



NATIONAL ACADEMY OF INVENTORS

NIAI

4TH
ANNUAL
CONFERENCE

MARCH 19-20

2015

California
Institute of
Technology
Pasadena

PROGRAM



 the
Lemelson foundation
years of improving lives through invention

Addressing Problems Worth Solving

The challenges we are confronting worldwide are both complex and daunting. In the next 20 years, the most important inventions will be those that address critical social and environmental issues, reaching and serving communities with the greatest needs. These inventions will deliver meaningful change, solve urgent problems, and create sustainable economic value for all.

The Lemelson Foundation focuses on problems that are *worth* solving—and not simply problems that *can* be solved. We recognize the need for a strong supportive invention ecosystem to make this happen. We seek to inspire inventors to know that they can make a difference. We work to ensure that the next generation of inventors can become agents of positive change.

Find out more about how we provide support to foster inventions to improve lives at:

www.lemelson.org/impactinventing



Distinguished Colleagues:

On behalf of the Board of Directors, it is my distinct pleasure to welcome you to the fourth annual meeting of the National Academy of Inventors, held this year at the California Institute of Technology and the Langham Huntington Hotel in Pasadena. In addition to a compelling program filled with outstanding speakers, our meeting sets the stage for our continued growth and future as an organization. We are grateful for the support of our sponsors and host institutions in making this conference possible. We thank our presenters, panelists, co-chairs, and the conference program committee for their hard work, and we thank you for being here.

We are delighted to welcome Steven Chu, Esther Takeuchi and Richard DiMarchi as our featured keynote speakers and look forward to hearing their insights on innovation. In addition, we are pleased to have Garrett Reisman, former NASA astronaut, as a featured speaker for our signature reception at the California Science Center. We are honored to have Andrew Faile, U.S. Deputy Commissioner for Patent Operations, once again as our keynote speaker for the NAI Fellows Induction Ceremony. We greatly value the strong relationship between the NAI and the USPTO and the initiatives upon which we collaborate, including the Smithsonian Institution and USPTO's 2015 Innovation Festival, for which we are honored to serve on the selection committee. The USPTO contributes an article to each issue of our quarterly journal, *Technology and Innovation*. Invited papers from this conference will be published in the journal, now in its sixth year.

This conference features the induction of the third class of NAI Fellows. On December 16, 2014, our distinguished Fellows Selection Committee elected 170 innovators to NAI Fellow status, representing 114 prestigious research universities and non-profit research institutes. Collectively, the new Fellows hold nearly 4,400 U.S. patents. With the induction of the 2014 class, there are now 414 Fellows, including 61 presidents and senior leadership of research universities and non-profit research institutes, 212 members of the other National Academies (NAS, NAE, IOM), 23 inductees of the National Inventors Hall of Fame, 16 recipients of the U.S. National Medal of Technology and Innovation, 10 recipients of the U.S. National Medal of Science, 21 Nobel Laureates, 11 Lemelson-MIT prize recipients, 112 AAAS Fellows, and 62 IEEE Fellows, among other awards and distinctions.

This past year has been one of accomplishment and recognition for the NAI. Last June, the NAI and the Intellectual Property Owners Association (IPO) released the *Top 100 Worldwide Universities Granted U.S. Utility Patents in 2013*. Based on data obtained from the U.S. Patent and Trademark Office, the list recognizes the important role patents play in university research and economic development. The 2014 rankings will be announced this summer. The NAI also weighed in on policy issues, including recognition of patents and commercialization activity for tenure and promotion in a white paper resulting from a panel at our 2013 annual meeting and published in *PNAS* (111(18), 6542-6547, 2014), and a paper on the intrinsic value of technology transfer in *Technology and Innovation* (16(1), 75-84, 2014). Both of these papers were co-authored by leadership from our member institutions. We also published correspondence on the importance of recognition for academic inventors in *Science* (346(6212), 928-929, 2014).

We continue to build strong connections with federal legislators, who annually recognize our NAI Fellows in the Congressional Record and have now submitted legislation in support of the NAI receiving a Congressional Charter. If your state's delegation has not yet signed on as co-sponsors, please contact Keara to join NAI's efforts to move the Charter forward.

Thank you for being part of the National Academy of Inventors. We applaud your accomplishments and look forward to another exciting year. Have a great meeting.

Sincerely,

Paul R. Sanberg, Ph.D., D.Sc., FNAI
President



SUMMARY AGENDA

Wednesday, March 18, 2015

2:00 – 4:00 PM	Tour of NASA's Jet Propulsion Laboratory
4:00 – 7:00 PM	NAI Board of Directors Meeting (Invitation Only)
5:00 – 9:00 PM	Early Conference Check-In
7:00 – 9:00 PM	President's Welcome Reception (All Invited to Attend)

Thursday, March 19, 2015

8:00 AM – 4:00 PM	Conference Check-In and Information Table
9:00 – 9:15 AM	Opening General Session
9:15 – 11:40 AM	Session A: <i>Transformative Invention</i>
9:30 – 10:05 AM	Keynote Address by Esther S. Takeuchi, Stony Brook University
10:00 – 11:30 AM	California Institute of Technology Architectural Tour
10:20 – 10:50 AM	State of the Academy Address by NAI President Paul R. Sanberg
10:50 – 11:40 AM	Panel 1: <i>Building a Strong Ecosystem for the Next Generation of Inventors and Invention-Based Businesses</i>
12:00 – 1:30 PM	Luncheon
1:30 – 2:00 PM	Break
2:00 – 4:00 PM	Session B: <i>From Discovery to Commercialization</i>
2:30 – 3:20 PM	Panel 2: <i>Changing the World: One Invention at a Time</i>
3:20 – 4:00 PM	Keynote Address by Steven Chu, Stanford University
3:00 – 4:30 PM	California Institute of Technology Architectural Tour
4:00 – 5:30 PM	Break before Dinner
5:30 – 6:00 PM	Buses depart the Langham Huntington Hotel for the California Science Center
6:30 – 10:00 PM	Signature Event: "To Infinity and Beyond" Reception California Science Center – Home of the Space Shuttle Endeavour
9:30 – 10:00 PM	Buses depart the California Science Center for the Langham Huntington Hotel

Friday, March 20, 2015

7:30 – 8:30 AM	<i>Technology and Innovation</i> Editorial Board Breakfast & Meeting (Invitation Only)
8:00 – 11:00 AM	Conference Check-In and Information Table
9:00 – 9:15 AM	Opening General Session
9:15 – 9:50 AM	Keynote Address by Richard D. DiMarchi, Indiana University
9:50 – 10:30 AM	Session C: <i>Revolutionary Advances in Technology</i>
10:30 – 11:30 AM	Panel 3: <i>University and Industry Complex: Driving Innovation and Scholarship</i>
11:30 – 11:45 AM	Buses depart the Langham Huntington Hotel for the Athenaeum at Caltech for the Fellows Luncheon
12:00 – 1:30 PM	NAI Fellows Luncheon
12:00 – 1:30 PM	Late Conference Check-In and Information Table (at the Athenaeum)
1:30 – 2:00 PM	Walk to Beckman Auditorium for the Fellows Induction Ceremony
2:00 – 2:30 PM	Fellows Keynote Address by Andrew Faile, U.S. Patent and Trademark Office
2:30 – 4:30 PM	2014 NAI Fellows Induction Ceremony
4:30 PM	Conference Ends
4:30 – 5:00 PM	Buses depart California Institute of Technology and return to the Langham Huntington Hotel
4:30 – 6:30 PM	NAI Fellows Reception at the Athenaeum (Invitation Only)



DETAILED AGENDA

Langham Hotel Map located on page 26.

WEDNESDAY, MARCH 18, 2015

- 2:00 – 4:00 PM** **Tour of NASA's Jet Propulsion Laboratory**
1:15: Buses will depart *The Langham Huntington Hotel*. Meet in the *Main Lobby*. Due to NASA policy, all participants were required to register by February 13 for prescreening. No exceptions.
- 4:00 – 7:00 PM** **NAI Board of Directors Meeting (Invitation Only)**
Location: The Boardroom
The Langham Huntington Hotel
1401 S Oak Knoll Ave, Pasadena, CA 91106
- 5:00 – 9:00 PM** **Early Conference Check-in**
Location: Courtyard
The Langham Huntington Hotel in Pasadena, California
- 7:00 – 9:00 PM** **President's Welcome Reception (All Invited to Attend)**
Location: Courtyard
The Langham Huntington Hotel in Pasadena, California

THURSDAY, MARCH 19, 2015

Complimentary WiFi is available in the Viennese Ballroom. Choose Wireless Network "Langham_MR." Once the browser opens insert access code NAI2015.

- 8:00 AM – 4:00 PM** **Conference Check-In and Information Table**
Location: Foyer of the Viennese Ballroom
The Langham Huntington Hotel in Pasadena, California
- 9:00 – 9:15 AM** **Opening General Session**
Location: Viennese Ballroom
- 9:15 – 11:40 AM** **SESSION A: TRANSFORMATIVE INVENTION**
Location: Viennese Ballroom
Session Co-Chairs:
Carolyn L. Cason, The University of Texas at Arlington
Shinn-Zong Lin, China Medical University, Taiwan
- 9:15 – 9:30 AM** **Harold G. Craighead**, Cornell University
Nanofluidics and the Nano-Bio Interface
- 9:30 – 10:05 AM** **Keynote Address**
Introduction of the Keynote Speaker
Thomas N. Parks, The University of Utah
Keynote Address
Battery Innovation: Intersection Among Materials, Engineering and Application
Esther S. Takeuchi, Stony Brook University
SUNY Distinguished Professor
NAI Charter Fellow

10:00 – 11:30 AM	<p>California Institute of Technology Architectural Tour 10:00 AM: Buses depart <i>The Langham Huntington Hotel</i> for Caltech. Meet in the <i>Main Lobby</i>. Buses will pick up passengers at the same location at 11:30 AM.</p>
10:05 – 10:20 AM	<p>Axel Scherer, California Institute of Technology <i>From Lab-on-a-Chip to Chip-in-the-Body: The Evolution of Point of Care Health Monitoring</i></p>
10:20 – 10:50 AM	<p>State of the Academy Address Paul R. Sanberg, National Academy of Inventors</p>
10:50 – 11:40 AM	<p>PANEL 1: BUILDING A STRONG ECOSYSTEM FOR THE NEXT GENERATION OF INVENTIONS AND INVENTION-BASED BUSINESSES Invited Panel hosted by The Lemelson Foundation</p> <p>Moderator: Carol Dahl, The Lemelson Foundation</p> <p>Panelists: Drew Haramata, Vanderbilt University Vinit Nijhawan, Boston University Walter D. Valdivia, Brookings Institution's Center for Technology Innovation Todd A. Watkins, Lehigh University</p>
11:40 AM – 12:00 PM	Break
12:00 – 1:30 PM	<p>Luncheon (Buffet) Location: The Horse Shoe Garden (outdoor venue) The Langham Huntington Hotel in Pasadena, California</p>
1:30 – 2:00 PM	Break
2:00 – 4:00 PM	<p>SESSION B: FROM DISCOVERY TO COMMERCIALIZATION Location: Viennese Ballroom The Langham Huntington Hotel in Pasadena, California</p> <p>Session Co-Chairs: George R. Newkome, The University of Akron James M. Rankin, University of Arkansas</p>
2:00 – 2:15 PM	<p>Erkki Ruoslahti, Sanford-Burnham Medical Research Institute <i>Guidance Systems for Nanomedicines</i></p>
2:15 – 2:30 PM	<p>Richard B. Silverman, Northwestern University <i>Basic Science to Blockbuster Drug: Invention of Lyrica®</i></p>
2:30 – 3:20 PM	<p>PANEL 2: CHANGING THE WORLD: ONE INVENTION AT A TIME Invited Panel hosted by the American Association for the Advancement of Science</p> <p>Moderator: Shirley Malcom, American Association for the Advancement of Science</p> <p>Panelists: Karen J.L. Burg, Kansas State University Rory A. Cooper, University of Pittsburgh Paul R. Sanberg, University of South Florida</p>
3:20 – 4:00 PM	<p>Keynote Address Introduction of the Keynote Speaker Elizabeth L. Dougherty, United States Patent and Trademark Office</p> <p>Keynote Address <i>Energy and the Climate Challenges: A Defining "Necessity" that can be the Mother of Many Inventions</i></p>

3:00 – 4:30 PM	<p>Steven Chu, Stanford University 12th U.S. Secretary of Energy Professor of Physics and Molecular & Cellular Physiology Recipient of the 1997 Nobel Prize in Physics</p> <p>California Institute of Technology Architectural Tour 3:00 PM: Buses depart <i>The Langham Huntington Hotel</i> for Caltech. Meet in the <i>Main Lobby</i>. Buses will pick up passengers at the same location at 4:30 PM.</p>
4:00 – 5:30 PM	Break before Dinner
5:30 and 6:00 PM	Buses will leave the front entrance of <i>The Langham Huntington Hotel</i> for the California Science Center at 5:30 and 6:00 PM.
6:30 – 10:00 PM	<p>Signature Event: “To Infinity and Beyond” Reception California Science Center – Home of the Space Shuttle Endeavour Samuel Oschin Air and Space Center 700 Exposition Park Drive Los Angeles, CA 90037 (Plated dinner provided, dress is business attire)</p> <p>Master of Ceremonies: Paul R. Sanberg, National Academy of Inventors</p> <p>Host Remarks by: Morteza Gharib, California Institute of Technology Randolph W. Hall, University of Southern California</p> <p>Featured Speaker: Garrett E. Reisman, SpaceX Crew member, Space Shuttle Endeavour Former NASA astronaut</p>
9:30 and 10:00 PM	Buses will leave the California Science Center for the hotel after the event.

FRIDAY, MARCH 20, 2015

7:30 – 8:30 AM	<p><i>Technology & Innovation</i> Editorial Board Breakfast and Meeting (Invitation Only) Location: The Promenade The Langham Huntington Hotel 1401 S Oak Knoll Ave, Pasadena, CA 91106</p>
8:00 – 11:00 AM	<p>Conference Check-In and Information Table Location: Foyer of the Viennese Ballroom The Langham Huntington Hotel in Pasadena, California</p>
9:00 – 9:15 AM	<p>Opening General Session Location: Viennese Ballroom</p>
9:15 – 9:50 AM	<p>Keynote Address Introduction of the Keynote Speaker Nasser Arshadi, University of Missouri-St. Louis</p> <p>Keynote Address <i>Pirates at the Yacht Club</i> Richard D. DiMarchi, Indiana University Standiford H. Cox Distinguished Professor of Biochemistry NAI Fellow</p>
9:50 – 11:30 AM	<p>SESSION C: REVOLUTIONARY ADVANCES IN TECHNOLOGY Location: Viennese Ballroom The Langham Huntington Hotel in Pasadena, California</p>

Session Co-Chairs:

Alexander N. Cartwright, The State University of New York System

Richard D. McCullough, Harvard University

9:50 – 10:05 AM

Emily A. Carter, Princeton University

Quantum Mechanical Stimulations of Millions of Atoms and Its Application to Fusion Energy

10:05 – 10:20 AM

C. Richard Schlegel, Georgetown University

Clinical Translation of HPV and Cell Culture Research

10:20 – 10:35 AM

Nicholas A. Peppas, The University of Texas at Austin

Innovation and Invention in the Pharmaceutical and Biomedical Industry: How to Improve Treatment and Quality of Life of our Patients

10:35 – 11:30 AM

PANEL 3: UNIVERSITY AND INDUSTRY COMPLEX: DRIVING INNOVATION AND SCHOLARSHIP

Invited Panel of Senior University Leadership

Moderator:

Henry C. Foley, University of Missouri System

Panelists:

Donald R. Bobbitt, University of Arkansas System

Patrick T. Harker, University of Delaware

Linda P. B. Katehi, University of California, Davis

11:30 AM – 12: 30 PM

Travel to the Athenaeum at Caltech for the Fellows Luncheon

Caltech Map and Parking Information can be found on page 27. Please note, if you plan to drive and park, you must purchase a parking pass.

11:30 and 11:45 AM

Buses will depart from the Main Entrance of The Langham Huntington Hotel for the Athenaeum at 11:30 and 11:45 AM.

Buses will leave Caltech for the hotel immediately following the induction ceremony at approximately 4:30 PM.

12:00 – 1:30 PM

NAI Fellows Luncheon

Location: West Patio of the Athenaeum
California Institute of Technology
551 South Hill Avenue
Pasadena, CA 91106

12:00 – 1:30 PM

Late Conference Check-In and Information Table

Location: West Patio of the Athenaeum
California Institute of Technology
551 South Hill Avenue
Pasadena, CA 91106

2:00 – 2:30 PM

Fellows Keynote Address

Location: Beckham Auditorium for the Fellows Induction Ceremony

Welcome Remarks and Introduction of the Keynote Speaker

Morteza Gharib, California Institute of Technology

Keynote Address

**Andrew Faile, United States Deputy Commissioner for Patent Operations
United States Patent and Trademark Office**

2:30 – 4:30 PM

Fellows Induction Ceremony

4:30 PM

Conference Ends

Buses will leave Caltech for the hotel immediately following the induction ceremony at approximately 4:30 PM.

4:30 – 6:30 PM

NAI Fellows Reception (Invitation Only)

Location: Main Lounge of the Athenaeum
California Institute of Technology
551 South Hill Avenue
Pasadena, CA 91106

6:00 and 6:30 PM

Buses will leave the Athenaeum for the hotel immediately following the Fellows Reception at approximately 6:00 and 6:30 PM.

ABOUT THE NATIONAL ACADEMY OF INVENTORS

The National Academy of Inventors is a 501(c)(3) non-profit member organization comprising U.S. and international universities, and governmental and non-profit research institutes, with over 3,000 individual inventor members and Fellows spanning more than 200 institutions, and growing rapidly. It was founded in 2010 to recognize and encourage inventors with patents issued from the U.S. Patent and Trademark Office, enhance the visibility of academic technology and innovation, encourage the disclosure of intellectual property, educate and mentor innovative students, and translate the inventions of its members to benefit society. The NAI edits the multidisciplinary journal, *Technology and Innovation*, published by Cognizant Communication Corporation (NY). www.academyofinventors.org

• GOALS AND OBJECTIVES •

- To recognize publicly a cadre of investigators who are also inventors.
- To enhance visibility of university and non-profit research institute technology development, promote entrepreneurship and be advocates for academic innovation in the local community.
- To be a resource for the local community to facilitate greater industry research contracts and interactions with companies and organizations in order to increase economic impact.
- To increase awareness of intellectual property by mentoring, fostering and encouraging faculty, staff and students to develop their intellectual property and inventions.
- To help shape society by being in a position to understand the translational use of inventions at the university or research institute and elsewhere; and to be a role model in such endeavors for students.
- To develop relevant invention-based activities in collaboration with the institution's administration of patents and licensing.

As the Academy grows and develops, we will continue to seek new ways to recognize and honor academic invention, provide unique opportunities for our Member Institutions, and build strong relationships with innovative groups and companies. There is no doubt that translational technology is critically important; it is the engine that will drive the economies of the 21st century. Our research institutions are growing and through their capabilities, we see a limitless future for our nation and the world.

2015 NAI Board of Directors and Officers

Paul R. Sanberg, President, University of South Florida
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Mary Beth Campbell, California Institute of Technology
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Sudeep Sarkar, University of South Florida
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NATIONAL ACADEMY OF INVENTORS®

2014 NAI FELLOWS

Honoring 170 academic luminaries of innovation and invention

To be inducted as NAI Fellows at the NAI Annual Conference, March 20, 2015
at the California Institute of Technology

Ilhan A. Aksay • Princeton University
Nancy L. Allbritton • The Univ. of North Carolina at Chapel Hill
Jan P. Allebach • Purdue University
Daniel W. Armstrong • The University of Texas at Arlington
Frances H. Arnold • California Institute of Technology
Kyriacos A. Athanasiou • University of California, Davis
Nadine N. Aubry • Northeastern University
David Baltimore • California Institute of Technology
Amit Bandyopadhyay • Washington State University
Joseph J. Beaman, Jr. • The University of Texas at Austin
James A. Birchler • University of Missouri-Columbia
Donald R. Bobbitt • University of Arkansas
Jeffrey T. Borenstein • The Charles Stark Draper Laboratory
H. Kim Bottomly • Wellesley College
Scott A. Brandt • University of California, Santa Cruz
Steven P. Briggs • University of California, San Diego
Robert A. Brown • Boston University
Karen J.L. Burg • Kansas State University
Robert H. Byrne • University of South Florida
A. Robert Calderbank • Duke University
Emily A. Carter • Princeton University
Alexander N. Cartwright • The State University of New York
H. Jonathan Chao • New York University
Ching-Shih Chen • The Ohio State University
Ashutosh Chilkoti • Duke University
Arul M. Chinnaiyan • University of Michigan
Steven Chu • Stanford University
James J. Coleman • The University of Texas at Dallas
J. Edward Colgate • Northwestern University
Barry S. Collier • The Rockefeller University
R. Graham Cooks • Purdue University
Rory A. Cooper • University of Pittsburgh
Harold G. Craighead • Cornell University
Charles S. Craik • University of California, San Francisco
Alfred J. Crosby • University of Massachusetts Amherst
Marcos Dantus • Michigan State University
Huw M.L. Davies • Emory University
Mark R.D. Davies • University of Limerick
Mark E. Dean • The University of Tennessee, Knoxville
Richard D. DiMarchi • Indiana University
Michael A. Dirr • The University of Georgia
Richard A. Dixon • University of North Texas
John P. Donoghue • Brown University
Jonathan S. Dordick • Rensselaer Polytechnic Institute
Jennifer A. Doudna • University of California, Berkeley
Anatoly Dritschilo • Georgetown University
Robert V. Duncan • Texas Tech University
Russell D. Dupuis • Georgia Institute of Technology
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James H. Eberwine • University of Pennsylvania
Elazer R. Edelman • Massachusetts Institute of Technology
J. Gary Eden • University of Illinois at Urbana-Champaign
Jennifer H. Elisseeff • Johns Hopkins University
Sir Martin J. Evans • Cardiff University
David A. Evans • Harvard University
Gregg B. Fields • Torrey Pines Institute for Molecular Studies
Stephen R. Forrest • University of Michigan

Michael W. Fountain • University of South Florida
Ingrid Fritsch • University of Arkansas
Cynthia M. Furse • The University of Utah
Elsa M. Garmire • Dartmouth College
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John C. Herr • University of Virginia
David R. Hillyard • The University of Utah
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Suzanne T. Ildstad • University of Louisville
M. Saif Islam • University of California, Davis
Robert D. Ivarie • The University of Georgia
Allan J. Jacobson • University of Houston
Trevor O. Jones • Case Western Reserve University
Michael E. Jung • University of California, Los Angeles
Kattesh V. Katti • University of Missouri-Columbia
Jay D. Keasling • University of California, Berkeley
Behrokh Khoshnevis • University of Southern California
Marcia J. Kieliszewski • Ohio University
Michael N. Kozicki • Arizona State University
Juan C. Lasheras • University of California, San Diego
Wen-Hwa Lee • China Medical University
Chiang J. Li • Harvard University
James Linder • University of Nebraska-Lincoln
Stuart M. Lindsay • Arizona State University
Robert J. Linhardt • Rensselaer Polytechnic Institute
Philip S. Low • Purdue University
Yuri M. Lvov • Louisiana Tech University
Asad M. Madni • University of California, Los Angeles
Marc J. Madou • University of California, Irvine
Richard A. Mathies • University of California, Berkeley
Richard D. McCullough • Harvard University
Carver A. Mead • California Institute of Technology
Wen Jin Meng • Louisiana State University
Xiang-Jin Meng • Virginia Tech
Thomas O. Mensah • Florida State University
Antonios G. Mikos • Rice University
Richard K. Miller • Olin College of Engineering
Duane D. Miller • The Univ. of Tennessee Health Science Center
Jan D. Miller • The University of Utah
Sergey B. Mirov • The University of Alabama at Birmingham
Jeffrey R. Morgan • Brown University
Brij M. Moudgil • University of Florida
José M.F. Moura • Carnegie Mellon University
Shuji Nakamura • University of California, Santa Barbara
Jagdish Narayan • North Carolina State University
Shree K. Nayar • Columbia University
Douglas F. Nixon • The George Washington University
Babatunde A. Ogunnaike • University of Delaware
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W. Gregory Sawyer • University of Florida
Axel Scherer • California Institute of Technology
Joseph M. Schimmels • Marquette University
C. Richard Schlegel • Georgetown University
Said M. Sebti • H. Lee Moffitt Cancer & Research Institute
George E. Seidel, Jr. • Colorado State University
Arun K. SenGupta • Lehigh University
Wan Y. Shih • Drexel University
Kevin M. Short • University of New Hampshire
Richard B. Silverman • Northwestern University
Marwan A. Simaan • University of Central Florida
Raj N. Singh • Oklahoma State University
Thomas C. Skalak • University of Virginia
Mohamed Y. Soliman • Texas Tech University
Bruce J. Tatarchuk • Auburn University
Gordon A. Thomas • New Jersey Institute of Technology
Mark E. Thompson • University of Southern California
Thomas G. Thundat • University of Alberta
Richard B. Timmons • The University of Texas at Arlington
Mark L. Tykocinski • Thomas Jefferson University
Kamil Ugurbil • University of Minnesota
Anthony J. Vizzini • Wichita State University
Horst Vogel • École Polytechnique Fédérale de Lausanne
Nicholi Vorsa • Rutgers, The State Univ. of New Jersey
Gordana Vunjak-Novakovic • Columbia University
Kristiina Vuori • Sanford-Burnham Medical Research Institute
Kevin M. Walsh • University of Louisville
Christine A. Wang • Massachusetts Institute of Technology
Shaomeng Wang • University of Michigan
Paul H. Weigel • The University of Oklahoma
Jonathan A. Wickert • Iowa State University
Alan E. Willner • University of Southern California
Richard C. Willson, III • University of Houston
Chi-Huey Wong • Academia Sinica
John A. Woolam • University of Nebraska-Lincoln
Shelby D. Worley • Auburn University
Chris Xu • Cornell University
Ping Xu • Shanghai Jiao Tong University
Zhi Xu • University of Missouri-St. Louis
Janet K. Yamamoto • University of Florida
Shu Yang • University of Pennsylvania
Michael J. Yaszemski • Mayo Clinic
Phillip D. Zamore • Univ. of Massachusetts Medical School

Collectively, the 2014 NAI Fellows hold 4,377 patents and represent 114 institutions.



• Presenter and Speaker Biographies •

THURSDAY, MARCH 19, 2015

SESSION A: TRANSFORMATIVE INVENTION



Co-Chair

Carolyn L. Cason, Vice President for Research, The University of Texas at Arlington

Carolyn L. Cason, Ph.D., R.N., FNAI, is a professor in the College of Nursing and Distinguished Teaching Professor and vice president for research at The University of Texas at Arlington. Cason has a distinguished career as a teacher, academic leader and innovator. She is co-founder of the university's Smart Hospital—a physical/virtual facility equipped with state of the art equipment and cutting-edge patient simulators to support instruction and research and development. With colleagues in engineering, she developed Smart Care (a living laboratory dedicated to developing non-invasive, pervasive technology to monitor health changes and support independent living for the elderly and those with disabilities). Her patent for a cardiopulmonary resuscitation sensor has been commercialized as a CPR card. Clinical trials are demonstrating the life-saving effects of feedback provided via the card to those delivering CPR to victims of cardiac arrest. She is a Fellow of the National Academy of Inventors (FNAI).



Co-Chair

Shinn-Zong Lin, Superintendent, China Medical University

Shinn-Zong Lin, M.D., Ph.D., FNAI, is professor of neurosurgery, superintendent of China Medical University Beigang Hospital, and vice superintendent of the Center for Neuropsychiatry at China Medical University Hospital, Taiwan. Lin trained at the National Defense Medical Center, Taipei, and Stony Brook University. He served as professor of neurosurgery at the National Defense Medical Center, chair of neurosurgery at Tri-Service General Hospital, and superintendent at Tzu-Chi General Hospital. Lin is the inventor of many patented treatment technologies for brain damage patients, holds 13 U.S. patents, and has over 212 publications in refereed journals. He is a highly accomplished neurosurgeon and applied neuroscientist for translational innovative therapies for stroke and neuro-degenerative diseases.



Presentation A-1

Nanofluidics and the Nano-Bio Interface

Harold G. Craighead, Professor of Applied and Engineering Physics, Cornell University

Harold G. Craighead, Ph.D., FNAI, is professor of applied and engineering physics and the Charles Lake Jr. chaired Professor of Engineering at Cornell University. He was a member of technical staff at Bell Laboratories and a research manager at Bellcore. Craighead served as director of the National Nanofabrication Facility and was the founding director of the Nano-biotechnology Center. He is a member of the National Academy of Engineering and a fellow of several scientific societies. His research has focused on nanofabrication and applications of nano-scale devices. Research projects include studies of nanomechanical systems, chemical sensors, and biomolecular analysis. He has been active in commercialization of academic research and is an inventor on 63 issued U.S. patents. He co-founded Nanofluidics, Inc., now Pacific Biosciences of California, a company based on single-molecule DNA sequencing technology.



Keynote Introduction

Thomas N. Parks, Vice President for Research, The University of Utah

Thomas N. Parks, Ph.D., FNAI, is vice president for research and interim vice president for technology venture development at The University of Utah, where he has been a neurobiology researcher and teacher at the School of Medicine since 1978. Parks holds four U.S. patents and was a co-founder and long-term board member of NPS Pharmaceuticals Inc. (NASDAQ: NPSP), which has developed several marketed pharmaceuticals, including two first-in-class products. He has also served as a board member or scientific advisor for several private technology companies and as a trustee or director for several non-profit organizations.



Keynote Address

Battery Innovation: Intersection Among Materials, Engineering and Application**Esther S. Takeuchi**, SUNY Distinguished Professor, Stony Brook University

Esther S. Takeuchi, Ph.D., FNAI, is a SUNY Distinguished Professor with a joint appointment in chemistry and materials science and engineering at Stony Brook University, and chief scientist in Brookhaven National Laboratory's Global and Regional Solutions Directorate. She is one of the world's leading energy storage researchers, best known for developing the technology for the power source used in implantable cardiac defibrillators. She holds 153 patents, more than any woman in the United States. She received the National Medal of Technology and Innovation, E.V. Murphree Award in Industrial and Engineering Chemistry (American Chemical Society), was inducted into the National Inventors Hall of Fame, and is a member of the National Academy of Engineering.



Presentation A-2

From Lab-on-a-Chip to Chip-in-the-Body: The Evolution of Point of Care Health Monitoring**Axel Scherer**, Bernard Neches Professor of Electrical Engineering, Medical Engineering and Physics, California Institute of Technology

Axel Scherer, Ph.D., FNAI, is the Bernard Neches Professor of Electrical Engineering, Medical Engineering, and Physics at the California Institute of Technology and visiting professor at Dartmouth College. He received his Ph.D. in 1985 and worked at Bellcore before joining Caltech in 1993. Scherer's group works on nanofabrication of electrical, optical, magnetic and fluidic devices and their integration into microsystems. He has co-authored 350 publications and holds over 100 patents in the fields of optoelectronics, microfluidics, and fabrication techniques. Scherer has co-founded several companies and has pioneered vertical cavity surface emitting lasers and photonic crystals, and developed silicon nanophotonics and surface plasmon enhanced light emitters. His group has perfected the fabrication of 3nm silicon nanostructures to engineer bandgap and mechanical properties through geometry. Scherer now works on building wireless implantable health monitors that can provide feedback for precision medicine and automation of point-of-care molecular pathology instruments for early detection of disease.



Paul R. Sanberg, President, National Academy of Inventors

Paul R. Sanberg, Ph.D., D.Sc., FNAI, is founder and president of the National Academy of Inventors, and senior vice president for research, innovation, and economic development at the University of South Florida. He trained at York University, the University of British Columbia, the Australian National University and Johns Hopkins University School of Medicine, among others. He has held academic positions at Ohio University, the University of Cincinnati, and Brown University. Sanberg is an inventor on 39 U.S. and over 70 foreign patents and has served on numerous scientific advisory boards for health-related foundations and companies. He is the author of more than 600 scientific articles and 14 books, with more than 23,000 citations (Google Scholar) to his published work. He is a Charter Fellow of the NAI, and fellow of the American Association for the Advancement of Science and the American Institute for Medical and Biological Engineering, AAAS-Lemelson Invention Ambassador, and serves on the nomination evaluation committee of the United States National Medal of Technology and Innovation.

PANEL 1: BUILDING A STRONG ECOSYSTEM FOR THE NEXT GENERATION OF INVENTIONS AND INVENTION-BASED BUSINESSES



Moderator

Carol Dahl, Executive Director, The Lemelson Foundation

Carol Dahl, Ph.D., is executive director of The Lemelson Foundation and leads the foundation's work to use the power of invention to improve lives. The Foundation inspires and enables the next generation of inventors and invention-based enterprises to promote economic growth in the U.S. and help solve social and economic problems for the poorest populations in developing countries. Additionally, the Foundation works to strengthen the ecosystem that supports inspiring and educating inventors while also helping them to translate their ideas to inventions with impact. Prior to joining the foundation in July 2011, Dahl worked for the Bill & Melinda Gates Foundation in various roles, including founding director of the Global Health Discovery Program and as director of staff for the overall Global Health Program. During her tenure at the Gates Foundation, Dahl built the platform discovery innovation programs Grand Challenges in Global Health and Grand Challenges Explorations.



Panelist

Drew Harmata, Student Inventor and Founder of PEURegem, Inc., Vanderbilt University

Drew Harmata was fortunate to grow up in a variety of regions, including the Midwest (Chicago), south (Houston), and New England (Connecticut). He graduated from the University of Virginia (UVa) in 2010 with a B.S. in biomedical engineering. While at UVa, he was an Undergraduate Research and Design Symposium finalist and held research intern positions at the National Institutes of Health and Phthisis Diagnostics, a start-up molecular diagnostic laboratory. Harmata has continued his education at Vanderbilt University where he is obtaining a Ph.D. in chemical and biomolecular engineering (May 2015). His research focuses on orthopaedic tissue engineering and biomaterials. While at Vanderbilt, Harmata co-founded PEURegen Inc., a medical device company dedicated to the advancement of wound care through the development of a pipeline of synthetic skin scaffolds.



Panelist

Vinit Nijhawan, Managing Director of Technology Development, Boston University

Vinit Nijhawan is managing director of technology development, and director of enterprise programs at the Institute of Technology, Entrepreneurship & Commercialization at Boston University, where he also teaches MBA courses on entrepreneurship. Nijhawan spent more than 30 years building five start-ups that were acquired and was CEO of three. He was a venture partner at Key Venture Partners where, in two years, he sourced over 200 deals and made one investment acquired for \$430 million. Nijhawan is an advisor and board member to several technology startups including MTDC, an early stage, quasi-public Massachusetts venture capital firm, and was a Mass High Tech All-Star in 2005. He earned a B.A.Sc. in electrical engineering from the University of Waterloo, Canada. Nijhawan has served as a member of the board of directors for the National Academy of Inventors since 2014.



Panelist

Walter D. Valdivia, Fellow, Brookings Institution's Center for Technology Innovation

Walter D. Valdivia, Ph.D., is a fellow in the Brookings Institution's Center for Technology Innovation. He studies innovation policy and focuses on technology transfer, the politics of federal R&D, and the governance of emerging technologies. He has published on university technology transfer and academic entrepreneurialism, the impact of emerging technologies on labor and the tensions between academic freedom and national security with respect to export controls. He has also co-authored a policy report on assessing R&D investments in Arizona. Valdivia's current research examines the distributional outcomes of various modes of university technology transfer, punctuated equilibrium in the R&D budget, and the governance of socially responsible innovation. He holds a B.S. in economics from Universidad Católica Boliviana, and an M.S. in economics and Ph.D. in public administration from Arizona State University.



Panelist

Todd A. Watkins, Executive Director of the Dexter F. Baker Institute for Entrepreneurship, Creativity and Innovation, Lehigh University

Todd A. Watkins, Ph.D., is the Arthur F. Searing Professor of Economics and founding executive director of the Baker Institute for Entrepreneurship, Creativity and Innovation, Lehigh University. Author of more than 75 related publications, his research and teaching focus on the intersection of innovation, entrepreneurship, public policy, and economic development. Watkins has led Lehigh's efforts developing entrepreneurship curricula and support infrastructure for student start-ups. The undergraduate program is ranked among the nation's top 20 by *Princeton Review* and *Entrepreneurship Magazine*, and was #12 by *Bloomberg Business Week*. He has been a principal advisor for dozens of start-ups and social ventures started by students. Watkins has been a consultant to the NIST Advanced Technology Program, the U.S. Congressional Office of Technology Assessment, and a member of The National Academies' Committee on Innovation Models for Aerospace Technologies, advising NASA on improving their innovation processes. Watkins holds a Ph.D. and an M.P.P. in public policy from Harvard University, and a B.S. in optics from the University of Rochester.



Co-Chair

George R. Newkome, Vice President for Research Emeritus and Professor of Polymer Science and Chemistry, The University of Akron

George R. Newkome, Ph.D., FNAI, is vice president for research emeritus, professor of polymer science and chemistry and the James and Vanita Oelschlager Professor of Science and Technology at The University of Akron. After a post-doctorate at Princeton University, he joined LSU where he became a full professor in 1978, and then LSU Distinguished Research Master in 1982. In 1986, he went to the University of South Florida as vice president for research and professor of chemistry and in 1992 was named Distinguished Research Professor. From 2001 to 2014, he was vice president for research and dean of the graduate school at The University of Akron. Currently, he is chairman of the board of the Northeast Ohio Student Venture Fund and on the board of directors of 14 corporations as well as numerous editorial boards. He is an honorary professor at Wenzhou University and affiliate professor at Florida Atlantic University. He has published over 500 papers and 29 U.S. and 23 foreign patents, as well as edited or written over 20 scientific books and monographs. Newkome received his B.S. and Ph.D. in chemistry from Kent State University.



Co-Chair

James M. Rankin, Vice Provost for Research and Economic Development, University of Arkansas

James M. Rankin, Ph.D., is vice provost for research and economic development at the University of Arkansas (UA). He holds a faculty rank of professor in electrical engineering. UA is a land-grant institution with an enrollment of 25,400 students. The Carnegie Foundation classifies UA as a Very High Activity Research University. As the chief research officer, the Office for Research and Sponsored Programs, Office for Research Compliance, Technology Ventures, Office for Entrepreneurship, High Performance Computing Center, Institute for Nanoscale Science and Engineering, Arkansas Center for Space and Planetary Science, and UA Press have reporting lines to him. Rankin was previously at Ohio University where he served as interim vice president for research, associate dean for research and graduate studies in the Russ College of Engineering and Technology, and director of the Avionics Engineering Center.



Presentation B-1

Guidance Systems for Nanomedicines

Erkki Ruoslahti, Distinguished Professor and former President, Sanford-Burnham Medical Research Institute

Erkki Ruoslahti, M.D., Ph.D., FNAI, is a Distinguished Professor and former president of Sanford-Burnham Institute for Medical Research and a founder of the Center for Nanomedicine at University of California, Santa Barbara. Ruoslahti is a pioneer in the field of cell adhesion. His main discovery and invention is the integrin-binding tripeptide motif RGD and integrins that recognize this motif. He now studies specific vascular addresses in directing drugs to sites of disease. Ruoslahti is a member of the U.S. National Academy of Sciences, Institute of Medicine, and American Academy of Arts & Sciences. He is the recipient of the Japan Prize, Gairdner Award, Clowes Award, Pasarow Award, and Jacobaeus Prize, and is 2012 Thomson-Reuters Citation Laureate. He is Knight and Commander of the Orders of White Rose of Finland and Lion of Finland.



Presentation B-2

Basic Science to Blockbuster Drug: Invention of Lyrica®

Richard B. Silverman, John Evans Professor of Chemistry and Professor of Biochemistry, Molecular Biology and Cell Biology, Northwestern University

Richard B. Silverman, Ph.D., FNAI, is the John Evans Professor of Chemistry and professor of biochemistry, molecular biology and cell biology at Northwestern University. He received his B.S. in chemistry from the Pennsylvania State University in 1968, served in the United States Army as a physical sciences assistant at the Walter Reed Army Institute of Research from 1969 to 1971, and received his Ph.D. in organic chemistry from Harvard University in 1974. Silverman is the inventor of the blockbuster drug Lyrica®, marketed by Pfizer for fibromyalgia, neuropathic pain and epilepsy. His awards include: Perkin Medal (2009); American Chemical Society Medicinal Chemistry Hall of Fame (2009); Sato Memorial International Award (Pharmaceutical Society, Japan, 2012); BMS-Smissman Award (ACS, 2013); Centenary Prize (Royal Society of Chemistry, 2013); Fellow, Royal Society of Chemistry (2013); Medicinal Chemistry Prize (Israel Chemical Society, 2014); Trustee Medal for Faculty Innovation and Entrepreneurship (Northwestern, 2014); iCON Innovator Award (iBIO Institute, 2014); and Fellow, American Academy of Arts & Sciences (2014). Silverman is the author on 330 research articles, 59 issued U.S. patents and five books.

PANEL 2: CHANGING THE WORLD: ONE INVENTION AT A TIME



Moderator

Shirley Malcom, Head of Education and Human Resources Programs, American Association for the Advancement of Science

Shirley Malcom, Ph.D., is head of education and human resources at the American Association for the Advancement of Science (AAAS). She works to improve the quality and increase access to education and careers in STEM. Malcom is a trustee of Caltech, a regent of Morgan State University, and a member of the Advisory Board for the SUNY Research Council. She served on the National Science Board, the policymaking body of the NSF, and on President Clinton's Council of Advisors on Science and Technology. Malcom, a native of Birmingham, Alabama, received her Ph.D. in ecology from Penn State University, master's in zoology from UCLA and bachelor's in zoology from the University of Washington. She holds 16 honorary degrees. Malcom serves on the boards of the Heinz Endowments, Public Agenda, the National Math-Science Initiative and Digital Promise. In 2003, Malcom received the Public Welfare Medal of the National Academy of Sciences, the highest award given by the Academy.



Panelist

Karen J.L. Burg, Vice President for Research, Kansas State University

Karen J.L. Burg, Ph.D., FNAI, is vice president for research at Kansas State University. Honors to Burg include a Presidential Early Career Award for Scientists and Engineers, the inaugural Swiss AO Research Prize, recognition as a Massachusetts Institute of Technology's TR100 Young Innovator, an American Institute for Medical and Biological Engineering Fellow, an American Council on Education Fellow, a U.S. Department of Defense Era of Hope Scholar, and AAAS-Lemelson Invention Ambassador. She has seven patents issued, thirteen disclosures and/or provisional patent applications recorded, with one patent serving as the basis for a diagnostics startup company. Burg has given over 200 invited presentations and authored over 140 peer reviewed publications on the subject of engineered tissues. A Burg invention was one of ten technologies featured in the inaugural Avon Foundation for Women – National Institutes of Health – Center for Advancing Innovation Breast Cancer Start-Up Challenge.



Panelist

Rory A. Cooper, FISA Foundation & Paralyzed Veterans of America Chair and Distinguished Professor of the Department of Rehabilitation Science & Technology, University of Pittsburgh

Rory A. Cooper, Ph.D., FNAI, is FISA Foundation & Paralyzed Veterans of America chair and Distinguished Professor of the Department of Rehabilitation Science & Technology at the University of Pittsburgh. He is also founding director and VA Senior Research Career Scientist of the Human Engineering Research Laboratories. Cooper has authored or co-authored 300 journal publications, has 15 patents awarded or pending, and is the author of two books: *Rehabilitation Engineering Applied to Mobility & Manipulation* and *Wheelchair Selection & Configuration*, and co-editor of *Introduction to Rehabilitation Engineering*, *Warrior Transition Leader: Medical Rehabilitation Handbook*, and *Care of the Combat Amputee*. He was recognized in the U.S. Congressional Record on July 27, 2009. In August 2010, his work in robotics to aid people with disabilities was featured in *Popular Science*. In September 2014, *PN Magazine* recognized Cooper as having transformed the lives of people with spinal cord injury.

Panelist

Paul R. Sanberg, Senior Vice President for Research, Innovation & Economic Development, University of South Florida

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Keynote Address



Keynote Introduction

Elizabeth L. Dougherty, Director of Inventor Education, Outreach and Recognition in the Office of Innovation Development, United States Patent and Trademark Office

Elizabeth L. Dougherty, J.D., is the director of inventor education, outreach and recognition in the Office of Innovation Development at the USPTO, where she develops, implements and supervises programs that support the independent inventor community, small businesses, entrepreneurs, and the intellectual property interests of colleges and universities, and coordinates the ombudsman program for small businesses and entrepreneurs. Dougherty also supervises the development of outreach programs to women, minority and other underserved communities, and builds and maintains relationships with state and local governments to promote local programs that support invention and innovation in the U.S. Since 2012, she has served on the NAI Fellows Selection Committee and is an Honorary Member of the NAI.



Keynote Address

Energy and the Climate Changes: A Defining “Necessity” that can be the Mother of Many Inventions

Steven Chu, William R. Kenan, Jr. Professor of Physics and Molecular & Cellular Physiology, Stanford University

Steven Chu, Ph.D., FNAI, is the William R. Kenan, Jr. Professor of Physics and Molecular & Cellular Physiology at Stanford University. His research spans atomic and polymer physics, biophysics, biology, biomedicine and batteries. He shared the 1997 Nobel Prize in Physics for the laser cooling and trapping of atoms. From January 2009 until April 2013, Chu was the 12th U.S. Secretary of Energy and the first scientist to hold a cabinet position since Benjamin Franklin. During his tenure, he began ARPA-E, the Energy Innovation Hubs, the Clean Energy Ministerial meetings, and was tasked by President Obama to assist BP in stopping the Deepwater Horizon oil leak. Prior to his cabinet post, he was director of the Lawrence Berkeley National Laboratory, professor of physics and molecular and cell biology at UC Berkeley, the Theodore and Francis Geballe Professor of Physics and Applied Physics at Stanford University, and head of the Quantum Electronics Research Department at AT&T Bell Laboratories.

California Science Center Reception

Master of Ceremonies

Paul R. Sanberg, President, National Academy of Inventors

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Host Remarks

Morteza Gharib, Vice Provost for Research, California Institute of Technology

Morteza Gharib, Ph.D., FNAI, is vice provost for research and Hans W. Liepmann Professor of Aeronautics and Bioinspired Engineering at the California Institute of Technology, specializing in hydro and aerodynamics, biological flows, bioinspired medical devices, and advanced flow visualization techniques. He co-founded Bioengineering Option at Caltech. Gharib holds more than 50 U.S. patents in areas of biomedical devices and imaging technology. He is a fellow of the NAI, AAAS and five other professional societies. He has received five new technology recognition awards from NASA in the fields of advanced laser imaging and nanotechnology. He received the R&D 100 Award for the design of a 3D imaging system in 2008. Gharib has served as a member of the board of directors of the NAI since 2014.



Host Remarks

Randolph W. Hall, Vice President for Research, University of Southern California

Randolph W. Hall, Ph.D., is vice president of research and a professor in the Daniel J. Epstein Department of Industrial and Systems Engineering at the University of Southern California. Hall has led the creation of policies to catalyze collaborative research, including changes in promotion and tenure, research attribution, and shared repositories; funding programs that support collaborative research and shared equipment; and infrastructure and events enabling digital scholarship. In this capacity, Hall is the author of *Queueing Methods for Services and Manufacturing* (Prentice Hall, 1997) and the editor of *Handbook of Transportation Science* (Springer, 2003), *Patient Flow, Handbook of Healthcare System Scheduling* (Springer, 2012) and *Reducing Delay in Healthcare Delivery* (Springer, 2013). He has been funded by the National Science Foundation, U.S. Departments of Homeland Security and Transportation, California Department of Transportation, Los Angeles County Department of Health Services and L.A. Care. Hall has numerous publications in the areas of transportation, logistics, system engineering, and queueing, including pioneering work on the use of dynamic information in path finding for transportation. He received his Ph.D., M.S. and B.S. in civil engineering from the University of California, Berkeley.



Featured Speaker

Garrett E. Reisman, Former NASA Astronaut and Director of Crew Operations, Space X

Garrett E. Reisman, Ph.D., is a former astronaut and current director of crew operations at SpaceX. He is responsible for all vehicle crew interfaces including displays, controls, space suits, human factors and crew health and medical issues. Prior to SpaceX, Reisman worked for NASA where he served as an astronaut starting in 1998. He has flown on two space shuttle missions, during which, he logged over 3 months in space including over 21 hours of extravehicular activity (EVA) in 3 spacewalks. Reisman served with both the Expedition-16 and the Expedition-17 crews as a Flight Engineer aboard the International Space Station. He is responsible for working with NASA to prepare SpaceX's Falcon 9 rocket and Dragon spacecraft to carry astronauts. Reisman was the SpaceX project manager for CCDev2 – a \$75 Million partnership with NASA to mature the Dragon Spacecraft launch abort system and crew accommodations. Reisman then became the SpaceX project manager for CCiCap – a \$460 Million partnership with NASA to complete the design of the Dragon-Falcon 9 crew vehicle, perform hardware testing, ensure astronaut safety and pave the way for NASA certification of the vehicle. He holds a B.S. in Economics and a B.S. in Mechanical Engineering and Applied Mechanics from the University of Pennsylvania, and an M.S. and Ph.D. in Mechanical Engineering from the California Institute of Technology. He is an FAA Certified Flight Instructor.

FRIDAY, MARCH 20, 2015

Keynote Address



Keynote Introduction

Nasser Arshadi, Vice Provost for Research, University of Missouri-St. Louis

Nasser Arshadi, Ph.D., is vice provost for research and professor of finance at the University of Missouri–St. Louis. He received his Ph.D. in financial economics from the University of Nebraska–Lincoln. He has published extensively in economics and finance journals on capital markets and the microeconomics of corporations with an emphasis on assessing and managing risk, and has published two books on financial intermediation and insider trading. He serves on the editorial boards of *Technology and Innovation* and *Public and Municipal Finance*, and served as an economist and policy analyst at the Board of Governors of the Federal Reserve System. Arshadi has served on the board of directors of the NAI since 2013.



Keynote Address

Pirates at the Yacht Club

Richard D. DiMarchi, Cox Distinguished Professor of Biochemistry and Gill Chair in Biomolecular Sciences, Indiana University

Richard D. DiMarchi, Ph.D., FNAI, is the Cox Distinguished Professor of Biochemistry and Gill Chair in Biomolecular Sciences at Indiana University. His contributions in peptide and protein sciences consist of three decades of work in academia, the pharmaceutical industry and biotechnology companies. He is a co-founder of Ambrx, Inc., Marcadia Biotech, Assembly, Calibrium and MB2 Biotech. He has served as a scientific advisor to multiple pharmaceutical companies and three venture funds. He is chairman of the Peptide Therapeutics Foundation. DiMarchi is a former executive at Eli Lilly & Company where he provided leadership in biotechnology, endocrine research and product development. He is recognized for the discovery and development of rDNAderived Humalog® (LisPro-human insulin). As a scientist and executive, DiMarchi also significantly contributed to the commercial development of Humulin®, Humatrope®, rGlucagon®, and Forteo®. His current research is focused on developing macromolecules with enhanced therapeutic properties, an approach he has termed chemical-biotechnology.



Co-Chair

Alexander N. Cartwright, Provost and Executive Vice Chancellor, The State University of New York System

Alexander N. Cartwright, Ph.D., FNAI, is professor of electrical engineering and biomedical engineering at the University at Buffalo (UB) and provost and executive vice chancellor of the State University of New York (SUNY) System. As SUNY's chief academic officer, he supports the SUNY chancellor and board of trustees in oversight of the 64-campus system. He previously served as UB's vice president for research and economic development. An internationally recognized scholar in optical spectroscopy and sensors, his one-step, low-cost holographic technology for fabricating a rainbow-colored polymer was one of five inventions worldwide named to the Society of Manufacturing Engineer's 2013 list of *Innovations that Could Change the Way You Manufacture*. He has produced over 150 peer reviewed articles and conference proceedings. He holds six patents and his work has been licensed by three startup companies. He is a Fellow of the NAI and SPIE and senior member of IEEE. His Ph.D. is from The University of Iowa.



Co-Chair

Richard D. McCullough, Vice Provost for Research, Harvard University

Richard D. McCullough, Ph.D., FNAI, is vice provost for research and professor of materials science and engineering at Harvard University. At Harvard, he provides leadership for interdisciplinary research initiatives, corporate and foundation development, entrepreneurship, and planning for the Allston campus. Formerly, he was vice president for research at Carnegie Mellon University, where he also had served as dean of science, head of chemistry, and was the Thomas Lord Professor of Chemistry. He has pioneered the discovery and development of printed electronic materials, including regioregular polythiophenes, reactive metal inks, highly conductive block copolymers, transistors, solar cells, nanoelectronics, and the living synthesis of conductive polymers. He has founded two companies: Plextronics and Liquid X Printed Metals. He received his B.S. in chemistry at The University of Texas, Dallas, Ph.D. at Johns Hopkins University, and was a postdoctoral fellow at Columbia University.



Presentation C-1

Quantum Mechanical Stimulations of Millions of Atoms and Its Application to Fusion Energy

Emily A. Carter, Gerhard R. Andlinger Professor in Energy and the Environment, and Professor of Mechanical and Aerospace Engineering and Applied Computational Mathematics, Princeton University

Emily A. Carter, Ph.D., FNAI, is the founding director of the Andlinger Center for Energy and the Environment, the Gerhard R. Andlinger Professor in Energy and the Environment, and professor of mechanical and aerospace engineering and applied and computational mathematics at Princeton University. She invents and applies quantum mechanics methods to enable design of materials for sustainable energy, holding patents for catalysts with improved thermal stability and more robust coatings for turbine engines. Carter received her B.S. in Chemistry from the University of California, Berkeley in 1982 (Phi Beta Kappa) and her Ph.D. in chemistry from Caltech in 1987. The author of over 300 publications, she has delivered more than 470 invited lectures worldwide and serves on numerous advisory boards spanning a wide range of disciplines. Carter's scholarly work has been recognized by a number of national and international awards and honors, including election to the National Academy of Sciences in 2008.



Presentation C-2

Clinical Translation of HPV and Cell Culture Research

C. Richard Schlegel, Chair of Pathology and Professor of Pathology and Oncology, Georgetown University

C. Richard Schlegel, M.D., Ph.D., FNAI, is chair of Pathology and professor of pathology and oncology at Georgetown University and an expert in human papillomaviruses (HPV) biology. He received his M.D. and Ph.D. degrees from Northwestern University Medical School and was a resident and postdoctoral fellow at Harvard Medical School. Schlegel moved to the NIH in 1980 where he continued viral oncology studies and became the chief of the Cell Regulation Section at NCI. In 1990 he moved to Georgetown where his work led to the technology for the current FDA-approved HPV vaccine. He has published more than 150 papers and received Georgetown's President's Award, Vicennial Award, and Patrick Healy Award and has patented several technologies related to HPV. Schlegel also directs the Center for Cell Reprogramming that focuses on a new cell biology technology that he developed. A new spin-off biotechnology company, Propagenix, will utilize this technology for diagnostic and regenerative medicine applications.



Presentation C-3

Innovation and Invention in the Pharmaceutical and Biomedical Industry: How to Improve the Treatment and Quality of Life of our Patients

Nicholas A. Peppas, Cockrell Family Regents Chair in Engineering, Professor of Chemical Engineering, Biomedical Engineering and Pharmacy and Chairman of the Department of Biomedical Engineering, The University of Texas at Austin

Nicholas A. Peppas, Sc.D., FNAI, is the Cockrell Family Regents Chair in Engineering, professor of chemical engineering, biomedical engineering and pharmacy and chairman of the Department of Biomedical Engineering at The University of Texas at Austin. His research blends modern molecular and cellular biology with engineering to generate the next-generation of medical systems and devices for patient treatment. Peppas is the inventor of numerous medical products including contact and intraocular lenses, artificial kidney membranes, cartilage, and devices for oral delivery of insulin for treatment of diabetics, calcitonin for osteoporosis and interferon beta for multiple sclerosis. He is an elected member of the National Academy of Engineering (2012 Founders Award), the Institute of Medicine of the National Academies, the National Academy of France, the Royal Academy of Spain, the Academy of Athens and the Texas Academy. In 2008, AIChE named him among the 100 Engineers of the Modern Era. Peppas holds a Dipl. Eng., National Technical University of Athens (1971), an Sc.D. from MIT (1973), and honorary doctorates from the Universities of Ghent (Belgium), Parma (Italy), Ljubljana (Slovenia) and Athens (Greece).



Moderator

Henry C. Foley, Executive Vice President for Academic Affairs, Research and Development, University of Missouri System

Henry C. “Hank” Foley, Ph.D., FNAI, is executive vice president for academic affairs, research and development for the University of Missouri System. He provides system-wide leadership for academic programs, technology-based economic development, research initiatives, student access and success, academic program review and eLearning. Previously, Foley was at Penn State for 13 years, where most recently he served as vice president of research, dean of The Graduate School at Pennsylvania State, and president of the Penn State Research Foundation. Prior to Penn State, Foley served on the chemical engineering faculty at the University of Delaware for 14 years. Earlier he worked at American Cyanamid, a world leader in refinery catalysts, and he has consulted with DuPont, Air Products, Mobil Oil, Monsanto, Engelhard Corporation and Westvaco. Foley earned a master’s degree in physical chemistry from Purdue University and a doctorate in physical/inorganic chemistry from Penn State.



Panelist

Donald R. Bobbitt, President, University of Arkansas System

Donald R. Bobbitt, Ph.D., FNAI, currently serves as president of the University of Arkansas System and is a member of the faculty of the Department of Chemistry and Biochemistry. Bobbitt was a member of the team that developed the first laser-based polarimeter suitable for use as a detector in High Performance Liquid Chromatography; it is now commercially marketed by PDR Chiral, Inc. Working with Gary Yanik of PDR Chiral, Bobbitt and his students developed methodology which exploited the bimodal polarimetric signal to characterize partially resolved distributions in process-scale enantio-selective separations. Bobbitt is a recipient of a Camille and Henry Dreyfus Foundation Teacher-Scholar Fellowship. He holds two U.S. patents and has published over 200 peer-reviewed publications, book chapters and presentations. He previously served on the editorial boards of *The Microchemical Journal* and *Talanta*, and now chairs an NIH study section.



Panelist

Patrick T. Harker, President, University of Delaware

Patrick T. Harker, Ph.D., FNAI, is president of the University of Delaware and a research leader in service operations management and economics; financial services operations and technology; operations research methodology; and transportation systems. He holds a U.S. patent and U.S. copyright for methods optimizing transportation schedules. Harker has published or edited nine books and over 100 articles, and is an ISI highly cited researcher in mathematics. He serves on the advisory boards of *INFORMS Service Science and Operations Research*, where he was previously editor-in-chief. Harker is a Fellow of the NAI and INFORMS and a member of the Institute of Electrical and Electronics Engineers, the American Economic Association and the International Academy of Management.



Panelist

Linda P.B. Katehi, Chancellor, University of California, Davis

Linda P.B. Katehi, Ph.D., FNAI, is chancellor of the University of California, Davis. She is a member of the National Academy of Engineering, a Fellow of the National Academy of Inventors, American Association for the Advancement of Science, and the American Academy of Arts & Sciences, and member of numerous national boards and committees. She chaired the President's Committee for the National Medal of Science and the Secretary of Commerce's committee for the National Medal of Technology and Innovation. Her work in electronic circuit design has led to numerous national and international awards and 19 U.S. patents. She is author of over 650 publications. Prior to joining UC Davis, she was a top administrator at the Universities of Illinois at Urbana-Champaign, Purdue and Michigan.

Keynote Address and NAI Fellows Induction Ceremony

Welcome Remarks and Keynote Introduction

Morteza Gharib, Vice Provost for Research, California Institute of Technology

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Fellows Keynote Address

Andrew Faile, United States Deputy Commissioner for Patent Operations, United States Patent and Trademark Office

As the Deputy Commissioner for Patent Operations, Andrew Faile is responsible for all patent examining functions in the nine Patent Technology Centers, the Office of Patent Training and the Central Reexamination Unit. Faile was the Assistant Deputy Commissioner for Patent Operations for the Electrical Discipline and has over 20 years of experience in patent examining and operations management. He first joined the USPTO in 1989 as a patent examiner in the areas of cellular telephony, radio frequency communications, and cable television. In 1994, he earned an examiner master's rating in telecommunications. Recently, Faile served on a joint management/union task force in charge of modernizing the examiner production system. He was awarded the Department of Commerce Silver Medal for his work on the task force.

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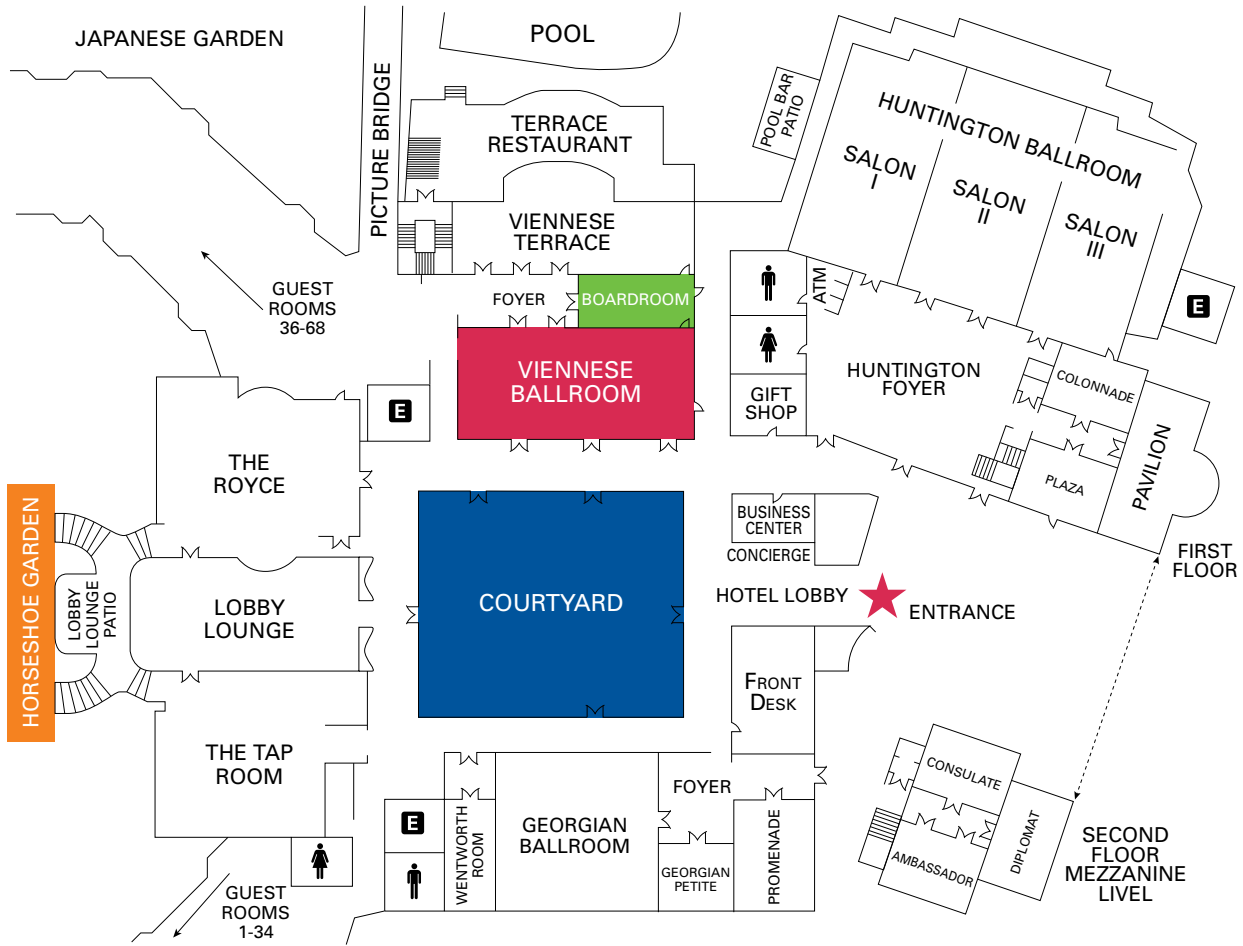
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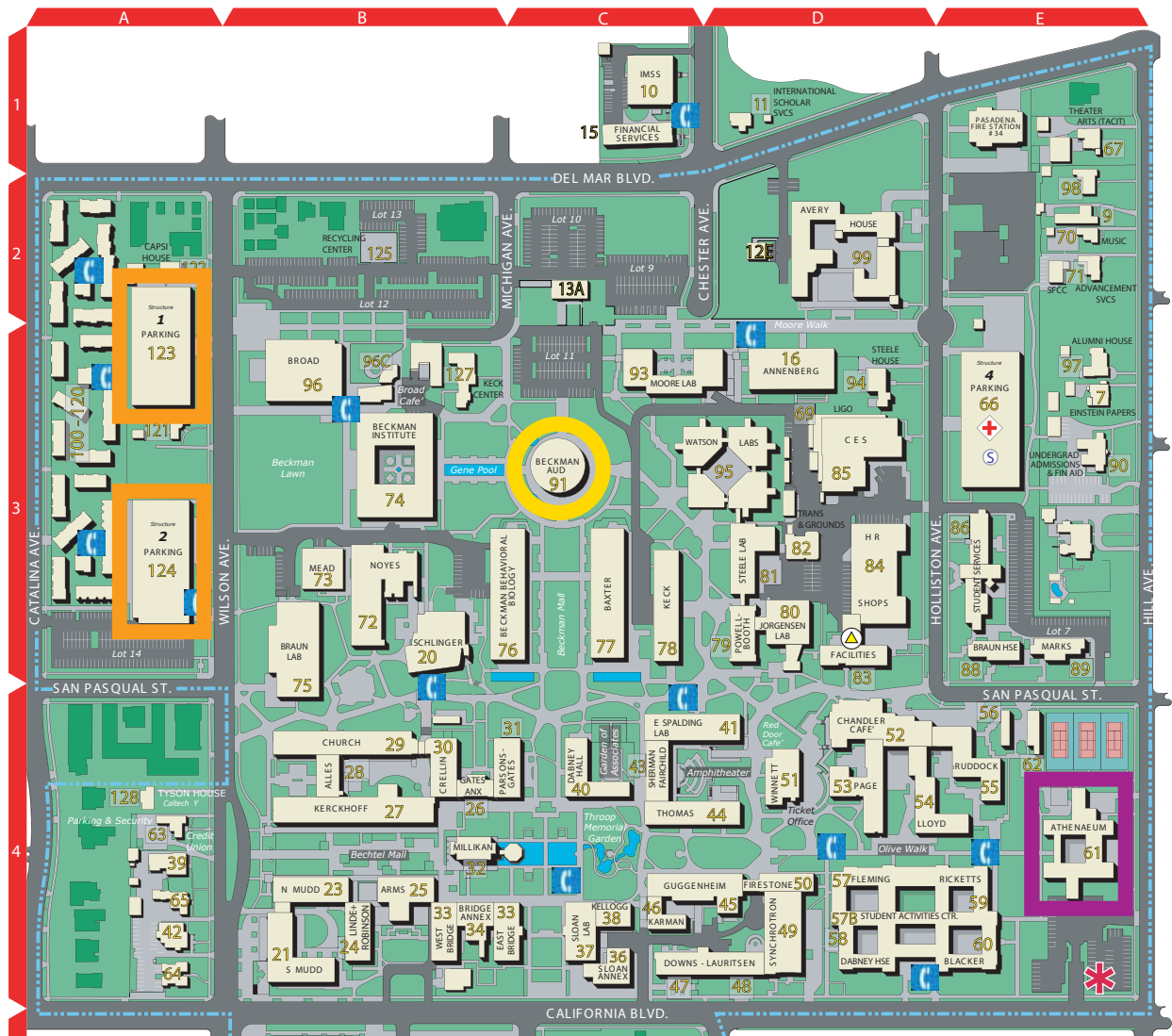
Map of The Langham Huntington Hotel







KEY: General Session A, B, C
President's Welcome Reception

NAI Board Meeting Room
Luncheon on Thursday

Map of the California Institute of Technology



-  Suggested Parking Location
-  Fellows Luncheon & Reception at the Athenaeum
-  Beckman Auditorium
-  Bus Drop-off and Pick-up Location

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ISSN: 1949-8241 E-ISSN: 1949-825X

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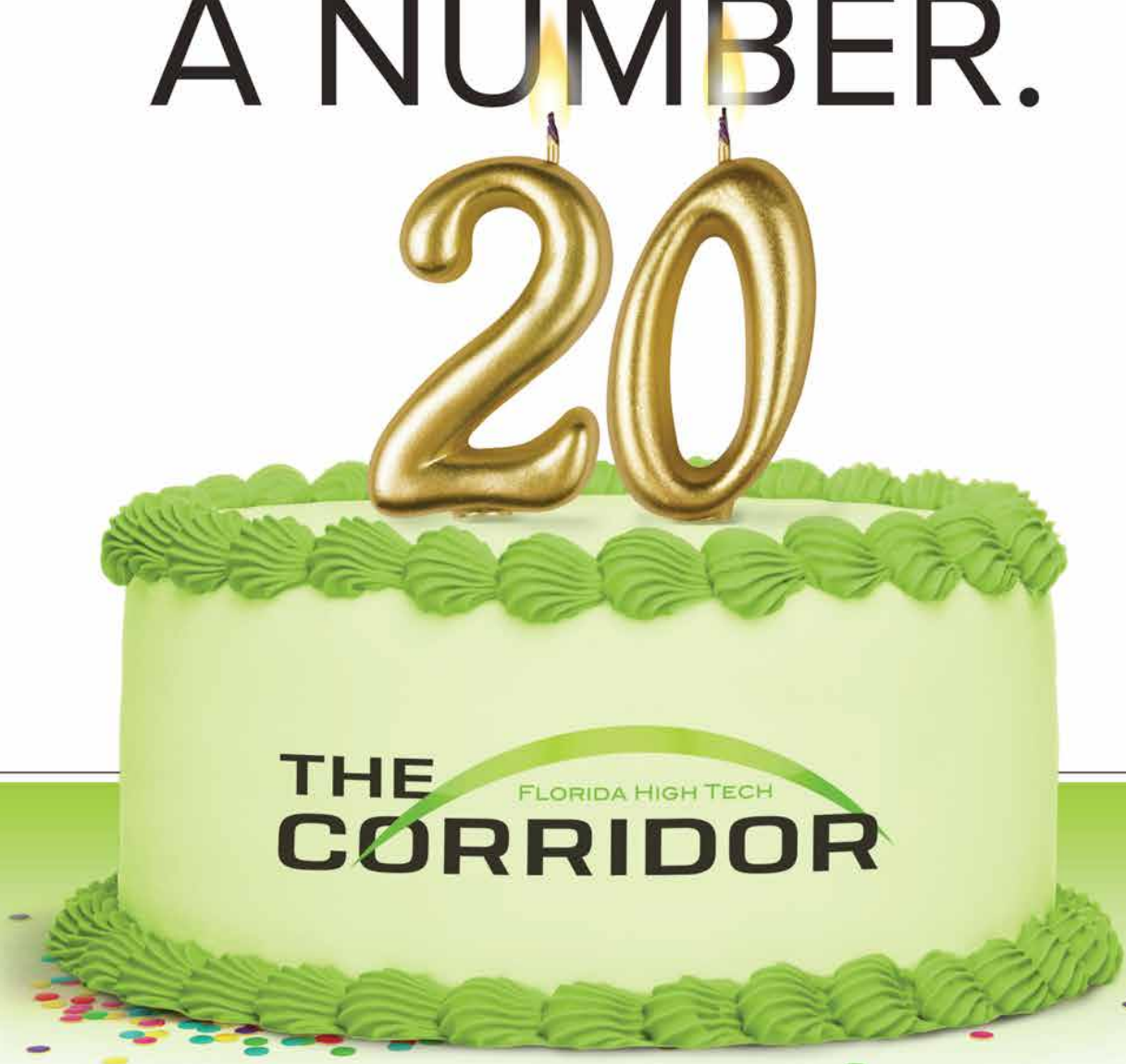


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