# TAMEST 2017 Annual Conference

## **#TAMEST2017**



January 10–12, 2017 The Westin Riverwalk ► San Antonio, Texas



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#### **ABOUT TAMEST**

The Academy of Medicine, Engineering and Science of Texas (TAMEST) was founded in 2004 to provide broader recognition of the state's top achievers in medicine, engineering and science, and to further position Texas as a national research leader. TAMEST also aims to foster the next generation of scientists and to increase the awareness and communication among the state's best and brightest about research priorities for the future.

TAMEST's membership represents Texas' best researchers from both industry and academia. TAMEST is composed of more than 280 Texasbased members of The National Academies of Sciences, Engineering, and Medicine and the state's nine Nobel Laureates.

## WELCOME



"As Texas confronts both great challenge and opportunity in the coming century, TAMEST is well-positioned to gather the state's top leaders in academia, industry and research to plan a brighter future for our state."

> Stephen A. Holditch, Ph.D. (NAE), Program Chair

What kind of place will Texas be 100 years from now? Can it be smarter, cleaner and more innovative? Research in Texas is moving the state in that direction, and at this year's TAMEST Annual Conference, some of the state's top minds are gathering to explore solutions for Texas' growing population, dynamic economy and changing climate. *Building a Sustainable Future for Texas* will examine key issues like education, energy, health, transportation and water and the challenges we face ensuring an equitable, efficient supply of them in the coming century.

#### **2017 ANNUAL CONFERENCE PROGRAM COMMITTEE**

#### **PROGRAM CHAIR**

#### Stephen A. Holditch, Ph.D. (NAE)

Professor, Harold Vance Department of Petroleum Engineering Texas A&M University

#### **PROGRAM COMMITTEE:**



#### Francisco G. Cigarroa, M.D. (NAM)

Ashbel Smith Professor and Director of Pediatric Transplantation Surgery The University of Texas Health Science Center at San Antonio



#### William Kline, Ph.D. Exxon Mobil Corporation (retired)



#### Christine A. Ehlig-Economides, Ph.D. (NAE)

Professor and Hugh Roy and Lillie Cranz Cullen Distinguished University Chair University of Houston



#### Danny D. Reible, Ph.D. (NAE)

Donovan Maddox Distinguished Engineering Chair Texas Tech University

## AGENDA

#### WERNEGRAV JANUADV 11

WEDNESDAY, JANUARY 11			12:15-2:00PM		LUNCH (Hidalgo Ballroom) Sustainable Education Panel: Evolution
7:30AM-7:00PM		NAVARRO BALLROOM Registration Open			in Texas Higher Education Over the Next 20 Years
7:30-8:30AM		Continental Breakfast			<b>Larry R. Faulkner, Ph.D.,</b> President Emeritus, The University of Texas at Austin
8:30-8:45AM		Welcome David W. Russell, Ph.D. (NAS), 2016 TAMEST President Stephen A. Holditch, Ph.D. (NAE), 2017 TAMEST Annual Conference Program Chair			PANELISTS: Robert L. Duncan, Chancellor, Texas Tech University System Gregory L. Fenves, Ph.D. (NAE), President, The University of Texas at Austin David W. Leebron, J.D., President, Rice University
8:45-9:30AM	*	Opening Keynote: Grand Challenges for Texas Marcia McNutt, Ph.D. (NAS), President, National Academy of Sciences			William H. McRaven, Chancellor, The University of Texas System Diana S. Natalicio, Ph.D., President, The University of Texas at El Paso John Sharp, Chancellor, The Texas A&M
9:30-10:15AM	4	Keynote Address: What is the Future for International Energy Pricing? Are There Alternatives? John Hofmeister, Founder and Chief Executive, Citizens for Affordable Energy; Former President of Shell Oil Company	2:15-3:15PM	<b>N</b>	Sustainable Health Panel: Exploiting "The Neighbor's Toolkit" MODERATOR: William Kline, Ph.D., Exxon Mobil Corporation (retired)
10:15–10:30AM		BREAK			PANELISTS: The Faustian Bargain of Transcatheter
10:30-10:55AM	4	TAMEST Shale Task Force: Sponsor Perspectives Marilu Hastings, Vice President, Sustainability Program, The Cynthia & George Mitchell Foundation			Alan Lumsden, M.D., Medical Director, Houston Methodist DeBakey Heart and Vascular Center Sustainable and Healthy Human Spaceflight Ellen Ochoa, Ph.D., Director, Lyndon B.
10:55–11:25AM	٥	Sustainable Water Systems of the Future: Fixing Old Mistakes and Avoiding New Ones Marc Edwards, Ph.D., Charles P. Lunsford Professor of Civil and Environmental Engineering, Virginia Tech	3:15-4:00PM	4	Keynote Address: The Outlook for Energy: A View to 2040 William Colton, Vice President, Corporate Strategic Planning, Exxon Mobil
11:25AM-12:10PM	0	Sustainable Water Panel: Meeting Texas' Future Water Needs MODERATOR: Danny D. Reible, Ph.D. (NAE), Donovan	4:00-4:15PM		BREAK
		Maddox Distinguished Engineering Chair, Texas Tech University PANELISTS: Ari Michelsen, Ph.D., Regents Professor, Texas A&M AgriLife Research Michael Webber, Ph.D., Deputy Director of the Energy Institute and Professor of Machanical Engineering. The University	4:15-4:45PM	4	Hydraulic Fracturing, Unconventionals and Sustainable Energy D. Nathan Meehan, Ph.D., P.E., 2016 President, Society of Petroleum Engineers and Senior Executive Advisor, Baker Hughes
		of Texas at Austin <b>Tracy Young</b> , Core R&D Program Director, Consumer, Infrastructure, and Performance Silicones Division, The Dow Chemical Company	4:45–5:15PM	ŦĬ'n	Incorporation of Renewable Resources into the Bulk Power System Woody Rickerson, P.E., Vice President, Grid Planning and Operations, Electric Reliability Council of Texas (ERCOT)

## AGENDA

5:15–5:45PM		Changing 21 <sup>st</sup> Century Freight	10:30–10:45AM	BREAK
		William R. Stockton, Ph.D., P.E., Executive Associate Agency Director, Senior Research Fellow and Chief Research Officer, Texas A&M Transportation Institute	10:45AM-12:00PM 🛛 💎	Sustainable Health Panel: Neglected Infections Emerging in the Epoch of the Anthropocene MODERATOR:
7:00-8:30PM		Edith and Peter O'Donnell Awards Dinner (Hidalgo Ballroom)		Peter J. Hotez, M.D., Ph.D. (NAM), Dean, National School of Tropical Medicine at Baylor College of Medicine and Texas
8:30-10:00PM		After-Dinner Reception		Children's Endowed Chair of Tropical Pediatrics, Texas Children's Hospital PANELISTS:
THURSDAY, JAN	UARY	12		Scott Lillibridge, M.D., Director of Health Initiatives, Texas A&M University System and Professor of Epidemiology, Texas
		NAVARRO BALLROOM		A&M School of Public Health
7:45AM-2:00PM		Registration Open		Yolanda McDonald, Ford Foundation Dissertation Fellow and Ph.D. Candidate,
7:45-8:45AM		Breakfast		Texas A&M University Robert B. Tesh, M.D., Department of Dath also and The University of Taxas
8:45–9:15AM	<b>AA</b>	Vehicle Electrification: Industry Trends and Predictions Bapiraju Surampudi, Ph.D., Staff Engineer, Southwest Research Institute		Pathology, The University of Texas Medical Branch at Galveston <b>Susan H. Wootton, M.D.</b> , Associate Professor, Pediatric Infectious Diseases, McGovern Medical School, The University of Texas Health Science Center at
9:15–10:30AM	♥0	2017 O'Donnell Awards Recipient Presentations		Houston
		Medicine: Meng Wang, Ph.D., Associate Professor, Department of Molecular and Human Genetics, Baylor College of Medicine Engineering: Andrew K. Dunn, Ph.D., Professor of Biomedical Engineering and Donald J. Douglass Centennial Professor of Engineering, The University of Texas at Austin	12:10-1:30PM 🔸	<ul> <li>Keynote Address: Lunch Session (Hidalgo Ballroom)</li> <li>Prophetic State: Texas on the Cusp of a Changing America</li> <li>Stephen Klineberg, Ph.D., Professor of Sociology and Founding Director, Kinder Institute for Urban Research, Rice University</li> </ul>
		Science: Daniel I. Bolnick, Ph.D., Professor of Integrative Biology and Chair of the Graduate Program in Ecology Evolution and Behavior, The University of Texas at Austin	1:30–1:45PM	Closing Remarks and TAMEST Leadership Transition

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## **KEYNOTE SPEAKERS**



#### Marcia McNutt, Ph.D. (NAS) President, National Academy of Sciences

#### **Grand Challenges for Texas**

Innovation is essential if Texans are going to enjoy a quality of life comparable to that of today in another 100 years, because current trends are not sustainable. What will be the next "gusher" to fuel the economy of Texas? What barriers must the state overcome to play a leading role in future innovation? The key, of course, will be enlightened human capital, far more diverse and cosmopolitan than what is the norm now.

Wednesday, 8:45 AM



#### John Hofmeister

Founder and Chief Executive, Citizens for Affordable Energy Former President, Shell Oil Company

#### What is the Future for International Energy Pricing? Are There Alternatives?

The extreme pricing volatility for oil over the past two years has brought commercial havoc to the oil and natural gas industry. The uncertainties of liquefied natural gas (LNG) developments have likewise brought commercial skepticism to the potential LNG marketplace, slowing its growth. Longer-term energy developments that could bring increased energy security to regions that are without adequate energy supply lack the necessity of sound commerciality.

What does the future hold for international energy pricing? Historic assumptions for oil were based upon cartel behavior and military preparedness. LNG assumptions were based on scarcity and few suppliers. Other regional energy projects have primarily been aspirations with no outcomes. Is there a future for norms or conventions?

This presentation will examine the present reality and prospects for international energy development, cooperation and likelihood of success in a world of resource surplus, technical success and climate degradation.

Wednesday, 9:30 AM

## **KEYNOTE SPEAKERS**



#### William Colton

Vice President, Corporate Strategic Planning, Exxon Mobil Corporation

#### The Outlook for Energy: A View to 2040

*The Outlook for Energy: A View to 2040* is ExxonMobil's long-term global view of energy demand and supply. Its findings help guide our long-term investments, and we share *The Outlook* to help promote better understanding of the issues shaping the world's energy future.

We can expect that new technologies will continue to create new energy options for our growing world. We don't know yet what all those technologies will be, but history tells us that the best ones will be affordable, available on a commercial scale, and not overly reliant on government support. Enabling these technologies will require policies that promote innovation, investments and free trade.

One of the constants in life is change. Another is energy. By understanding the trends described in *The Outlook*, we can better anticipate how much—and which kinds of—energy the world will need in the future. This insight helps guide our investments as we work to help safely meet the world's need for affordable, reliable energy—the energy that helps create and add value to modern living for people everywhere.

Wednesday, 3:15 PM



#### Stephen Klineberg, Ph.D.

Professor of Sociology and Founding Director, Kinder Institute for Urban Research Rice University

#### Prophetic State: Texas on the Cusp of a Changing America

Two remarkable trends have redefined the twenty-first century in America; nowhere are they more clearly seen than in cities like Houston, Dallas, San Antonio, and Austin. Texas is where the American future is going to be worked out.

The blue-collar, resource-based industrial era has been superseded by a new high-tech, knowledge-based, worldwide economy, marked by growing inequalities predicated above all else on access to high-quality education and technical skills.

At the same time, Texas is at the forefront of the epic transformation in the composition of the U.S. population, as an earlier generation, predominantly Anglo and now aging, is being replaced by a new generation of Americans, who are a mix of all the ethnicities and religions of the world.

We review the findings from 35 years of the "Kinder Houston Area Survey" to explore the way the new realities are unfolding both in Houston and throughout the state and nation, and we consider their implications for the challenges and opportunities that lie ahead.

Thursday, 12:10 PM (Hidalgo Ballroom)

# **<b>OSUSTAINABLE ENVIRONMENT: WATER**



Marc Edwards, Ph.D.

Charles P. Lunsford Professor of Civil and Environmental Engineering, Virginia Tech

#### Sustainable Water Systems of the Future: Fixing Old Mistakes and Avoiding New Ones

America is facing a drinking water infrastructure crisis, which is most severe in cities and towns that have lost substantial population. In addition to having costs distributed over fewer customers, infrastructure degradation can actually increase with reduced water demand, which further destabilizes the financial viability of the water system. The net result is widespread infrastructure inequality. Buildings at the cutting edge of the water-energy nexus (i.e. "green buildings") also suffer from water quality problems that can adversely affect public health, due to very high water age and low flow rates. This presentation will review case studies that highlight these problems and potential solutions.

Wednesday, 10:55 AM

#### **PANEL: MEETING TEXAS' FUTURE WATER NEEDS**

The state's population is expected to almost double over the next 50 years with a potentially similar increase in water demand. The economic growth required to sustain that population requires a stable and secure supply of water, yet the state's water is already stressed, particularly during times of drought.

This panel will provide their perspectives on future water demand and approaches to satisfy that demand. Michael Webber will discuss water for energy production and urban communities, Ari Michelsen will focus on the agricultural sector and Tracy Young will focus on industrial water needs. Together, their presentations will identify the challenges and opportunities for meeting Texas' future water needs.

Wednesday, 11:25 AM

#### Moderator



#### Danny D. Reible, Ph.D. (NAE)

Donovan Maddox Distinguished Engineering Chair, Texas Tech University

#### **Panelists**



#### Ari Michelsen, Ph.D.

Regents Professor, Texas A&M AgriLife Research



#### Michael Webber, Ph.D.

**Tracy Young** 

Deputy Director of the Energy Institute, Co-Director of the Clean Incubator, Josey Centennial Fellow in Energy Resources and Professor of Mechanical Engineering, The University of Texas at Austin

Core R&D Program Director, Consumer and Infrastructure Solutions, The Dow Chemical Company



# **SUSTAINABLE EDUCATION**

### **PANEL: EVOLUTION IN TEXAS HIGHER EDUCATION OVER THE NEXT 20 YEARS**

Strong forces of change are impinging on higher education in Texas and across the United States. They derive from limitations in the historic model used to finance higher education, from technological capabilities that offer new modes of teaching and learning; from cultural changes among new generations of students; and from political pressures to differentiate priorities and financing among the historic missions of undergraduate teaching, graduate and professional teaching, research, and public service. This panel of six sitting presidents and chancellors will discuss their visions for the changes likely to happen in Texas universities, public and private, over the next two decades.

► Wednesday, 12:15 PM (Hidalgo Ballroom)

#### **Moderator**



Larry R. Faulkner, Ph.D. President Emeritus, The University of Texas at Austin

#### **Panelists**



Robert L. Duncan Chancellor, Texas Tech University System

**Gregory L. Fenves, Ph.D. (NAE)** President, The University of Texas at Austin



**David W. Leebron, J.D.** President, Rice University

William H. McRaven Chancellor, The University of Texas System

**Diana S. Natalacio, Ph.D.** President, The University of Texas at El Paso

John Sharp Chancellor, The Texas A&M University System

# **SUSTAINABLE HEALTH**

#### PANEL: EXPLOITING "THE NEIGHBOR'S TOOLKIT"

#### Introduction: Neighbors Talking Across the Fence

"The solution to my problem may very well be found in my neighbor's toolkit." The neighborly sharing that saves us when we're missing a 5/8" socket can also be the difference between everyday development and world-changing discovery. Recognizing that "It's all pumps and pipes," Houston's energy, medical and human spaceflight neighbors have come together to promote dialogue, stimulate curiosity and encourage collaboration.

#### Panel Discussion: Sustaining Neighborly Connections

The panel will field questions and discuss learnings from the energy, cardiovascular and human spaceflight capital of the world, Houston, Texas. The panel will discuss how Houston is sustaining relationships among neighbors who are really big, really busy and pursuing world-changing objectives.

Wednesday, 2:15 PM

#### Moderator



William Kline, Ph.D. Exxon Mobil Corporation (retired)

#### **Panelists**



#### Alan Lumsden, M.D.

Medical Director, Houston Methodist DeBakey Heart and Vascular Center

#### The Faustian Bargain of Transcatheter Surgery

Transcatheter technology has revolutionized the accessibility and sustainability of cardiovascular intervention. Although very different in scale, the concepts and tools are very similar to what petroleum engineers employ as they also work through long, thin tubes. Now having been practiced by a generation of surgeons, it's increasingly obvious that the many benefits to patients have been achieved with the consequences of frequent radiation exposure to the surgeons themselves.



#### Ellen Ochoa, Ph.D.

Director, Lyndon B. Johnson Space Center, NASA

#### Sustainable and Healthy Human Spaceflight

Even as the engineering challenges are formidable, the most concerning obstacle to extended duration spaceflight is human health. Decades of human spaceflight have demonstrated that there are many health and fitness issues that must be addressed if we are to send humans back to the Moon, to asteroids, and on to Mars.

One of the greatest health challenges is exposure to radiation when outside the protection of the earth's magnetic field, similar to the dosages experienced by transcatheter surgeons. Activities like Scott Kelly's "One Year Mission," and others occurring now or planned for the coming years, are helping us continue to perform the science and gather the data needed to answer the questions of how to address the human health challenges of long duration human spaceflight. In most instances, these activities have direct applicability to terrestrial energy, medicine, and other industries, which means it's very important to get to know your neighbors.

# Fire SUSTAINABLE ENVIRONMENT: ENERGY



#### D. Nathan Meehan, Ph.D., P.E.

2016 President, Society of Petroleum Engineers and Senior Executive Advisor, Baker Hughes

#### Hydraulic Fracturing, Unconventionals and Sustainable Energy

Rapid growth in North American oil and gas production has been driven by the development of unconventional oil and gas resources requiring long horizontal wells and multiple-stage hydraulic fracturing treatments. This development is a large-scale industrial process carried out over broad areas and has been the subject of intense scrutiny and criticism. This talk examines the most salient deficiencies associated with fracking and the steps necessary to minimize environmental and social impacts. Surprisingly, a lack of knowledge about the reservoir characteristics and well performance is shown to be the challenge that (if overcome) would both minimize environmental impacts and improve economic viability.

Issues in sustainability of oil and gas generally are discussed in light of the new model involving the development of tens of thousands of wells to add production and reserves comparable with a few hundred wells in the world's mega-fields. Sustainability challenges addressed include wellbore integrity, fugitive methane emissions, well control failures, production impacts, water usage, air and noise pollution, flaring and more. Collaboration with regulators, advances in technology and improved scientific and engineering understanding will all be required to make unconventionals compatible with long-term sustainability goals.

#### Wednesday, 4:15 PM



#### Woody Rickerson, P.E.

Vice President, Grid Planning and Operations, Electric Reliability Council of Texas (ERCOT)

#### Incorporation of Renewable Resources into the Bulk Power System

The power industry has recently begun to experience a fundamental change in the types of generation resources used to serve load connected to the bulk power system. The incorporation of intermittent renewable resources into the Electric Reliability Council of Texas' (ERCOT) portion of the bulk power system has created an array of new operational and planning difficulties. This presentation, "Incorporation of Renewable Resources into the Bulk Power System," provides background into the sometimes unlikely problems associated with a changing mix of generation resources and the strategic solutions that have been implemented to maintain reliability of the system.

Wednesday, 4:45 PM

#### TAMEST SHALE TASK FORCE: SPONSOR PERSPECTIVES



#### Marilu Hastings

Vice President, Sustainability Program, The Cynthia & George Mitchell Foundation

TAMEST has convened a task force to examine the environmental and community impacts of shale oil and gas development in Texas. TAMEST's Shale Task Force will be a first-of-its-kind, comprehensive review of scientific research and related findings regarding impacts of shale oil and gas production in Texas. The Cynthia & George Mitchell Foundation is a sponsor of this important work.

Wednesday, 10:30 AM

# SUSTAINABLE TRANSPORTATION



#### William R. Stockton, Ph.D., P.E.

Executive Associate Agency Director, Senior Research Fellow and Chief Research Officer, Texas A&M Transportation Institute

#### Changing 21st Century Freight

By 2040, freight in Texas will double to 3.8 billion tons annually, equivalent to one semi-truck per person, per year. The economic, environmental and social consequences of straight-line truck growth are not sustainable.

Texas Transportation Institute (TTI) research addresses these challenges in three distinct ways:

#### Changing the Supply Chain

Using very large datasets focused on the "fluidity" of supply chains, TTI is discovering opportunities to shorten transit and dwell times, and increase travel time reliability, especially at the U.S.-Mexico border. TTI has developed the nationally-accepted baseline models to evaluate long-term strategies and real-time operational changes.

#### Employing Technology to Platoon Trucks

TTI is a pioneer in truck platooning—allowing trucks to be electronically tethered to a lead vehicle with an active driver. Trailing truck drivers operate in stand-by mode, but with less fatigue, ready to take over to leave the platoon to make deliveries or change routes.

#### Developing an Entirely New Freight Movement System

The Freight Shuttle System is a game-changing freight technology, initially developed at TTI and now in prototype testing by a spin-off company. This solid-state system (only a handful of moving parts) requires no public financial support and operates autonomously on a fixed guideway more cost-effectively than a truck.

#### Wednesday, 5:15 PM



#### Bapiraju Surampudi, Ph.D.

Staff Engineer, Southwest Research Institute

#### Vehicle Electrification: Industry Trends and Predictions

The automobile industry is in the midst of a metamorphosis from vehicles driven from fossil fuels to vehicles driven by electricity. The main drivers for this change are emission reductions, fuel economy, performance and convenience. Dr. Surampudi's research includes focus on energy storage and vehicle electrification to develop integration, testing and control methodologies that balance driveability, performance and efficiency. He manages the Energy Storage System Evaluation and Safety (EssEs), an industry consortium of companies that fund research in lithium ion batteries. This presentation will highlight the history, main drivers, levels, barriers, current trends and future predictions of vehicle electrification.

Thursday, 8:45 AM



#### PANEL: NEGLECTED INFECTIONS EMERGING IN THE EPOCH OF THE ANTHROPOCENE

#### **Moderator**



#### Peter J. Hotez, M.D., Ph.D., FASTMH, FAAP (NAM)

Dean, National School of Tropical Medicine and Head, Section of Pediatric Tropical Medicine, Baylor College of Medicine Director, The Sabin Vaccine Institute and Texas Children's Hospital Center for Vaccine Development

#### **Panelists**



#### Scott Lillibridge, M.D.

Director of Health Initiatives, Texas A&M University System and Professor of Epidemiology, Texas A&M School of Public Health



#### Yolanda McDonald

Ford Foundation Dissertation Fellow and Ph.D. Candidate, Texas A&M University



#### Robert Tesh, M.D.

Professor of Pathology, Microbiology and Immunology, and Preventative Medicine, John S. Dunn Distinguished Chair in Biodefense, The University of Texas Medical Branch at Galveston



Associate Professor, Pediatric Infectious Diseases, McGovern Medical School, The University of Texas Health Science Center at Houston

The state of Texas has recently seen the emergence of several important neglected and emerging infections, including the Zika virus infection in 2016, chikungunya virus infection last year, Ebola virus infection in 2014 and dengue in the early 2000s, in addition to the relatively recent emergence of Chagas disease, cysticercosis, murine typhus, toxocariasis, and others. Major hotspot areas of Texas include South Texas and our major urban centers.

The panel will seek to understand the forces now helping to promote the emergence of these diseases in Texas and specifically examine those related to our new human-induced geological epoch, sometimes referred to as the Anthropocene. Among the key drivers are human migrations, shifts in transportation patterns, urbanization, deforestation, climate alterations, and the dominant force of poverty, among others. Accordingly, biomedical scientists will now need to engage in an unprecedented dialogue with earth and social scientists to better understand risks and rational approaches to risk mitigation. Also to be discussed are new and exciting tools under development to follow, track, and prevent new infectious disease epidemics in Texas.

Thursday, 10:45 AM

The Edith and Peter O'Donnell Awards showcase the best and brightest in Texas research, whose creative work could have a lasting impact on our lives. Their work meets the highest standards of science, and the paths to their discoveries show immense ingenuity and imagination. The awards are named in honor of Edith and Peter O'Donnell, who are among Texas' staunchest advocates for excellence in scientific advancement and STEM education.

## TEXAS' RISING STAR RESEARCHERS 2017 O'Donnell Awards Recipients



#### Meng Wang, Ph.D. Associate Professor, Department of Molecular and Human Genetics, Baylor College of Medicine

## ENGINEERING

Andrew K. Dunn, Ph.D. Professor of Biomedical Engineering and Donald J. Douglass Centennial Professor of Engineering, The University of Texas at Austin

## Daniel I. Bolnick, Ph.D.

Professor of Integrative Biology and Chair of the Graduate Program in Ecology Evolution and Behavior, The University of Texas at Austin









#### MEDICINE: Meng Wang, Ph.D.

Dr. Wang is an associate professor of molecular and human genetics at Baylor College of Medicine. As humans live longer, Wang's work looks at how to improve our "health span" in addition to our lifespan. Through her unique studies of worms, she has discovered new genetic and molecular insights into how humans age. She's also exploring natural compounds to develop therapies that could result in healthier aging.

"Dr. Wang is a bright, wonderful, passionate scientist, with a curiosity about problems that are really important for general health," says Huda Zoghbi, M.D., professor of molecular and human genetics at Baylor College of Medicine. "Through her innovative genetic and technological approaches, she's really provided beautiful insight about some pathways that regulate health and longevity. She's discovered a totally independent way to affect life span."



ENGINEERING: Andrew K. Dunn, Ph.D.

Dr. Dunn is professor and director of the center for emerging imaging technologies at The University of Texas at Austin. He has developed technology that allows us to see things we haven't seen before in the human brain. Through his laser speckle imaging technique, we can now see blood flowing in the brain in real time, allowing us to see where clots are forming. This allows neurosurgeons to easily identify areas suffering from reduced blood flow and prevent strokes.

"He has developed this magnificent laboratory and exceptional research. He's been able to use advanced optical techniques to really see the very early stages of clots in the brain. This was not possible before he started working on it," says Nicholas Peppas, Sc.D., Cockrell Family Regents Chair in Engineering No. 6, Family Chair for Department Leadership No. 1 and professor of Chemical Engineering at The University of Texas at Austin.



**SCIENCE: Daniel I. Bolnick, Ph.D.** 

Dr. Bolnick is a professor of integrative biology at The University of Texas at Austin. His work has deepened our understanding of how evolution and ecology intersect. His work often takes him out in the natural world, including yearly trips to Canada to study parasite resistance in fish. By understanding how some fish are resistant to parasites, we could achieve a better understanding of our own immune systems, which could lead to better treatments for everything from allergies to Crohn's Disease.

"It's this synthesis of ecology and evolution that's enabled him to open up a whole new area. This environment he's created for himself is really rich and ripe for the possibilities of discovery," says Daniel Jaffe, Ph.D., vice president for research at The University of Texas at Austin. "He's really broken new ground across a very broad field that has a lot of impact."



#### **KAY BAILEY HUTCHISON DISTINGUISHED SERVICE AWARD**

The Academy of Medicine, Engineering and Science of Texas (TAMEST) is pleased to recognize Exxon Mobil Corporation with the Kay Bailey Hutchison Distinguished Service Award, in appreciation of their steadfast support of TAMEST and research in Texas.

"ExxonMobil's support has been truly beneficial to our organization," says TAMEST President David W. Russell, vice provost & dean of basic research at The University of Texas Southwestern Medical Center. "Under the leadership of Chairman and CEO Rex Tillerson, ExxonMobil has been an active and consistent partner to our organization by sponsoring TAMEST events and initiatives. XTO President Sara Ortwein has also been a constant champion of TAMEST and rising star researchers in Texas, and ExxonMobil has been a leader furthering STEM education in Texas and across the nation. We're honored to recognize ExxonMobil for their <u>contributions to TAMEST</u> and the research community in Texas."

The Kay Bailey Hutchison Distinguished Service Award was established in 2013 to recognize individuals and organizations that have demonstrated outstanding leadership in furthering TAMEST's mission. Senator Hutchison was the inaugural recipient in 2013, recognized for her role in founding TAMEST. Other recipients of the award include Peter O'Donnell, Jr., Dr. Larry Faulkner and Kenny Jastrow. This is the first TAMEST award recognizing an organization.

#### **CELEBRATING TAMEST'S NEWEST MEMBERS**

In 2016, TAMEST welcomed 21 new members, bringing the total number of members to 286. Of these new members, ten were elected to one of the National Academies in 2016, and 11 became members through their relocation to Texas.

#### NATIONAL ACADEMY OF MEDICINE



#### Malcolm K. Brenner, M.D., Ph.D.

NATIONAL ACADEMY OF MEDICINE: 2016 Founding Director, Center for Cell and Gene Therapy Fayez Sarofim Distinguished Service Professor Baylor College of Medicine

Dr. Brenner is a clinician-scientist who pioneered basic and clinical research focused on use of gene transfer to augment the immune response to tumors. His contributions have led to the development of genetically modified T cells that can safely and effectively target cancer tumors.

His clinical research interests span many aspects of stem cell transplantation, using genetic manipulation of cultured cells to obtain therapeutic effects. Efforts in his laboratory to analyze the cell of origin when relapse occurs in patients with acute myelogenous leukemia led Dr. Brenner's team to be the first to label autologous bone marrow cells genetically after purging, prior to being reintroduced to the patient. He is now studying the use of gene-modified T lymphocytes for prevention and treatment of Hodgkin and non-Hodgkin lymphoma, lung cancer, nasopharyngeal cancer and neuroblastoma, and has developed and clinically tested safety switches to reduce the toxicity of these cells.

He served as editor-in-chief of *Molecular Therapy* and a former president of the American Society for Gene and Cell Therapy (ASGCT) and the International Society for Cell Therapy. He has won many awards for his work, including the ASGCT Outstanding Achievement Award, the American Society of Hematology Mentor Award and the Pioneer Award from the peer-reviewed journal *Human Gene Therapy* in recognition of his scientific achievements and leadership in the field.



#### William Tierney, M.D.

NATIONAL ACADEMY OF MEDICINE: 2006 Inaugural Chair of Department of Population Health Professor of Population Health Dell Medical School at The University of Texas at Austin

Dr. Tierney is a general

internist and medical informaticist who currently serves as chair of the Department of Population Health in the Dell Medical School at The University of Texas at Austin. He and his department are playing a leading role in the Dell Medical School's mission to help Austin become a model healthy city.

Areas of focus for the Department of Population Health will include Community Engagement and Public Health, Primary Care & Value-Based Health, Occupational Health, Global Health, Health Information and Data Analytic Sciences, Community-Based and Health Services Research, and leading the Dell Medical School's teaching focus on population health.

Dr. Tierney is a primary care physician, a member of the National Academy of Medicine, and a Master of the American College of Physicians. Prior to joining the Dell Medical School, he served as President and CEO of the Regenstrief Institute, Inc. in Indianapolis, and held the Sam Regenstrief Professor of Health Services Research at the Indiana University School of Medicine where he also served as Associate Dean for Clinical Effectiveness Research and Chief of Internal Medicine for Eskenazi Health, the nation's fourth largest safety net health system.



#### Cheryl Lyn Walker, Ph.D.

NATIONAL ACADEMY OF MEDICINE: 2016 Director, Center for Precision Environmental Health Professor, Departments of Molecular and Cell Biology and Medicine Baylor College of Medicine

Dr. Walker is the director of the Center for Precision Environmental Health at Baylor College of Medicine, where she holds the Alkek Presidential Chair and is a professor in the Departments of Molecular & Cell Biology and Medicine. She also currently directs the NIEHS Center for Translational Environmental Health Research (CTEHR), and serves on the Board of Scientific Advisors for the National Cancer Institute. Dr. Walker is an international leader in environmental carcinogenesis, and elucidating molecular mechanisms of disease. Her studies on the role of the epigenome in geneenvironment interactions have yielded signifiant insights into mechanisms by which early life exposures influence health and disease across the lifecourse. Her work has also led to the discovery of new tumor suppressor functions in the cell, and a dual role for the cell's epigenetic machinery in regulating both chromatin and the cytoskeleton.

Dr. Walker earned her B.A. in 1977 from the University of Colorado-Boulder in Molecular, Cellular and Developmental Biology, and a Ph.D. in 1984 in Cell Biology from The University of Texas Southwestern Medical School, with additional post-doctoral training as a staff fellow at National Institute of Environmental Health Sciences. She has been recognized with the Dallas-Ft. Worth Living Legend Faculty Achievement Award in Basic Research from The University of Texas MD Anderson Cancer Center, the Cozarrelli Prize from the National Academy of Sciences, the 2015 Outstanding Distinguished Scientist Award from Sigma Xi and the 2016 Leading Edge in Basic Research Award from the Society of Toxicology. Dr. Walker has been named a University Distinguished Professor at Texas A&M University, and is a fellow of the Academy of Toxicological Sciences and the AAAS, and in 2016 was elected to the National Academy of Medicine. She is a past president of the Society of Toxicology, past president of Women in Cancer Research of the AACR, and has held numerous leadership and service positions on advisory boards for the Institute of Medicine, NCI and other NIH Institutes.

#### NATIONAL ACADEMY OF ENGINEERING



#### Satya N. Atluri, Sc.D.

NATIONAL ACADEMY OF ENGINEERING: 1996 Director, Center for Advanced Research in the Engineering Sciences Whitacre College of Engineering Texas Tech University

Dr. Atluri's widely-cited research reveals the workings of complex biological and mechanical systems. His work has focused on improving the safety of helicopters by developing a mathematical model to better predict the failure of rotors and other major components, and research on integrated materials science, mathematics, modeling and engineering of the materials genome.

He is a fellow of the American Academy of Mechanics, the American Institute of Aeronautics and Astronautics, the American Society of Mechanical Engineers, the Aeronautical Society of India, and the Chinese Society of Theoretical and Applied Mechanics, as well as an honorary fellow of the International Congress on Fracture.

The American Society of Mechanical Engineers awarded the Nadai Medal, the highest award presented by the society's Materials Division, to Dr. Atluri in 2012 for his contributions to and achievements in materials engineering. Dr. Atluri has received numerous medals and other honors from the National Academy of Engineering, the American Institute of Aeronautics and Astronautics, the American Society of Civil Engineers, the Federal Aviation Administration, the Society of Engineering Science and the Greek National Association of Computational Mechanics.



#### Joan Frances Brennecke, Ph.D.

NATIONAL ACADEMY OF ENGINEERING: 2012 Professor, McKetta Department of Chemical Engineering The University of Texas at Austin

Dr. Brennecke will be a professor in the McKetta Department of Chemical Engineering and holder of an endowed chair at The University of Texas at Austin (UT Austin) starting August 1, 2017. Currently, she is the Keating-Crawford Professor of Chemical and Biomolecular Engineering at the University of Notre Dame.

Her interests are in the development of more environmentally friendly solvents and processes. Of particular interest is the use of ionic liquids and carbon dioxide for extractions, separations, and reactions. As a member of the UT Austin faculty, she will conduct research and engage in the teaching and training of graduate and undergraduate students.

Dr. Brennecke's research will focus on energy and sustainability, including the design of ionic liquid systems for gas and liquid separations, use in co-fluid vapor-compression refrigeration systems, and for safer, more reliable and longer-lasting batteries. Dr. Brennecke will work closely with the university's office of technology commercialization to facilitate technology transfer from her lab to the marketplace thus benefiting the university and the state of Texas.



#### Frederick R. Chang, Ph.D.

NATIONAL ACADEMY OF ENGINEERING: 2016 Director, Darwin Deason Institute for Cyber Security Southern Methodist University

Dr. Chang is the director of the Darwin Deason Institute for Cyber Security and the Bobby B. Lyle Centennial

Distinguished Chair in Cyber Security at Southern Methodist University (SMU). He is also a senior fellow in the John Goodwin Tower Center for Political Studies in SMU's Dedman College and a distinguished scholar in the Robert S. Strauss Center for International Security and Law at The University of Texas at Austin. Dr. Chang has also served as director of research at the National Security Agency. Dr. Chang has been awarded the National Security Agency Director's Distinguished Service Medal. He has served as a member of the Commission on Cyber Security for the 44th Presidency and as a member of the Computer Science and Telecommunications Board of the National Academies. He has also served on National Academies committees and is currently a member of the Intelligence Science and Technology Experts Group of the National Academies of Sciences, Engineering, and Medicine.

He is the lead inventor on two U.S. patents and has twice served as a cyber security expert witness at hearings convened by the U.S. House of Representatives Committee on Science, Space and Technology.



#### Basil Louis Joffe, Ph.D.

NATIONAL ACADEMY OF ENGINEERING: 2016 Senior Operations Research Consultant Spiral Software

Dr. Joffe is Senior Operations Research Consultant at Spiral Software. He has previously served as vice

president of technology at Aspen Technology and CEO of Basil Joffe Associates Inc.

Dr. Joffe was awarded the 2006 Computing Practice Award by the Computing & Systems Technology Division of the American Institute of Chemical Engineers (AIChE) for his role in developing innovative planning systems for the process industries.

In 1984, Dr. Joffe introduced to the market PIMS (Processing Industry Modeling System), the first personal computerbased application for optimized production planning, which revolutionized the planning function for the process industries worldwide.

Dr. Joffe was elected to the National Academy of Engineering in 2016 for "for leadership in optimizationbased production planning systems for the petroleum and petrochemical industry." Dr. Joffe received his doctorate in Process Control Engineering from the Imperial College of Science and Technology, University of London and studied chemical engineering at the University of Cape Town.





#### David R. Maidment, Ph.D.

NATIONAL ACADEMY OF ENGINEERING: 2016 Hussein M. Alharthy Centennial Chair in Civil Engineering Professor, Department of Civil, Architectural and Environmental Engineering The University of Texas at Austin

Dr. Maidment is the Hussein M. Alharthy Centennial Chair in Civil Engineering at The University of Texas at Austin (UT Austin), where he has been on the faculty since 1981. He received his Bachelor's degree in Agricultural Engineering with First Class Honors from the University of Canterbury, Christchurch, New Zealand, and his M.S. and Ph.D. degrees in Civil Engineering from the University of Illinois at Urbana-Champaign.

Prior to joining the faculty at UT Austin, he was a research scientist at the Ministry of Works and Development in New Zealand, and at the International Institute for Applied Systems Analysis in Vienna, Austria, and he was also a Visiting Assistant Professor at Texas A&M University. Dr. Maidment is a specialist in surface water hydrology, and in particular in the application of geographic information systems to hydrology. In 2016, he was elected to the National Academy of Engineering "for development of geographic information systems applied to hydrologic processes."



#### **Richard Miles, Ph.D.**

NATIONAL ACADEMY OF ENGINEERING: 2011 TEES Distinguished Research Professor Aerospace Engineering and Mechanical Engineering Departments Texas A&M University

Dr. Miles is currently Robert Porter Patterson Professor Emeritus and Senior Scholar at Princeton University and is a member of the National Academy of Engineering. He will establish and lead a Center of Excellence in Interdisciplinary Optical and Laser Detection Systems for National Security and Safety at Texas A&M University beginning this year.

His research interests include hypersonics and advanced laser diagnostics with particular attention to the use of lasers, microwaves and electron beams for energy transfer and flow control. One such application of his innovative research is the development of state-of-the-art instrumentation for remote detection that will identify hazardous gases and dangerous contaminants such as anthrax or the Ebola virus, hidden explosives such as IEDs, and/or greenhouse gases and pollutants.



#### Thomas J. Overbye, Ph.D.

NATIONAL ACADEMY OF ENGINEERING: 2013 Professor, Department of Electrical and Computer Engineering Texas A&M University

Dr. Overbye is the Fox Family Professor of Electrical and

Computer Engineering at the University of Illinois at Urbana-Champaign (UIUC). In the fall of 2017, he will begin teaching in the Department of Electrical and Computer Engineering on topics related to power distribution and generation.

His research interests are in the domains of Smart Grid Cyber Security, Renewable Electric Energy Systems, Power System Visualization, Power System Analysis by Computer Methods, Power System Stability, and Power Systems Operation and Control.

He received his B.S., M.S., and Ph.D. degrees in Electrical Engineering from the University of Wisconsin-Madison in 1983, 1988 and 1991, respectively. Prior to joining UIUC, he was employed with Madison Gas and Electric Company from 1983 to 1991.

He served on the U.S. DOE Power Outage Study Team in 1999, helped with their National Transmission Grid study in 2002, and served on the August 14, 2003, Blackout Investigation team. Dr. Overbye is the original developer of PowerWorld Simulator, an innovative software package for power system analysis and visualization, and a co-founder of PowerWorld Corporation. He is also the recipient of the Alexander Schwarzkopf Prize for Technological Innovation and a University of Wisconsin-Madison College of Engineering Distinguished Achievement Award.



#### George M. Pharr IV, Ph.D.

NATIONAL ACADEMY OF ENGINEERING: 2014 Professor, Department of Materials Science and Engineering Texas A&M University

Dr. Pharr's research interests include nanoindentation and nanomechanical testing;

thin film and small-scale mechanical behavior; mechanisms of fracture and flow in solids; and finite element modeling of indentation contact. At Texas A&M University, he will teach at both the graduate and undergraduate levels on nanomaterials and mechanical behavior of solids.

He received ASM International's Bradley Stoughton Award for Young Teachers of Metallurgy in 1985. His honors also include the Amoco Award for Superior Teaching at Rice University and the Innovation in Materials Characterization Award of the Materials Research Society. He is a fellow of ASM International, the Materials Research Society, and TMS.

He has chaired or co-chaired many large professional society meetings including the Gordon Research Conference on Thin Film Mechanical Behavior, which he co-founded in 1998. He is an author or co-author of more than 220 scientific publications, including four book chapters, and a Thomson ISI "Highly Cited Researcher in Materials Science."

He previously served as the Chancellor's Professor and McKamey Professor of Engineering at the University of Tennessee, where he also held a joint faculty position in the Materials Science and Technology Division at the Oak Ridge National Laboratory.



#### Andrea Prosperetti, Ph.D.

NATIONAL ACADEMY OF ENGINEERING: 2012 Distinguished Professor of Mechanical Engineering Cullen College of Engineering University of Houston

Dr. Prosperetti leads the multidisciplinary Center for

Advanced Computing and Data Systems, which applies highperformance computing to applications including energy, infrastructure, aerospace, health and national security. He is known for his work involving fluid mechanics, specifically multiphase flows. highest award in his field, the Fluid Dynamics Prize. Since 2008, he has served as editor-in-chief of the *International Journal of Multiphase Flow* and serves on the editorial board of the *Annual Review of Fluid Mechanics*. He also serves part time as the Gerrit Berkhoff Professor of applied physics at the University of Twente in The Netherlands.

He earned an M.S. in 1972 and a Ph.D. in engineering science in 1974 from the California Institute of Technology.

He is the single author of approximately 40 papers and coauthor of over 160 others. He previously was the Charles A. Miller, Jr. Distinguished Professor of Mechanical Engineering at Johns Hopkins University.



#### **Ann Beal Salamone**

NATIONAL ACADEMY OF ENGINEERING: 2016 President Rochal Industries LLC

Ann Beal Salamone is president of Rochal Industries LLC, a private research company which develops new

biomaterials for wound and burn care. She has developed products for electronics, water purification, personal care and healthcare and has invested in, and served on, the boards for several entrepreneurial companies as well as cofounded six companies.

During her tenure as vice president of EDC (a South Florida science & technology incubator), EDC's clients increased aggregate revenues by more than \$98 million, raised more than \$74 million in outside funding and created 5,013 jobs.

She was elected chairman of ACS's Polymer Division (8,000 members), and is a co-founder of the Intersociety Polymer Education Council, which has provided hands-on in-services to over 500,000 K-12 science teachers since 1991.

She is an inaugural fellow of ACS and a fellow of AIMBE, the recipient of the 2002 Crystal Slipper Award "Executive Woman of the Year" and a recipient of the 2011 Healthcare Businesswomen's Association LEAD Award. She is a member of the UTSA Biomedical Engineering Advisory Board, a member of three UTHSCSA Advisory Boards related to translational clinical science and community health and a member of BioMed SA.

Salamone was elected to the National Academy of Engineering in 2016 "for development of materials for biomedical applications, personal care, electronics, and water purification."

In 2003, the American Physical Society honored him with the



#### Bridget R. Scanlon. Ph.D.

NATIONAL ACADEMY OF ENGINEERING: 2016 Senior Research Scientist, Bureau of Economic Geology The University of Texas at Austin

Dr. Scanlon is a Senior Research Scientist at the

Bureau of Economic Geology in the Jackson School of Geosciences at The University of Texas at Austin (UT Austin). Dr. Scanlon has conducted research at UT Austin since 1987.

Her research focuses primarily on hydrogeology, with an emphasis on groundwater resources using remote sensing, modeling and field studies. Her recent research evaluates the interdependence of water and energy for power generation in Texas and also water use in hydraulic fracturing for shale oil and gas development.

Dr. Scanlon received her Ph.D. in Geology from the University of Kentucky. She is the recipient of numerous awards, including the Publication Award of the Bureau of Economic Geology and Joseph C. Walter Jr. Excellence Award, Jackson School of Geosciences. She is a fellow of the American Geophysical Union.

She was elected to the National Academy of Engineering in 2016 for "contributions to the evaluation of groundwater recharge and aquifer depletion."



#### Ganesh C. Thakur. Ph.D.

NATIONAL ACADEMY OF ENGINEERING: 2016 Distinguished Professor of Petroleum Engineering Director of Energy Industry Partnership Cullen College of Engineering University of Houston

Dr. Thakur is recognized globally as a leader in various aspects of oil and gas reservoir management, including reservoir engineering, water flood management, and EOR and has designed, developed and implemented complex projects around the world for Chevron. He has written several Society of Petroleum Engineers (SPE) publications on these topics, three books, and a video series. He has also mentored many professionals and taught around the world.

During a career with Chevron that spanned four decades, Dr. Thakur served in various roles including vice president of technology, as global advisor and as a Chevron Fellow. He also served as the SPE President in 2012.

He earned his Ph.D. in petroleum and natural gas engineering from Pennsylvania State University in 1973. One year earlier, he received his M.A. in mathematics and his M.S. in petroleum and natural gas engineering two years earlier, both from Penn State. He holds a 1980 MBA from Houston Baptist University. Dr. Thakur received his B.S. Honors with the first rank from IIT (Indian School of Mines).

Dr. Thakur also serves as Director for Energy Industrial Partnerships at the University of Houston. This center represents efforts in upstream and midstream as they apply to important applications.

#### NATIONAL ACADEMY OF SCIENCES



#### Leif Andersson, Ph.D.

NATIONAL ACADEMY OF SCIENCES: 2012 Professor, Department of Veterinary Integrative Biosciences College of Veterinary Medicine and Biomedical Sciences Texas A&M University

Dr. Andersson has made a number of contributions to the field of genetics, which have applications in veterinary medicine and agriculture. Additionally, he has published more than 370 scientific articles and has received six patents and filed applications for two more.

He has discovered numerous gene variants explaining the rich phenotypic diversity among domestic animals. For instance, he discovered a gene variant that is responsible for the ability of some horses, such as the Paso Fino and Tennessee Walker, to move with a smooth ambling gait. Additionally, in recent papers published in *Nature* and *Science*, he identified genes responsible for variation in beak shape in Darwin's finches.

Dr. Andersson has also been uniquely elected to four major scientific royal societies in Sweden (Royal Swedish Society for Agriculture and Forestry, the Royal Swedish Academy of Sciences, Royal Society of Sciences in Uppsala and the Royal Physiographic Society in Lund) and was elected as a Foreign Member of the U.S. National Academy of Sciences. He has received numerous other prizes: the Wolf prize in Agriculture, the Thureus Prize in Natural History and Medicine from the Royal Society of Sciences, the Linnaeus Prize in Zoology

from the Royal Physiographic Society in Lund, the Hilda and Alfred Eriksson's Prize in Medicine from the Royal Swedish Academy of Sciences, and the Olof Rudbeck Prize from Upsala Medical Society.



#### Bonnie Bartel, Ph.D.

NATIONAL ACADEMY OF SCIENCES: 2016 Ralph and Dorothy Looney Professor Department of BioSciences Rice University

Dr. Bartel's research in plant biology has led to a new

and deeper understanding of how plants produce and use hormones and how they sequester oxidative metabolism in subcellular compartments known as peroxisomes. She is known for her work in fundamental areas of plant biology the regulation of the growth hormone auxin, the presence and functions of plant microRNAs and the roles and dynamics of peroxisomes.

She was elected to the American Academy of Arts and Sciences in 2013 and is a fellow of both the American Association for the Advancement of Science and the American Society of Plant Biologists. Dr. Bartel's mentoring was recognized in 2011 with Rice's Presidential Mentoring Award; her teaching received recognition in 2006 when she was named a Howard Hughes Medical Institute (HHMI) Professor and awarded a \$1 million HHMI grant to build new programs at Rice that integrate undergraduate teaching with research.

She has authored or co-authored more than 90 peerreviewed studies, commentaries and book chapters. She is a past member of the board of directors of the Genetics Society of America and a current member of the board of trustees of the American Society of Plant Biologists.



#### Maurice Brookhart, Ph.D.

NATIONAL ACADEMY OF SCIENCES: 2001 Professor of Chemistry University of Houston

Dr. Brookhart received his B.A. degree in 1964 from Johns Hopkins University and his Ph.D. degree in organic

chemistry from UCLA in 1968. Following a NATO postdoctoral appointment at the University of Southampton, he joined

the chemistry faculty of The University of North Carolina. After retiring from UNC in 2014 he joined the Chemistry Department at UH in September 2015.

Dr. Brookhart is noted for his fundamental research on the synthetic and mechanistic chemistry of compounds containing metal-carbon bonds, species known as organometallic complexes. His current research focuses on developing new organometallic catalysts for linking together olefins in a process known as olefin polymerization to produce new polymers and plastics. A second project involves developing catalysts to break and functionalize inert carbon-hydrogen bonds as a means to convert simple hydrocarbons derived from natural gas and petroleum to value-added materials.

Dr. Brookhart has received four national American Chemistry Society Awards: the ACS Award in Organometallic Chemistry, the Arthur C. Cope Award, the ACS Award in Polymer Chemistry and the ACS Gabor A. Somorjai Award for Creative Research in Catalysis as well as the Gibbs Medal in 2010.



#### James J. Bull, Ph.D.

NATIONAL ACADEMY OF SCIENCES: 2016 Johann Friedrich Miescher Regents Professor in Molecular Biology Department of Integrative Biology The University of Texas at Austin

Dr. Bull's research focuses on evolutionary genetics, from the molecular level through to the physical expression of genes in organisms. He investigates such topics as the evolution of engineered genomes, the evolution of drug resistance in microbes and how organisms adapt, both in theory and experimentally.

Dr. Bull was previously elected as a fellow of the American Academy of Arts & Sciences. He received his Ph.D. in biology from the University of Utah, Salt Lake City, in 1977. He is a member of the University's Center for Computational Biology and Bioinformatics and Institute for Cellular and Molecular Biology.



#### John Suppe, Ph.D.

NATIONAL ACADEMY OF SCIENCES: 1995 Distinguished Professor Department of Earth and Atmospheric Sciences University of Houston

Dr. Suppe was previously a distinguished chair and research professor at National

Taiwan University and has been a member of the U.S. National Academy of Sciences since 1995. In the Earth and Atmospheric Sciences department, he will establish and lead the multidisciplinary Center for Tectonics and Tomography at the University of Houston. This center will yield fundamentally new insights into the interaction of past plate motions and the global circulation of the Earth's mantle.

Dr. Suppe received his B.A. from the University of California, Riverside in 1965 and his Ph.D. from Yale University in 1969. He joined the Princeton University faculty in 1971 and was chairman of the Department of Geology from 1991 to 1993. He transferred to emeritus status and moved to Taiwan where he became a distinguished chair and research professor at the National Taiwan University in 2007.

His research specialties are structural geology and tectonics, and he is best known for his work on "fault-related folding" theories with his two classical papers "Geometry and kinematics of fault-bend folding" and "Geometry and kinematics of faultpropagation folding." Additionally, Dr. Suppe is also well known for his extensive work on the formation of mountain belts with examples from California, Taiwan and China.

#### **THE ROYAL SOCIETY**



#### Girish Saran Agarwal, Ph.D.

THE ROYAL SOCIETY: 2008 Professor, Department of Biological and Agricultural Engineering Texas A&M University

Dr. Agarwal is distinguished for his pioneering work in

theoretical quantum optics, particularly the non-classical properties of light and its interaction with atoms. He published seminal papers on the use of phase space and master equations in quantum optics. He was one of the first to recognize that quantum interferences could be used to modify dissipative processes in quantum optics, a key part of current work on "slow light" and developed theoretical tools to address problems in open system dynamics now in use worldwide. He was director of the Physical Research Laboratory in Ahmedabad and has nurtured an internationally respected school of quantum optics in India over the past 30 years.

Dr. Agarwal joined Texas A&M University on September 1, 2016. Before that, he was the Noble Foundation Chair and Regents Professor at Oklahoma State University. He is a member of The Royal Society in the United Kingdom. His research is in theoretical quantum optics, particularly the interaction of laser light with atoms, and in developing applications for this technology. These applications will permit the identification of chemical compounds and will form the basis to detect pathogens and chemicals at a distance.

## PROTÉGÉS

Protégés are invited to attend the conference as special guests of TAMEST Members.



I. Yucel Akkutlu, Ph.D. Assistant Professor Petroleum Engineering Texas A&M University Stephen A. Holditch, Ph.D.



Raymundo Arroyave, Ph.D. Associate Professor Department of Materials Science and Engineering Texas A&M University Alan Needleman, Ph.D.



**Debjyoti Banerjee, Ph.D.** Professor; Faculty Fellow Texas A&M University *Akhil Datta-Gupta, Ph.D.* 



**Robert C. Bast Jr., M.D.** Vice President for Translational Research The University of Texas MD Anderson Cancer Center *David Piwnica-Worms, M.D., Ph.D.* 



**Oguzhan Bayrak, Ph.D.** Civil, Architectural and Environmental Engineering Department The University of Texas at Austin James O. Jirsa, Ph.D.



Kapil N. Bhalla, M.D. Professor, Leukemia Department The University of Texas MD Anderson Cancer Center *Neal Copeland, Ph.D.* 



**Sibani Lisa Biswal, Ph.D.** Associate Professor, CHBE Rice University *George J. Hirasaki, Ph.D.* 



Klaus Brun, Ph.D. Southwest Research Institute H. Norman Abramson, Ph.D.



Radek K. Bukowski, M.D., Ph.D. Associate Chair for Investigation and Discovery, Department of Women's Health Dell Medical School The University of Texas at Austin *William M. Sage, M.D., J.D.* 



Patricia Calvo, Ph.D. Scientist Rochal Industries, LLC Joseph C. Salamone, Ph.D.

Richard L. Corsi, Ph.D.







Sharon Y.R. Dent, Ph.D. Professor and Chair Department of Epigenetics and Molecular Carcinogenesis The University of Texas MD Anderson Cancer Center *Ronald A. DePinho, M.D.* 



Kasey Faust, Ph.D. Assistant Professor Department of Civil, Architectural and Environmental Engineering The University of Texas at Austin *Richard L. Tucker, Ph.D.* 





## PROTÉGÉS





Harry Swinney, Ph.D. Irene M. Gamba, Ph.D. W.A. 'Tex' Moncrief, Jr. Chair in Computational Engineering and Sciences III Department of Mathematics The University of Texas at Austin Thomas J.R. Hughes, Ph.D.

The University of Texas at Austin

Ernst-Ludwig Florin, Ph.D.

Associate Professor

**Department of Physics** 



Jonathan Gelfond M.D., Ph.D. Associate Professor Department of Epidemiology and Biostatistics The University of Texas Health Science Center at San Antonio *Amelie G. Ramirez, Dr.P.H., M.P.H.* 



Bruce Gnade, Ph.D. Professor

Materials Science and Engineering The University of Texas at Dallas Don W. Shaw, Ph.D.



Nick V. Grishin, Ph.D. Professor Biophysics The University of Texas Southwestern Medical Center Johann Deisenhofer, Ph.D.



Jaime C. Grunlan, Ph.D. Linda & Ralph Schmidt '68 Professor of Mechanical Engineering Department Mechanical Engineering Texas A&M University J.N. Reddy, Ph.D.



**Teja Guda, Ph.D.** Assistant Director Center for Innovation and Technology Entrepreneurship The University of Texas at San Antonio *Rena Bizios, Ph.D.* 



Paul Hand, Ph.D. Assistant Professor Computational and Applied Mathematics Rice University *Richard A. Tapia, Ph.D.* 



Donald Hilgemann, Ph.D.

Professor Department of Physiology The University of Texas Southwestern Medical Center David W. Russell, Ph.D.



Ibrahim Karaman, Ph.D. Head and Chevron Professor I Department of Materials Science & Engineering Texas A&M University Alan Needleman, Ph.D.



**Rajesh Khare, Ph.D.** Professor, Chemical Engineering Texas Tech University *Chau-Chyun Chen, Sc.D*.



Julie La Barba, M.D. Medical Director, Culinary Health Education for Familie (CHEF) Assistant Professor, Department of Pediatrics Baylor College of Medicine The Children's Hospital of San Antonio *Fernando A. Guerra, M.D.* 

Associate Professor of Chemistry &

**Electrical and Computer Engineering** 





**Cin-Ty A. Lee, Ph.D.** Professor and Department Chair Earth Science Rice University Peter I. Rossky. Ph.D.



Peter J. Rossky, Ph.D. Kelly X. Leung, Ph.D. Senior Scientist

Christy Landes, Ph.D.

Rice University Robert F. Curl, Ph.D.

## PROTÉGÉS



Charles Lin, Ph.D. Assistant Professor Molecular and Human Genetics Baylor College of Medicine Brendan Lee, M.D., Ph.D.



**Stephan Link, Ph.D.** Associate Professor Chemistry and Electrical and Computer Engineering Rice University *Robert F. Curl, Ph.D.* 



Nathaniel Lynd, Ph.D. Assistant Professor McKetta Department of Chemical Engineering The University of Texas at Austin *C. Grant Willson, Ph.D.* 



Elisabeth Martinez, Ph.D. Assistant Professor Pharmacology The University of Texas Southwestern Medical Center David J. Mangelsdorf, Ph.D.



**Rebecca McMahon, Ph.D.** Senior Scientist Rochal Industries, LLC *Ann Beal Salamone* 



Stathis Michaelides, Ph.D., P.E. Professor and W. A. Tex Moncrief Chair of Engineering Department of Engineering Texas Christian University *Karl J. Springer* 



Michael R. Moreno, Ph.D. Assistant Professor Department of Mechanical Engineering and Biomedical Engineering Texas A&M University J.N. Reddy, Ph.D.



Robert D. Moser, Ph.D. Professor Department of Mechanical Engineering The University of Texas at Austin J. Tinsley Oden, Ph.D.



Margaret Phillips, Ph.D. Professor and Chair Biochemistry The University of Texas Southwestern Medical Center Melanie H. Cobb, Ph.D.



**Guan Qin, Ph.D.** Associate Professor and Gulf Coast Section of Society of Petroleum Engineers University of Houston *Christine A. Ehlig-Economides, Ph.D.* 





Jeffrey Rogers, Ph.D. Associate Professor Human Genome Sequencing Center Baylor College of Medicine *Richard A. Gibbs, Ph.D*.

**Badri Roysam, D.Sc.** Chair, Electrical & Computer Engineering Department Cullen College of Engineering University of Houston *Kaushik Rajashekara, Ph.D.* 



Shelly Elese Sakiyama-Elbert, Ph.D. Department Chair and Professor Biomedical Engineering The University of Texas at Austin *Nicholas A. Peppas, Sc.D.* 

Simmons Comprehensive Cancer Center The University of Texas Southwestern





Richard D. Wood, Ph.D. Professor

Daniel Siegwart, Ph.D.

Melanie H. Cobb, Ph.D.

Assistant Professor

**Medical Center** 

Department of Epigenetics & Molecular Carcinogenesis The University of Texas MD Anderson Cancer Center *Helen Piwnica-Worms, Ph.D.* 



Le Xie, Ph.D. Associate Professor Department of Electrical & Computer Engineering Texas A&M University Christine A. Ehlig-Economides, Ph.D.

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Michael S. Brown, M.D. (NAM, NAS) Nobel Prize in Physiology or Medicine, 1985 | The University of Texas Southwestern Medical Center | TAMEST Founding Co-chair

Robert F. Curl, Ph.D. (NAS) Nobel Prize in Chemistry, 1996 | Rice University

Johann Deisenhofer, Ph.D. (NAS) Nobel Prize in Chemistry, 1988 | The University of Texas Southwestern Medical Center

Joseph L. Goldstein, M.D. (NAM, NAS) Nobel Prize in Physiology or Medicine, 1985 | The University of Texas Southwestern Medical Center

Dudley R. Herschbach, Ph.D. (NAS) Nobel Prize in Chemistry, 1986 | Texas A&M University

Russell A. Hulse, Ph.D. Nobel Prize in Physics, 1993 | The University of Texas at Dallas

David M. Lee, Ph.D. (NAS) Nobel Prize in Physics, 1996 | Texas A&M University

Steven Weinberg, Ph.D. (NAS) Nobel Prize in Physics, 1979 | The University of Texas at Austin

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General conference programming will take place in the Navarro ballroom. Lunches and O'Donnell Awards dinner will be held in the Hidalgo Ballroom.



WI-FI

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# SAVE THE DATE 2018 TAMEST Annual Conference The Space Beyond: Aerospace Opportunities in Texas January 10-12, 2018



SOUTH SHORE HARBOUR RESORT AND CONFERENCE CENTER • LEAGUE CITY, TEXAS



**Program Chair: Bonnie Dunbar, Ph.D. (NAE)** Texas A&M Engineering Experiment Station (TEES) Distinguished Research Professor Department of Aerospace Engineering Texas A&M University



TAMEST's 2018 Annual Conference will focus on the fundamental elements of space and aeronautics in Texas. *The Space Beyond: Aerospace Opportunities in Texas* will explore the potential in Texas for greater research and development in aerospace, specifically in areas of defense, human spaceflight, aeronautics and planetary research. The conference will take place just outside Houston in League City, Texas, near the NASA Johnson Space Center. Plan to be part of this unique opportunity to explore Texas' future in the space beyond.

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