of Glasgow, UK.



### **Stan Dubyn**

Stan Dubyn is the founder, chairman and chief executive officer of Millennium Space Systems, which specializes in design and development of one-of-a-kind, high-performance spacecraft that are affordable and schedule responsive. Prior to founding Millennium Space Systems, he was president and chief operating officer of SpaceDev and concurrently served as chief executive officer of Integrated Space Systems (ISS), previously a subsidiary of SpaceDev.

Before SpaceDev, Dubyn was the co-founder, senior vice president and chief operating officer of Spectrum Astro from 1990 to 2000. Prior to Spectrum Astro, he held key management and technical positions at TRW Space & Electronics and at Hughes Space & Communications Group. In those positions, he worked numerous satellite programs, was responsible for the planning and implementation of a dedicated mission ground station, and for development and execution of integrated ground and flight operations and extravehicular (EVA) training for Space Shuttle astronaut crews.



### **Debra Facktor Lepore**

Debra Facktor Lepore is vice president and general manager of strategic operations for Ball Aerospace & Technologies Corp. She is the company's senior executive in the Washington, D.C., area and leads the company's Washington-area operations, communications and strategic development. Previously, she was an industry professor at Stevens Institute of Technology, served as director of strategic programs for the Systems Engineering Research Center (SERC) and

conducted research on expedited systems engineering programs for the U.S. Department of Defense. Lepore has extensive entrepreneurial business experience including serving as president of DFL Space LLC; president of AirLaunch LLC, funded by DARPA and the U.S. Air Force; and vice president of business development and strategic planning for Kistler Aerospace Corporation. Lepore is a fellow of the American Institute of Aeronautics and Astronautics and former board chair of Women in Aerospace. Lepore holds an M.S.E. and B.S.E., both in aerospace engineering, from the University of Michigan.



### **Talbot Jaeger**

Talbot Jaeger is the founder and chief technologist at NovaWurks Inc., a provider of high-technology space products and services. Jaeger leads the NovaWurks team and is responsible for product development and all projects at the company. With more than 30 years of experience in the aerospace industry, Jaeger has managed and directed project concepts, systems engineering and 10 spaceflights from initial design through project completion. In addition, he led the development of

the Mayflower CubeSat, a highly integrated building-block space technology, delivering the product from initial design in just six months. Prior to establishing NovaWurks, Jaeger held positions at TRW and Northrop Grumman Corporation, including director of Northrop Grumman's NovaWorks research unit. His career also included stints as the lead on the launch of vehicle design and concept developments at Scaled Composites

and chief architect for the seedling study and Phase 1 research of DARPA's System F6 program. Jaeger has degrees in biochemistry, information computer science and electrical engineering from the University of California, Irvine.



**Amit Mehra**

Amit Mehra co-founded Ventions, LLC in 2004, and currently serves as chief financial officer and managing partner. Prior to starting Ventions, he worked as chief engineer at D-STAR Engineering, where he was responsible for developing an advanced turbine engine for unmanned air vehicles (UAVs). He has also worked as a management consultant with Dean and Company, a strategy consulting firm in the Washington, D.C. area, in its energy and telecom practices. His graduate research was awarded first prize at the Merrill Lynch Global Innovation Grants Competition for its widespread commercial potential. Mehra has received various awards including recognition as one of the top 12 technology innovators of Indian descent in the United States, a best paper award at the International Fluid Dynamics conference, and the Caltech Carnation Merit Fellowship. Mehra holds a Ph.D. and M.S., both in aeronautics/astronautics, from MIT and a B.S. in engineering and applied science from Caltech.



**Mike Gold (Moderator)**

Mike Gold is Bigelow Aerospace's director of D.C. operations & business growth. Gold is responsible for a broad array of activities, including international business development, legal issues, congressional affairs and strategic planning. Gold was appointed by the U.S. Secretary of Transportation to serve on and chair the Commercial Space Transportation Advisory Committee (COMSTAC), a federal advisory committee comprised of leading commercial space industry executives that advises the Federal Aviation Administration (FAA)'s Office of Commercial Space Transportation. Additionally, he was appointed by the National Research Council to serve on the Space Technology Industry-Government-University roundtable, which provides direction and advice to NASA's Space Technology Mission Directorate. Gold has written three law review articles describing the intersection between the commercial space industry and export controls, has had two editorials entered into the Congressional Record, and testified before the U.S. Senate Commerce Committee to address issues related to commercial space development.