

**US-Korea Conference 2017**

Korean-American Scientists and Engineers Association

# UKC 2017

**ENGAGEMENT OPPORTUNITIES  
FOR GLOBAL CHALLENGE**

**REPORT**

**UKC**   
Washington D.C. **2017**

**WASHINGTON D.C.**

**AUGUST 9–12, 2017**

**HYATT REGENCY CRYSTAL CITY**

## Engagement Opportunities for Global Challenges: “CONVERGENCE and INNOVATION through COOPERATION”

The US-KOREA Conference on Science, Technology and Entrepreneurship (UKC) will be held August 9 – 12, 2017 in the Hyatt Regency Crystal City near Washington DC, Capitol of the United States.

Building on the strength of having numerous National Laboratories, Government Agencies, Universities and industries in the region, e.g., NIH, NASA, NIST, FDA, etc., UKC2017 provides valuable opportunities for cooperation between the US and Korea.

The program includes symposiums, forums and workshops to cover broad areas of science and technology, including but not limited to basic science, applied science, engineering, technology, entrepreneurship and science policy. It also offers laboratory tours, e.g., NASA, NIH, George Washington University, Johns Hopkins, University of Maryland, etc.

### US-Korea Conference (UKC)

UKC provides an environment where convergence and innovation can be ignited and implemented. It can play a major role in the Creative Economy that requires interdisciplinary integration.

UKC can play a major role in reducing the technology gap with policy makers, and build the framework to tackle global challenges through science diplomacy.

UKC fosters peer networking and mentoring, and provides a platform for current and future leaders to meet in an environment where meaningful partnerships and friendships can form and grow.

UKC Communicates Science and Technology with the public, and cultivates Science, Technology, Engineering and Math (STEM) education to empower future generations.



# UKC 2018 New York

재미한인과학기술자협회  
**KSEA**  
Korean-American Scientists and Engineers Association

 **KUSCO**  
KOREA - U.S. SCIENCE COOPERATION CENTER

 **KOFST**  
한국과학기술단체총연합회

**Korean-American Scientists and Engineers  
Association (KSEA)**

**UKC 2017 Report**



**US-Korea Conference (UKC 2017)  
On Science, Technology, and Entrepreneurship**

*<http://ukc.ksea.org/UKC2017/>*

Co-Organized with  
The Korean Federation of Science & Technology Societies (KOFST)  
and  
The Korea-US Science Cooperation Center (KUSCO)

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# UKC 2017 ORGANIZERS

## CONFERENCE CHAIR / CO-CHAIR

**Eun-Suk Seo** (University of Maryland)  
UKC 2017 Chair & KSEA 46<sup>th</sup> President  
**Myung-Ja Kim** (KOFST President)  
UKC 2017 Co-Chair

## EXECUTIVE COMMITTEE

**Eun-Suk Seo** (University of Maryland)  
UKC 2017 Chair & KSEA 46<sup>th</sup> President  
**Sung Woo Kim** (North Carolina State University)  
Executive Director  
**Byungkyu Brian Park** (University of Virginia)  
Program Chair  
**Chang Soo Nam** (North Carolina State University)  
Finance Director  
**Sunkyu Park** (North Carolina State University)  
General Director  
**Chang Mo Kim** (University of California, Davis)  
Web and Publicity Director  
**Sung-Ung Kang** (Johns Hopkins University)  
Local Organizing Committee Chair  
**Youngsoo Richard Kim** (North Carolina State University)  
Adviser  
**Un Woo Lee** (General Secretary of KOFST)  
**Hyun Sook Cho**  
(Science Attaché, Embassy of the Republic of Korea)  
**Euna Yoon** (KSEA HQ)

## PROGRAM COMMITTEE

**Byungkyu Brian Park** (University of Virginia)  
Program Chair  
**Youngkee Kim** (University of Chicago)  
Program Co-Chair  
**Chueng-Ryong Ji** (North Carolina State University)  
**Dong Hee Son** (Texas A&M University)  
**Sookkyung Lim** (University of Cincinnati)  
**Hyunmin Yi** (Tufts University)  
**Youngmok Kim** (Synergy Flavors, Inc.)  
**Yong Rak Kim** (University of Nebraska–Lincoln)  
**Tom Oh** (Rochester Institute of Technology)  
**Young-Sup Yoon** (Emory University)  
**Ho Wook Jun** (University of Alabama at Birmingham)  
**Benjamin C. Lee** (INVIA Solutions)  
YGPF Co-Chair

## LOCAL ORGANIZING COMMITTEE

**Sung-Ung Kang** (Johns Hopkins University)  
Local Organizing Committee Chair  
**Byongyong Yi** (University of Maryland, Baltimore)  
Local Organizing Committee Co-Chair  
**Hee-Yong Kim** (National Institute of Health)  
**Sungyong David In** (Ichthus International Law, PLLC)  
**Hyo Joo Han** (Georgia Southern University)  
**Munhwa Kim** (University of Maryland)  
**Ruth Carter** (NASA Goddard Space Flight Center)  
**Chung-Hyuk Park** (George Washington University)  
**Byung-Joon Song** (National Institute of Health)  
**Dong-Yun Kim** (National Institute of Health)  
**Sang Mok Chung** (Food and Drug Administration)  
**Taekjip Ha** (Johns Hopkins University)

## SPONSORSHIP COMMITTEE

**Kyuwon Ken Choi** (Illinois Institute of Technology)  
Sponsorship Committee Chair  
**K. Stephen Suh** (Hackensack University Medical Center)  
**Jim Hyung Lee** (Stevenson Ranch Management Consulting)  
**Max Han** (Accenture)

## WEB & PUBLICITY COMMITTEE

**Chang Mo Kim** (University of California, Davis)  
Web & Publicity Committee Chair  
**Jun Bum Shin** (Oregon State University)  
**Michael Lee** (New Jersey Institute of Technology)  
**Michelle Cho** (KSEA HQ)  
**Jongsung You** (KSEA HQ)



## MESSAGE FROM UKC 2017 CHAIR



**Dr. Eun-Suk Seo**  
President of KSEA

Professor  
University of Maryland

Dear UKC 2017 Participants, Sponsors, and Supporters:

It is my great pleasure to report that the 2017 US-Korea Conference on Science, Technology and Entrepreneurship (UKC 2017) was successfully held August 9 - 12, 2017 in the Hyatt Regency Crystal City near Washington DC, Capital of the United States. We are proud to have been able to bring together over 1,000 participants, including scientists, engineers, government officials, industry executives, and policy-makers from both the US and Korea.

The conference program consisted of three plenary sessions, twenty forums, and twelve symposia, including seventeen interdisciplinary sessions covering broad areas of science and technology with the theme Engagement Opportunities for Global Challenges: Convergence and Innovation through Cooperation. It also offered laboratory tours of the NASA Goddard Space Flight Center and National Institutes of Health. UKC 2017 focused on the environment where convergence and innovation can be ignited and implemented through interdisciplinary integrations. The conference also offered a special opportunity for scientists and engineers to interact with policy makers so that strategies and policies can be developed as issues and challenges of major importance in the field of science and engineering are addressed. The UKC 2017 forums dealt with hot issues such as, fine dust, new drug development, the fourth Industrial Revolution, science diplomacy etc. to build a framework to tackle global challenges.

In addition, the conference fostered peer networking and mentoring, and it provided a platform for current and future leaders to meet in an environment where meaningful partnerships and friendships can form and grow. A Young Generation and Professional Forum as well as a Youth Science and Technology Leadership Camp were organized to empower and develop future generation leaders. The success of UKC 2017 would not have been possible without the sponsors, whom I would like to thank individually for enabling this unique conference. We believe UKC is not a one-time event, but rather an engagement opportunity for continued productive collaborations. Korea Evaluation Institute of Industrial Technology (KEIT) selected two out of six white papers submitted at its UKC forum and ten out of eighty-six technical demand survey responses for the new project development program. A Memorandum of Understanding (MOU) was signed during UKC 2017 to establish our partnership with the Institute for Information & Communications Technology Promotion (IITP). Another MOU was signed with Chungbuk National University. A new initiative with Korea Electric Power Corporation (KEPCO) has begun.

A lot of KSEA volunteers and staff worked with me for more than a year to organize this conference as Executive Committee, Program Committee, Local Organizing Committee, etc. Their dedication and commitment for service to the community is truly inspiring. No words can describe how grateful I am for their tireless efforts.

My special thanks to the Ministry of Science and ICT, Korean Ambassador to the US, six members of the Korean National Assembly, State of Virginia and State of Maryland for their strong support and active participation in UKC 2017. I would also like to thank the co-hosts, Korean Federation of Science and Technology Societies (KOFST), led by President Myung-Ja Kim, and the Korea-U.S. Science Cooperation Center (KUSCO) for their strong partnership with KSEA.

I look forward to seeing all of you at UKC 2018 next year in New York.

Eun-Suk Seo  
UKC 2017 Chair and KSEA 46th President  
Professor of Physics, University of Maryland, USA

## MESSAGE FROM UKC 2017 PROGRAM CHAIR



**Dr. Byungkyu Brian Park**  
UKC 2017 Program Chair

Associate Professor  
University of Virginia

Dear Distinguished Guests and Participants,

On behalf of the UKC 2017 Program Committee, we would like to express our sincere gratitude to each one of over 1,000 participants including conference attendees, sponsors, presenters, volunteers and HQ staff members who made the UKC 2017 another great success.

The program offered a total of 17 interdisciplinary sessions where presenters from two or more disciplines had engagement opportunities for global challenges and sought convergence and innovation through collaborations. Furthermore, our program provided each poster presenter with an opportunity to showcase their research via speed talk that helped much focused and active discussions during the poster session. We are proud to note that many of UKC 2017 forums addressed most significant challenges (e.g., fine particulate matter) and most urgent needs (e.g., preparing for 4th industrial revolution). Finally, the plenary sessions highlighted not only prominent US speakers including Nobel Laureate Dr. John Mather of NASA Goddard Space Flight Center and Dr. Cherry Murray of Harvard but also exemplary Korean-Americans including Dr. Hongkun Park of Harvard, and rising stars in healthcare sector from government, academia and industry.

The conference venue allowed participants to seek opportunities in internship, job interview, and research project collaboration and to explore the Capital of the United States.

We look forward to meeting you all again at UKC 2018.

Byungkyu Brian Park, Ph.D.  
Program Chair and Associate Professor at University of Virginia

Young-Kee Kim, Ph.D.  
Program Co-Chair and Professor at University of Chicago



**Dr. Young-Kee Kim**  
UKC 2017 Program Co-Chair

Professor  
University of Chicago



## WELCOMING AND CONGRATULATORY REMARKS



**Dr. Eun-Suk Seo, President, Korean-American Scientists and Engineers Association (KSEA)**

“It is my great pleasure to welcome all of you to UKC 2017, jointly organized by KSEA, KOFST, and KUSCO. We are living in this rapidly changing world. A fusion of technologies is blurring traditional boundaries. Whether it should be called the 4th industrial revolution or not, it is timely for UKC to offer engagement opportunities for global challenges with a theme, convergence and innovation through cooperation, focusing on UKC’s special multidisciplinary nature. I hope that the UKC 2017 will be a rewarding and memorable event for each one of you and I also hope and trust you will enjoy your visit to this beautiful and exciting city of Washington DC.”



**Dr. Myung-Ja Kim, President, The Korean Federation of Science and Technology Societies (KOFST)**

“I would like to extend my warmest welcome to scientists and engineers from home and abroad for joining the 2017 UKC at this critical juncture of great transformation. We stand on the brink of a new era driven by internet of things, cloud, big data, and mobile, with AI robots, virtual reality, drones, driverless cars and nanomaterials. I would like to extend my sincere appreciation to Pres. Seo Eun-Suk and the dedicated staff of KSEA for successfully organizing this wonderful event. I wish you all the best and happiness in your future endeavors.”



**Honorable Sang Jin Shin, Member, National Assembly of the Republic of Korea**

Chairman, Committee on Science, ICT and Future Planning; Broadcasting and Communication

“I would like to extend my deepest appreciation to all the distinguished guests of the 2017 UKC. Most of all let me express my sincere gratitude to President Eun-Suk Seo of KSEA and President Myung-Ja Kim of KOFST.”



**Honorable Wonho Choi, Director General, Ministry of Science, ICT (MSIT)**

“It is a great honor for me to attend this UKC 2017. Our new Minister Yoo Young-min could not make it today and I would like to speak on his behalf. He would like to extend his sincere congratulations for the opening of UKC 2017.”



## WELCOMING AND CONGRATULATORY REMARKS



### **Honorable Terence R. McAuliffe, Governor, State of Virginia**

“I want to welcome to beautiful Arlington County for the UKC. Strengthening our partnership with South Korea is vital to Virginia’s success in the global economy which why organizations like the KSEA are so vitally important. The organization and this conference promote the creation of 21th century jobs in the science and technology fields.”



### **Honorable Larry Hogan, Governor and Yumi Hogan, First Lady of the State of Maryland**

“It is our pleasure to take this opportunity to welcome you to the UKC on Science, Technology and Entrepreneurship, hosted by the KSEA. The UKC is an incredible event that brings those in the science and technology fields together with various laboratories, government agencies, industries, and universities.”



### **Honorable Mark Lee Keam, Member of the Virginia House of Delegates**

“It is my distinct pleasure and honor to welcome all of you to the Commonwealth of Virginia. It is really important today as scientists, engineers, entrepreneurs, business people, academics, and those in government and I hope you realize how important you job is for the betterment of society. It’s about mankind do better with each generation. I hope KSEA will speak up that underlying science and technology must be used for good.”



## MESSAGE FROM THE MINISTER



**You Young Min**

Minister  
Ministry of Science and ICT

Dear respected members of the science and technology community!

Please allow me to extend my sincere congratulations for the opening of UKC 2017, the greatest US-Korea science and technology festival and the venue for communication and networking for experts.

I would like to express my gratitude to President Kim Myung-ja of the Korean Federation of Science and Technology Societies, President Seo Eun-Suk of the Korean-American Scientists and Engineers Association and everyone who has worked to prepare this important event.

I would like to thank Chairman Shin Sang-jin of the Science, ICT, Broadcasting, and Communications Committee of the National Assembly and Members of the National Assembly Kim Jung-jae, Lee Eun-kwon, Kim Kyung-jin, Shin Yong-hyeon, Mr. Mark Keam, Member of Virginia House Delegates, First Lady Yumi Hogan and other distinguished guests for taking time from their busy schedules to take part in this event.

I would also like to express respect to over 10,000 Korean-American scientists who have shown great passion and efforts to become outstanding scientists and engineers, since the establishment of Association of Korean-American Scientists and Engineers back in 1971 in the U.S., an advanced nation in the field of science and technology.

Korea could commence the journey towards a science and technology powerhouse when it established Korea Institute of Science and Technology with the help of the U.S. half a century ago. At that time, promising Korean-American scientists working in one of best research labs in the U.S. came back to their home country without hesitation and contributed to the remarkable economic development of Korea, which the whole world envies.

Like the UKC 2017 theme, “Convergence and Innovation through Cooperation”, now, Korea is determined to provide new opportunities for national growth by driving convergence and innovation in science and technology in the era of the Fourth Industrial Revolution.

To this end, Ministry of Science and ICT, would like to lay foundation for inclusive growth and take an innovative leap forward in the era of science and technology innovation represented by the Fourth Industrial Revolution.

First of all, our Ministry would substantially increase investment in basic research.

We would make sure to improve the system for selecting and evaluating research projects so that researchers’ failures can be utilized as knowledge assets, supporting them to focus on conducting more creative and challenging research freely. Also, our Ministry will take initiative in implementing science and technology policies and allocating R&D budget as the “control tower in science and technology innovation”.

Our Ministry will strive to bring dynamism and vitality to the overall science and technology innovation ecosystem by nurturing future talents, creating new jobs and securing future growth engines.

In addition, our Ministry, as the Ministry in charge of the Fourth Industrial Revolution, will launch the Committee on the Fourth Industrial Revolution that is in charge of coordinating policies on science, economy and society related to new technologies including AI, big data and IoT.

Our Ministry will also strive to put in efforts for collaboration and communication among the government, its citizens and the enterprises in proposing national strategies in preparation for an intelligent information society.

—  
**MESSAGE FROM  
THE MINISTER**

Dear honorable Korean-American scientists and engineers,

The first US-Korea summit of the newly inaugurated government was held in Washington June this year.

In the summit, two countries agreed to have close talks and collaborate on not only economy and security but also science and technology including space, cyber security and ICT, which led to the solid Korea-US alliance.

I believe Korean-American scientists and engineers are treasures for Korea and play an important role in linking the two countries in sustaining the partnership between Korea and the U.S.

Our Ministry would do our best in supporting Korean-American scientists and engineers to play greater and more important roles both in Korea and Canada.

Once again, I would like to congratulate the hosting of UKC 2017 and wish all the best for everyone.

Thank you very much.

2017. 8. 10.

Minister You Young Min  
of Ministry of Science and ICT

—  
**MESSAGE FROM  
THE GOVERNOR**



**Terence R. McAuliffe**

Governor  
Commonwealth of Virginia



**COMMONWEALTH of VIRGINIA**

*Office of the Governor*

Terence R. McAuliffe  
Governor

August 9, 2017

Korean-American Scientists and Engineers Association  
1952 Gallows Road, Suite 300  
Vienna, Virginia 22182

Dear Friends:

I extend a warm welcome to everyone attending 19<sup>th</sup> annual U.S.-Korea Conference on Science, Technology and Entrepreneurship, hosted by the Korean-American Scientists and Engineers Association.

The U.S.-Korea Conference on Science, Technology and Entrepreneurship is a nexus for science and diplomacy. By bringing together the most gifted minds in their respective fields, this conference allows stakeholders to come together to tackle 21<sup>st</sup>-century challenges facing the world. I commend the organizers and attendees who worked tirelessly to hold this conference, as well as their willingness to combat these issues together. Thank you for all that you do to strengthen diplomacy between the U.S. and Korea.

Best wishes for a successful event.

Sincerely,

A handwritten signature in blue ink, which appears to read "Terence R. McAuliffe". The signature is fluid and cursive, written over a light blue circular background element.

Terence R. McAuliffe

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—  
**MESSAGE FROM  
THE MEMBER OF CONGRESS**



**Barbara Comstock**  
Member of Congress  
10th District, Virginia

**BARBARA COMSTOCK**  
10TH DISTRICT, VIRGINIA



**Congress of the United States**  
House of Representatives  
Washington, DC 20515

COMMITTEE ON TRANSPORTATION &  
INFRASTRUCTURE

COMMITTEE ON SCIENCE, SPACE &  
TECHNOLOGY  
CHAIRWOMAN, RESEARCH AND TECHNOLOGY

COMMITTEE ON HOUSE ADMINISTRATION

President Eun-Suk Seo, UKC 2017 Chair and KSEA 46<sup>th</sup> President  
Myung-JA Kim, UKC 2017 Co-Chair and KOFST President

I would like to extend my sincerest congratulations to all those who have organized and are participating in the Korean-American Scientists and Engineers Association annual conference on Science, Technology and Entrepreneurship. The Scientists and Engineer Association holds an important role in furthering the development of science and technology in the Korean community, and with the 19<sup>th</sup> annual US-Korea Conference 2017, continues to boast the collective and innovative nature of the Association through cooperation on a global platform.

This conference will provide an important arena that will foster a continued dialogue among stakeholders on science and technology issues between the United States and Korea. By offering symposiums on a wide array of issues such as basic science, engineering, and technology, the association provides a great opportunity for members of the community to come together and foster meaningful partnerships in support of these important fields.

As a representative of Virginia's 10<sup>th</sup> Congressional District, I serve on the Committee on Science, Space, and Technology, and I hold a special appreciation for the significance of STEM education and its role toward empowering current and future generations. I appreciate the efforts of the Korean-American Scientists and Engineers Association to continue developing these important relationships, and I look forward to staying in touch on these issues with you and my constituents across the region in our Korean community.

I look forward to working with you in the years ahead.

Sincerely,

Barbara Comstock  
Member of Congress

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## From the Big Bang to the End of the Universe, and How We'll Learn More with the James Webb Space Telescope



**NOBEL LAUREATE  
DR. JOHN C. MATHER**

Senior Astrophysicist and Senior Project Scientist

James Webb Space Telescope  
NASA's Goddard Space Flight Center

Dr. John Mather gave the plenary address on Thursday morning at UKC 2017 speaking on the new James Webb Space Telescope which is the successor to the Hubble space telescope. In his talk, title "From the Big Bang to the End of the Universe, and How We'll Learn More with the James Webb Space Telescope," he addressed how this new telescope which will be launched in October of 2018 will expand the phenomena that can be observed from black holes to the growth galaxies. He showed simulations primordial material leading to the formation of galaxies and solar systems within them. Dr. Mather further showed some of the details and designs of the telescope from the instrumentation to the observatory.

Dr. John C. Mather is a Senior Astrophysicist and is the Senior Project Scientist for the James Webb Space Telescope at NASA's Goddard Space Flight Center in Greenbelt, MD. His research centers on infrared astronomy and cosmology. Dr. Mather is the recipient of numerous awards, including the Nobel Prize in Physics (2006) with George Smoot, for the COBE work, and the NASA Distinguished Service Medal (2007). He received his Bachelor of Arts degree from Swarthmore College with highest honors in physics in 1968 and received his PhD in physics from the University of California at Berkeley in 1974. Dr. Mather is now working with teams and committees to develop plans for a future great telescope capable of observing signs of life on planets orbiting other stars.

### Public Lecture

#### The History of the Universe from the beginning to the end: where did we come from, where can we go?



Where did we come from, and where are we going? I will outline the history of the universe from its early moments in the Big Bang, to the possible end. Our history is full of beneficial catastrophes, and we wouldn't be here without them: stars explode, the Moon is formed in a giant collision with the Earth, the Earth is bombarded by asteroids and comets for hundreds of millions of years, and multiple extinction events through hot, cold, poison, and asteroid impacts cause rapid evolution of life. But here we are, our ancestors survived and thrived through it all. Now, we can tell the story, we can look for more details, and we can

begin to adventure through the solar system and eventually beyond, in partnership with a new entity, artificial intelligence coupled with robotics. Scientific discovery has been propelled by competition (including war) for thousands of years, so it's immensely important to public policy. I will illustrate with examples from NASA, including our measurements of the Big Bang, discoveries with the Hubble, and future telescopes like the James Webb Space Telescope (planned for 2018 launch) and beyond. Within a few decades, we may know that life is common in the universe, or perhaps not.

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## Grand Challenges for Research and Development in Sustainable Energy Systems



**PROF. CHERRY MURRAY**

Benjamin Peirce Professor

Technology and Public Policy in the  
John A. Paulson School of Engineering  
and Applied Sciences and Professor of  
Physics  
Harvard University,

Dr. Cherry Murray gave the first plenary address on Friday morning at UKC 2017 speaking on the domains of research that are of importance for establishing sustainable energy systems. In her talk, titled “Grand Challenges for Research and Development in Sustainable Energy Systems”, she addressed the need for a paradigm shift as the world undergoes the fourth industrial revolution as well as global climate change. She then highlighted the challenge of meeting the energy demands of the growing population while limiting the potential environmental harm. She continued by summarizing the current state of development of various relevant technologies and industries, such as renewable energies and batteries. She concluded her talk by listing some of the challenges currently faced by materials and data storage fields.

Dr. Cherry Murray, Benjamin Peirce Professor of Technology and Public Policy in the John A. Paulson School of Engineering and Applied Sciences and Professor of Physics, Harvard University, has made research accomplishments in the areas of light scattering, soft condensed matter physics, surface physics and nanostructures. Dr. Murray served as the Director of the Department of Energy’s Office of Science, from 2015 until 2017, overseeing \$5.5 billion in competitive scientific research in the areas of advanced scientific computing, basic energy sciences, biological and environmental sciences, fusion energy sciences, high energy physics, and nuclear physics, as well as the management of 10 national laboratories. Her current interests are in public policy for science and technology and national security.





## “Nano” as a Guiding Narrative: A Personal Journey



**PROF. HONGKUN PARK**

Professor  
Chemistry and Chemical Biology and a  
Professor of Physics  
Harvard University

Dr. Hongkun Park gave the second plenary address on Friday morning at UKC 2017 tracing the history and development nanotechnologies. In his talk, titled “A Hitchhiker’s Guide to Nanotechnology”, he introduced the interdisciplinary field of nanotechnology by summarizing the various nanomaterials that were initially developed in the 1980s and 90s. He also emphasized the role of prominent researchers as trendsetters in the agenda setting process which set out the framework for future research and development. He then highlighted his own group’s research which focuses on solid-state quantum optics, nanoscale materials and tools. He concluded his talk by sharing some recent developments in brain-human interaction and that of biological tools.

Dr. Hongkun Park is a Professor of Chemistry and Chemical Biology and a Professor of Physics at Harvard University. He is also an Institute Member of the Broad Institute of Harvard and MIT and an affiliate member of the Harvard Quantum Optics Center, Harvard Center for Brain Science, and Harvard Stem Cell Institute. He serves as an associate editor of Nano Letters and a member of the Editorial Board of Chemical Science, and is a fellow of the American Association for the Advancement of Science and World Technology Network. Awards and honors that Hongkun Park has received include the David and Lucile Packard Foundation Fellowship for Science and Engineering, the Alfred P. Sloan Research Fellowship, the Ho-Am Foundation Prize in Science, the Camille Dreyfus Teacher-Scholar Award, the NIH Director’s Pioneer Award, and the US DoD Vannevar Bush Faculty Fellowship.



## Panel Discussion: Leaders In Healthcare

Dr. Jennifer Lee, Dr. Seong Mun, and Mr. Young Bang led the plenary panel discussion, Leaders in Healthcare. In their session, the panelists addressed the current global challenges in health policy, health IT, and future directions of the US healthcare industry. The panelists also provided guidance for healthcare leaders: Drs Lee and Mun emphasized building strong partnerships with people in different disciplines. Mr. Bang also encouraged leaders to step outside their comfort zone.



**DR. JENNIFER LEE**

Deputy Under Secretary  
Health for Policy and Services  
Department of Veterans Affairs



**DR. SEONG K. MUN**

President and CEO  
Open Source Electronic Health  
Record Alliance (OSEHRA)



**MR. YOUNG BANG**

Senior Vice President  
Booz Allen Hamilton



Dr. Lee is a board certified and practicing emergency medicine physician. She is also serving as Deputy Under Secretary for Health for Policy and Services in the Veterans Health Administration and is Senior Advisor to the Secretary. In this role, she provides guidance to the Secretary and Under Secretary for Health on a broad array of matters related to health policy, the VA's health care delivery programs, and key strategic initiatives. Dr. Mun is founding President and CEO of Open Source Electronic Health Record Alliance. The US Department of Veterans Affairs established this not-for-profit organization that promotes open source innovation in health IT. Mr. Bang is Senior Vice President at Booz Allen Hamilton, a company that develops and scales state-of-the-art machine intelligence, deep learning, data science, big data solutions, and advanced/predictive analytics capabilities. Mr. Bang led health IT initiatives for VA, MHS, CD, FDA, NIH, and HHS.

## KSEA AWARDS RECIPIENTS

### • Outstanding Contribution to KSEA Award (Presented jointly by KSEA and MSIT)



**Dr. Sung-Kwon Kang**  
KSEA 35th President

Research Staff Member  
IBM T.J. Watson Research Center

Dr. Kang has had a distinguished career in industry having worked for IBM T.J. Watson Research Center (1984–current) and INCO Research & Development Center (1980–1984) after his Professorship in Stevens Institute of Technology (1977–1980). He received his Ph.D. from University of Pennsylvania (Materials Science and Metallurgy) in 1973 and B.S. from Seoul National University (Metallurgical Engineering) in 1969. His contribution in environmental friendly lead (Pb)–free solder interconnections and electrically conductive adhesives are well recognized nationally and internationally. He received a Fellow Award from TMS (2011) and IEEE (2009) as well as KBS Global Korean Award (2013).

During his tenure as the KSEA’s 35th President, he established UKC2006 as a premier mainstream conference. Online system for registration and abstract submission was implemented for the first time. Many distinguished guests and speakers (e.g. MOST/KOFST) were invited, which led to the increased funding to the next admins. NMC was expanded to NMSC by implementing science program and NMSC budget increased by 3 times. He was actively involved in fund-raising and the 35th income was increased by 36%. He also provided a leadership as a committee chair including Election (96), Scholarship (99), Nomination (07), HAC (11), and LRPC (16). He has served as a committee member for total 38 years during his regular membership of 42 years. His service for KSEA is highly recognized.



### • Engineer of the Year Award (Presented jointly by KSEA and KOFST)



**Dr. Gyeong Soon Hwang**

Paul D. and Betty Robertson Meek and  
American Petrofina Foundation Centennial Professor  
University of Texas at Austin

Dr. Hwang is the Paul D. and Betty Robertson Meek and American Petrofina Foundation Centennial Professor in Chemical Engineering at the University of Texas at Austin (UT-Austin). He received his BS (1991) and MS (1993) from Seoul National University and his PhD (1999, with MS in Applied Physics) from California Institute of Technology (Caltech), all in Chemical Engineering. He also carried out post-doctoral research at the Max Planck Institute for Solid State Research (1999) and Caltech (2000–2001). Since joining UT-Austin as an Assistant Professor in 2001, Dr. Hwang has rapidly developed his research program in computational materials and chemical science. His outstanding records of research, teaching, and service have led to his early promotion to Associate Professor with tenure (2006) and Full Professor (2011). He has been involved in many top-notch research projects concerning the electrochemical properties and performance of nanomaterials and molecular systems for energy, electronics and environment. Dr. Hwang has published over 170 articles in prospective peer-reviewed journals, such as Nature Materials, PRL, JACS and PNAS. He has given more than 130 presentations as an invited speaker, including plenary and keynote addresses at international conferences. His professional career has been recognized with multiple prestigious awards and honors, including Faculty Investment Initiative Award, NSF CAREER award, and ECS F.M. Becket Memorial Award.

## KSEA AWARDS RECIPIENTS

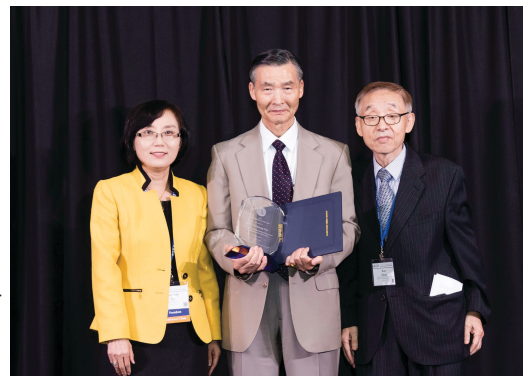
### • Entrepreneur of the Year Award (Presented jointly by KSEA and Maeil Business Newspaper)



**Dr. Tai Ryang Shin**

President and Founder  
Swagger Foods Corporation

Dr. Shin is the President and Founder of Swagger Foods Corporation, in Vernon Hills, Illinois. He received his doctorate in Food Science and Human Nutrition from University of Illinois, Urbana-Champaign. He started his business from a one-bedroom apartment in Chicago in 1978, when the national economy was struggling; and 39 years later, the company continues to grow from startup to a successful business. The company manufactures foods such as a variety of seasoning mixes, side dish mixes, custom blends, clean label and nutrition driven formulations, and other innovative R&D.



As an entrepreneur, his accomplishments are well recognized in the industry as a trusted supplier of premium quality food products. Dr. Shin has made notable contributions to community and education, including providing a gift to UIUC for its Food Science Pilot Plant renovation, and establishing two scholarships, one of which is the Swagger Food Corporation Scholarship. He has a strong passion for education, and was awarded his Ph.D. degree at 65 years old. He is actively involved in several professional memberships and positions, and received several awards and recognitions. Dr. Shin is an accomplished entrepreneur, a contributor to the community and university, and a passionate developer for health and nutrition.

### • Outstanding Chapter and Chapter President Award

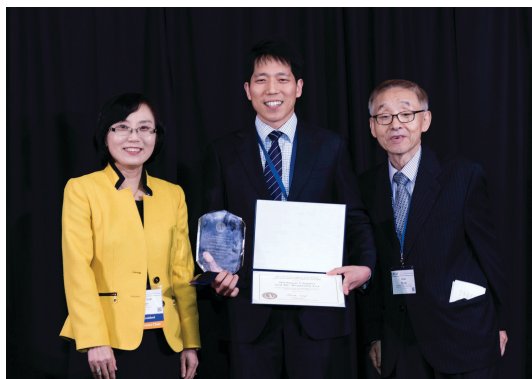


**Dr. Benjamin C. Lee**  
Michigan Chapter President

Research Scientist  
INVIA Solutions

MI Chapter had held NMSCs, regional conferences & membership drives for the last three consecutive terms. Chapter Presidents and Technical Group Councilors from the chapter had participated in more than 75% of KSEA council meetings and email-voting. CP Benjamin Lee also contributed to YG activities and worked hard to obtain a 501c3 status as of 2/3/2017. Its other members also contributed to HQ activities such as UKC session organizing, YG and KWise. The chapter has not received any recognition since it was fully activated since 2010. Overall, Michigan Chapter and CP Benjamin Lee are well deserved for the award on the basis of the overall chapter activities and CP Lee's dedicated services to KSEA.

Dr. Lee received his B.S. in Electrical Engineering from Cornell University in Ithaca, New York, in 1999 and then received his M.S. and Ph.D. in Electrical Engineering: Systems from the University of Michigan in Ann Arbor, Michigan, in 2010 studying signal processing. His research interests include image reconstruction, inverse problems, medical imaging, and image processing with applications in CT and MRI. He has also been working as a research scientist at INVIA Medical Imaging Solutions in Ann Arbor, Michigan, USA, since its start-up in 2005, working on kinetic modeling, image reconstruction, computational geometry, and registration algorithms for commercial nuclear medicine cardiology quantification software. He has served as the Michigan Chapter President during the 2016-2017 term, has been helping organize various KSEA Young Generation events and programs, and is now serving as the Publication Director 1 in the 46th KSEA administration.





**Dr. Seogjoo Jang**

Professor  
Queens College, City University of  
New York

### Outstanding Community Service Award

Seogjoo Jang (SJ) received BS (89) and MS (93) degrees in Chemistry from Seoul National University, and PhD degree in Chemistry (1999) from the University of Pennsylvania. As a theoretical and computational chemist specializing in quantum dynamical processes in condensed and molecular media, he worked as a postdoctoral fellow/associate at MIT during 1999-2002 and as a Goldhaber Distinguished Fellow at Brookhaven National Laboratory in 2003-2005. He started working as an assistant professor at Queens College, City University of New York (CUNY) and served as a doctoral faculty at the Graduate Center of CUNY in September, 2005. He was granted an early promotion to Associate Professor in 2009, got tenured in 2010, and was promoted to full professor in 2012. Since joining CUNY, SJ has developed an internationally recognized research program particularly focusing on energy and charge transport processes in natural and synthetic materials related to solar energy conversion, and received NSF CAREER award (2008) and Camille Dreyfus Teacher Scholar Award (2010). His research projects have been supported continuously by both NSF and Department of Energy since 2009.

SJ has been serving KSEA since 2007, as vice president (2007-2009), senior vice president (2009-2010), and president (2010-2011) of the New York Metro Chapter, during which he led strengthening and enriching Korean-American math and science Olympiad events. During 2011-2014, he served as the council member of KSEA representing technical group B. As a project director of the 42nd KSEA administration, he organized Professional Development Workshop in 2004 to motivate and inspire more successful career development of younger generation of KSEA members. Most recently, as a project director for the 45th administration, in 2017, he led the first mentorship and leadership training (MeLT) workshop dedicated to creating training slides and contents for training KSEA members in their early career stages.



### Young Generation Leadership Award

Dr. Koh is a KIPAC fellow at the Kavli Institute for Particle Astrophysics and Cosmology at Stanford University and SLAC. He received his BS with distinction from Harvey Mudd College, CA, in 2011 and his PhD from Georgia Institute of Technology in 2017. He co-authored 2 peer-reviewed journal articles and 11 conference proceedings and talks. He also received NSF EAPSI Graduate Research Fellowship and other awards. His research focuses on using numerical simulations to understand the formation of the first stars and galaxies in the universe. Dr. Koh has provided outstanding YG leadership and voluntary services for KSEA over a period spanning more than 6 years through various positions such as YGTLC Chair/Co-Chair/Organizer, NMSC volunteer, and UKC2015 local arrangement. As a leader of YGTLC 2016, he displayed excellent management and organizational skills to assign all tasks completely, fairly and evenly so that the entire plans could be executed successfully. For YGTLC, he initiated a method of grouping tasks and a city tour so that all attendees and organizers can enjoy the conference together. His leadership for YG activities is well recognized.



**Dr. Daegene Koh**

Post-Doctoral Scholar  
Stanford University

## KSEA HONOR RECIPIENT

- **Distinguished Sponsor Membership**

Hyundai Motor Company has contributed exceptionally to the financial well-being of KSEA over the past several years. Hyundai Motor Company's sponsorship for UKC and KSEA is highly recognized, and they are honored to continue their support.



Established in 1967, Hyundai Motor Company has grown into the Hyundai Motor Group, with more than two dozen auto-related subsidiaries and affiliates. Hyundai Motor Company has seven manufacturing bases outside of South Korea including Brazil, China, the Czech republic, India, Russia, Turkey, and the United States. Hyundai Motor Company offers a full line-up of products including small to large passenger vehicles, SUVs and commercial vehicles.



**The world didn't need another hybrid. It needed a better one.**

The all-new 2017 Hyundai IONIQ.

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**2017 YOUNG  
INVESTIGATOR  
GRANT WINNER**

## 2017 YOUNG INVESTIGATOR GRANT WINNER

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**The KSEA Young Investigator Grant is the KSEA’s highest recognition given to young professionals who earned a doctoral degree in science or engineering, and have been working in academia, industry, or government for no more than 6 years after the degree. The grant of \$10,000 will be awarded to the recipient.**



**Dr. Jiook Cha**

Assistant Professor  
Columbia University

Dr. Jiook Cha is an assistant professor at the Department of Psychiatry of Columbia University Medical Center. He received his B.S. from Korea University in 2007 and Ph.D. in Neuroscience from State University of New York at Stony Brook in 2013. Prior to joining Columbia University in 2016, he was a post-doctoral researcher at the Columbia University Medical Center. He is a recipient of 2016 National Institute of Mental Health K01 Award (\$740k funding over 4 years) and three other research grants.

He has published 23 peer-reviewed articles in coveted journals and he also has an excellent citation record as a young investigator. With the KSEA Young Investigator Grant, Prof. Cha will investigate “Neurocognitive Mechanisms of Childhood Anxiety: Brain Circuitry of Fear Generalization.” The proposed work aims to provide the first evidence of the association of pediatric anxiety with fear generalization as well as to elucidate complex brain-behavior relationships underlying the fear generalization. Prof. Cha hopes that this research can contribute to developing neurobehavioral targets to determine when and where to intervene with childhood anxiety and to promote preventive therapeutic interventions to youth with pathological anxiety.



**Dr. Aram Chung**

Assistant Professor  
Rensselaer Polytechnic Institute (RPI)

Dr. Aram Chung is an assistant professor in the Department of Mechanical, Aerospace and Nuclear Engineering at Rensselaer Polytechnic Institute (RPI). He received his B.S. from the School of Mechanical and Aerospace Engineering at Seoul National University (SNU) in 2006, and M.S. and Ph.D. from the Sibley School of Mechanical and Aerospace Engineering at Cornell University in 2009 and 2011, respectively. He then conducted postdoctoral studies for two years in the Department of Bioengineering at the University of California, Los Angeles (UCLA) before joining RPI.

He is a recipient of numerous honors and awards, and he has published 19 peer-reviewed articles in high-impact journals with an excellent citation record as a young investigator. With the KSEA Young Investigator Grant, Prof. Chung will investigate single-cell deformability based cancer disease identification and rapid drug screening by developing “Next Generation microFluidic cell Stretcher (NG-FS).” The proposed work aims to establish a new cell mechanotyping platform capable of characterizing large populations of single-cell deformability near real-time. With a successful development of NG-FS, it is possible to screen large cancer cell populations, identifying their specific stage and subtypes in real-time to answer fundamental questions in cancer cell stiffness associated diseases and their progression for clinical diagnosis and biophysical studies.



UKC 2017 focused on basic science, industry technology and emerging technology. Significant research findings, R&D trends, and future prospects of sciences and technologies were solicited in the areas including, but not limited to the following.

<b>BASIC SCIENCE PROGRAM</b>		
PHY	Physics	Chair: Chueng-Ryong Ji (NCSU) / Co-Chairs: Bum-Hoon Lee (Sogang Univ.), Kyungseon Joo (Univ. of Connecticut)
CHM	Chemistry	Chair: Dong-Hee Son (Texas A&M Univ.) / Co-Chairs: Sungjee Kim (POSTECH), Jong-In Hahm (Georgetown Univ.)
MAS	Math/Applied Math/Statistics	Chair: Sookkyung Lim (Univ. of Cincinnati) / Co-Chairs: Chang-Ock Lee (KAIST), Myles Kim (Florida Polytechnic Univ.)

<b>ENGINEERING PROGRAM</b>		
CHE	Chemical Engineering	Chair: Hyunmin Yi (Tufts University) / Co-Chairs: Daeyeon Lee (Univ. of Pennsylvania), Jinwoo Lee (POSTECH)
CIT	Computer Sciences and Information Technologies	Chair: Jeho Park (Harvey Mudd College) / Co-Chairs: Woontack Woo (KAIST), Eunjee Song (Baylor University)
MSE	Materials Science and Engineering	Chair: Yongho Sohn (Univ. of Central Florida) / Co-Chairs: Gwan-Hyung Lee (Yonsei Univ.), YeonWoong Jung (Univ. of Central Florida)
MAN	Mechanical, Aerospace and Naval Engineering	Chair: Chang Kyoung Choi (Michigan Tech. Univ.) / Co-Chairs: Keunhan (Kay) Park (Univ. of Utah), Seokmin Kim (Chung-Ang Univ.)
CEA	Civil, Environmental, Architecture	Chair: Yong-Rak Kim (Univ. of Nebraska) / Co-Chairs: Boo-Hyun Nam (Univ. of Central Florida), Dae-Hong Kang (Duke Univ.)
EEC	Electrical, Electronics and Communications	Chair: Tom Oh (Rochester Institute of Technology) / Co-Chairs: Gon Namgoong (Old Dominion Univ.), Joeng Nyeo Kim (ETRI)

<b>HEALTH AND MEDICAL PROGRAM</b>		
FAN	Food, Agriculture and Nutrition	Chair: Youngmok Kim (Synergy Flavors, Inc.) / Co-Chairs: Hongsik Hwang (USDA-ARS), Seung-Joo Lee (Sejong Univ.)
BMP	Bio, Medical and Pharmaceutical	Chair: Young-sup Yoon (Emory Univ.) / Co-Chairs: In-Hyun Park (Yale Univ.), Woong-Yang Park (Sungkyunkwan Univ.)
BME	Biomedical Engineering	Chair: Ick Chan Kwon (KIST) / Co-Chairs: Jennifer Shin (KAIST), Ho-Wook Jun (Univ. of Alabama)

<b>INTERDISCIPLINARY SESSIONS</b>	
BME/BMP	Drug Development
BME/BMP	Exosome Biology and Engineering for Medicine
BME/BMP	New Drug Discovery
CEA/CIT	Smart City
CEA/MAN/CHM	Carbon Capture Storage and Utilization (CCSU)
CHM/CHE	Advanced Polymeric and Nanomaterials: Quantum Dots and Exciton Dynamics, Advanced polymeric materials, Nanostructures for Energy Application 1 & 2., Advanced Nanomaterial Manufacturing Technologies for Energy and Organic Electronics, Materials for Energy Applications
CIT/CEA	Connected and Automated Vehicle 1 & 2
CIT/EEC	Cybersecurity
MAN/MSE	Nano-Micro Fabrication for Bio/Energy/Material
MAS/BME/BMP	Mathematical Aspects of Biology and Biomedical Engineering: Modeling, Simulation, and Analysis
MSE/MAN	Additive Manufacturing / 3D Printing



## PHYSICS SYMPOSIUM

The Physics Symposium brought together world leading scientists and young researchers in various fields of Physics from across the U.S. and Korea. Both fundamental and emergent physics were presented and the link between the two was discussed. Topics included Fundamental Physics, Emergent Physics, and Applied Physics. The progress of the Institute for Basic Science (IBS) and the associated Rare Isotope Science Project (RISP) in Korea is in close connection with Facilities in US. This meeting served as a timely event for the enrichment of research collaboration and networking between US and Korea. The Physics Symposium consisted of 3 invited sessions with 16 oral presentations. In the Poster Session, 10 physics posters were presented.



**CHUENG-RYONG JI, PhD**  
Symposium Chair

Professor  
North Carolina State University



**BUM-HOON LEE, PhD**  
Symposium Co-Chair

Professor  
Sogang University



**KYUNGSEON JOO, PhD**  
Symposium Co-Chair

Professor  
University of Connecticut

### KEY MESSAGES:

The Physics Symposium brought together world leading scientists and young researchers in various fields of Physics from across the U.S. and Korea. Fundamental physics, applied physics and emergent physics were presented and the link among the three paradigms was discussed. Topics included High-Energy Physics, Nuclear Physics, Cosmology, Astrophysics, Biophysics, Optics, Plasma Physics and Condensed Matter Physics. In particular, the technology development in the measurement of physical phenomena was remarkable. The fundamental understanding of the basic principles in physics has also progressed significantly on a par with the technology development. This meeting served as a timely networking event for the basic science topics centered by fundamental, applied and emergent physics.

### CRITICAL CHALLENGES:

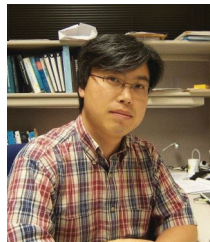
While the technical progress of instrumentation is critical in many branches of physics, focusing too much just on instrumentation could be double edged. One may easily forget the physics that was originally aimed at, when the researchers are indulged in the instrumentation itself too much. It is also necessary to understand clearly the similarity and the difference between the fundamental physics and the emergent physics

### FUTURE DIRECTIONS:

More networking opportunities among the experts in the fundamental physics, the applied physics and the emergent physics will be desirable to enhance the more active discussion on solving the challenging questions addressed at the turn of the century. Interface between the theory and the experiment is particularly crucial for the physical understanding to answer the challenging science questions.



## CHEMISTRY SYMPOSIUM



**DONG-HEE SON, PhD**  
Symposium Chair

Associate Professor  
Texas A&M University



**SUNGJEE KIM, PhD**  
Symposium Co-Chair

Associate Professor  
POSTECH



**JONG-IN HAHM, PhD**  
Symposium Co-Chair

Professor  
Georgetown University

Chemistry has been crucial to the understanding of the behavior of materials on molecular level and the advancement of modern technology through its application. Much of recent advances in chemistry were made at the interface of chemistry, physics, biology and engineering, and interdisciplinary research is becoming increasingly more important in solving important and complex problems. This year's Chemistry Technical Group organized symposia focusing on the following two key themes with several co-organized sessions with Chemical Engineering Technical Group: (1) Biological and soft materials. (2) Advanced polymeric nanomaterials. Experimental, theoretical and computational approaches addressing the current issues on the design, characterization and application of these materials were discussed.

### KEY MESSAGES:

The Chemistry symposium covered broad issues in chemistry and its related disciplines by hosting joint symposia with Chemical Engineering technical group. Presentations from the experts from US and Korea discussed the topics on the two key themes (biological and soft materials, advanced polymeric and nanomaterials) highlighting recent advances in the experimental, theoretical and computational fields



and their applications in medicine, energy and new functional materials. Importance of developing new experimental and computational approaches that are environmentally more sustainable and more economical has also been noted.

### CRITICAL CHALLENGES:

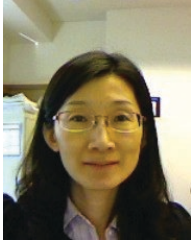
Continued effort in understanding the microscopic origin and obtaining the molecular picture of the new phenomena observed in the natural system and newly developed materials, and the development of new tools for probing the structure and dynamics will be important to translate the basic science into useful technology. Development of sustainable and energy-efficient chemical processes for practical applications of the scientific findings will become increasingly more important in future.

### FUTURE DIRECTIONS:

The Chemistry symposium has been successful for multiple years now in developing multidisciplinary symposia with other technical groups removing the barriers between different communities having common scientific interest. We will continue to make such effort in the coming years. Participants in Chemistry symposium this year agreed to initiate the creation of a group representing Korean-American Chemists in US, which will work closely with KSEA to provide an efficient platform promoting the interaction among the members and representing the interests of the members.

## MATH/APPLIED MATH/STATISTICS SYMPOSIUM

The Math/Applied Math/Statistics (MAS) symposium brought together leading researchers and young scientists from the US and Korea for an exchange of new ideas and invaluable information. The symposium provided opportunities to present and learn about the most recent advances in the areas of mathematics, applied mathematics, statistics, and related fields and demonstrate their applicability to natural sciences and engineering. The UKC MAS symposium has been an exciting venue to interact with researchers from other scientific and engineering fields, promoting interdisciplinary collaboration, and it will continue to play such a role in many decades to come. The MAS Symposium consisted of 5 invited sessions with 26 oral presentations.



**SOOKKYUNG LIM, PhD**  
Symposium Chair

Associate Professor  
University OF Cincinnati



**CHANG-OCK LEE, PhD**  
Symposium Co-Chair

Professor  
KAIST



**MYLES KIM, PhD**  
Symposium Co-Chair

Assistant Professor  
Florida Polytechnic University



### KEY MESSAGES:

The MAS symposium covered topics on discrete mathematical model, statistics in data science, mathematical image processes, efficient computational methods, mathematical data science, numerical methods, and mathematical aspects of biology and biomedical engineering. It is evident that mathematics, applied mathematics, and statistics are making a significant contribution in scientific and engineering fields by providing not only insights from computational and theoretical attributes but also efficient and accurate computational tools. It is also true that theoretical and computational development do not always go hand in hand with testing with real life application resulting in lacking in the feedback.

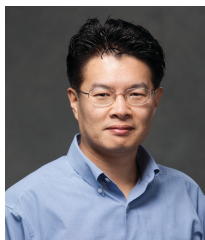
### CRITICAL CHALLENGES:

There is a noticeable gap between the physical world and the mathematical theories/concepts that are used to explain real world physical phenomena. To narrow the gap, it will be crucial to build feedback loops among empirical scientists and theoretical scientists. It is also imperative that a strong integration of basic research, engineering approach, and practical implementations be established for the delivery of improved insights into the latest ideas across the scientific world. This year, MAS symposium had an interdisciplinary joint session. Thus, it is one step closer to such feedback loops and integrated research environment.

### FUTURE DIRECTIONS:

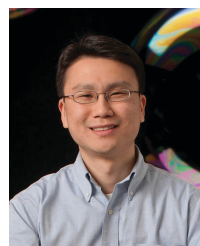
It is important to continue developing new and efficient computational methods as scientific research fields progress more and more towards data and computation driven approaches, and such approaches are demanded in real life applications. It will also be crucial in the future to reach out to other scientific/medical/engineering fields so that the theories and technologies can be tested, modified, and improved against empirical data and real life situations. As we did this year, MAS symposium shall continue organizing cross-disciplinary joint sessions with other symposia in related topics. Doing so will initiate and promote integration and collaboration, which is in line with the UKC's mission.

## CHEMICAL ENGINEERING SYMPOSIUM



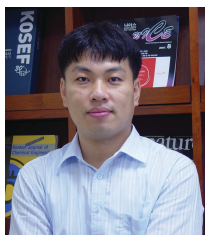
**HYUNMIN YI, PhD**  
Symposium Chair

Associate Professor  
Tufts University



**DAEYEON LEE, PhD**  
Symposium Co-Chair

Professor  
University of Pennsylvania



**JINWOO LEE, PhD**  
Symposium Co-Chair

Professor  
POSTECH

The Chemical Engineering Symposium was designed to provide a forum for leading experts and young researchers to present and discuss recent advances in Chemical Engineering and closely related fields. Topics included nanobiotechnology, advanced polymeric and nanomaterials, computational methods in materials synthesis and process modeling. Continuing our recently established tradition, CHE and CHM held total four parallel joint sessions in the advanced polymeric and nanomaterials areas. Particularly, the CHE symposium this year culminated with Special Session Honoring Professor Kyu Yong Choi's Career, where four leading researchers from both Korea and U.S. presented their experience and appreciation of Professor Choi along with leading-edge research progress in their respective fields. The speakers included Daeyeon Lee (University of Pennsylvania), Sangbok Lee (University of Maryland), Gyeong S. Hwang (University of Texas, Austin) and Jae W. Lee (KAIST).

### KEY MESSAGES:

The CHE symposium covered latest advances in a wide range of important areas including but not limited to synthetic biology, advanced functional materials and manufacturing practices. Similar number of junior and senior participants from U.S. and Korea further facilitated high quality and solid discussions. The polymeric and nanomaterials sessions were held in joint sessions with CHM symposium building on last year's success. Since there exist many common denominators in the challenges, techniques and application areas between the two symposia on these topics, participants from both symposia were indistinguishable and showed equivalent involvement and enthusiasm. The special session for Professor Kyu Yong Choi established our tradition of honoring senior members who made significant contributions to the community.



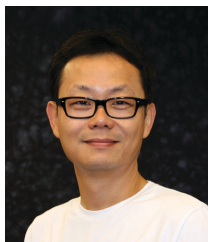
### CRITICAL CHALLENGES:

Despite the success of joint sessions and active participation, little opportunity was present for in-depth discussions on new and potential collaborations due to the tight schedule. The limit of only six sessions total per symposium also prevented other important areas in chemical engineering to be covered, such as biochemical engineering and catalysis.

### FUTURE DIRECTIONS:

In the future UKC conferences, we plan to expand on our recent success and coordinate more joint sessions with other symposia. It would also be very beneficial to increase the number of sessions to cover more topic areas so that more speakers can participate. Importantly, more networking and discussion opportunities in small group settings will be pursued to further enhance the quality and outcome of the symposium in future UKC meetings.

## COMPUTER SCIENCE AND INFORMATION TECHNOLOGY SYMPOSIUM



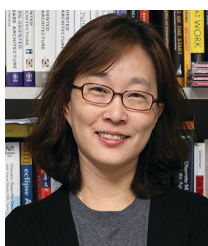
**JEHO PARK, PhD**  
Symposium Chair

Associate Director  
Harvey Mudd College



**WOONTACK WOO, PhD**  
Symposium Co-Chair

Professor  
KAIST



**EUNJEE SONG, PhD**  
Symposium Co-Chair

Associate Professor  
Baylor University

The Computer Sciences and Information Technologies (CIT) symposium encompassed diverse areas of research and development in CS/IT fields as well as entertainment and other technology-related areas such as connected vehicles and smart cities. The symposium also provided a unique venue for CS/IT researchers and engineers from both academia and industry in the US and Korea. The topics included augmented reality/virtual reality, machine learning, data Science, automated and connected vehicles, optimization methods, software engineering, and cybersecurity. The CIT Symposium consisted of four interdisciplinary sessions, one cooperate sponsored session, four regular sessions, and one poster session.

### KEY MESSAGES:

- The CIT symposium had 43 talks in 8 sessions (including interdisciplinary talks) and 11 posters covering a wide variety of research and industry topics in CS and IT.
- Many research presentations inspired the need for interdisciplinary research such as cybersecurity, entertainment (AR/VR), education, and automated and connected vehicles.
- Interdisciplinary sessions offered good opportunities for networking and collaboration between different fields of studies and practices.
- Some of the researches are commercially viable and in the process of seeking investment.
- Corporate sponsored (NAVER sponsored) session about augmented reality and virtual reality provided cutting-edge technologies in the field.

### CRITICAL CHALLENGES:

- Although interdisciplinary sessions seemed to provide good opportunities for research and industry projects, programming such sessions in conjunction with regular sessions was very challenging.
- When there were two or more related sessions offered in parallel, the number of participants noticeably went down.
- The CIT symposium can find more opportunities in many other areas and spur their advancement greatly by providing more interdisciplinary sessions. However, it must be carefully programmed.
- Workforce development in Computer Science is very important. More tools and techniques for effective teaching are desired. Gender gap in computing education should be overcome.

### FUTURE DIRECTIONS:

- Education and workforce development in the fields of Computer Science, information technology, and information systems were in great demand. Many participants recommended to form a session about education and workforce development in the future.
- More interdisciplinary sessions encompassing related topics within and beyond CS and IT fields are suggested.
- More technologies and collaborations in the university lab will make a way into commercial products.
- Although it's still an early stage, data science and connected technologies will play a greater role in business environment.
- Computers will be more human friendly with more advanced human-computer interactions.

## MATERIAL SCIENCE AND ENGINEERING SYMPOSIUM



**YONGHO SOHN, PhD**  
Symposium Chair

Professor  
University of Central Florida

From the ages of stone, bronze and iron, to the advent of steel and semiconductors, the history of civilization can be described in terms of our increasingly sophisticated mastery of new materials, which we now know as materials science and engineering (MSE). The MSE symposium at UKC 2017 will first focus on both “new materials” with noble and multifunctional properties and applications including energy production, harvesting and storage. Equally important is the “sophisticated mastery” of materials (e.g., processing and manufacturing), which often has been the rate-limiting step, and in some instances, an insurmountable challenge, in implementing new materials for applications. The MSE symposium at UKC 2017 will therefore address transformative technologies critical for innovative device/materials processing and additive manufacturing (e.g., 3-D printing). Fundamental sciences underlying the “discovery and mastery” of advanced materials along with technical approaches utilizing computational and interdisciplinary efforts will be highlighted through technical presentations and discussions.



**GWAN-HYOUNG LEE, PhD**  
Symposium Co-Chair

Professor  
Yonsei University

The MSE Symposium brought together world leading scientists and young researchers in various fields of Physics from across the U.S. and Korea, and consisted of 12 invited and 17 contributed presentations. Opening keynote lecture was given by Takhee Lee from Seoul National University, and Additive Manufacturing / 3D Printing session included invited presentations by senior program/technical leads from US Army Research Laboratory (ARL) and National Institute of Standards and Technology (NIST); program flyer attached. Additive manufacturing (AM) of engineered materials is an emerging technique that can produce customized engineering components with novel structure and properties for various applications. Interdisciplinary approach to problem solving is required to advance the technology to complete fruition with scientific understanding. Topics of interests include, but not limited to materials (metals, polymers, ceramics), fluid dynamics, heat transfer, process controls, feedstock development, in-situ and ex-situ monitoring of structure and defects, surface finish, ICME process-properties and structure relations, engineering applications and societal impact.



**YEONWOONG JUNG, PhD**  
Symposium Co-Chair

Assistant Professor  
University of Central Florida

Both pioneering science and industry-relevant engineering topics were presented and discussed. The MSE symposium at UKC 2017 served as an important event for the enrichment of research collaboration and networking between US and Korea.

### KEY MESSAGES:

Technical sessions of MSE symposium were divided into “Frontiers of Materials Science” and “Materials Engineering” with a special interdisciplinary session on “Additive Manufacturing / 3D Printing.” Prevalent message throughout the symposium and within each presentation was the importance of materials discipline as “enabling science and technology” for creating new products with new functions especially for the 4th industrial revolution, and improving performance and durability of existing products to be integrated into the future.

In addition to technical discussion ranging from materials physics to component manufacturing including commercial applications, there was a lively discussion about exchange of data and results to promote true collaboration between scientists/engineers from the US federal agencies (e.g., DOD and DOC) and Korean entities (e.g., federal research institutes). While scientific messages demonstrated continuous and detailed work required for future advancement, promotion of collaboration must be addressed at the highest level of government so that scientists and engineers can communicate freely within the government regulations and compliances.

**CRITICAL CHALLENGES:**

Some of the critical challenges facing frontiers of materials science and engineering is the transferring of laboratory-scale innovation into commercial manufacturing. Challenges facing industry-based materials engineering was the lack of foundational/scientific database that can be applied to engineered products. Hence even within the discipline, *connecting and collaborating between science and engineering/technology* was identified as critical challenges – and MSE is a uniquely identified to address this challenge.

To help facilitate collaboration between the US and Korea, *an understanding of organizational structures, both political and technological, in both nations* was identified as the first step. A complete knowledge of agencies that are (and should be) excluded and included in the data exchange agreement between the US and Korea is required. In addition, promotion of collaboration must be *addressed at the highest level of government so that scientists and engineers can communicate freely within the government regulations and compliances*

**FUTURE DIRECTIONS:**

- Focused and sustained effort on functional materials in electronics and energy to support hardware with functional materials for 4th industrial revolution.
- Fundamental science underlying additive manufacturing / 3D printing for rapidly incoming technology – analogous to 2D printing on paper (e.g., Chinese wooden block to computer-based laser-jet technology).
- Promoting US-Korea collaboration with the knowledge of organizations and laws.

**ADDITIVE MANUFACTURING / 3D PRINTING**  
An Interdisciplinary Session of  
Material Science and Mechanical Engineering Symposiums  
2017 US-Korea Conference on Science, Technology & Entrepreneurship  
Hyatt Regency Crystal City, Arlington, VA 22202  
August 10, 2017, THURSDAY 1:00pm - 3:20pm Prince William Room (3F)



Kyu G. Cho received B.S. (1985) in Mechanical Engineering and M.S. (1992) in Materials Science from the Worcester Polytechnic Institute (WPI), and received M.S. (2005) in Computer Science from the Towson University. In 1994, He began his career as a federal employee at the US Army Research Laboratory. He was promoted to Senior Scientist in 2009, appointed to Innovative Materials Processing Team Leader in 2012, and selected to Manufacturing and Sustainment Science and Technology (S&T) Research Area Lead in 2013. He currently serves as Deputy at Materials and Manufacturing Technology (ManTech) Branch, Associate Director and Chief Scientist at the ARL Center for Agile Materials and Manufacturing Sciences (CAMMS). He is responsible for acquiring and advancing fundamental and applied materials and manufacturing S&T, and transitioning enabling manufacturing capabilities to Army and defense industrial bases. Kyu leads and supports a number of government-academic-industry R&D programs/teams for transitioning critical S&T and affordable ManTech to Army acquisition and sustainment programs for the Army readiness.



Dr. Katman Migler is the Project Lead on Polymers Based Additive Manufacturing at the National Institute of Standards and Technology (NIST). His primary interest is the measurement of non-equilibrium phenomena in soft matter, with particular focus on those that occur in polymer processing, such as in polymer crystallization and in 3D printing. Recent work has included the development of a framework for Polymers Additive Manufacturing that couples theory, on-line measurement, materials characterization and final performance. He led the team that recently developed the thermo-Raman microscope. He served as Leader of the Complex Fluids Group, and developed programs in micro-fluidics, carbon nanotube separations and nanotube composites. Before joining NIST, he was a postdoctoral research fellow at Exxon's Corporate Research Laboratory and at the Collège de France. He earned his Ph.D. in Physics from Brandeis University. He is a fellow of the American Physical Society.



Dr. Lyle Levine works in the Materials Measurement Laboratory of the National Institute of Standards and Technology (NIST) in Gaithersburg, MD. He leads the Additive Manufacturing of Metals Project that uses world-leading measurement capabilities to guide and validate high-fidelity microstructure evolution models. Dr. Levine recently founded AM-Bench, an additive manufacturing benchmark test series with active participation from over 40 different organizations around the world. He has a broad scientific background with diverse interests such as developing new synchrotron X-ray methods, percolation theory descriptions of dislocation behavior, density functional theory simulations of atomic-scale wire deformation, as well as AM. Dr. Levine received his B.S. in physics from Caltech and his Ph.D. in physics from Washington University in St. Louis. He has edited 3 books, published more than 130 technical papers, and has given about 130 plenary, keynote and invited lectures. Dr. Levine is a recipient of NIST's highest honor for innovations in measurement science, the Allen V. Astin Measurement Science Award, and the U.S. Department of Commerce Silver Medal.



Dr. Ashley Paz Y Puente is an Assistant Professor of Mechanical and Materials Engineering at University of Cincinnati, OH, USA. She earned her B.S. and M.S. from University of Central Florida, and her Ph.D. in Materials Science and Engineering at Northwestern University. Her research and teaching interests include diffusion and reaction kinetics, phase transformations, and physical-mechanical metallurgy. Most recently she has used in-situ X-ray tomographic microscopy to investigate the fabrication of metallic microtubes by harnessing the Kirkendall effect. A new project focuses on decoupling printing and alloying of metallic scaffolds via the use of additive manufacturing techniques as a precursor followed by gas-phase alloying to obtain the target composition. Throughout her rising academic career thus far, she has been the recipient of several coveted awards including a National Science Foundation Graduate Research Fellowship, a National Defense Science and Engineering Grant, and a Cabell Fellowship from Northwestern University.

## MECHANICAL, AEROSPACE AND NAVAL ENGINEERING SYMPOSIUM



**CHANG KYOUNG CHOI, PhD**  
Symposium Chair

Associate Professor  
Michigan Tech. University



**KEUNHAN PARK, PhD**  
Symposium Co-Chair

Assistant Professor  
University of Utah



**SEOKMIN KIM, PhD**  
Symposium Co-Chair

Professor  
Chung-Ang University

The Mechanical, Aerospace, and Naval Engineering (MAN) Symposium covered a wide range of areas including mechanics, materials, controls, manufacturing, and energy transport. The MAN symposium was composed of Manufacturing, Micro-Nano-Measurement/Control, and Thermal/Fluid Engineering sessions. The symposium provided the opportunity to discuss the latest cutting-edge research in mechanical, aerospace, and naval engineering with researchers from across the U.S. and Korea. In the MAN Symposium, 16 oral presentations (including 3 invited presentation) and 7 posters were presented.

### KEY MESSAGES:

- Additive manufacturing with both soft and metal materials using a 3D printer seems popular.
- Advance manufacturing is now well bridged with biomedical applications and medical devices.
- Stability issues of biped systems and human gait patterns are well assessed to make impacts on robotics and human interface areas.
- Both theoretical and experimental studies in the field of microfluidics and heat transfer were discussed.

### CRITICAL CHALLENGES:

- The improvement of material property in additive manufactured part are still required.
- The following challenges are very difficult for program chair/co-chairs effectively to manage the program and the sessions:
  - No shows
  - Last minute cancellations
  - Late appearances
- Time management of the speed talk for the poster session was not easy, although its intention was well delivered to the audience.
- The time for each oral presentation (15-20 min.) was not enough to ask/answer the questions.

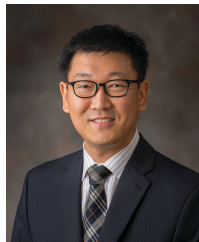
### FUTURE DIRECTIONS:

- More interdisciplinary and multidisciplinary efforts to tackle complex problems.
- More communications and network development with collaborative works
- More specific theme (e.g., automobile related research areas) for more systematic discussion.





## CIVIL, ENVIRONMENTAL AND ARCHITECTURE SYMPOSIUM



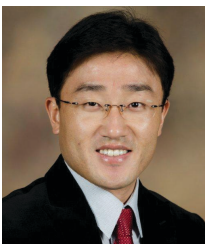
**YONG-RAK KIM, PhD**  
Symposium Chair

Professor  
University of Nebraska

The CEA Symposium brought together world leading engineers, active faculty members, established researchers, and young researchers in various fields of civil, environmental, and architectural engineering from across the US and Korea. Both fundamental and emerging research topics were presented and the link between the two was discussed. Topics included infrastructure resilience, water and environment, commercializable civil engineering technologies, connected and automated vehicles (co-organized with CIT), carbon capture, storage, and utilization (co-organized with MAN and CHM), and smart city (co-organized with CIT). In addition, many participations from graduate students were set in a form of speed talk session which was followed by a poster session. All CEA sessions and CEA-jointed sessions served as timely events for the enrichment of research collaboration and networking between US and Korea. The CEA served total 9 regular sessions (total 50 presentations) and a poster (speed talk) session where total 33 posters were presented. In each session, one talk was invited from eminent scholars and/or government agency officials.

### KEY MESSAGES:

The CEA symposium covered topics on state-of-the-art and state-of-the-practice solutions and future directions/trends in the areas of structures, materials, geotech, construction, water resources, and environments. Moreover, CEA co-organized several multidisciplinary joint sessions with CIT, MAN, and CHM. The KICT-KSCEE session addressed how civil engineering technologies can be linked with commercialization.



**BOO-HYUN NAM, PhD**  
Symposium Co-Chair

Associate Professor  
University of Central Florida

### CRITICAL CHALLENGES:

There is a strong need to integrate basic science, fundamentals, most recent research findings, engineering approaches and other relevant technologies in a multidisciplinary manner. A closer collaboration between areas and fields is a key toward more sustainable CEA systems that are more durable, smarter, performing well, efficient, and longer-lasting. It is also necessary for government to help define and implement long-term vision and preserve continuity of the vision as an institutional partner for global issues.

### FUTURE DIRECTIONS:

In the future, civil engineers will serve as master builders, environmental stewards, innovators and integrators, managers of risk and uncertainty, and leaders in shaping public policy. Toward that it is important to understand how fundamentals can be used for engineering aspects and how engineering solutions can shape the entire community and public policy. This requires close collaborative efforts between areas and fields. Future civil engineering will be more comprehensive than today by achieving active engagement on a variety of environmental and infrastructure fronts.



**DAE-HONG KIM, PhD**  
Symposium Co-Chair

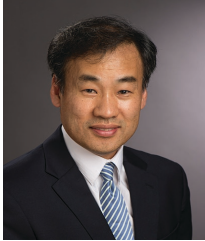
Associate Professor  
University of Seoul



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## ELECTRICAL, ELECTRONICS, AND COMMUNICATIONS SYMPOSIUM

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**TOM OH, PhD**  
Symposium Chair

Associate Professor  
Rochester Institute of Technology



**GON NAMGOONG, PhD**  
Symposium Co-Chair

Associate Professor  
Old Dominion University



**JEONG NYEO KIM, PhD**  
Symposium Co-Chair

Senior Researcher  
ETRI

The Electrical, Electronics, and Computer Engineering (EEC) Symposium was designed to provide emerging technologies and diverse developments in a wide range of disciplines of Electrical and Computer Engineering. With the success of the global internet and the increasing importance of wireless mobile communications, this symposium provided a platform to introduce latest innovations as well as showcase applications enabled by these technologies. This symposium brought together scientists and engineers from the US and Korea, promoting the opportunity for technical information exchange and research collaboration between these two vibrant communities. The EEC Symposium consisted of 1 CIT/EEC joint and 4 EEC sessions with 21 oral presentations and 2 poster presentations.

### KEY MESSAGES:

EEC sessions covered contemporary state-of-art technologies including power distribution, various applications in the areas of microelectronics, optoelectronics and bio-applications. Particularly, various energy technologies including MicroLEDs, power distribution for EVs, flexible device and applications and energy harvesting and its simulation methods were discussed. A key note from KIAT emphasized the close technical collaborations between US and Korea to surpass the current technical barriers for commercialization.

### CRITICAL CHALLENGES:

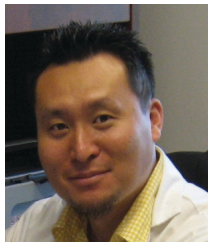
Four key areas were identified and discussed, including power distributed, security, energy and bio/medical applications. Those technical areas require further global collaboration and complimentary expertise that will bring synergic impacts to further advance aforementioned technologies.

### FUTURE DIRECTIONS:

To deepen the topics, it might help to increase a number of sessions to have more discussions with diverse topics. In addition, to broaden audiences, it might need to include more diverse EEC topics and also invite more professionals.



## FOOD, AGRICULTURE AND NUTRITION SYMPOSIUM



**YOUNGMOK KIM, PhD**  
Symposium Chair

Senior Research Scientist  
Synergy Flavors, Inc.

The FAN Symposium offers professionals in the Food, Agriculture, and Nutrition fields a multidisciplinary platform to learn about the latest scientific advances from academic, government, and industrial leaders. The symposium covers all areas of foods, agricultural products, and nutrition. Specifically, the symposium focuses on: (1) scientific information on food science including functional food, food processing, food quality, safety and regulation, food nanotechnology, and other emerging food technologies; (2) scientific information and development in agriculture including agronomy, insect science, forestry, plant and animal sciences, and other agricultural areas; and (3) advances in nutrition, mechanistic understanding of nutrient actions on human health, and prevention and treatment of various disease conditions including obesity, diabetes, cancer, stroke, and many other disorders using nutritional approaches. The symposium is a great opportunity to communicate latest advances in science and technology as well as public health policies involving food, agriculture and nutrition, and stimulate collaboration between participants from US and Korea in this subject area.



**HONGSIK HWANG, PhD**  
Symposium Co-Chair

Research Chemist  
USDA-ARS

### KEY MESSAGES:

Since FAN symposium is a combination of very different scientific area (food, nutrition and agriculture), a chair and co-chairs put a lot of effort to find a good balance between those areas. We were able to hold 2 food sessions, 2 nutrition sessions and 2 agriculture sessions meaning that we were able to find a great balance. Also, we held a CJ from that was able to attract a lot of Korean food scientists that is interested in advanced and most recent food science that is being used in industry in Korea.

### CRITICAL CHALLENGES:

Again, since we tried to invite speakers from three different areas, it was not an easy task. Especially, without full travel support, inviting speakers was a huge challenge. Also, many speakers travelled with spouses and children but they had nothing to do after the conference began. We may need to have some program for them. A group of high school students came in in the middle of session and it was quite noisy and they asked some inappropriate questions at the end of the talk. Also, all of them just left in the middle of talk, which I think it was a little rude. I do not want them in my session any more in the future if they act like that.



**SEUNG-JOO LEE, PhD**  
Symposium Co-Chair

Professor  
Sejong University

### FUTURE DIRECTIONS:

Since we received a lot of great comments after the conference is over, we will try to have same format from now on. We will keep looking for a good balance between three different scientific areas and try to invite good speakers.

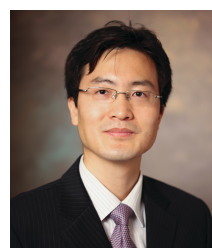


## BIO, MEDICAL AND PHARMACEUTICAL SYMPOSIUM



**YOUNG-SUP YOON, PhD**  
Symposium Chair

Professor  
Emory University



**IN-HYUN PARK, PhD**  
Symposium Co-Chair

Associate Professor  
Yale University



**WOONG-YANG PARK, PhD**  
Symposium Co-Chair

Professor  
Sungkyunkwan University

Biomedical sciences have greatly enhanced our understanding of molecular and cellular mechanisms underpinning various aspects of living organisms in health and disease. Many of the outstanding questions in biomedical research call for interdisciplinary collaboration among scientists in basic science, clinical medicine, and pharmaceutical sciences. Accordingly, the goals of BMP symposium are to present the latest advances in biological, medical, and pharmaceutical sciences, to facilitate mutual understanding of these rapidly advancing fields, and to foster collaboration across the disciplines. In this symposium, we discussed latest developments in not only biomedical principles, but in technologies to enrich our understanding. This year, our symposium covered topics ranging from basic biology to translational science to clinical medicine. More specifically, we covered diseases that are most prevalent and technologies that have critical importance in health and science such as cardiovascular science, cancer, diabetes, immunology, neuroscience, systems biology and bioinformatics, and drug discovery. We also created interdisciplinary sessions and forums with the Biomedical Engineering (BME) and Mathematics/Statistics (MAS) Symposium. We are sure that this BMP symposium offered an invaluable opportunity for a wide range of scientists, engineers, and physicians to broaden their perspectives and to facilitate collaboration among participants.

### KEY MESSAGES:

Various cutting edge topics in major health and science-related disciplines were covered. In the cardiovascular medicine and science sessions, new progresses in cardiac and vascular development, stem cell-derived progenies, direct reprogramming, a combined approach for regenerative therapy, and shear-stress induced lymphangiogenesis were discussed. In cancer biology, novel cancer genome, comprehensive molecular and immune profiling and precision medicine approaches were discussed. In diabetes section, novel molecular pathways for insulin resistance, obesity and diabetes, and therapies aiming at these new targets were presented. The drug development session covered from target discovery to full-blown drug development to legal issues. In the immunology session, regulatory pathway of T cell immunity, autoimmune system, macrophage pathway, CyTOF, memory T cell activation and regulatory T cell regulation by IL-27 were discussed. In the neuroscience session, basic brain development, lipid-regulatory pathway in neurodegeneration and neuroprotection, new target for Parkinson's disease, and Rett syndrome study by stem cell and pain pathway were presented. In the systems biology session, methods to study somatic mutations in early embryo, evolutionary traits in *Xenopus*, computational approach for mRNA stability, neuronal activity-mediate transcription regulation and CpG islands regulating chromatin architectures were discussed.

### CRITICAL CHALLENGES:

In this symposium, state-of-the art scientific progresses and future developments were broadly and deeply discussed. While this symposium has tried its best to cover the most important topics in biology, medicine, and pharmaceutical sciences, it still lacks some crucial disciplines such as precision medicine, big data analyses, and more interdisciplinary areas. So we are facing new challenges in the upcoming new discovery and developments in science and engineering fields e.g. how we can incorporate new knowledge and experiences developed in the fields of artificial intelligence, precision medicine and the fourth industrial revolution. Also, we feel the need of integrating previously uncovered disciplines such as IT and robotic into this BMP session. In this sense, we should develop more revolutionizing sessions in the upcoming meetings and by doing this we can leap into the next stage of the BMP symposium

in which world-leading scientists, medical doctors, engineers, entrepreneurs, and other related professionals convene and lead the new fields. To achieve this goal, we will make our best endeavors to attract the highest-possible profile investigators in the US and Korea and ask the leaders to commit to the success of this conference. Moreover, more contribution of the next generation professionals including trainees and junior faculty is desperately needed. To accomplish these goals, we will surely seek for more financial support and create a better ecosystem to sustain and expand the symposium as well as the overall conference.

#### **FUTURE DIRECTIONS:**

The basic principles of BMP symposium are to provide a venue to discuss the most current and relevant science and health-related topics and to develop new ideas and to foster collaborations among professionals in different disciplines. In accordance with the new developments of science and engineering fields, in the upcoming years, we will broadly cover subjects such as precision medicine, artificial intelligence, big data analysis, and medical device in relation to the current disease topics (cancer, neuroscience, diabetes, cardiovascular medicine, immunology and inflammation, and regenerative medicine). We will continuously foster forming interdisciplinary sessions and invite the best scientists, engineers, medical and pharmaceutical professionals, and entrepreneurs. We will invite more trainees and also develop sessions to mentor young and emerging professionals, offering them with opportunities for their career developments. We will further bring more sponsors across the disciplines. To augment the networking among investigators, we will create a list of attendees and distribute the contact information, so that they can continue dialogues for further developments and connections. By doing this, we will make this symposium the most desiring conference among US-Korea professionals.

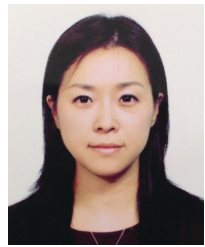


## BIOMEDICAL ENGINEERING SYMPOSIUM



**ICK CHAN KWON, PhD**  
Symposium Chair

Principal Researcher  
KIST



**JENNIFER SHIN, PhD**  
Symposium Co-Chair

Professor  
KAIST



**HO-WOOK JUN, PhD**  
Symposium Co-Chair

Associate Professor  
University Of Alabama

As in any other major industry, problem solving in modern medicine increasingly requires a true convergence of many scientific and engineering fields. While some of the last frontiers of biomedicine, such as neuroscience and regenerative medicine, critically demands new ideas and tools from other disciplines, paradigm-shifting technological innovations in information science, nanotechnology, and robotics could open new opportunities in healthcare. At the same time, a new generation of engineers, “fluent” in many different languages of science, are creating entirely new fields to view the old questions with a fresh look. In the BME symposium, we strive to provide a stimulating forum for all researchers willing to go beyond the “comfort zone” to explore new opportunities in biomedical engineering.

### KEY MESSAGES:

We are proud to witness the great success of the 4th BME symposium at the annual UKC meeting. We had a fruitful and exciting forum where the leading Korean and Korean-American scientists and engineers in the field of biomedical engineering, biomedicine, and convergence technology were able to gather together to discuss exciting advancements and technological development. This networking opportunity among these leaders is likely to spur future collaborations that would benefit both Korean and Korean-American scientists. We are sure that it would contribute to a brighter future of Science and Technology in Korea with an enormous potential in not only improving human health but creating new industrial and economical opportunities. The symposium covered topics on various convergent technologies to better understand and improve human health via different approaches in multi-disciplines including biomaterials & tissue engineering, mechanobiology & biotransport, neuro-engineering, and immunotherapies & drug delivery.

### CRITICAL CHALLENGES:

Bringing back the leaders who attended this year’s BME Symposium to our future meetings as well as recruiting additional new faces and rising future leaders in the vastly diverse areas of biomedical engineering would be crucial to ensure the continued success of BME and the related field. A key to the success of this year’s BME Symposium was that we were able to attract the top-class investigators who generated much excitement and motivations, which then led to spontaneous networking and collaboration opportunities. We must continue to work hard to recruit the symposium organizers who would be willing and able to attract leaders over different generations across the related fields. Additional financial support for the invited speakers would help the organizers recruiting new faces at both senior and junior levels.



### FUTURE DIRECTIONS:

Based on the feedbacks from the first to third BME Symposium in 2014, 2015, and 2016, we have improved our symposium by expanding our collaboration with the BMP session by holding the BME/BMP joint forum and joint networking dinner. In the future, we could consider collecting the contact information and brief research summary from attendees to create a database. These database would be used to increase KSEA and KBMES membership and promote attend KBMES workshop and UKC. We will also explore more sponsors from bio, health, and pharmaceutical industries.

Each Forum addressed one or more global challenges, including the 9 focus areas identified by MSIP (e.g., Automated Vehicles, Lightweight Materials, Smart City, Artificial Intelligence, Augmented Virtual Reality, Precision Medicine, New Drug Development, Carbon Capture and Storage, and Fine Dust), climate change, energy, etc. Sponsored Forums were customized to meet the sponsor's needs

Bio Economy I
Bio Economy II
Biotechnology
CJ (CheilJedang)
Congressional Science Policy
Fine Particulate Matter
History Form
IP (Intellectual Property)
KEIT (Korea Evaluation Institute of Industrial Technology)
KHIDI (Korea Health Industry Development Institute)
KIST (Korea Institute of Science and Techonology)
KISTI (Korea Institute of Science and Technology Information)
KRRI (Korea Railroad Research Institute)
Kyung Hee University
LG Electronics
NST-KIMM-KIER Energy
RISP (Rare Isotope Science Project)
SBA (Seoul Business Agency)
Science Diplomacy
SMB Workshop
KWiSE-KOFWST
YGPF (Young Generation and Professional Forum)

## BIO ECONOMY

### DRUG DEVELOPMENT & APPROVAL I: BIOLOGICS AND BIOSIMILAR DEVELOPMENT AND APPROVAL IN THE US



Chair: Hae-Young Ahn  
(Food and Drug Administration)



Co-Chair: Myeong-Hee Yu  
(Korea Institute of Science and Technology)



Co-Chair: SooYoung Lee  
(Celltrion Biotechnology)

### DRUG DEVELOPMENT & APPROVAL II: HOW TO MAXIMIZE RETURN OF TIME AND EFFORT INVESTMENT IN DRUG DEVELOPMENT AND APPROVAL



Co-Chair: Sang Mok Chung  
(Food and Drug Administration)



Co-Chair: Jin Sun Kim  
(Hanmi Pharm Co)

Therapeutic biologics often represent cutting-edge research in which the latest scientific discoveries are translated into novel therapies that provide new treatment options for patients. Biologic development and approval have been very active. Since the Biologics Price Competition and Innovation Act (BPCI Act) created an abbreviated licensure pathway for biosimilars, many companies including Korean companies are heavily involved in biosimilar developments. The first session brought drug developers, regulators, and patent officers from Korea and the US, and discussed industry perspectives, regulatory and legal perspectives of biosimilar developments and approvals.

Drug development & approval is known to be a time and energy consuming processes with relatively slow and low return of investment while they require timely execution of multi-disciplinary decisions. Meanwhile, nature of drug development & approval becomes increasingly competitive. The situation is more challenging for emerging sponsors due to limited resources and lack of experience. The second session shared and discussed cases to facilitate drug development & approval across diverse stages in the processes for maximizing the return of time and effort investment focusing on situations with emerging sponsors.



**KEY MESSAGES:**

The Drug Development and Approval I session focused on the strategies and methodologies in biosimilar development and approval. Dr. Lee from CELLTRION presented how Celltrion successfully met all the regulatory requirements for Remsima™ to be approved as the first mAb biosimilar in the US. His presentation included evaluation of analytical biosimilarity and extrapolation strategies in detail. Dr. Nikolov of the FDA lectured the FDA's approaches to evaluate the totality of the Evidence for Biosimilarity. His presentation focused on FDA's current policies in strategies and methodologies in biosimilar development and approval and discussed how the clinical programs should be tailed to demonstrate biosimilarity. A patent lawyer, Ms. Kim reviewed legal and practical implications and impacts of the Supreme Court decision including the availability of a federal injunction to compel confidential information disclosure and the timing of the biosimilar maker's notice of marketing.

The Drug Development and Approval II session focused on how we can maximize potentials and minimize risk/failure in drug development, and thus we can maximize investment return of time and effort. Dr. Sun Jin Kim's key message was the critical role of translational sciences. Often, clinical development failures come from inconsistency between pre-clinical and clinical disease models, and their consistency should be verified through solid translation sciences. Dr. Kim presented an important valuation of an in-house program through paradigm shift from low to high investment return using unique translational sciences. Dr. Hui Holly Kimko provided key messages that investment return in drug development can be maximized using Modeling and Simulation as it can provide important bridging among information obtained during clinical development of new drugs and critically assist future study designs. Dr. Sang Mok Chung introduced how we can make efficient and competitive clinical development paradigms as drug development programs become increasingly competitive. Dr. Chung introduced Regulatory Sciences as one of important disciplines in new drug development and its potential role in building competitive drug development master plans.

**CRITICAL CHALLENGES:**

There were two critical challenges in this Forum:

Several invited speakers have to pay their registration fees. The speakers have to spend their times to prepare presentations and travel to participate at the forum. In addition, they are asked to pay for the registration fee.

The forum consisted of excellent speakers. We tried to announce and promote the Forum and UKC to local life scientist community. However, no information on the on-site registration process was available nor one-day forum pass.

**FUTURE DIRECTIONS:**

It would be better to extend the conference period instead of holding many sessions simultaneously. Audiences were spread out to many sessions and each session had only few attendees.

## BIOTECHNOLOGY



Chair: Gyoonhee Han  
(Yonsei University)



Co-Chair: Ji-Young Min  
(Institut Pasteur Korea)

Drug discovery in the era of biotechnology has significant implications for various aspects of human life and global economy. This forum examined the current strategies for and state of international, regional, and national prevention, preparedness, and response to biomedical and emerging infectious disease related to drug discovery. It provided a forum for the international infectious diseases community, academics, industry researchers, government officials, and policy makers to present their recent achievements, exchange ideas, and develop a new vision for future preparedness. This forum brought the researchers from Korea and U.S. to discuss the status and future of the particle accelerators and related field of biotechnology.

### KEY MESSAGES:

Drug discovery often represents cutting-edge research in which the latest scientific discoveries are translated in to novel therapies that provide new treatment options for emerging infectious diseases and cancers. In this forum, new strategies for controlling tumor growth that avoids

the resistance to existing mTOR inhibitors resulting from cancer-associated mTOR mutations were presented. Moving forward, the use of human-induced pluripotent stem cells (hiPSCs) as a novel platform for understanding and diagnosing radiation-induced cardiotoxicity, and for screening of therapeutic agents to mitigate radiation risks was demonstrated. Presented in this forum were innovative phenomic approaches that are not only helping to shed a new light on the discovery of first-in-class compound with novel molecular mechanism of emerging viruses, but also providing a great hope of fighting some for the more devastating outbreak in new ways.



### CRITICAL CHALLENGES:

Drug development and approval is known to be a time and efforts consuming processes with relatively slow and low return of investment while they require timely execution of multi-disciplinary decisions. Meanwhile, the nature of drug development & approval becomes increasingly competitive as indicated in the low success rates. The situation is more challenging for the emerging infectious diseases and persistent cancers due to limited resources and lack of experience.

### FUTURE DIRECTIONS:

Beyond the bond of scientific cooperation that unites us all together, this forum will contribute to fuel our eagerness to commit ourselves in cooperative and high-level public health and research initiatives. In the fight against infectious diseases and cancer, we must combine our talents and set up top priorities to offer pioneering preventive and therapeutic solutions.

## CJ (CheilJedang)



Chair: Sung Woo Kim  
(North Carolina State University)



Chair: Jae Ho Jang  
(CJ CheilJedang)

This was the third CJ Forum hosted during UKC since 2015. This year CJ Forum included presentation competition for CJ Blossom Park Grant (CJBP Grant). Four teams were selected and invited to present the proposal for the decision of final recipient. From the competition two teams have been selected for funding. A subsequent open session included introduction of CJ Blossom Park Research and Development with discussion and questions among participants from FAN Symposium.

### KEY MESSAGES:

This was the third attempt of CJ Forum since UKC 2015. FAN was the key participants to CJ Forum. The first CJ Blossom Park Research Funding Request was well participated with 12 proposals from bioscience, material science, food, and agriculture areas. Four proposals were selected, invited for final competition, and presented to the top management (CEO, VP, and Executives). The top two have been commented for funding with needed revision (Over \$100,000 per proposal). CJ had a separate interview session with 8 candidates.

### CRITICAL CHALLENGES:

No major critical challenges. One minor challenge was the location of interviews. There were no dedicated rooms for the interview but ballrooms were provided while the band practice was occurring.

### FUTURE DIRECTIONS:

CJ Forum could be continued for UKC 2018 but the planning should be arranged in 2017. CJ Blossom Park RFP could also be continued which will bring benefits to KSEA members.



## US-Korea Congressional on National Policies on the 4th Industrial Revolution



Chair: Jaehoon Yu  
(University of Texas, Arlington)

The inaugural US-Korea Congressional panel was held 1:30 – 3:20pm, Thursday, Aug. 9, 2017 during UKC2017, moderated by Dr. Jaehoon Yu, the 45th president of KSEA. This year's panel discussion was the forum for the US-Korea National Policy on 4th industrial revolution. The primary topic discussed in this forum was the U.S.-Korea National Policies to promote and support the 4th industrial revolution. The panel discussion will include the very definition of an "Industrial Revolution", the potential areas of technology that can trigger the 4th Industrial Revolution, the direction of national policies in the U.S. and Korea to promote and support such a revolution, and the national policies to train human resources in a timely fashion in preparation for such a revolution. Most ideal outcome of this panel would be to learn from each country's congressional members their thoughts and to work together in a strong partnership ushering in and shaping the 4th Industrial Revolution.



Figure. 2 A photograph taken after the 1st US-Korea Congressional Panel Discussion. From left, Dr. Seunghwan Kim, Dr. Chan-Mo Park, Dr. Jaehoon Yu – Moderator, Hon. Kyung Jin Kim – Korean National Assembly, Dr. Sae Young Ahn, Del. Mark Keam – VA State House, Mr. Tim Hwang, Dr. Rush Holt – the CEO of AAAS and Hon. Dr. Won-Ho Choi of Korean Ministry of Science and ICT.

The forum was organized in a panel discussion without specific talks given by the panel members. However, the five panel members were as follows:

### Dr. Rush Holt

- 18th chief executive officer of American Association for the Advancement of Science (AAA) since Feb. 2015
- Served for 16 years in the U.S. House of Representative for New Jersey 12th District
- Served as the Assistant Director of Princeton Plasma Physics Laboratory 1987 – 1998
- Physics of physics

### Tim Hwang

- Tim is the Founder and CEO of FiscalNote, a government relationship management platform
- Forbes 30 Under 30
- Inc. 30 Under 30
- CNN Top 10 Startups
- A World Economic Forum Technology Pioneer, a Trustee on the Board of the Greater Washington Community Foundation (the largest funder of non-profit and philanthropic initiatives in the region), and a member of the The Economic Club of Washington, D.C.

and the Young Presidents Organization (YPO).

Mark Keam

- 4th Term Member of VA House of Delegates
- 1st Korean American to serve in a state-level office
- Chief counsel to a United States Senate Whip
- Currently serves on the House Commerce & Labor, Finance, Education, and Agriculture Committees
- Executive with a Fortune 15 technology firm
- Interim President and CEO of Asian/Pacific Islander American Chamber of Commerce & Entrepreneurship

Hon. Dr. Won-ho Choi

- Director General, International Cooperation Bureau, Ministry of Science, ICT and Future Planning (MSIP)
- Served as the director general of many S&T related bureaus in Korean government, including most recently for the Intellectual Property Bureau of the president

Dr. Seayoung Ahn

- Advisor to KSEA's 4IR Committee; 25th KSEA president (1996 – 1997)
- Served as a research scientist at US Naval Research Lab
- Has been serving as a true bridge between various Korean entities and the US for the past 45 years!

The session began with the introduction and a short statement of each of the five panel members. Dr. Holt emphasized that no matter what area is going to be the leading areas for the 4th Industrial Revolution (4IR), an extremely important aspect is that the entire humanity must be benefiting from it through the input from scientists to national policies and thus science diplomacy must be an important factor in 4IR policy.

Mr. Tim Hwang followed Dr. Holt and covered the technical aspect of the area in which the 4IR is expected to occur. He emphasized that the computing technology utilizing artificial intelligence along with collection and manipulation of data as well as the interface to enable the interactions with the data are going to lead the society in the 4IR era. Robots will be carrying out a lot of work currently done by humans and will, therefore, replace people. Sensors and other devices will collection of data. Augmented capabilities will enhance blue collar jobs.

Delegate Mark Keam followed the two and emphasized that in the 4IR era many challenges will arise, not due to lack of technology but due to will to accept the impact of technology into the societal issues. Such advancement in technologies and the arrival of 4IR could cause major societal challenges and cause disparities in the functions and contributions of members in society.

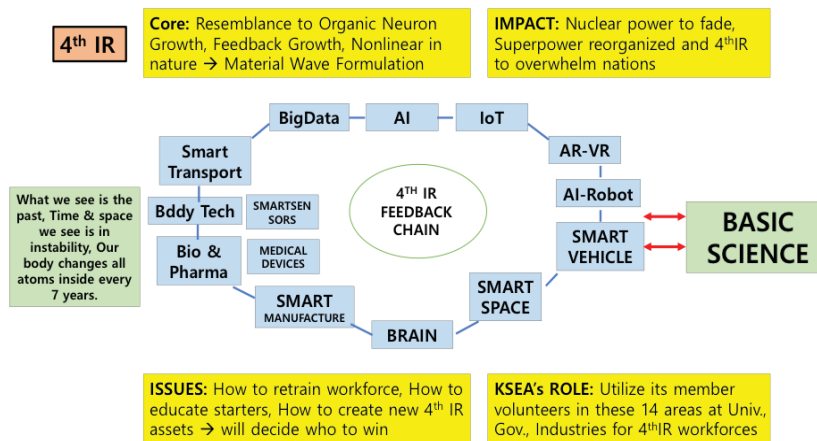
Hon. Dr. Sang Jin Shin, the Chairman of the Korean National Assembly Oversight Committee on Mistry of Science, IT and Technology and other S&T entities and a medical doctor and a professor at Seoul National University, spoke about Korean National Policies and the way Korea is preparing for 4IR. Korea has created a presidential advisory committee for 4IR and has increased the R&D budget to support 4IR. Hon. Dr. Won-ho Choi followed Hon. Shin and described in detail the policy the Ministry of Science and ICT established to support 4IR, allowing government supported entities to take part in the R&D. He also emphasized that the supporting regulations are being prepared so that 4IR era would not be delayed due to lack of corresponding and properly prepared regulations.

Finally, Dr. Saeyoung Ahn of KSEA emphasized that training and retraining of human resources to be an active participant in a work with 4IR is absolutely essential. He presented a feedback loop diagram as shown in Fig. 1 which clearly shows the impact of such training and retraining of human resources have to the society in 4IR era. Dr. Ahn is the chairman of the newly established KSEA’s human resource training for 4IR committee and is expected to liaise to relevant Korean entities on behalf of KSEA to help both US and Korea to establish national policies that can benefit both countries.

The discussion then followed the statements of each of the panel members. The original list of discussion topics prepared by the moderator were:

1. What constitutes an industrial revolution? Why? How?
2. In which area would the 4th industrial revolution likely to happen?
3. What kind of skill sets do people need to be an active member of the revolution?
4. What should be the national policy to support and promote such a revolution?
5. How do we train human resources to prepare for such a revolution?
6. How do US and Korea work together to be an equal partner?
7. What would be the next and how should we strategically prepare for it?

Of these questions, the panel was able to cover only up to questions number 5. The most important challenges identified during the discussion was how to train and retrain work forces in both the countries to fully utilize the human resources in the era of the 4th industrial revolution.



Small text below the diagram: Saeyoung Nate Ahn - Presented at the UKC2017 4th IR Forum, Aug 11th, 2017 Arlington, VA USA

Figure. 1 The feedback loop presented by Dr. S. Ahn, a panel member representing KSEA

Honorable Mr. Kyung Jin Kim raised a question on minimizing the fraction of members in the society left out in this new endeavor. A lot of discussions revolved around the way to prepare to embrace all of these human resources to ensure their positive contributions. What was obvious was that neither US nor Korean government is prepared to address this important question which could become the source for social unrest or at the minimum generating more extreme disparity within the society for “haves” and “not-haves”.

In conclusion, these issues are important and must be addressed in a thoughtful manner, and thus continued discussion to yield tangible solutions are needed. UKC is a good forum to bridge the US and Korea on this matter. It was promised to organize the next US-Korea Congressional Forum at UKC2018.

## Fine Particulate Matter



Chair: Heejung Jung  
(University of California, Riverside)

For tens of millions people living in urban areas, air pollution poses of serious adverse health effects such as respiratory diseases, lung cancer, heart disease, premature death, and others. In 2016 more than 80 percent of people living in urban areas were exposed to air quality levels exceeding the World Health Organization (WHO) air quality guidelines. The largest source of urban air pollution is often motor vehicles, but the contribution of other industrial combustion processes is also important. Particulate matters, volatile organic compounds and oxides of nitrogen from the combustion sources are involved with the formation of fine particulate matters and that result in air pollution.

The appearance of displeasing hazy skyline and the formation of unhealthy smog are hardly a new aspect of Korea's urban atmosphere. Despite the implementation of a range of policies and management efforts by the Korean government for decades, the reduction of fine particulate matters is still desirable. Policies and programs should be developed systematically and revised periodically to understand emission sources and characteristics comprehensively, to identify mitigation opportunities, and to track the emission reduction and air quality improvement.

As a benchmark, U.S. has successfully reduced fine particulate matters and improved air quality past 50 years starting with Clean Air Act in 1963 and subsequent legislations. Four panel members were invited from U.S. institutions and agencies to share their knowledge on primary emissions, secondary formation, air quality modeling, and policy.



### KEY MESSAGES:

Policies and programs should be developed along with systematic research and technology development and revised periodically to understand fine particulate matter (FPM) emission sources, characterize the emissions comprehensively, identify emission mitigation opportunities, and track the emission reduction and air quality improvement.

### CRITICAL CHALLENGES:

Understanding fine particulate matters is extremely difficult due in part to uncertainties in the current emission inventory, complexity in the secondary particle formation, uncertainties in long-range transport process, and lack of compiled experimental data over a long period. Systematic research from identifying FPM sources to characterizing FPM to establishing a continuous ambient monitoring system could help overcome the challenges.

### FUTURE DIRECTIONS:

Results from air quality modeling, source apportionment test, and emission inventory should be updated and compared annually. This will help properly prioritize limited resources to reduce emissions from various sources. The development of sub-models based on systematic experimental data and field data is essential to improve the prediction of air quality under the Korea's complex environments. It is important to develop multi-dimensional outreach programs of air pollution and its health issues for general public, environmental advocates, legislators, and local and central government policy makers. As public awareness and knowledge increases, it is much easier to build consensus on the sensitive subjects for emissions control. Once successfully on track with air pollution control, South Korea can export emission control technologies and share control policies with other developing countries to reduce air pollution globally.

In addition, policies and programs on fine particulate matter issues should be developed along with reducing regional ozone concentrations and greenhouse gases concurrently. Since the sources of particulate matters, ozone precursors, and greenhouse gases are oftentimes common, developing and implementing comprehensive air quality and GHG reduction policies and programs would be more cost effective compared with solving the issues separately. In the process of developing and implementing the policies and programs, systematic research and technology development will be critical to achieve the air quality and GHG reduction goals.

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## INTELLECTURE PROPERTY (IP)

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Chair: Paul Taeksoo Lee  
(Korea-US IP Foundation)

IP Forum 2017 was the consecutive 6th year event held by KorusIP in UKC. In this Forum the IPC (International Patent Consortium), a policy of Trump Administration, which is proposed by Brookings Institute, and the policy report issued in early this year “Localizing the Economic Impact of Research and Development: Policy Proposals for the Trump Administration and Congress” was introduced. The presentation proposed for the industries and scientists that the Federal Labs will internationally share their R&D results in an early stage of R&D so that the R&D results can be effectively utilized not only in the U.S. but also in other countries.

### **KEY MESSAGES:**

The IPC (International Patent Consortium), a policy of Trump Administration, which is proposed by Brookings Institute, and the policy report issued in early this year “Localizing the Economic Impact of Research and Development: Policy Proposals for the Trump Administration and Congress” was introduced. The presentation proposed for the industries and scientists that the Federal Labs will internationally share their R&D results in an early stage of R&D so that the R&D results can be effectively utilized not only in the U.S. but also in other countries.

### **CRITICAL CHALLENGES:**

This new idea of IPC will, once implemented, give a significant impact on the R&D and Industry in Korea because the R&D investment of US Federal Labs is about ten times as bigger as Korean one, and thus the US Federal Labs are regarded as the biggest technology sources for the world R&D and industries, and thus the technology sharing which will be a core concept in the business of the 4th Industrial Revolution will give Korean industries an opportunity entering into a new technology business as well as developing new technologies on top of the shared technologies.

### **FUTURE DIRECTIONS:**

This new trend of technology sharing of Federal Labs and a significant role of IP in this emerging era of the 4th Industrial Revolution where a sharing business model like Uber or Air BNB is a newly emerging concept is a great challenge to the societies of science of technology. World Economic Forum defines the new era as “The possibilities of billions of people connected by mobile devices, with unprecedented processing power, storage capacity, and access to knowledge, are unlimited. And these possibilities will be multiplied by emerging technology breakthroughs in fields such as artificial intelligence, robotics, the Internet of Things, autonomous vehicles, 3-D printing, nanotechnology, biotechnology, materials science, energy storage, and quantum computing.” In this coming new era our science and technology should be prepared for this sharing trends and IP Forum will continue to watch the changes in the Federal Labs and bring the issues in the future UKC.



## KEIT (Korea Evaluation Institute of Industrial Technology)



Korea Evaluation Institute of Industrial Technology (KEIT) is one of most active and dynamic innovation support organizations in Korea, managing R&D programs to foster innovation. The KEIT Forum is to promote the participation of Korean-American scientists and engineers in planning of Korea national R&D projects for improving R&D productivity and Global Cooperation.

Korean-American scientists and engineers in various technical areas discussed the trends of current leading technologies in this Forum with Program Directors (PD) of KEIT to generate creative and innovative ideas for national R&D projects planning.

This forum focused on 6 industrial technology areas including Medical Device, Biomedical, Nano Convergence/Metal Materials/Ceramics, Smart Electronics, Intelligent Semiconductor, and Chemical Processing.



Chair: Sung Woo Kim  
(North Carolina State University)



Co-Chair: Yong Beom Cho  
(KEIT)



### KEY MESSAGES:

KEIT Forum included an extensive discussion session in 6 disciplinary areas (Medical Device, Biomedical, Nano Convergence/Metal Materials/Ceramics, Smart Electronics, Intelligent Semiconductor, and Chemical Processing) with 36 invited professionals and 6 KEIT Project Directors. Outcomes from discussion sessions will be considered in deciding topics areas for RFP in Korea next year.



### CRITICAL CHALLENGES:

No major critical challenges have been observed. However, selection process of 36 professionals was rather a challenge.

### FUTURE DIRECTIONS:

It may be beneficial to educate KSEA members about benefits of participating KEIT research demand survey for upcoming years in advance to KEIT Forum.

## RISP (Rare Isotope Science Project)



Chair: Young-Kee Kim

(Chair, the Department of Physics, The University of Chicago)



Chair: Kang Seog Lee

(President, Korean Council of High Energy Physics, Chonnam National University)

World-renowned accelerators are the discovery and innovation engines of scientific enterprise and where the Korean particle accelerator communities are steadily forwarded for. It is imperative that the critical value-added role of particle accelerator facility in the areas of fundamental science and application to be sustained. In Korea, Pohang Accelerator Laboratory (PAL) and Korea Multi-purpose Accelerator Complex (KOMAC) are successfully operating and a rare isotope accelerator facility, RAON, to be commissioned on 2021, will provide the considerable values to the particle accelerator community. This forum brings the researchers from Korea and U.S. to discuss the status and future of the particle accelerators and related fields of science and technology.

### KEY MESSAGES:

Accelerators are “engines of discovery,” essential scientific instruments for advancing science and technology of the 21st century. International collaboration is the norm of the accelerator projects. If successfully managed, the collaboration can lead to substantial savings in cost and time, to the mutual benefits of the collaborating laboratories. The forum reviewed three accelerator projects in Korea, the PLS-II and PAL-XFEL at PAL (Pohang Accelerator laboratory), ROAN accelerator system for RISP (Rare Isotope Science Project) at IBS, and the KOMAC (Korea Multipurpose Accelerator Complex). The first two are of B\$ class and the third a few hundreds M\$. These projects have all benefitted from various forms of collaborations with laboratories in US and other countries. Eric Colby gave a presentation on the management by DOE of accelerator laboratories in US.



### CRITICAL CHALLENGES:

International collaboration can sometimes be hampered by government regulations and competitive tendency. The issue would be more pronounced when the technical abilities are lopsided between two partners. Such was the case a few decade ago in Korea when accelerator science and technology in Korea was practically non-existing. The trend is changing recently and we see cases of successful equal-partner collaborative arrangements. However, it is piecemeal and case-by-case basis, lacking a coherent overall plan integrated to the project. In addition, there are several cases where the response of the US laboratories to the MOU inquiries are unacceptably slow. Currently, there is no organization in Korea equivalent to the DOE-BES providing oversight of all major accelerator projects. Such an office is essential for coordinating the accelerator projects. It should also help to pursue international collaboration by establishing an overarching MOU with US DOE. We are happy to hear that Korea is in fact moving in that direction—the IBS will take up the oversight role in two to three years.

### FUTURE DIRECTIONS:

An excellent example of successful international collaboration in accelerator projects is the SLAC-KEK collaboration on B-factory construction. It was technically a very challenging project with the performance goals beyond the conventional wisdom. However, the project succeeded spectacularly both as the PEP-II at SLAC and B-factory at KEK because accelerator scientists at both laboratories collaborated and competed at the same time. The characters of accelerator physicists in both laboratories were different—more experienced senior staff at SLAC versus competent and younger staff at KEK. On the balance, however, their accelerator physics capabilities were of similar level and that is why the collaboration became so successful. Such is the direction the accelerator science community in Korea should strive for in order for Korea to become a strong international center for advanced accelerator—the engines of discovery.

## SCIENCE DIPLOMACY

This forum seeks to understand the nature and the role of science diplomacy for enhancing cross-border cooperative activities despite challenging political environments. In particular, the science diplomacy partnerships in and around the Asia-Pacific region are explored, which may contribute to building the capacity for sustainable science diplomacy in the region through bilateral and multilateral projects as well as an active engagement of long-term research platforms and scientist organizations.



Chair: Seunghwan Kim  
(Pohang University of Science and Technology  
(POSTECH))

### KEY MESSAGES:

- Nowadays science and technology contributes to not only the economic development but also the exploration of sustainable solution to global challenges and improving the relations between countries in politically difficult situations.
- Historically there is an accumulation of good examples of the soft role of science and technology in public diplomacy in action, even in ‘science for diplomacy’.
- People in science and technology and their networks are crucial in science diplomacy. We can take advantage of the scientist and engineer’s networks such as KOSEN, KSEA and long-term platforms in Asia Pacific.
- For a sustainable action for ‘science for diplomacy’, a common agenda of multilateral cooperation on long-term platforms needs to be developed and pursued. For example, APCTP can be a good example of a long running international platform in Asia Pacific playing the hub for science-diplomats.
- The AAAS recognizes the importance of capacity building in science diplomacy and supports the professional development and education of students and early-career professionals who are interested in international cooperation and science diplomacy.

### CRITICAL CHALLENGES:

- The notion of science diplomacy is still foreign in many countries in the region, so that there is a need for develop more opportunities and activities for extended discussions on science diplomacy.
- The capacity building is critical, at least in the initial stage, in the countries in the Asia Pacific region for building science diplomacy community and its sustainability.
- It is important to take advantage of existing long-term platforms and building new ones to effectively support science diplomacy for a long time.

### FUTURE DIRECTIONS:

- Need a series of well-planned activities and programs to advance science diplomacy in Korea and around the region.
- For this purpose, a first step is taken to hold the first science diplomacy forum on possible topics of multilateral collaboration at the end of November in Korea, which will be announced later.
- As a pioneer, APCTP will start a new initiative on science for diplomacy by establishing a new science diplomacy center for a strengthened collaboration with AAAPS, KSEA and AAAS, etc on mutually agreed issues of science diplomacy.

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## SMALL/MEDIUM BUSINESS (SMB) WORKSHOP

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The SMB (small/medium business) workshop is organized by the KSEA SMB Committee (ad hoc) as part of its US-Korea SMB Partnership Program. The main goal of the Program is to promote and facilitate SMB partnerships between Korea and the US. Through the partnerships, SMBs in the two countries will have an easier market entry into their counterpart country. The program is available gratis to SMBs as a public service of KSEA. The issues to be addressed in the workshop are rather non-technical and more directed toward legal, economic, financial, etc. Participant have a chance to introduce themselves and present their wish lists. Time is set aside to have one-on-one partnership networking.



Chair: H. Thomas Hahn  
(UCLA)



Co-Chair: Gyeong S. Hwang  
(University of Texas, Austin)



Co-Chair: Kenneth K. Park  
(AT & T)

### KEY MESSAGES:

An ad hoc Small/Medium Business Committee (SMBC) was formed to reach out to Korean and Korean-American SMBs and develop mutually beneficial partnerships. Such partnerships would entail (1) collaboration between KSEA members and SMBs and (2) holistic counseling on new business opportunities and marketing. The first goal would be met by the Open Innovation Center and the second, by the SMB Partnership Program. The SMB Committee will actively contact and communicate with both stake holders in person as well as via the Internet: KSEA members on one side and SMBs on the other.

### CRITICAL CHALLENGES:

The most difficult challenge is to convince SMBs to partner with KSEA members as freelance researchers to carry out industrial research. Faculty members are free to do any research of their own choosing during their summer months and consulting time. Somewhat less challenging is the faculty members' willingness to do industrial research. KSEA can facilitate such partnerships by providing business and legal guidance and arrangements.

### FUTURE DIRECTIONS:

SMB Committee will continue to provide holistic counseling to SMBs, especially those in Korea while expanding their services to Korean-American SMBs. They will listen to SMBs to pinpoint their needs and refine the needed services. The Open Innovation Center plans to start their services using an e-mail letter SMB Briefs and KSEA-SMBC.org website. An Entrepreneurship Symposium will be proposed for the next UKC to listen to SMBs' needs and wants.

## KWiSE-KOFWST Forum (Korean-American Women in Science and Engineering/Korea Federation of Women's Science & Technology Associations)

### WOMEN'S LEADERSHIP IN SCIENTIFIC INNOVATION AND COLLABORATION



Organizer, Hee-Yong Kim

Chief, Laboratory of Molecular Signaling, NIAAA, NIH  
President, KWiSE



Co-Organizer, Se-Moon Park

President, KOFWST

#### I. Presentation Titles and Speakers

**Hee-Yong Kim** (NIH, USA), KWiSE introduction/ **Myeong-Hee Yu** (KOFWST, Korea), Role of KOFWST/ **Wha-Jin Han/Myeong-Hee Yu** (WISSET, Korea), Korea's Major Leadership Programs for Women in STEM Field/ **Esther Yang/Gloria Kim** (E&D Yang and Associates), Career Development in Globally Competitive Environment/ **Cherry A. Murray** (Harvard University, USA), What I've Learned as an Executive in Industry, National Laboratories, Academia and Government/ **Hae-Ra Han** (Johns Hopkins University, USA), Lessons I've Learned/ **Jin-Hee Cho** (US Army Research Laboratory, USA), Working as a Female Defense Scientist in DoD

#### II. Panel Discussion

**MiHye Kim** (Chungbuk National University, Korea)/ **Myung-Hee Park** (NIH, USA) / **Yeon Bai** (Montclair State University, USA)/ **Dohwan Park** (University of Maryland BC, USA)/ **Myeong-Seon Lee** (Cheongju University, Korea)/ **Heykyung Lee** (Johns Hopkins University, USA)/ **Sohyoung Kim** (NIH, USA)/ **Yangmi Shin** (FDA, USA)/ **Hyojin Kim** (Catholic University, USA)

#### III. Key Messages

The KWiSE-KOFWST Women's Forum entitled "Women's Leadership in Scientific Innovation and Collaboration" was organized to promote a spirit of pursuing scientific excellence and its application to current issues of the world through scientific and technical innovation and collaboration. The session was to harness the untapped leadership potential of female scientists and engineers to empower a future generation of women leaders in science and technology. It was an interactive and engaging event to foster peer networking and mentoring among attendees. By inviting speakers and panelist, scientists and engineers from academia, industry, and government; as well as entrepreneurs to represent diverse generations and disciplines, KWiSE and KOFWST provided a platform for current and future leaders to meet in an environment where meaningful partnerships and friendships can be nurtured. Inspirational role models of women scientists/engineers who can share their experience will greatly help prepare for future leadership. Tips and advice for success were communicated, including a global perspective hands on experience in leadership in various sectors and career stages. It was a wonderful opportunity to exchange ideas, learn and inspire, and promote better leadership for women scientists and engineers.

#### IV. Critical Challenges

A more creative approach should be considered to encourage participation of women scientists at UKC and KWiSE-KOFWST forum to truly take advantage of the multigenerational and multidisciplinary networking opportunity the KWiSE-KOFWST forum offers. We may need to recruit more women speakers at the scientific sessions/forums of UKC in general, so that it is easier for them to participate in the Women's Forum.

#### V. Future Directions

It is important to attract young generation women scientists/engineers to participate in the forum for nurturing future women leaders in the science and engineering fields. The KWiSE-KOFWST Forum at UKC may continue to serve as a platform to exchange ideas and encourage the future generation by discovering/highlighting new talents and providing opportunities to network among the current and future women leaders in the math, science and engineering fields.

## YGPF (Young Generation and Professional Forum)



Jim Hyung Lee  
YGPF Chair

Senior Associate  
GiANT Worldwide



Benjamin Lee  
YGPF Co-Chair

Research Scientist  
INVIA Medical Imaging Solutions



Jinhwa Chun  
YGPF Co-Chair

Yield Manager  
OpenX Technologies

The 10th Young Generation and Professional Forum (YGPF) was successfully held from August 10th through August 12th, 2017 in Washington D.C. A total of 70 participants registered to attend from all over North America.

The Young Generation and Professional Forum addressed what may seem like a glass ceiling for the highly educated, and equips the attendees with tools to create an impactful change for our future. The motivation behind the new focus of the forum was because unfortunately, the most educated and experienced people at their job are not always the most influential people in the USA. Many believe that if they did well in school, got into a good college, and then got a good job, they would then be set for life. However, often they neglect social time for study and work, which threatens the benefits we seek from furthering our education. Therefore, the YGPF aimed to help the industry and young professionals become not only better thought leaders of today, but also the influential leaders of tomorrow.



The UKC 2017 YGPF

The 2.5 day program began on Thursday with a welcome session for all travel award recipients and YGPF registrants. This was followed by a “Influential Leadership” keynote and workshop session by Mike Oppedahl, Managing Partner from the leadership coaching firm GiANT Worldwide, which provided their discounted services as part of an in-kind donation, to help those in YGPF to become better leaders focusing on many of the points to navigate the social challenges in the workplace. On following two mornings on Friday and Saturday, the “Career Speed Talks” consisted of 23 participants in industry presenting what they do for their career in concise 3 slide presentations in under 5 minutes. The career topics ranged from engineering, bioscience, health, business and entrepreneurship. During Friday afternoon, the “Workplace Discrimination” talk and workshop by Marrian S. Chang, Shareholder, Ogletree Deakins, in which she spoke and answered questions about discrimination in the workplace of all kinds including sexual, racial, age, disability, and others. During Friday afternoon, there were 18 YGPF posters with topics in leadership, career development, and technology. On Saturday, the “Overcoming Quarter-Life Crisis” talk and workshop by Paul Sohn, Founder & CEO, QARA, focused on those young professionals with about the five years of work experience pondering what to do next with their careers. Then the “Immigration Law” workshop by Gilda O. Karpouzian, Attorney at Law Office of Gilda O. Karpouzian, presented topics aimed at 1st generation Koreans looking to stay in the U.S.

Career speed talk winners were for 1st place for “Registered Dietitian in Nutrition / Dietetics” by Jisun Park from the Swedish Medical Center, 2nd place for “Associate Strategy Officer in Strategy / Philanthropy” by Rachel Lee from the Bill & Melinda Gates Foundation, and 3rd places tied for “Small Business Owner in Food / Hospitality” by Annie Choi from Found Coffee | FrankieLucy Bakeshop, and “Internal Auditor in Audit” by Vicky Tao from Caltech.

Poster winners were for 1st place for “So... Where are You Really From? Understanding and Responding to Racial Microaggressions and Bias” by Katherine Cho from UCLA Graduate School of Education and Information, 2nd place for “Chronic Disease Management in AV” by Eric Oak from High Desert Medical Group, and 3rd place for “Why We Need Global Goals” by Eunyoung Song from Kyung Hee University.



*YGPF Forum Organizers and GIANT Leadership Coaches*



*YGPF Friday night networking dinner at Kora*

Our main challenge this year was that YGPF is unable to unify the target audience as there is a mix of experience levels when it comes to an audience, comprised of academia, early career, and established working professionals. UKC provided a unique opportunity for their ability to connect with experienced attendees in both academia and the professional field. It seems like a natural fit for the professionals, technical forums and symposiums to partner with the YG in UKC to provide an intentional mentoring and apprenticeship experience built into the conference. This would not only better unify KSEA across generations through relationships, but also create better understanding and information sharing, ultimately creating a better experience for all, which UKC uniquely provides compared to all other organization and conferences. All in all this year’s YGPF was a great success and we hope the progress made in the program development continues for the next UKC.



**Karl Kwon, Research Scientist, in4mation insights, Boston, MA**

“Thank you to all the organizers who had worked so hard to put together the event.”



**Celine Seulgi Hong, Bioinformatics Scientist, National Institutes of Health, Bethesda, MD**

“This was my first UKC and I owe everyone for making it a memorable experience! I got to meet so many wonderful people with lovely smiles and warm hearts.”



**Kevin Kim, Undergraduate Student, Cooper Union, New York, NY**

“Thank you again to chairs, organizers, volunteers, and participants who made this awesome experience possible. It was a pleasure meeting such passionate and outstanding individuals!”



**Taewoong Kim, Graduate Research Assistant, The University of Oklahoma, Norman, OK**

“I would like to thank everyone all for the great time we had in DC! It was definitely a phenomenal time getting to know one another, sharing thoughts, and most importantly talking about our life by getting out of our comfort zones!”



**Justin Junghee Kim, Electrical Engineer, Empire Electronics, Troy, MI**

“I just wanted to thank all organizers who put tremendous of effort for this awesome conference and also all participants who made conference much more special. UKC was so great; it was really unique opportunity to meet such talented/fascinated people at once!”



**Katherine Cho, PhD Student, UCLA, Los Angeles, CA**

“Thank you to everyone, especially the organizers, for making the conference so amazing. I loved getting to meet and reconnect with everyone. This was also the first time I’ve ever presented my research at YGPF and KSEA in general so thank you for your thoughtful comments, insightful questions, and stories you shared. “



**Jasmine Cho, Undergraduate Student, USC Marshall School of Business, Los Angeles, CA**

“I am grateful to have met such bright and talented friends this past week. It was my first KSEA experience but I appreciate how everyone was so welcoming and willing to share their stories with me and the rest of the YGPF family. It’s truly inspiring to witness Koreans and Korean-Americans all over the nation fighting for what everyone is passionate about and leaving a legacy. “



**Jinseong Lee, Graduate Research Assistant, University of Maryland, College Park, MD**

“My 1st time to YGPF in the US, since attending the UKC long ago and the YGF in Korea, was a great opportunity to meet such precious people. Above all, I really appreciate all organizers for their enthusiastic support and all those friendly participants who came and talked to me. As encouraged to do so by the UKC Chair and KSEA President, Dr. Eun-Suk Seo, I am lucky to be connected with you.”



**Jisun Park, Clinical Dietitian, Swedish Medical Center, Seattle, WA**

“I appreciate all [the] hard work that made UKC 2017 so successful with lots of joy, enthusiasm, connection, dream, and potentials. It was my first time to join UKC, and was so impressive, memorable, fun, and fruitful! It was a great honor to meet all promising students and professionals, and to make connection with them and get to know them more through this wonderful event!. Definitely want to join again next year!”



# Youth Science and Technology Leadership Camp (YSTLC)



K. STEPHEN SUH, PhD  
YSTLC Chair

Director  
Hackensack Univ. Medical Center

UKC 2017 selected 14 students for the Youth Science and Technology Leadership Camp (YSTLC). This new tradition of UKC to educate youth from 8th to 12th graders started in UKC 2016. This year, the camp was filled with more laughter from students because all of them (and I mean every single one of them) were very active and extremely engaged in all projects. All mentors provided very detailed guidance and lectures to nurture them, so that they can one day become the next generation of scientists and leaders.

The students exhibited unlimited curiosity and never-ending energy to explore all disciplines of science and technology. This year, YSTLC 2017 was structured as 7 nights 8 days (August 5th to 12th) course. The students were fully exposed to science, technology, engineering and mathematics (STEM) areas during the first half and then naturally merged with the schedule of UKC 2017 events for the second half of the week. During this initial stage of exploring STEM fields, the students visited various research facilities and academic laboratories and worked on scientific projects, such as the Mars Rover prototype testing. At this step, the students also had chances to assess their own scientific interest by attending intensive lectures from KSEA leaders, academic professors and industry experts. The students had private viewing and Q&A sessions at the famous National Aeronautics and Space Administration (NASA) facility, visited multiple STEM laboratories such as the zebrafish national core laboratory at the National Institutes of Health (NIH), a biomedical engineering laboratory, the 3-Dimensional Fabrication and Printing Education site at the National Library of Medicine, a virtual reality testing site and the Robotic Limbs Development Lab at the Army Walter Reed Hospital. Students had a chance to visit whole Johns Hopkins facilities, including the medical center, libraries and the world-renowned Peabody Museum and Library.

These trips allowed the students to “look into their hearts” and develop a spark of passion for STEM careers. As the UKC 2017 began on Wednesday, the students bravely performed a science-themed musical that was full of gestures and songs in front of 200 VIPs gathered from Korea and USA. This exercise built self-confidence for them to raise their hands and ask questions during STEM lectures at the UKC sessions. During the second phase, students solidified their commitment to STEM and started to understand academic preparations that they would need to structure their studies

until they enter college, which was another fun part of the camp. They learned how to read and understand an official scientific program book and decide what scientific sessions that they wished to attend alongside their mentors.

The students also met the Nobel Laureate Dr. John Mather for 1.5 hours and each one of them took turns asking questions about the astrophysics and the universe. This mentoring session was one of highlights of the camp since students got to interact with the Nobel Prize winner and absorb the passion of STEM from the Laureate. Here, students truly understood that they do not need to be a “genius” to win the Nobel prize but that they need to build an incredible amount of passion for one discipline that they love. The students also experienced a few meetings with future “big-brothers and big-sisters” from the Young Generation and Professional Forum and the students learned of their activities and were advised on college life and young professional development.



Meeting with the Nobel Laureate Dr. John Mather

The primary objective of the camp was quite simple. Let us show the students what STEM “feels like, smells like, and tastes like.” Our intention was not to drill knowledge into them but to help them to discover STEM inside their heart. The camp taught the students (a) to reassure themselves that they will be future leaders, (b) to perform self-assessment on whether they will enjoy careers as scientists, engineers, physicians or technologists and (c) to confirm what field of science, medicine or technology that they will start to prepare.

This intensive youth program was organized by K. Stephen Suh (President Elect, Hackensack Meridian Health) as the chair, Jiyeon Yoon (KSEA Education Director, UTexas Arlington), Dr. Ruth Chiang Cater and Dr. Jeff Bolognese (NASA) as the NASA Mars Rover project director, Dr. Dong Yun Kim (NIH) as the health science project director, Dr. Young Mi Ji (Walter Reed Hospital) as the Army projects director, Dr. Sung-Ung Kang (Johns Hopkins) as the medical science project director, and Dr. Seung Yeul Lee as the camp organization director. YSTLC was organized by Ms. Euna

## YSTLC REPORT

Yoon (KSEA HQ) as the administration director. The mentors were Joanne Lee (Columbia University), Dr. Hwangbo Han (STG Inc), Grace Hyun Kim (UCLA) and In Chan Lee (U of Michigan). The mentors had a rewarding and gratifying experience with bright young students. YSTLC invites more KSEA members to become mentors for these youth group students. We thank everyone that contributed to the event.



Visiting NASA



Washington DC Night Tour



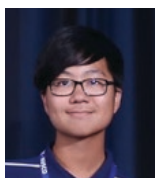
YSTLC 2017 Closing Ceremony

DATE	PROGRAM
<b>AUGUST 6. SUNDAY</b>	<ul style="list-style-type: none"> <li>Registration, Orientation, and Self Introduction with YSTLC Organizers</li> <li>Introduction about the NASA Science Team Project Assignment</li> <li>Washington DC Night Tour</li> </ul>
<b>PUBLIC HEALTH AND DISEASE DAY</b>	
<b>AUGUST 7. MONDAY</b>	<ul style="list-style-type: none"> <li>NIH Visiting Center, Nobel Laureate Exhibit Hall, Human Genome Project, Clinical Center, and Library</li> <li>Walter Reed Hospital/USUHS, Animal Facility Houses, Dummies Labs, and Rehabilitation Research Center</li> <li>Networking with Scientists and Engineers</li> </ul>
<b>BRAIN SCIENCE AND BIO-MEDICAL ENGINEERING DAY</b>	
<b>AUGUST 8. TUESDAY</b>	<ul style="list-style-type: none"> <li>Johns Hopkins University, Homewood Campus, Dept. of Biomedical Engineering, and Physics Lab</li> <li>Visiting George Peabody Library</li> <li>Visiting Johns Hopkins University, Medical Campus Labs</li> <li>Networking with JHU Medicine Mentors</li> </ul>
<b>AEROSPACE DAY</b>	
<b>AUGUST 9. WEDNESDAY</b>	<ul style="list-style-type: none"> <li>NASA Science Team Project and Science Musical Preparation</li> <li>NASA Goddard Space Flight Center Lab, Implement Rover Mission Project</li> <li>NASA Team Project Award Ceremony</li> <li>Perform Science Musical at the UKC 2017 VIP Reception</li> <li>Evening Session with Group Mentors for each Discipline</li> </ul>
<b>UKC 2017 WITH NOBEL LAUREATE</b>	
<b>AUGUST 10. THURSDAY</b>	<ul style="list-style-type: none"> <li>Attending UKC 2017 Plenary Session</li> <li>Meeting with Nobel Prize Winner</li> <li>Attending Public Lecture by Nobel Laureate, Dr. John Mather</li> <li>Attending Afternoon Symposia/Forums with Mentors followed by Discussion</li> </ul>
<b>UKC 2017 CONFERENCE PROGRAM</b>	
<b>AUGUST 11. FRIDAY</b>	<ul style="list-style-type: none"> <li>Attending Plenary Session, Lectures from Globally Renowned Scientists</li> <li>Attending Afternoon Symposia/Forums with Mentors followed by Discussion</li> </ul>
<b>CLOSING YSTLC 2017</b>	
<b>AUGUST 12. SATURDAY</b>	<ul style="list-style-type: none"> <li>YSTLC 2017 Video Presentation</li> <li>YSTLC 2017 Award Ceremony, and Photo Session</li> </ul>



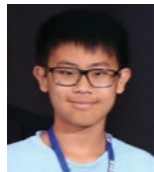
**Michelle Wu (Carroll High School, TX)**

YSTLC was a very exciting and memorable program. I had a lot of fun getting to know people from all different places. Everyone really bonded through staying up late to work on the musical and the NASA rover. Going to the UKC and listening to the various lectures was a very vigorous, yet rewarding process. I learned a lot about things that I couldn't have imagined only a few days before. For example, getting electricity from dirty water! This conference greatly expanded my horizon of thought into considering which profession I would like to pursue. Previously, I was thinking about going into medicine. However, after attending YSTLC, I am now considering going into computer programming and robotics. My most memorable moment at YSTLC was being able to talk to Dr. John Mather, Nobel Laureate in Physics. I think it was just an amazing opportunity to be able to talk to someone with so many accolades. Even though I am not really interested in physics or space, I still found myself fascinated with what Dr. Mather had to say about a scalar field and space before the time of the big bang. In all, KSEA was a very enjoyable program, and I hope I can go again next year!



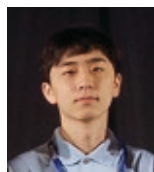
**Justin Han (Centreville High School, VA)**

Overall I would say that I enjoyed my time at the YSTLC Summer camp over this year. I got to meet people I never would have met through this camp and I also got to sharpen my communication skills working on the projects that we did, consisting of the Mars rover and the singing presentation. The events we went to were very fun and educational, from us touring D.C. and just socializing among each other, to exploring the campus of John Hopkins and learning about what we can do at the college. It was a good way for me to look at colleges differently and what I may want to major in. The guest speakers we had were very inspirational and informational to learn from and about. Whether it be the Nobel Prize winner, to a rocket scientist, the people were always really welcoming and that helped me to relax a bit more. The booths and different talks that we went to had a lot of information to process but it was very fun nevertheless. I got to talk and befriend almost everyone at the camp and had a good time playing cards, talking, talking to people in different rooms, and overall just messing around with them. In conclusion the YSTLC Summer camp was an enjoyable experience for me as it helped me make new friends and to learn more about a field I may have interest in in the future. I would happily come back again next year.



**Nathanael Kim (Claremont High School, VA)**

My experience at YSTLC was an eye-opener. It helped me understand important skills in science and leadership. While the seminars were generally very hard to understand because of the difficulty of the subject, I tried my best to understand the topic at hand and by the end of the lecture I had figured out the general idea of the talk. When we went to NASA, NIH, and Johns Hopkins, I enjoyed learning about the creative ways people with injuries and disabilities can be aided. I also enjoyed Johns Hopkins university because it seems like an interesting college to go to and definitely one I will think about in the future. The things I learned at YSTLC may not have been important in the near future, but they will definitely be very important life skills as I get older and have to use them. It was most unlike any other summer camp I have ever been to.



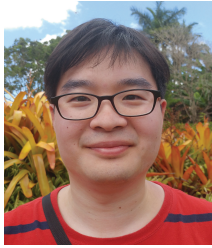
**Sijean Ahn (Christian International School in Daejeon, South Korea)**

My name is Sijean Ahn and I am currently a grade 10 student at Christian International in Daejeon, South Korea. This summer I had the opportunity to participate in a one-week summer program called YSTLC (Youth Science and Technology Leadership Camp) in Washington D.C. which was held in cooperation with KSEA (Korean-American Scientists and Engineers Association). The main purpose of this program is to give opportunities for learning for students who are interested in the field of science. I was really excited about this program because I already knew I wanted a career in science but I was not exactly sure what field I would focus on. By the end, I was confident that biology was best for me. While at the camp, I can point to 3 experiences in particular that led me there. The first experience was a lecture by Dr. Ji, a doctor from NIH (National Institutes of Health). She talked about the kinds of experiments she is doing, which are related to stem cells and bone growth. The best part was when the lecture was over, I was able to ask a lot of questions. It really made me think that this kind of area would be fun. I was also able to visit NIH, where I was able to tour a variety of labs. The most interesting part was a room that was full of fish tanks. It turns out that the researchers were using fish cells to do gene research. After that, I could imagine myself doing that same kind of work. On the last few days, we were able to choose lectures related to our interests. Even though I couldn't understand the lecture, the professors seemed so satisfied and happy when talking about their area. I thought that I wanted the same attitude towards my career. I concluded that a career in biology would give that to me. In conclusion, the experience I had in YSTLC was real benefit for me. I think if I didn't do it, I would have struggled to choose my major when I go to university.

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# 2017 KSEA-KUSCO Graduate Scholarship Winners

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**Sungyun Cho**  
Weill Cornell Graduate School of  
Medical Sciences



**Sanghyun Hong**  
University of Maryland College Park



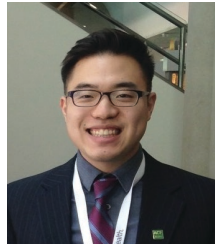
**Nathanael Lee**  
Georgetown University



**Yoonjung Yoonie Joo**  
Northwestern University



**Sungyup Jung**  
The City College of New York



**Peter Yu**  
Ohio State University



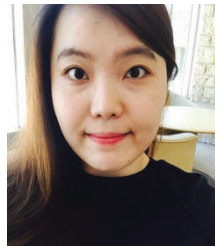
**Daejin Kim**  
Georgia Institute of Technology



**Esther Kim**  
Baylor College of Medicine



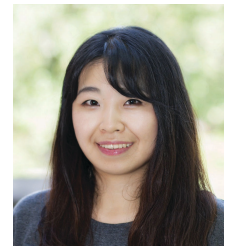
**Eun-Kyeong Kim**  
Pennsylvania State University



**Jihyun Kim**  
Texas A&M University



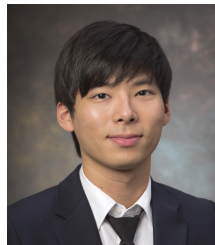
**Sun Ho Ro**  
Rutgers University



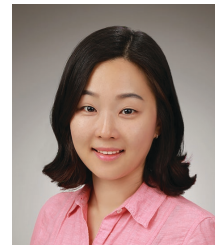
**Jinhee Kim**  
University of Florida



**Taewoong Kim**  
The University of Oklahoma



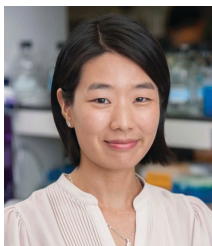
**Philip Kong**  
Yale University



**Soyoon Kum**  
University of Texas at Austin



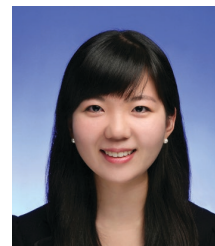
**Jungwoo Kim**  
California Institute of Technology



**Kihyun Lee**  
Weill Cornell Medical College



**Woong Hwang**  
Yale University



**Haemin Paik**  
California Institute of Technology



**Jason Ki**  
City University of New York

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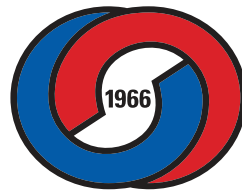
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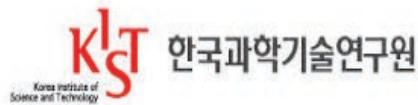


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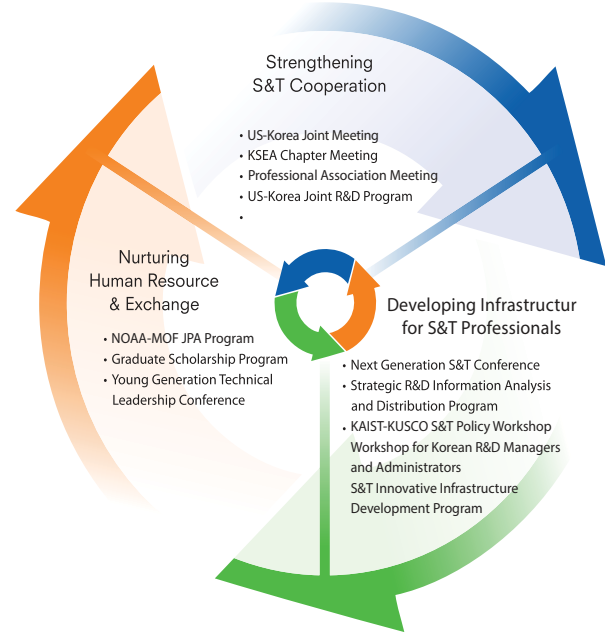




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- ▶ 실험동물센터  
실험동물의 표적화 지원 및 첨단영상분석장비를 활용하여 신약성 있는 표적동물을 위한 바이오훈분야 지원
- ▶ 임상시험센터  
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연구개발 - 시제품 제작 - 시범생산 단계의 원스톱서비스로 의료기기 개발지원
- ▶ 임상시험산업생성센터  
비즈니스 및 임상시험을 위한 전문 상담을 통해 한국의 글로벌 바이오훈분야를 촉진

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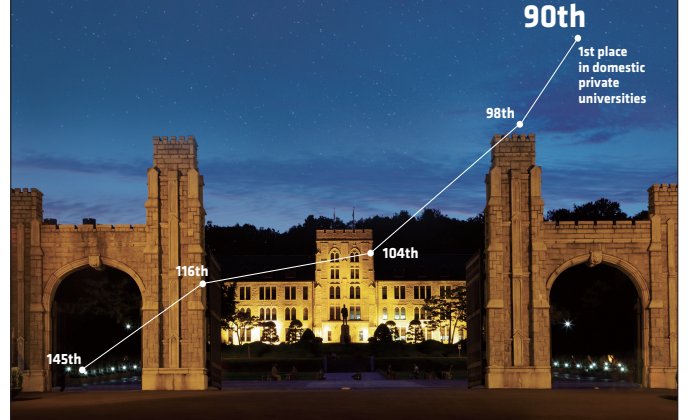
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