About KSEA

Korean-American Scientists and Engineers Association (KSEA) is a 48-year-old non-profit national-level professional organization. It is open for individuals residing in the USA who are engaged in science, engineering or a related field.

KSEA’s objectives are:
- To promote the application of science and technology for the general welfare of society;
- To foster the cooperation of international science communities especially among the US and Korea;
- To serve the majority of Korean-American Scientists and Engineers and help them to develop their full career potential.

KSEA has 78 Chapters/Branches, 13 Technical Groups and 30 Affiliated Professional Societies (APS) covering all major branches of science and engineering. Since its birth in 1971, KSEA has been recognized as the main representative organization promoting the common interests of Korean-American scientists and engineers toward meeting the objectives mentioned above.

KSEA welcomes participation from 1.5th-generation, 2nd-generation, and 3rd-generation Korean-American scientists and engineers including the mixed-race and adoptee communities. KSEA promotes helping younger generation Korean-Americans to be aware of the rapid advances in science and engineering occurring both inside and outside of the US. Especially, to create opportunities for young generation members to interact with talented scientists and engineers in Korea.
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Welcome to the first issue of KSEA Letters for the 48th Administration!

Looking back, there were some exciting events that have already kicked off the new year for our organization. Summer flew by quickly, fall is already nearly over, and winter will be here soon. So allow us, the 48th KSEA Publication Team, the honor of sharing some of these stories with you.

This year’s US-Korea Conference (UKC) was a great success! It brought participants from all over the world into the windy city of Chicago ranging from young high school students full of potential to world-renowned scientists ready to share their sage wisdom. We have included a thorough breakdown of UKC 2019 in this issue.

Not too long after the conclusion of UKC 2019, local KSEA chapters were already executing big Membership Drive events here and there across the United States. There were family picnics, exciting seminars, competitive game nights, classy cocktail-dinner parties, and even a golf tournament!

In the beginning of September, the 22nd Future Leaders Conference brought over 100 Koreans from many different countries to gather in South Korea to build international networks and communities and share in each other’s unique insight and perspective. You can read about the experience of one of our KSEA members that had the privilege to attend.

In a few months, it will be time to elect the next leaders of KSEA. Included in the current issue are short bios from the upcoming candidates. There are also some information for upcoming opportunities such as the Young Investigator Grant (YIG), various KSEA Honors and Awards, and the National Mathematics and Science Competition (NMSC).

The next big KSEA event will be this coming January. The 16th Young Generation Technical and Leadership Conference will be located in Seattle, Washington and will be continuing the new tradition of hosting a gala! The second annual Ygnite Gala welcomes everyone within and outside of Korean/Korean-American communities interested in science and technology.

If you have any news, event information, or articles you wish to share with other KSEA members, please contact the KSEA Publication Directors or email your article to sejong@ksea.org.

We hope you enjoy this issue of KSEA Letters! Until next time,
Your Publication Directors

The 48th Admin. Publication Directors

JUN BUM SHIN, PhD. Publication Director 1
Assistant Professor Oregon State University

JONATHAN YOUNG KIM Publication Director 2
Software Engineer CSX Technology

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PhD Candidate University of California, Los Angeles
Dear Fellow KSEA members,

As the 48th President of the Korean-American Scientists and Engineers Association (KSEA), I am proud that we successfully completed the 32nd US-Korea Conference on Science, Technology and Entrepreneurship in Chicago in 2019 (UKC 2019). I believe that this year's UKC was one of the most successful ones. Through UKCs, KSEA has made remarkable contributions to advancing science and technology for both the U.S. and Korea. UKC is the biggest event that KSEA is offering every year; however, there are nearly 250 other events that KSEA is hosting every year. We have already kicked off many events to benefit our members and contribute to the U.S. and Korea. I would like to ask our members to join in these events and enjoy together.

UKC 2019 in last August brought more than 1,000 scientists, engineers and entrepreneurs to the windy city, Chicago. With the theme of “Smart Science, Engineering, and Technology for Livable Communities,” participants enjoyed addressing technological challenges in the era of the 4th Industrial Revolution in building livable communities. Four keynote speakers, Nobel Laureate Dr. Lars Peter Hansen, Robot Engineer Dr. Dennis Hong, Biomedical Scholar Dr. Luke Lee, and Entrepreneur Mr. Arie van Gemeren, attracted participants’ great attention by giving inspiring speeches. We also invited renowned speakers in three major tracks: Smart Science, Smart Engineering and Smart Health. They emphasized technological innovations to improve our daily lives. UKC 2019 provided opportunities for participants to discuss many hot issues in these areas through fourteen symposia and seventeen forums. Among many programs, the University Leadership Forum attracted great attention. Nine university presidents from the U.S. and Korea discussed current and future challenges and opportunities in higher education.

For the first time this year, UKC 2019 offered the Innovation and Entrepreneurship Symposium (IES). IES successfully provided a cooperative environment for current and future aspiring entrepreneurs in the U.S. and Korea to network with high-profile entrepreneurs and investors, and to explore growing cross-border business opportunities. In addition to introducing best practices of startups and offering network opportunities with potential investors, the Startup Pitching Competition in IES selected twenty-two startups as semifinalists and offered a pitching opportunity. UKC 2019 participants ranged from budding high school students to world renowned senior scientists. During UKC 2019, talented high school students participated in the Youth Science and Technology Leadership Camp (YSTLC), selected graduate students from Korea attended the KSEA-KOFST Next Generation Leadership Workshop, and our next generation members organized the Young Generation and Professional Forum (YGPF) independently. The UKC 2019 was truly a venue for a productive and memorable experience to each of our participants. I would like to give special thanks to the sponsors, committee members, local organizing committee members, volunteers, and headquarter staff for making this conference possible.

After UKC 2019, we are gearing up many events and programs. Among many, I would like to point out several upcoming major events. In December, we will invite approximately 65 early career scientists and engineers as well as 15 established professionals to Washington, D.C. for the 2019 Scientists and Engineers Early Career Development (SEED) to provide mentorship and help develop their careers. In January 2020, over 100 young individuals will be joining in the 16th Young Generation Technical Leadership Conference (YGTLC, a.k.a. Ygnite) at Seattle, Washington for emerging scientists, engineers, healthcare professionals, academics, start-up professions, and industry professionals from Korean and Korean-American backgrounds. In April, we are hosting the National Mathematics and Science Competition (NMSC) to elevate abilities, talents and scientific innovations of all students. In May, we will offer the 3rd Annual Professional Development Forum (PDF) to provide networking opportunities with entrepreneurs and information to establish startup companies. KSEA members will benefit from participating in these events.

KSEA has been successful in building Korean-American networks and advancing science and technology for both the U.S. and Korea. Our membership has been growing every year. However, there are many Korean-American scientists, engineers and entrepreneurs who are not connected with us. I plan to put my best effort to triple our membership before KSEA’s 50th anniversary in 2021 to make KSEA an organization truly representing the Korean-American scientists, engineers, and entrepreneurs. I look forward to working with you to achieve this.

Sincerely,

Jun-Seok Oh
KSEA President
Farewell from UKC 2019 in Chicago!

I hope you all enjoyed attending the “2019 US-Korea Conference on Science, Technology and Entrepreneurship (UKC 2019)” that was successfully held in the smart city of Chicago. I took the above photo during a boat tour of the Chicago bay and hope y’all did that too.

The theme of UKC 2019 was “the smart science, engineering and health for livable communities” that showcased a pinnacle of successful US-Korea cooperative research efforts in all smart areas of science, engineering and health. This monumental conference was initiated by the inspiring plenary presentation by Nobel Laureate Lars Peter Hansen of the University of Chicago, Dennis Hong of UCLA, Luke Lee of the University of California at Berkeley, and Arie Van Gemeren of the Rising Tide Fund. Particularly, we would like recognize Congressman Jong-kul Lee, a member of science, ICT, broadcasting and communication committee, who gave special welcoming remarks on the US-Korea collaborations on science and engineering and entrepreneurship.

One of the unique parts of UKC 2019 was the organize of the three parallel tracks of smart science, smart engineering and smart health. This new format (since 2011 UKC) of having three concurrent track sessions was designed to encourage more active interactions among people with different backgrounds. Yes, we observed an increasing interaction among participants from 13 separate technical groups ranging from Physics (A) to Industrial Engineering (M). We believe the UKC 2019 had something for everyone, which encompassed the industry forums for entrepreneurs, YG Forum/YSTLC for young generation scientists and engineers and KWiSE Forum for women scientists and engineers. We hope that many people found their new and better careers from a large number of exhibition/recruiting booths.

All presentations were outstanding and sometimes even unpublished results were discussed, which were followed by deeply engaging questions by the enthusiastic audience. A high level of camaraderie among KSEA members and science and engineering enthusiasts at UKC 2019 not only made it fun but also enlightening.

Finally, on behalf of the program committee, we would like to thank all attendees for sharing their knowledge and experiences. Hope to see y’all again at UKC 2020 in LA!

Sincerely Yours,

Hosin “David” Lee, UKC 2019 Program Chair
Seong Keun Kim, UKC 2019 Co-Chair
President of KSEA | Professor, Western Michigan University

President Oh opened the 32nd annual US-Korea Conference. Welcoming participants to the city of Chicago (better known as Chicagoland), he discussed the theme, “Smart Science, Engineering and Health for Livable Communities” as a way to consider how to improve our lives. UKC 2019 was meant to provide a platform for people to discuss the everyday issues as well as the global concerns amongst the diverse range of members who embody the Korean-American Scientists and Engineers Association. With special thanks to the sponsors, committee members, and volunteers, the opening of UKC began!

President of the Korea Federation of Science & Technology Societies (KOFST)

Dr. Kim opened with welcoming remarks about Chicago’s hosting of the World Fair and the period of the Second Industrial Revolution. Couching this critical context and history of Chicago, she discussed the importance of science and technology—one that is now more important than ever in an ever-evolving and intertwining society. With the hope that UKC will serve as an incubator for Korea and the United States to lay the groundwork for joint research and advance science and technology, she wished all the attendees the best of luck for our future endeavors.

Congressmen, U.S. Representative for Illinois’s 11th Congressional District

Providing congratulatory remarks, Congressman Bill Foster spoke about his background as both a businessman and scientist. With a Ph.D. and industrial experience in physics, Congressman Foster partakes in the Science, Space, and Technology Committee and is chairing a committee on the impact of artificial intelligence on finance. Congressmen Foster concluded his remarks with the hope of technology pushing for equality and how science is the common language for which people can come together to address society’s most pressing problems.

Member of the National Assembly of Korea

Mr. Jong Kul Lee opened his congratulatory remarks joking that he has the reputation for longest filibuster, but would shorten his remarks for today. In celebration of the 35th anniversary of Korean Liberation Day (광복절), Mr. Lee highlighted the importance of action from lawmakers and the ways in which we are able to promote Korea both in and outside of the United States. He ended his remarks with a call to action for participants to push the boundaries of our respective fields and that the future of the world depends on science and technology.

President of Seoul National University

President Se Jung Oh, in his opening remarks, shared how he was a co-organizer of UKC eight years ago and noted how the conference has grown since then. He continued by describing some of the key innovations that have changed the world and transformed the paradigms of our world. Talking about the Fourth Industrial Revolution, President Oh described how we need to connect the most pressing problems of our world, with the data scientists, AI scientists, engineers, technicians and more, who are equipped to address these issues. He concluded that the Fourth Industrial Revolution is the hope for a better, more innovative world.

Consul General, Consulate General of the Republic of Korea in Chicago

Mr. Kim welcomed UKC participants to Chicagoland, recognizing that this meaningful event returned to Chicago after 20 years. With this year being the 74th year of Korea’s independence from Japan’s imperialism, Mr. Kim highlighted how the Republic of Korea became the 12th largest economy in the world by creating cutting-edge technology and developing in the industrial sector. Such developments would not be possible without people like the participants at UKC. Congratulating KSEA, Mr. Kim ended by encouraging the attendees of UKC to consider and contribute to the pressing issues of our time, including climate change, fine dust pollution, and radioactive waste, saying that, “We need international collaboration more than ever.”
Dear Friends:

As Mayor, and on behalf of the City of Chicago, I am honored to welcome all those gathered for the 32nd US-Korea Conference on Science, Technology and Entrepreneurship.

The US-Korea Conference is hosted by the Korean-American Scientists and Engineers Association, the Korean Federation of Science & Technology Societies, and the Korea-U.S. Science Cooperation Center. Together, these organizations are working to address the technological challenges facing us today. This year’s conference, themed “Smart Science, Engineering and Health for Livable Communities,” will bring industry professionals together to network, learn, inspire, and strengthen relationships between the United States and Korea.

With a full schedule of symposiums, meetings, and workshops attendees with discuss smart science, smart engineering, and smart health ideas. In addition, the Young Generation and Professional Forum program and the Youth Science and Technology Leadership Camp will give young people the opportunity to share their ideas and network. I recognize all those involved with the US-Korea Conference for their work in moving science and technology forward.

I hope that during your stay in Chicago you take the time to see all the City has to offer. Vibrant neighborhoods, an iconic skyline, and an incredible lakefront invites you to explore Chicago. I hope you have a chance to explore our downtown and lakefront areas, tour the vibrant neighborhoods across our city, sample our diverse cuisine, visit our distinguished universities, and our world-class museums during your stay.

I hope your event is enjoyable and memorable. Best wishes for continued success.

Sincerely,

LORI E. LIGHTFOOT
MAYOR
CITY OF CHICAGO

August 14, 2019
Uncertainty in Economics: Why Should We Care

Dr. Lars Peter Hansen is the David Rockefeller Distinguished Service Professor in Economics, Statistics, Booth School of Business & the College, University of Chicago. He is a leading expert in economic dynamics and works at the forefront of economic thinking and modeling, drawing approaches from macro economics, finance, and statistics. Dr. Hansen joined the faculty of the University of Chicago’s Department of Economics in 1981. He currently directs the Macro Finance Research Program housed under the Becker Friedman Institute.

He is a recipient of the 2013 Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel. In addition to the Nobel prize, he has also received many other awards and honors including the 2010 BBVA Foundation Frontiers of Knowledge Award, the CME Group-MSRI Prize in 2008, the Erwin Plein Nemmers Prize in 2006, and the Frisch Medal in 1984. Dr. Hansen is a fellow of the National Academy of Sciences and the American Finance Association. He also is a member of the American Academy of Arts and Sciences and past president of the Econometric Society. Hansen holds a bachelor’s degree in mathematics and political science from Utah State University and a doctorate in economics from the University of Minnesota.

Dr. Hansen gave the first plenary talk during the Opening Ceremony of UKC about his research on the uncertainty in economics. False pretenses of knowledge about complicated economic situations have become all too common in public policy debates. While we do know some things, we don’t know everything. We believe that prudent decision-making should acknowledge what we don’t know. Decision makers should strive to quantify dimensions of their ignorance and adjust their decisions accordingly. Dr. Hansen has made fundamental advances in our understanding of how economic agents cope with changing and risky environments. He has contributed to the development of statistical methods designed to explore the interconnections between macroeconomic indicators and assets in financial markets. His recent research describes a tractable approach for acknowledging, characterizing, and responding to the limited understandings discovered by researchers’ efforts to interpret existing evidence by using theories and statistical methods available at any particular moment. He explores how to quantify intertemporal risk-return tradeoffs and ways to model economic behavior when consumers and investors struggle with uncertainty about the future.

Whether they acknowledge it explicitly or not, real world decision makers also use models or “views” about how their decisions affect future outcomes. Because they ignore some forces and oversimplify others, all models are just approximations to reality, some better than others depending on the purposes to which they are put. Furthermore, at any time we can choose among multiple models and are unsure how much credibility to assign to each of them. Data can surely help us assess the credibility of alternative models, but the real world is so complicated and data so limited that data can only tell us so much. Therefore, economic modelers and decision makers require ways to express their opinions about the plausibility and usefulness of alternative models for the problem at hand. Because data are only partially informative about a model’s plausibility, a decision maker’s purpose as well as his or her “subjective belief” play important roles too.

The more complex the situation, the bigger the challenge becomes of confronting uncertainty in meaningful ways. Thus, when there are more environmental intricacies, there is greater scope of a broader approach to uncertainty that is important. Dr. Hansen’s research aims to convert insights from formal mathematical analysis into operational tools of analysis for understanding, among other topics, how financial markets work and how alternative fiscal and monetary policies can be assessed.
Do Robots Need to Look Like Human?

Dr. Dennis Hong, a TED alumnus, is a Professor and the Founding Director of RoMeLa (Robotics & Mechanisms Laboratory) of the Mechanical & Aerospace Engineering Department at UCLA. His research focuses on robot locomotion and manipulation, autonomous vehicles and humanoid robots. His work has been featured on numerous national and international media. Washington Post magazine called Dr. Hong “the Leonardo da Vinci of robots.” Dr. Hong has been named to Popular Science’s 8th annual “Brilliant 10”, honoring top scientists younger than 40 years of age from across the United States, “Forward Under 40” by the University of Wisconsin-Madison Alumni Association, and also honored as “Top 40 Under 40” alumni by Purdue University. Hong’s other past awards include the National Science Foundation’s CAREER award, the SAE International’s Ralph R. Teetor Educational Award, and the ASME Freudenstein / GM Young Investigator Award to name a few. Dr. Hong received his B.S. degree in Mechanical Engineering from the University of Wisconsin-Madison (1994), his M.S. and Ph.D. degrees in Mechanical Engineering from Purdue University (1999, 2002).

Dr. Hong gave the second plenary on Friday morning, August 16th, where he discussed what society considers robots to be. Are smartphone robots? Are elevators robots? In Hollywood, robots are often depicted in the humanoid form. Thus when we think of robots we naturally imagine humanoid robots. For robots to move around in a human environment and to do work using tools made for humans, it is natural to have robots that have the shape and size of a human. His work, through the Robotics & Mechanisms Laboratory (RoMeLa), has focused on developing humanoid robots for more than a decade for fire fighting and disaster relief applications. However, such robots are still too slow, too unstable, too complex, too expensive, and too unsafe which prevent them to be used in real life situations. Dr. Hong tackled this query by describing the evolution of robots, from ones that walked sideways, to teaching them how to jump, to eventually moving away from humanoid features. Dr. Hong concluded by reminding the audience about the importance of bringing a social purpose of robotics, briefly discussing robots within the context of disaster relief and emergencies. In closing, Dr. Hong urged us to embrace our creativity and playful side, reminding us that creativity and imagination cannot be separated from fun.
Dr. Luke P. Lee received both his BA in Biophysics and PhD in Applied Physics and Bioengineering from the University of California (UC), Berkeley. He joined the faculty at UC Berkeley in 1999 after more than a decade of industry experience. He became the Lester John and Lynne Dewar Lloyd Distinguished Professor of Bioengineering in 2005. He also served as the Chair Professor in Systems Nanobiology at the ETH Zürich from 2006 to 2007. He became Arnold and Barbara Silverman Distinguished Professor at Berkeley in 2010 and was reappointed again in 2015. He is the founding director of the Biomedical Institute for Global Healthcare Research & Technology (BIGHEART), and served as Associate President (International Research and Innovation) and Tan Chin Tuan Centennial Professor at the National University of Singapore from 2016 to 2018. He is a Fellow of the Royal Society of Chemistry and the American Institute of Medical and Biological Engineering. His work at the interface of biological, physical, and engineering sciences for medicine has been recognized by many honors including the IEEE William J. Morlock Award, NSF Career Award, Fulbright Scholar Award, and the HoAm Prize. Lee has over 350 peer-reviewed publications and over 60 international patents filed. His current research interests are quantum biological electron tunneling in living organisms, integrated optical microfluidics for the early detection of cancer and neurodegenerative diseases, and in vitro neurogenesis, and solving ill-defined problems of global healthcare.

For the third plenary session at UKC, Dr. Lee opened his plenary talk with a William Blake poem and the importance of looking at the world through a grain of sand, as a way in his field to find solutions in nature for preventive healthy life. He described the mission of BioPOETS (or Bio-inspired photonics optofluidics electronics technology and science) in creating transformative medicine to change the way we look at health to ultimately create POEMs: patient oriented engineering medicine. With the acronym of SANDs, the Speedy Analytical Nano-optofluidic Diagnostic system can help us to predict and stop the spread of infectious disease. Using the example of how most of us have been taught about photosynthesis, Dr. Lee challenges us to think about the ways in which we have been taught about science—the hypothesis-driven learning that does not always translate into proven, empirical data (or, in this example, about the quantum biological tunneling and transferring of electrons). With this question in mind, Dr. Lee created the Quantum PRET (Plasmonic Resonance Energy Transfer)-based molecular imaging to better exam cellular behavior. Dr. Lee concluded by describing how the rapid and accurate molecular-level detection network by smart SANDs for human, agricultural, foods, and environmental health will radically improve global healthcare and empower us to create a new proactive, predictive, and preventive paradigm for enhancing global biosecurity.
Mr. Arie Van Gemeren is currently a Principal at Rising Tide VC, an early-stage investments firm with a focus on early-stage technology and healthcare. He is focused on big ideas in financial technology, insurance technology, real estate, and blockchain technology. He also works on delivering value-add work for the firm's current portfolio of promising companies as well as the firm's tremendous group of Limited Partners. Previously, he served as an investment advisor with Goldman, Sachs & Co., advising a very exclusive group of wealthy families and institutions across the United States and abroad on all manners of investments. Prior to this, he was an equity research analyst with Fisher Investments, an international money management firm. He is a CFA Charterholder.

Mr. Gemeren gave the final plenary lecture during the Closing Ceremony of UKC about the global ecosystem of entrepreneurship and innovation. His opening started with the evolution of startups and the ways in which the startup culture in the United States is uniquely positioned. Using Silicon Valley as an example, he discussed the key factors in creating a sustainable "epicenter of entrepreneurship and innovation." A thriving epicenter generally has a university at its core, as they bring fresh ideas and a belief that it's possible to create something new. He mentions the importance of grants and research which help in discovery. Having a cluster of major corporations and service providers helps support the younger companies gain traction. A crucial component that is often missing is access to capital. Finally, founders and investors are necessary to not only start the new business ventures, but also to re-inject capital back into the ecosystem. The United States has more experience in the startup world and thus is put in an opportune position to mentor other countries such as France and South Korea. Through these relationships, the world can become united into a global collaboration in entrepreneurship and innovation.
• Distinguished Service Membership (DSM) Award  
(Presented by KSEA)

Dr. Sung had a distinguished academic career, having worked for Tufts (1978–2013), and Massachusetts Institute of Technology (1972–1978). He received his Ph.D. from MIT in 1972, MS at University of Chicago in 1967, and BS from Seoul National University in 1964. His contributions in composites and polymer field are well recognized nationally and internationally. He received numerous prizes, including National Medal of First Order for Science & Engineering from Korean Government in 2008, Seymour Simches Award for Distinguished Teaching in 2013, Award for Overseas Scientists and Engineers from Korean Ministry of Science & Education in 2012, and membership in Korean National Academy of Engineering in 2001. During his tenure as the KSEA’s 30th President, he inaugurated National Math Competition and KSEA Awards. In addition, he initiated a few private sponsored Endowed Scholarships and made a strong request of the Korean Government to retain KUSCO board membership for KSEA.

He also provided a leadership as committee chairs including the Finance Committee (2003–2005), the Fund Management Committee (2017–2019), the Rules Committee and a Task Force for Restructuring the Council (2014), and many other committees as well as New England CP and Technical Group and ex-President Councilors. Among his contribution to KSEA, as the chair of Rules Committee, he developed and modified Bylaws and Policies for the Council restructuring in the 42nd term. Dr. Sung also provided a critical guidance for a proper direction of the actions to EC and Council for the “election issue,” therefore, he had taken a charge of resolving the issues in the 43rd term. He has served KSEA for 36 years as a member of many committees and task forces. His service for KSEA is highly recognized.

• Outstanding Contribution to KSEA Award  
(Presented by KSEA and MSIT, Ministry of Science and ICT)

Prof. Lee had a distinguished academic and professional career, having worked for URI (1985–current), and King Saud U., Riyadh, Saudi Arabia (1982–1985). He received his Ph.D. from U. of Texas at Austin in 1982, M.S. from Rutgers–The State U. of NJ in 1978, and B.S. from Seoul National University (SNU) in 1974 after serving 3 years for Korean Army. His contributions in pavement and transportation engineering field are well recognized nationally and internationally. He has been active for American Society of Civil Engineers (ASCE) which include serving as President of Bituminous Materials Committee and Rhode Island Chapter, and was elected as a Fellow in 2008. He also received numerous awards including URI Faculty Excellence Awards in 1990 & 1999, URI Outstanding Contributions to Research in 2005, and SNU Alumni Association Distinguished Academic Award in 2017. He became a member of National Academy of Engineering of Korea (NAEK) in 2008 and received Commendation by Republic of Korea President in 2013. During his tenure as the KSEA’s 36th President, he was active in expanding HQ operations with the support of Korean Federation of Science and Technologies (KOFST), government officials and congressmen through increasing KSEA budget over $1M for the first time. He was also successfully organized UKC 2007 in Washington D.C by inviting then NSF Director, most Presidents of Korean Research Institutes and many distinguished speakers drawing over 1,000 attendees. He also worked on computerized operations and continued world-wide cooperation through helping European Associations to start Math competitions.

He also provided strong leadership as committee chairs including Honor & Award (2013–14), Scholarship (2014–16), Rules (2017–18) and Long-Range Planning (2018–19), and as Chapter President of Austin (1980–81) and New England (1989–90). He also established and served as President of Korean Transportation Association in America (KOTAA) and Korean-American Society of Civil and Environmental Engineers (KSCEE). To this day, he continues to serve KSEA HQ and local chapter as a speaker, committee member, and organizer for regional conferences. He has served as a KSEA member over 40 years. His service for KSEA and Korean-American societies is highly recognized.
Dr. Young-Kee Kim, an experimental particle physicist, is the Louis Block Distinguished Service Professor of Physics and Chair of the Department of Physics at the University of Chicago. Her research focuses on understanding the origin of mass for fundamental particles by studying the W boson and the top quark, two of the most massive elementary particles, on CDF experiment at Fermi National Accelerator Laboratory (Fermilab), Batavia, IL, and by studying the Higgs boson that gives mass to elementary particles on the ATLAS experiment at the Large Hadron Collider at The European Organization for Nuclear Research (CERN) in Geneva, Switzerland. She also works on accelerator science, playing a leadership role in NSF’s Science and Technology Center for Bright Beams.

Dr. Kim earned her B.S. and M.S. in Physics from Korea University in 1984 and 1986, respectively, and her Ph.D. in Physics from the University of Rochester in 1990. Prior to her current faculty position at University of Chicago in 2003, she was a faculty at University of California, Berkeley. She is a recipient of numerous fellowships including Fellow of the Alfred P. Sloan Foundation (1997), the American Physical Society (2004), the American Association for the Advancement of Science (2012), and the American Academy of Arts and Sciences (2017). She received the Ho-Am Prize (2005), Science Service Medal from South Korean Government (2008), Rochester Distinguished Scholar Medal (2010), and Korea University Alumni Award (2012).

Dr. Nosang Myung is a Professor of Chemical and Environmental Engineering Department and Founding Director for UC-KIMS Center for Innovative Materials for Energy and Environment (UC-KIMS CIME), University of California-Riverside. Prof. Myung has a stellar research, teaching, service and leadership record. He has secured around $16 million research funds, published over 220 peer-reviewed papers with over 11,000 citations from the Google Scholar and the h-index of 46 from the Web of Science, advised 16 PhDs and 25 PostDocs, and serving as Specialty Chief Editor for Frontiers of Chemistry, Electrochemistry Section, an Associate Editor for Sensors and Actuator Report. He is nationally and internationally recognized for his research in the areas of nanotechnology, particularly the use of electrochemical and electrospinning techniques to produce novel heterostructured materials, for applications in sensors (biological and chemical), thermoelectrics, photocatalysts, and photovoltaics. Nanotechnology being multidisciplinary, his research spans nearly all engineering disciplines - electrical, mechanical, bioengineering, material science and engineering, environmental, and of-course chemical, the field of his primary training. The thirteen issued patents and a few provisional patent applications are a strong evidence of the value engineering of his research. It is notable that his inventions are licensed by a start-up company for commercialization.
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- **Entrepreneur of the Year Award**
  (Presented jointly by KSEA and Maeil Business Newspaper)

Dr. Lee is the President and Chief Executive Officer of Aspen Systems, Inc. located in Marlborough, MA since 1984. He also serves as a Director of Triton Systems, Inc. He received his M.S. and Ph.D. degrees in Mechanical Engineering from MIT. Dr. Lee founded Aspen Systems Inc. in 1984, which is a technology incubator and commercialization company and co-founded Triton Systems, Inc. in 1992 which spun off several advanced technology companies such as Aduro Biotech and FRX Polymer, and Sensera, Inc. The Aspen System’s products include advanced insulation materials, compact cooling systems, miniature rotary compressors, and a variety of other products for use by medical, refrigeration, and air-conditioning industry. His innovative and entrepreneurial spirit and accomplishment is well recognized by numerous awards and recognitions such as 1999 Small Business Innovative Research Technology of the Year in Manufacturing and Materials, 2003, 2004, 2006 R&D 100 Awards, Shock Doctor/Aspen Aerogels selected as one of 10 nanotechnology products by 2004 Forbes Magazine, 25 Breakout Companies in the world selected by 2005 Fortune Magazine, 2006 National Tibbets Award, 2006 Nano 50 Award by Nanotech Briefs Magazine. A remarkable achievement is at the Aspen Aerogels, Inc. that he spun off based on the technologies developed in the Aspen Systems. The case on the development of flexible aerogel and its successful commercialization was adapted in 2002 by the Harvard MBA program and has been used as a case study material. Dr. Lee is the holder of the Commercialization Achievement Index 100 for 11 consecutive years from 2003 to 2013 by US Department of Defense Small Business Innovation Research Program. He was one of the three representative entrepreneurs on the commemoration of 100 years of Korean-American immigration in 2009. With over 40 years of entrepreneurial experience with technology development, Dr. Lee is highly qualified to receive the Entrepreneur of the Year Award based on his accomplishments as a successful entrepreneur to the community and being a sustainable business leader over many years. In addition, he was the principal invited speaker at the Small and Medium Business (SMB) Workshop at 2016 UKC and continued making devoted efforts to help the SMB Committee.

- **Young Generation Leadership Award**

Katherine is a Ph.D. candidate at the University of California, Los Angeles, studying protests at colleges and universities. She received a B.A. in Public Policies Studies from Duke University in 2010 and M.A.s in Sociology & Education from Columbia University in 2016, as well as in Higher Education & Organizational Change from UCLA in 2017. She has a solo-authored peer-reviewed publication, two books chapters (one forthcoming), and was most recently awarded the 2019 National Academy of Education/Spencer Foundation’s Dissertation Fellowship. She was a research analyst for the Higher Education Research Institute from 2016-2019, a program manager for the Colin Powell School for Civic and Global Leadership from 2011-2016, and a grant-writing consultant throughout. Katherine's motive for both her professional and personal work stems from a desire to empower communities through social justice, as indicative of her past roles: being an associate board member of the Korean American Family Service Center to help raise $10k towards supporting family and relational trauma; painting as a mural artist for underserved schools in New York City; being as a student representative at both UCLA and Columbia University; and volunteering as a grant-writing/media consultant for an orphanage in Bolivia.

Katherine has provided outstanding YG leadership and voluntary services for KSEA for the last five years through various positions such as YGTLC Chair (2019)/Co-Chair (2018)/Team Leader (2016-2017), YG Director for 47th admin, YG Committee member in 2017-2020, UKC YG Professional Forum Co-Chair in 2016, and KOFST YGF US co-team leader in 2016. For YGTLC/Ygnite 2019, Katherine took the initiative to organize an inaugural Ygnite Gala resulting in successful fundraising with a silent auction (approx. $6,000), notable keynote speeches including that of Dr. Jim Yong Kim through a video talk, and a networking banquet with KSEA councilors and senior members. Her leadership for YG activities and contribution to KSEA HQ activities are well recognized.
• **Outstanding Community Service Award**

Dr. Yoon has been an associate professor in Science Education at the University of Texas-Arlington since 2012. She received her B.S. in Science Education from Ewha Womans University and earned her Ph.D. in Curriculum and Instruction at Indiana University, Bloomington. She served as the STEM education program director in the 46th administration, the first to do so in the history of KSEA. Dr. Yoon’s most notable contribution to KSEA is the organization of the first Youth Science and Technology Leadership Camp (YSTLC) at UKC2016 in Dallas. She designed the entire program, coordinated all the visits of the participating students to the local research facilities, and managed the personnel to look after the participating students. She was integral in making the 2016 YSTLC successful. She also organized the 2nd YSTLC at UKC 2017, helping the YSTLC program become a routine part of the UKC for next generation’s leaders.

Another noticeable activity of Dr. Yoon’s for the local community as a science educator is a special project called “Community Science”. The goal of this project is to promote ethnic minority students’ achievements and interests in science by providing them with unique science learning experiences. To make this project valuable, she trained college students to develop their own science lessons integrated with different cultures (Korean, Indian, Mexican, and so on), and presented their culturally-inclusive science lessons at local elementary schools as well as the Greater Dallas Korean School, where she has served young students as a teacher and a manager of the board since 2012. As a result of this project, young students at elementary schools can receive benefits through exposure to different styles of science education.

Overall, Dr. Yoon has made a big difference in the local community as well as in KSEA society by positively impacting the future, namely the young generation, through her passion for STEM education.
The KSEA Young Investigator Grant is 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. Se Kwon Kim is the Vineyard Assistant Professor in the Department of Physics and Astronomy at the University of Missouri at Colombia. He received his B.S. in 2006 in Mathematics and Computer Science at the Korea Advanced Institute of Science and Technology, and in 2009 in Physics from Seoul National University. He then obtained his Ph.D. in Physics at Johns Hopkins University in 2014. Prior to his current faculty position at the University of Missouri, he was a postdoctoral research associate at the University of California at Los Angeles.

Dr. Kim is a physics theorist who has focused on understanding magnetism, spintronics, topological solitons, and topological phases in condensed matter systems. He has made several outstanding achievements, especially in the past few years, working on quantum spin structures in matters with unique symmetry and topology. Since 2013, Dr. Kim has published more than 15 papers as the first author in physics journals including Physical Review Letters, Physical Review B, and Applied Physics Letters, on a wide range of topics, showing impressive productivity and creativity. Dr. Kim is a recipient of the Outstanding Young Research Award from the Association of Korean Physicists in America in 2016.

Dr. Kim is internationally recognized for his outstanding theoretical contributions in the area of topological condensed matter physics as well as for his extensive worldwide collaborations with experimental groups. Dr. Kim has clearly demonstrated exceptional potential for leadership at the frontiers of knowledge in the field.

With the KSEA Young Investigator Grant, Dr. Kim will investigate “Superfluid-Inspired Spin Transport with Minimal Dissipation in Magnetic Materials.” The proposed research aims at exploring the possibility of superfluid-inspired spin transport by using realistic models for magnets. This will expand into the extraordinary spin transport in quantum materials, envisioning a revolution of low-power and high-speed computing that can ultimately benefit humankind.

Dr. Chi Hwan Lee is an Assistant Professor of Biomedical Engineering, Mechanical Engineering, and Speech, Language, and Hearing Sciences at Purdue University. He is a co-founder and CTO at Curasis, LLC, specializing in rehabilitation monitoring systems and also serves as a scientific advisor at Omniply Tech, Inc, specializing in sticker-like electronics. He received his M.S. in 2009 and Ph.D. in 2013 in Mechanical Engineering from Stanford University and B.S. in 2007 in Mechanical Engineering from Illinois Institute of Technology.

His research interests focus on sticker-like flexible biosensors that are capable of non-invasively and unobtrusively interfacing with the human body for promoting wearable healthcare, medicine and rehabilitation.

As a junior faculty, Dr. Lee has already demonstrated scientific scholarship with measurable impacts. He has published >40 peer-reviewed articles with over 3,500 citations and an h-index of 27. His work was highlighted in multiple high impact journals, including Advanced Materials (IF: 21.9), Science Advances (IF: 11.51) and PNAS (IF: 9.5). He holds 2 US patents and 7 filed. He has received several research grants including a grant from US AFOSR, Eli Lilly & Company and NIH to develop various biosensors in the domain of connected healthcare.

With the KSEA Young Investigator Grant, Dr. Lee proposed to develop and validate a costs-effective (disposable) sticker-like sensor patch for scheduled and continuous monitoring of vital signs and daily activities of patients, which would be particularly beneficial to the in-home care and tele-rehabilitation.
Distinguished Sponsor Membership

CJ has exceptionally contributed to the financial well-being of UKC and KSEA since 2008. Its total contribution is one of the highest among the corporate sponsorships. CJ’s sponsorship for a long period has been highly recognized.

Since 1953, CJ CheilJedang has been spearheading the development of the domestic food industry for the past 60 years, and continuously evolving by expanding business areas to include food, BIO and pharmaceuticals.

CJ Foods business is seeking to become a global No.1 food company leading K-Food culture by spreading the excellence of Korean food around the world. CJ BIO provides the best products and solutions based on the world-class eco-friendly biotechnology and intends to leap forward to be the global No.1 BIO company fulfilling the nutritional and health requirements of humans and animals.

CJ Blossom Park, the largest food and BIO convergence Research Complex of CJ group, is playing a pivotal role in making CJ a leading global company by developing innovative products using the ONLYONE technologies, top-notch infrastructure, and world top-class R&D professionals.
The Korean Federation of Science and Technology Societies (KOFST) has five core missions: Receptiveness to Governance Innovation, Enhancing Science and Technology (S&T) Communities, Strengthening S&T Leadership, Responsiveness to Social Demands, and Globalization through S&T Diplomacy. The KOFST Next Generation S&T Leader Program is unique because it cuts across them all.

The purpose of the program is to provide young scientists and engineers in Korea and in the United States with the opportunity to network, raise global awareness, and foster international collaboration. Success of the program largely hinges on quality interaction with STEM professionals at various career stages working in academia, public sectors, and private sectors. As the largest Korean STEM professional conference in the US, the US-Korea Conference (UKC) has served as the ideal venue to achieve the purpose because of its breadth and depth. The 3-4 day period leading up to UKC is utilized for cultural excursions, site visits, networking events, and professional development sessions.

The 2019 USA program ran from August 10 through August 18, 2019 in Chicago. The organizing committee included leaders and mentors from academia, industry, and national laboratories: Dr. Junseok Oh (Western Michigan University); Dr. Young-Kee Kim (University of Chicago), Dr. Gloria J. Kim (University of Florida); Drs. Dong-Hyun Kim, Kyoo-Chul Park, Chang-Han Rhee, Daniel Moser (Northwestern University); Lori Kim, Dr. Kyung Hyo Kim, Seung Won Chung (AbbVie); Dr. Dongwook Jang (HERE Technologies); Dr. Michael Yonshik Choi (Lucent Technologies & Illinois Institute of Technology); Dr. Zuhawn Sung (Fermilab); Drs. Taeil Kim, Duck Young Chung, Young Soo Park (Argonne National Laboratories); Mr. Kyeyoung Park (KOFST).

The Seventeen participants consisted of graduate students and postdoctoral fellows from diverse disciplines and representing multiple Korean institutions. The program kicked off with a warm welcome and overview by the 48th KSEA President Dr. Junseok Oh, followed by a highly interactive Strategic Networking workshop led by Dr. Gloria Kim. A full day of an intensive Career Workshop was offered on Day 2. The six workshop speakers offered an in-depth look into the hiring process in academia and industry. Common mistakes stemming from cultural differences and advice on how to circumvent them were discussed in-depth. Despite the rigor, which was undoubtedly taxing on the jet-lagged bodies of the participants who had been in the US for barely 24 hours, the participants never wavered. The questions remained sharp. The energy remained high. Discussions continued during the break. The speakers eagerly shared lessons they learned along the way and volunteered to connect participants with other people who could help them further. Participants glowing and overwhelmingly praised the 2-day workshop for the tailored and personalized approach in their reviews of the program. At the German pub Hofbrauhaus, where dinner was served, the group celebrated their camaraderie.

Day 3 consisted of a blend of cultural excursion and academic research lab visits. At the request from KOFST, the Museum of Science and Industry, Chicago—one of the largest science museums in the world—became the first stop. Dr. Young-Kee Kim, the Department Chair of the University of Chicago Physics Department, showcased her hidden talent as a tour guide when she showed the group around the University of Chicago campus. Dr. Jiwoong Park, a prominent scholar in the nanomaterial field, opened his lab for the visitors. In the evening, the group got a taste of Chicago’s deep-dish pizza at Gino’s East. Chicago’s capricious summer weather came into full display after allowing a brief chance for the group to take in the city’s world-famous view from 360 Chicago.
Participants visited Argonne National Lab and Fermilab on Day 4. The multinational aspect of STEM research was visible in plain sight and could be felt in the diversity of the people working in the labs. The leaders of the Korean Scientists’ Association at both institutions took the time to lead a small group discussion and dine with them. The dim sum dinner was a welcome break from the Western cuisine they had indulged in thus far. Day 5 was spent in the northern suburbs of Chicago, home to Northwestern University and the biopharmaceutical company AbbVie.

An 18-member Chitadae, a Korean traditional marching band, heralded the opening of UKC 2019 on Day 6. The participants made a beeline to their sessions of interest. By the time they were ready for their work at the poster session in the late afternoon, they had already made acquaintances with many of the conference attendees. Networking dinner was a joint affair with the leaders and members of KSEA Young Generation. They continued to broaden their perspectives, get new ideas for their own research, and make new connections at UKC on Day 7. Day 8, which was set for departure, came much quicker than everyone thought. The participants, mentors, and organizers promised to stay in touch.

The post-event survey consisted of 11 questions, 8 of which were to rate various aspects of the program on a 1-5 Likert scale. All 17 participants responded and gave an overall positive rating of 4.62 out of 5. Specific praises, requests and suggestions were offered in long detail in the responses to the three free writing questions. The most prominent request was to take into account the different disciplinary background of the participants and reflecting that in future site visit plans. The 2019 organizers most appreciate the feedback and will be sure to pass it on to the 2020 organizing committee. KSEA wishes all the participants the best of luck on their future endeavors!
Since its start in 2016, the Youth Science and Technology Leadership Camp (YSTLC) has provided 8th-12th grade students of Korean descent interested in STEM with an immersive experience at a deeper level.

Organized by university professors and STEM professionals from diverse disciplines, YSTLC takes a multi-faceted approach for participants to further knowledge in science and technology, learn about various STEM majors and professions, and be inspired to pursue their dreams as future scientists and engineers. This is accomplished through university, industry and government lab visits, participating in the US-Korea Conference (UKC) – the largest Korean STEM professional conference in the US, networking with renowned scientists, engaging in a hands-on team project, and cultural excursions. Feedback from participants have been overwhelmingly positive. YSTLC has been continuously evolving to adapt to the constantly changing landscape in STEM research and education.

This year, the 7-day program ran from August 11 through August 17, 2019 in Chicago. Organizers included Dr. Gloria J. Kim (University of Florida) as chair; Dr. Jiyoon Yoon (University of Texas - Arlington) as co-chair; Dr. Youngkee Kim (University of Chicago), Dr. Hye Jin Ko (University of Texas – Arlington), Hyunjun Choi (Northwestern University), Yoonjung Joo (Northwestern University), Sujin Cho (Northwestern University) as mentors; Jung Hak Kim (Young Astronauts Korea), Kyeoung Hee Jeong (Young Astronauts Korea) as guides for students selected from Korea; and Ms. Euna Yoon (KSEA HQ) as the administration director. Dr. Jaehoon Yu (University of Texas – Arlington) served as the YSTLC Research Internship Director, a post that was made official this year after a pilot case was successfully run after YSTLC 2018.

The sixteen students from North America and Korea quickly adapted to the intense schedule that started early in the morning and ended late at night. On the night of Day 1, they self-organized into two teams and worked each on a science-themed skit that would be performed three nights later at the UKC2019 VIP dinner. On Day 2, they explored the Museum of Science and Industry where the interactive exhibits satiated their curiosity and stimulated their desire to delve deeper. The next stop, the University of Chicago, the birthplace of the world’s first self-sustaining nuclear chain reaction and home to numerous Nobel Laureates was the natural place to unleash their many questions. The students received VIP treatment from the Chair of the Physics Department, Dr. Younghie Jeong, who arranged and led the campus tour. By the time they had finished interacting with graduate students and postdoctoral fellows at the academic research labs, they were ready to refuel and digest everything they learned. Gino’s East provided the fuel; the spectacular view of the city from 360 Chicago aided the internalization process.

On Day 3, the group experienced first-hand how government research labs work by visiting Argonne National Lab and Fermilab. Groups of Korean scientists and engineers at both labs generously donated their time to tell their own story, offer guidance on careers in STEM, and engage in small group discussions. Day 4 was spent at Northwestern University’s International Institute for Nanotechnology and AbbVie, a major pharmaceutical company. That evening, the students showcased their creativity and talent by performing the skits they had rehearsed, impressing the organizers and audience with their timely message about environmental concerns and the quality of the production. After the performance, Dr. Yu held a session for the students, where he talked about his research, the YSTLC 2020 Research Internship, and life as a STEM professional. He also gave advice on how to make the most out of the conference.
UKC 2019 kicked off on Day 5. By then, the students were well-prepared to participate in what was for most of them their first professional STEM conference. Before venturing into the sessions, they had an exclusive meeting with 2013 Nobel Laureate Prof. Lars Peter Hansen. Dr. Gloria Kim translated for the native Korean students so everyone could take full advantage of this rare opportunity. Prof. Hansen indulged the students, who asked a variety of questions about his research, his family, his childhood, how the Nobel Prize changed his life, obstacles he had to overcome to become the thought leader he is now. For two days (Day 5 and 6), the students attended sessions in fields of their interest and interacted with the speakers. Even at the talks that were challenging for novices to understand, they were not shy about asking questions. At the Gala dinner in the evening of Day 6, all participants were recognized for their eager participation and received a certificate of completion.

It was also at this ceremony that the selected student for the YSTLC 2020 Research Internship was announced. The competition ran concurrently with the YSTLC program and the opportunity was made available exclusively to YSTLC 2019 participants. The internship position includes a $3,000 grant. The selection process involved YSTLC faculty panel’s comprehensive assessment: candidate’s academic records, a written statement of interest, observation records by the mentors during YSTLC, and an in-person interview with the Internship Director were all taken into account. This year’s winner, Skyler Ryu, will begin his internship at Fermilab in Summer 2020.

In the morning of Day 7, as the students bid each other and the organizers farewell, it was clear that special friendships and bonds had been formed. STEM is a highly collaborative enterprise – paths will cross again (and again) at some point as they pursue their dreams. KSEA is looking forward to providing them with the resources to help them succeed as STEM professionals and welcoming them at future events.
Seung Jin Lee, Sangsan High School

I am Seung Jin Lee, a freshman at Sangsan High School who has a lot of interest in biology and chemistry. In addition to biology and chemistry, astronomy, economics, and even medical science have become more interesting for me. I want to decide my course to biology and chemistry, which was the most interesting and fun part of learning. It took me a lot of time to set this course. Because when I tell about my career and interests are the natural science lectures, acquaintance coax and reprimand me, saying, “It’s a job that doesn’t make a lot of money, and it’s a difficult job in Korea.” So I’ve changed my career path to lawyers, doctors, businessmen, etc. And I’ve looked up a lot about that and tried to learn fun. But in the case of biology and chemistry, there was something new and something very interesting. But other laws and management were boring, so I was sleepy a lot, and it was hard to learn because I didn’t have any more interest in them. So I tried to decide my course with biology and chemistry, but I couldn’t make much money, so the real problem came. If you look through the internet, there are many gloomy things that come out, from when graduate students do not get paid properly when they meet improper professors. So I thought about it a lot again, and as I’ll tell you later on, I decided my career path at ease just because graduated students said that I don’t have to suffer from living difficulties during the research life.

I’ve been interested in astronomy, economics, and medical science in addition to biology and chemistry, and I’ve been looking for magazines, journals, documentaries, movies, and so on. However the path has to be more specific and narrow. I’ve only been increasing my path. So I wanted to shape my career because I don’t think I can decide what I’m interested in if I continue to think about what I like (astronomy, biology, chemistry) and what I really want to do for money (economics, medical science, the law). And if I set my course, I wanted to develop an international perspective on that field. So I participated in YSTLC camp because I wanted to learn about the current trends in the field that I’m interested in through the UKC Forum, as well as several research institutes at the YSTLC camp. The first thing that helped me shape my career, which was my biggest goal, was the lectures at the University of Northwestern’s Institute of International Nanotechnology and the UKC Forum. I have also been briefed on various laboratory equipment by the International Nanotechnology Institute and have been briefed on the experiments. It was an invaluable chance to get in and out of the lab. It’s amazing to walk around the lab and look at the equipment, but I also had a lot of motivation to study with such equipment. But the teachers who walked around and introduced us to the lab and the chance that I could ask questions were very helpful. She was chemistry major that I’m interested in, and she was a person who has been on my way. I’ve asked a lot about chemistry, but she has told me a lot of helpful stories, so I think I’ve solved my questions and concerns. At the UKC Forum, I sat on several lectures, including Artificial Photosynthesis. It was great because they were interesting and interesting, and it was good to know more about the trends of science. Even though the content was difficult, I could hear it until the end because my eyes kept on them. So, I think the camp was very rewarding because the lecture I heard at the UKC Forum and University of Northwestern’s Institute of International Nanotechnology helped me to shape my path into biology and chemistry. I am very grateful that I was able to participate in this camp.

Yeaeun Park, Busan Jungang Girls’ High School

Hello I’m Park Yeaeun from Busan, South Korea. I first want to say thank you to KSEA because it’s an honor to having this thankful opportunity. Through YSTLC, I was able to get certain to my dream and could make my dream, astrophysicist, more concrete.

At fermilab, one of the staff explained dark matter and dark energy to us. Due to the existence of DARK HALO surrounding the dark matters, the stars in universe can’t fly all around though they are spinning in great amount of speed. As the dark matters take up most of the mass of a galaxy, the gravity from the mass of galaxies applies gravitational pull between two galaxies. Our galaxy and Andromeda galaxy are the examples of this case.

Also, after the Big Bang, many scientists expected that the universe will eventually decelerate and maintain the static condition or keep the deceleration of universe expanding. However it didn’t. It is expanding at an accelerating rate. What makes the universe expand at an accelerating rate? The dark energy makes it. But nobody know why. The dark energy is a theoretical energy to explain the acceleration of universe expanding so it’s a unknown being that we should study to find out. In case of Fermilab, they made a sensitive digital camera which has 570 mega pixel camera can be visible for infrared rays and install in Chile to find what dark energy is.

One of the sponsors of UKC 2019, KASI, told me what they do and the works they started these days. KASI is the national research institute in astronomy and space science of South Korea and people in there usually research optical astronomy, radio astronomy, space science including planetary science and theoretical astronomy. They are now doing a new NASA's medium scale project called SPHEREx project with Caltech.
SPHEREx project is to measure near-infrared rays spectrum of thousands of galaxies. KASI has made NISS, a near-infrared telescope, and SPHEREx is a upgraded version of NISS. By using technology of NISS, we can study huge space structure, cosmic infrared background and ice molecule in our galaxy which will be the origin of life. I realized that now in Korea we are focusing on development of infrared telescope and our technologies are getting better and better so that we have took on lots of medium scale projects. It made me surprised and I got motivated through this. I had a prejudice that astronomy research in Korea is not in a good state but while I was not aware of it, we were developing more and more things and I want to be like people working hard in their fields.

Through YSTLC, I have learned lots of stuffs that I don’t regret to have a dream, astrophysicist. The most important thing is that I could find my way to work in the field of astronomy. I didn’t have a clear goal to motivate me to study for it before. After this program I feel I have changed a lot.

I’ve met one Korean university student at Fermilab who was looking for dark matters in 8 months internship. When I asked him about his work, he answered me passionately and that desired me working at Fermilab. His passion made me desire working or having internship at Fermilab. In addition, during the week that other friends studied, I was able to have a valuable experience that I could not experience in Korea. As I was afraid of English, I was able to speak English with my friends who studied abroad and talk in English. My week as YSTLC became a valuable time. I was able to dream of becoming an engineer by visiting research institutes and participating in a big conference, listening to lectures, conducting musical programs and receiving certificates for microplastics in front of many university presidents and professors, and having a strong national and world class background. It was like a dream that I had learned, felt, gained a lot. If you are thinking about YSTLC around, I would like to recommend it actively.

Yerim Heo, Chungju Girls’ High School

I am a high school senior who wants to be an energy engineer. It is important to go to college well, but I applied because I think there will be no chance like this.

When I felt a slump in studying, I was inspired to study by participating in the camp and gained confidence in English. I was able to make mentors for college, for career, by making friends with graduate students of the department that I wanted.

The most memorable laboratory was the Argonne National Laboratory. It was a factory-like lab, unlike other labs in a sophisticated building. So I didn’t expect much. But after watch-
Jiwon Woo, Hankuk Academy of Foreign Studies

Hello, my name is Jiwon Woo. I am a freshman from Hankuk Academy of Foreign Studies in Korea. There are three main reasons I participated in this camp. First, as a student who wants to become an astrophysicist, visiting various labs and universities by joining the camp was an invaluable opportunity for me. Second, I could meet friends who had similar interests as I do during the camp and have various experiences. Finally, the opportunity to join Prof. Yu’s laboratory as an intern was the perfect opportunity to research about astrophysics in depth.

I felt a lot of things during this camp. At the Museum of Science and Industry, I saw a lot science-related exhibitions such as lights, waves, and weather phenomenon, as well as a special exhibition related to wearable IT. Such exhibitions made me think about how far the development of technology has brought us, and how further will it carry us. At the same time, as I looked at the Ju87 ‘Stuka’ dive bomber and the Supermarine Spitfire fighter hanging from the ceiling, I also thought that technology has brought us not only benefits but also the power of destruction as well. This made me think that whether technology will result in good such as various medicines or bad such as destructive warfare used in WW2.

When I visited the University of Chicago, we walked over the place where Enrico Fermi successfully conducted the world’s first nuclear reactor experiment in 1943, and visited several laboratories and buildings dedicated to lectures and research. I was impressed by the university’s high-quality researches and its legacies. While looking at the structure constructed to commemorate the first successful nuclear fission experiment, I once again thought that scientific advancements are like two sides of a coin, with the ability to create and destroy.

At Argonne National Laboratory, I could feel how fast technology advanced during the last 70 years since energy research began while watching at the engine research facility, particle accelerator, and nuclear reactor exhibitions.

Next, while visiting Fermi National Accelerator Laboratory, we talked about various fundamental particles such as leptons, quarks, and force particles. As I realized research about these fundamental particles were the key to revealing the secrets of the universe, I felt thrill flowing through my body.

While visiting IIN of Northwestern University I was excited to see what the future created by various technologies, including nano-technology, would be like.

After that, I was able to learn a lot of new things about physics during the UKC convention. Also, I was able to learn a lot about the results of the collaboration between KASI and NASA by participating in the forum that reinstated the relationship between the two organizations.

Overall, YSTLC 2019 has been an excellent experience for me. Not only did I get to learn a lot more about scientific facts, I also made a lot of friends who had the same interests as I do, gaining the opportunity to make various interactions and have more excellent experiences.
The following is my personal account of the smart track keynote lectures that I was able to attend. Since these lectures were given in three parallel sessions, it is to be noted that the following summary is inevitably only partial in its coverage.

The session for Science was held in Grand Ballroom F with the theme “Quantum Science”. There were about 50 people attending throughout the session on the first day. The three speakers, Profs. David Awschalom (University of Chicago), Hyunseok Jeong (Seoul National University), and Jungsang Kim (Duke University), gave talks on the theoretical aspects of quantum computing and its practical implementation in real systems. The highly promising prospect of quantum computing may be realized by finding a suitable system, whether in semiconductor device or ions in ion trap, and the session as a whole addressed a sufficiently illuminating set of topics in this regard.

The session for Engineering was held in Grand Ballroom G with the theme “Smarty City”. It drew the largest audience (of about 100) among the three sessions. With the advent of large-scale information and high-speed communication technology, the theme appeared to be timely and relevant for the sustainable future. Prof. Jaeseung Jeong (Korea Advanced Institute of Science and Technology) shared his unique and rare experience on the design of Sejong Smart City in Korea, while Dr. Brenna M. Berman (City Tech Collaborative) and Prof. Gregory Carmichael (University of Iowa) addressed other aspects of Smart Cities such as innovation strategy to realize them and the environmental issues therein.

The session for Health was held in Grand Ballroom H with the theme “Neuroscience”. There were about 50 people attending. Prof. Hee-sup Shin (Institute for Basic Science) gave a talk on neural circuits for a psychotherapeutic regimen against fear disorders, while Prof. Elizabeth Quinlan (University of Maryland) discussed activating the visual cortex to promote amblyopia recovery. Dr. Hee-Yong Kim (National Institute of Health) gave a talk on GPCR signaling in neuro-activities.

On August 16, the session on Science focused on “Soft and Living Matter”, a subject perceived to be highly important but so far largely unchartered because it lies in between hard science and biology. All three speakers command global leadership in their own areas of research: Steve Granick (Institute for Basic Science and Ulsan National Institute of Science and Technology) in soft-matter physics, Prof. Taekjip Ha (Johns Hopkins University) in single-molecule biophysics and biomedical engineering, and Prof. Changbong Hyeon (Korea Institute for Advanced Study) in bio-system modeling. A wide range of topics were discussed in polymers and vesicles, CRISPR system with DNA repair control, and dynamic modeling and analysis of molecular motors. Presentations were outstanding and sometimes even unpublished results were discussed, which were followed by deeply engaging questions and answers by the enthusiastic audience and speakers.
The SMART Science Track sessions were organized to highlight some of the greatest scientific challenges of the 21st century: developing quantum technologies toward the second quantum revolution and understanding the principles of soft and living matter. These emerging fields of Quantum Science and Soft and Living Matter take highly interdisciplinary approaches that combine physics, chemistry, computation, materials science, biology, and engineering. The Science Track sessions provided an opportunity for a glimpse of cutting-edge research efforts in these fields.

Chair: Young-Kee Kim  
(University of Chicago)

Co-Chair: Doochul Kim  
(Institute for Basic Science)
David Awschalom is the Liew Family Professor and Deputy Director of the Institute for Molecular Engineering at the University of Chicago, and a Senior Scientist at Argonne National Laboratory. He works in the emerging fields of spintronics and quantum information engineering, developing new methods to control the quantum states of individual electrons, nuclei, and photons in semiconductors with potential applications in computing, communication and encryption. Professor Awschalom received the American Physical Society Oliver E. Buckley Prize and Julius Edgar Lilienfeld Prize, the European Physical Society Europhysics Prize, the Materials Research Society David Turnbull Award and Outstanding Investigator Prize, the AAAS Newcomb Cleveland Prize, the International Magnetism Prize and the Néel Medal from the International Union of Pure and Applied Physics. He is a member of the American Academy of Arts & Sciences, the National Academy of Sciences, the National Academy of Engineering, and the European Academy of Sciences.
https://ime.uchicago.edu/awschalomblab/

Hyunseok Jeong obtained his Ph.D. at Queen’s University Belfast in 2003 with an Institute of Physics (IoP) PhD thesis prize, and then worked as a research fellow at the University Queensland in Brisbane. In 2008, he joined the Department of Physics and Astronomy at Seoul National University as an assistant professor, and is now working as a professor in physics. His research interests include foundations of quantum mechanics, quantum optics and quantum information. His major contributions compass the generalized quantification of macroscopic superpositions and coherence, theories of the quantum-to-classical transition, generation of new types of non-classical light, and schemes for all-optical quantum computation and communication.
https://physics.snu.ac.kr/hjeong/

Prof. Jungsang Kim’s current research focus is practical realization of quantum computers. He received his B.S. degree from Seoul National University (1992) and his Ph.D. from Stanford University (1999), both in Physics. He worked at Bell Laboratories for five years, working on developing cutting-edge optical and wireless communication systems. He joined the Electrical and Computer Engineering department at Duke University in 2004, where he has worked on trapped ion quantum computing, high pixel-count imaging systems, and novel quantum device research. He has been serving as a principal investigator for many collaborative research projects on quantum computing and communications. In 2015, he co-founded IonQ, focusing on commercial development of ion trap based quantum computer.
https://mist.pratt.duke.edu/

Steve Granick is the Director of the Institute for Basic Science (South Korea), Center for Soft and Living Matter. He is a member of the U.S. National Academy of Sciences and of the American Academy of Arts and Sciences. Among his other major awards are the Paris-Sciences Medal, APS national Polymer Physics Prize, and ACS national Colloid and Surface Chemistry Prize. He served as Chair of the DOE Council on Materials Panel on Polymers at Interfaces and Chair of the APS Division of Polymer Physics. Holding and having held Honorary and Visiting Positions at multiple universities in Europe and Asia, he has core experience in science globalization. Before joining the Institute for Basic Science in Korea, Granick spent 30 years at the University of Illinois at Urbana-Champaign (USA).
www.lbs.re.kr/softmat /

Dr. Taekjip Ha is a Bloomberg Distinguished Professor of Biophysics and Biomedical Engineering at Johns Hopkins University and an investigator with the Howard Hughes Medical Institute. He develops and uses single molecule and single cell measurement tools to study life at high resolution. Dr. Ha received a bachelor in Physics from Seoul National University in 1990 and Physics Ph.D from University of California at Berkeley in 1996. After postdoctoral training at Stanford, he was a Physics professor at University of Illinois at Urbana-Champaign until 2015. Dr. Ha serves on Editorial Boards for Science, Cell and eLife. He is a member of the National Academy of Science and a fellow of the American Academy of Arts and Sciences. He received the 2011 HoAm Prize in Science.
http://ha.med.jhmi.edu/

Changbong Hyeon received his B.S. and M.S. degrees from Seoul National University and a Ph.D. in Chemical Physics from the University of Maryland at College Park. Following post-doctoral work at the Center for Theoretical Biological Physics in the University of California at San Diego, he joined the Chemistry department at Chung-Ang University in 2008 as an assistant professor and has been a professor at the Korea Institute for Advanced Study since 2010. His current research interests are in molecular motors, genome dynamics, and many other molecular/subcellular processes.
http://newton.kias.re.kr/~hyeonecb/
The SMART Health Track sessions were organized to highlight cutting-edge research efforts in contemporary fields of Neuroscience and Cancer. The presentations were centered around compelling topics such as molecular/neural mechanisms for neurodevelopment, synaptic plasticity and animal behavior as well as cancer genomics, cell migration in \textit{in vivo}-like 3D environment and DNA repair. These Health Track sessions provided an opportunity for a glimpse of specific, measurable, achievable, relevant and time-oriented endeavor to unveil some of the fundamental mechanisms of brain function and cancer progression, and their translational potential for clinical and public health applications.

Chair: Hee-Yong Kim  
(National Institute of Health)  
Co-Chair: Kyungjae Myung  
(UNIST)
Since mid-90’s Dr. Hee-Sup Shin’s group has pioneered in applying molecular genetics to studying neural mechanisms for animal behaviors, primarily focusing on defining the role of the thalamus. His approach to this objective was by elucidating the physiological consequences of deranged regulation of intracellular Ca^{2+} level in neuronal cells, because proper regulation of the cytoplasmic Ca^{2+} level is critical for neuronal functions. He utilizes a wide range of techniques, including molecular genetics, physiology in vivo and in vitro, optogenetics, and behaviors. Beginning in 2010 his group’s research focus has been evolved to studying the neurobiology of social behaviors. Shin’s group has pioneered in developing a behavioral assay called observational fear learning, a new behavioral paradigm for studying empathy fear in the mouse. Using this system they revealed that the circuits involving the thalamus, the anterior cingulate cortex and the amygdala control the empathy fear behavior.

[https://irp.nih.gov/pi/hee-kim](https://irp.nih.gov/pi/hee-kim)

Dr. Hee-Yong Kim studies lipid biochemistry and cell membrane-related molecular signaling mechanisms underlying neurodevelopment and neuroprotection. She graduated from Seoul National University in South Korea and received her Ph.D. in Chemistry from University of Houston with specialization in mass spectrometry. Dr. Kim joined NIH and was subsequently tenured in 1992 and served as a Section Chief at the Intramural Research Program of National Institute of Alcohol Abuse and Alcoholism until she became the Chief of Laboratory of Molecular Signaling in 2006. Dr. Kim’s laboratory discovered lipid-derived novel endogenous molecular mechanisms for optimal development and protection of the brain. Her multidisciplinary research team developed mass spectrometry-based lipidomic, metabolomic and quantitative proteomic approaches to reveal protein-lipid/protein-protein interactions and conformational changes of proteins including GPCRs. Her current investigation is focused on the translation of these fundamental mechanisms to in vivo neuroprotective and therapeutic potential in brain injury models.  

[https://irp.nih.gov/pi/hee-kim](https://irp.nih.gov/pi/hee-kim)

Dr. Kenneth Yamada’s research focuses on the dynamic interactions and movements of cells and their surrounding 3D extracellular matrix as tissues are remodeled in real time. His group identifies novel mechanisms and regulators of cell interactions and their roles in tissue remodeling during embryonic development and cancer cell invasion. He received BA, MD, and PhD degrees from Stanford University, and was a Section Chief at the National Cancer Institute for 10 years and a Section Chief at NIDCR, NIH since 1990 – currently heading the Cell Biology Section. Elected a Fellow of the AAAS in 1991, he received the first Senior Investigator Award of the American Society for Matrix Biology in 2004, Distinguished Scientist Award of the American Association for Dental Research in 2008, promotion to NIH Distinguished Investigator in 2011, and was elected as a Fellow of the American Society for Cell Biology (ASCB) in 2017.  

[https://irp.nih.gov/pi/keneth-yamada](https://irp.nih.gov/pi/keneth-yamada)

Dr. Park’s research specializes in computational and statistical analysis of high-throughput sequencing data in epigenomics and cancer genomics. Originally trained in applied mathematics (B.A., Harvard; Ph.D., Caltech), he was introduced to molecular biology and genetics during his postdoctoral studies in biostatistics. His group has developed several algorithms used around the world for analyzing structural alterations in cancer genomes as well as chromatin modifications. He is a co-leader of the Cancer Data Sciences Program at Harvard/Dana-Farber Cancer Center and a member of the Division of Genetics at Brigham and Women’s Hospital and the Harvard Stem Cell Institute.  

[http://compbio.hms.harvard.edu](http://compbio.hms.harvard.edu)

Professor Myung is the director of the Center for Genomic Integrity, established in December 2014. In 1991 he received his B.S. in Zoology and then in 1993 earned his M.S. in Molecular Biology, both from Seoul National University. He completed his Ph.D. in Molecular Biology, Cell Biology and Biochemistry at Brown University in 1999. He started his independent research career at the National Human Genome Research Institute (NHGRI) in 2002 and promoted as a senior investigator. In 2014, he returned to Korea and took up his position at IBS. Dr. Myung’s research interest has been focused on genomic integrity, which are challenged by endogenous and exogenous species such as replication errors or oxidation stresses and radiation or toxic chemicals, respectively. He has been studying multiple DNA repair pathways at the molecular level using small molecules with molecular, cell biological and biochemical techniques and animal models.  

The SMART Engineering Track sessions were organized into two sessions that brought forth the promises and challenges of developing and sustaining a technological enhanced smart living: smart cities and smart systems. For the development of smart city living environment, UKC 2019 SMART Engineering Track addressed vision and definition of smart cities through an example of Sejong’s Life Zone, technological and policy innovations through an example of Chicago, and environmental challenges associated, such as air quality. To address the technological needs of smart living, UKC 2019 SMART Engineering Track presented selected smart systems such as development of flexible endoscopic surgery robots, vision for smart sensors and systems, and required education and training of the engineers for the future work. The UKC 2019 SMART Engineering Track sessions provided a glimpse into the future of technologically enhanced, smart living, and highlight opportunities and challenges for, among many, selected research, development and education efforts.

Chair: Mun Y. Choi
(University of Missouri)

Co-Chair: Dong-Soo Kwon
(Korea Advanced Institute for Science and Technology)
**Sejong Smart city experiments the city of future**

A city is a vessel of civilization. Smart City is a city that provides sustainable happiness for citizens by digitizing all phenomena that take place in cities and analyzing them using artificial intelligence. To achieve this goal, it is quite important to obtain important data in various areas such as mobility, energy, security and safety, education, healthcare, culture and shopping. In addition, it is more important than anything to provide urban services to create synergistic effects by combining them, so-called horizontal integration of the data and services across areas. To realize this, we must answer the questions including how to use the digital twin, how to design the data platform for urban services, and how to use blockchain and artificial intelligence for data management and analysis. In addressing those issues, this talk introduces the current status of Sejong Smart City as an example.

Professor Jaeseung Jeong is currently a professor at the Department of Bio and Brain Engineering, the chief professor at the Program of Brain and Cognitive Engineering, and the Head of Graduate School of Future Strategy in KAIST (Daejeon, South Korea). He received Ph.D. from Department of Physics in KAIST. He has been working as a postdoc associate at the Department of Psychiatry, School of Medicine in Yale University (New Haven, USA) and as an assistant professor at the Department of Psychiatry, College of Physicians and Surgeons in Columbia University (New York, USA). His research topics include brain dynamics of decision-making, computational modeling of neuropsychiatric disorders including depression, addiction, and dementia, Brain-Robot Interface (BRI), and Brain-inspired Artificial Intelligence. He was selected as one of ‘Young Global Leaders’ from World Economic Forum (WEF a.k.a. Davos Forum) in 2009 and received several awards from scientific communities. Recently, he has been selected and working as the master planner of Sejong Smart city national pilot project.

**Leveraging Collaborative Innovation to Realize Smart Cities**

Brenna Berman is Executive Director of City Tech, an IoT urban infrastructure lab that transforms cities into testbeds for new ideas. City Tech remakes essential services and infrastructure, from skills to skyscrapers and expands those solutions to other cities, thus increasing the world’s odds of solving big, urban problems. City Tech is currently easing subway congestion during large events; creating a digital map of Chicago’s underground; and launching a digital directory of public health services in Chicago. Prior to joining City Tech, Brenna served in Chicago Mayor Rahm Emanuel’s administration, which she joined in 2011. She served as the Chief Information Officer for the City and Commissioner for the Department of Innovation & Technology (DoIT) from 2012 to spring of 2017. In that time, she focused on transforming the team at DoIT to provide the skills and expertise to implement the Mayor’s vision of data-driven resident services and of a more efficient, effective, and innovative City government. This meant adding new skills to the team to increase the focus on software engineering and analytics, improving the department’s commercial partnerships to drive savings for the City, and identifying ground-breaking civic partnerships.

During her tenure as CIO, Brenna delivered on the Mayor’s commitment to a robust open data program, integrated advanced analytics into many city departments, drove IoT innovation for the City through unique partnerships by co-founding City Tech and the Midwest IoT Council, and, in partnership with the University of Chicago, realized the vision of urban-scale sensing with the Array of Things. Prior to joining the Emanuel Administration, Brenna built a career promoting government innovation over 10 years at IBM, where she worked closely with government agencies in cities and countries across the world to leverage technology and analytics to improve the services they provide to their residents. She advised governments on a variety of issues, from targeting personalized services through analytics to normalizing program offerings to simplify the delivery process and make them understandable to residents. Throughout her time at IBM, Brenna tailored cutting-edge business and data models, from processes to analytic algorithms for large government organizations in order to accelerate their own modernization efforts, providing an incredibly valuable skill set for the work she continues at City Tech. Brenna earned her bachelor’s degree and Masters in Public Policy from the University of Chicago.

**Improving Air Quality in Smart Cities**

Gregory R. Carmichael has done extensive research related to air quality and its environmental impacts. He is currently the Karl Kammermeyer professor of chemical and biochemical engineering at the University of Iowa. He also serves as the co-director of the Center for Global and Regional Environmental Research. His research activities include the development of comprehensive air quality models and their application to regional and international air pollution problems. His studies have led to a greater appreciation and understanding of the importance of long-range transport of pollutants within Asia and across the Pacific. His work has also explored the importance of dust on atmospheric chemistry. His work has focused on the role of black carbon (BC) in the atmosphere and its dual role as an air pollutant and climate warming agent. He is a member of the scientific steering committee for the UNEP ABC Asia project and was a co-lead author on a UNEP study aimed at providing a critical assessment of the role of BC as a short-lived radiative forcing agent. He also serves as chair of the Scientific Advisory Group for the World Meteorological Organization Global Atmospheric Watch Urban Meteorology and Environment project, which is focused on building capacity worldwide to improve air quality forecasts and related services.
Flexible Endoscopic Surgery Robots

Dong-Soo Kwon is a Professor in the Department of Mechanical Engineering at the Korea Advanced Institute of Science and Technology (KAIST), Director of the Human-Robot Interaction Research Center, Director of the Center for Future Medical Robotics. He is serving the IEEE Robotics and Automation Society (RAS) as a member of the Administrative Committee (AdCom). In addition, he is the founder CEO of EasyEndo Surgical Inc., Chairman of the board of directors of Korea Institute of Robot and convergence (KIRO), and a member of National Academy of Engineering of Korea (NAEK).

His research deals with Medical Robotics, Haptics, and Human-Robot Interaction. He has contributed to the advancement of several robot venture companies by technology transfer. Recently, he has established a start-up company based on his medical robot research results. He had worked as the Research Staff in the Telerobotics section at Oak Ridge National Laboratory from 1991 to 1995. He was a Graduate Research Assistant in Flexible Automation Lab. at Georgia Institute of Technology from 1985 to 1991, and the Section Chief, Manager at R&D Group of Kanglim Co., Ltd from 1982 to 1985. He received the Ph.D. in the Department of M.E. at Georgia Institute of Technology in 1991, M.S. in the M.E. at KAIST in 1982, and B.S. in the M.E. at Seoul National University in Korea in 1980.

Future of Work and the Worker: Opportunities and Challenges for Engineering Education

Dr. Apelian received his BS degree in Metallurgical Engineering from Drexel University (1968) and his Doctorate in Materials Science and Engineering from MIT (1972). After graduating from MIT, he joined Bethlehem Steel’s Homer Research Laboratories where he co-developed the Ultra-Form series of high strength low alloy steels. He joined Drexel University in 1976 and held various positions at Drexel, including professor, Head of the Department of Materials Engineering, Associate Dean of the College of Engineering, and subsequently Vice-Provost of the University.

He joined WPI in July 1990 as the Institute’s Provost and led the mission of broadening WPI’s academic programs and research agenda. After a six-year tenure as Provost, he headed the Metal Processing Institute (MPI) at WPI, which is an industry-university alliance with Centers in Metal Casting, Heat Treating, and Resource Recovery and Recycling. MPI is supported by over 80 corporate partners, as well as funding from private foundations and the federal government. During the last decade, MPI has developed into one of the nation’s premiere research centers dedicated to metal processing. The Center for Resource Recovery and Recycling is the Nation’s first center dedicated to recycling of materials; it is an NSF sponsored I/UCRC Center.

Apelian is the recipient of many distinguished honors and awards – national and international: Acta Materialia Hollman Award; Brimacombe Prize; ASM Gold Medal; The National Materials Advancement Award, etc. Apelian is a Fellow of TMS, ASM, APMI. He is a member of the National Academy of Engineering (NAE), European Academy of Sciences, and the Armenian Academy of Sciences. He has ~ 700 publications to his credit; 15 books and 21 patents. He serves on several technical, corporate and editorial boards. During 2008/2009, he served as President of TMS. Apelian is Founding Editor of the Journal of Sustainable Metallurgy. He is serving Chair of the ASM Educational Foundation (2016-2018). The 2016 Bernard Gordon Prize for Innovation in Engineering Education was awarded to WPI – and the four recipients are: Diran Apelian, Kris Wobbe, Art Heinricher and Rick Vaz. He received the MPIF Distinguished Service to Powder Metallurgy Award in 2017 and became a Fellow of the National Academy of Inventors and the WPI Innovator of the Year in 2018.

With the Sense of Smell, the World can be Colorful

Professor Nosang Vincent Myung received his B.S. M.S. and Ph. D. Degree in Chemical Engineering from the University of California, Los Angeles in 1994, 1997, and 1998, respectively. He spent three years as a research engineer at the same institution. In 2001-2003, he joined micro electromechanical systems (MEMS) group at Jet Propulsion Laboratory (JPL) which is one of NASA center as a member of engineering staff. In 2003, he joined Department of Chemical and Environmental Engineering at University of California-Riverside and served as the Department Chair from 2011-2017. Currently, he is the founding director for UC-KIMS Center for Innovative Materials for Energy and Environment and co-director for Winston Chung Global Energy Center. During his career, he received coveted awards including 올해의 해외과학기술인상(장관상/과총 회장상), ECS Electrodeposition Division Research Award, KICHE President Award, Brainpool Fellow from Korean Government, University of California Regent Fellowship, Jet Propulsion Laboratory Spot Award, Abner Brenner gold medal award from American Electroplaters and Surface Finishers Society (AESF). First time author’s award from Plating and Surface Finishing, National Science Foundation graduate fellowship, Department of Education fellowship, American Electroplating and Surface Finishing summer scholarship, Hughes aircraft company scholarship. Dr. Myung’s research interests are focused on the synthesis of nanoengineered materials and apply these materials in various advanced applications including spintronics, sensors, electronics, optoelectronics, energy harvesting, and environmental remediation. Dr. Myung’s group objective is to control nanoscale sized features to enhance material properties and device functions beyond those that we currently know. Currently, he published over 200 peer-reviewed journal papers and his h-index is 57 with the total citation of over 11,000.
The Physics Symposium brought together world leading scientists and young researchers in various fields of Physics from across the U.S. and Korea. Fundamental and Emergent physics along with Quantum Information Science were organized and the link with other interdisciplinary areas were discussed. This meeting served as a timely event to discuss the enrichments of research collaboration and networking between US and Korea. In particular, as the RAON which is a radioactive ion beam accelerator in Korea is expected to be completed by the end of 2021 through the Rare Isotope Science Project (RISP) of the Institute for Basic Science (IBS), the progress in US with the Facility of Rare Isotope Beam (FRIB) and the Electron Ion Collider (EIC) project appears highly relevant for the forthcoming years of research collaboration and networking between US and Korea. The Physics Symposium consisted of three invited sessions with total twelve oral presentations and one poster session with twelve posters. One of the invited sessions was jointly organized with the Association of Korean Physicists in America (AKPA).

KEY MESSAGES:
The Physics Symposium brought together world leading scientists and young researchers in various fields of Physics and relevant areas from across the U.S. and Korea. Fundamental and Emergent physics along with Quantum Information Science were presented and the link with other interdisciplinary areas was discussed. It was an excellent occasion to hear the talks from the diverse fields such as condensed matter physics quantum electron transport and mechanics, medical engineering, electrical engineering, nuclear and particle physics. There was a good mix between the experimental works and the theoretical studies. During the talks, the speakers were engaged actively with audiences well through questions, answers and comments. The diverse mixture of research fields may offer a chance for physicists to expand their knowledge boundary to learn from other areas of work. For example, CMOS detectors are extremely useful to demonstrate powerful, compact tools for health monitoring and CMOS technology can be useful to control large arrays of qubits in quantum computing. Also, the discussions on the fundamental physics with the 12 GeV upgraded Jefferson Lab experimental facilities and the future EIC projects along with the FRIB progress are highly relevant for the construction of the RAON in Korea which is expected to be completed by the end of 2021. In addition, the overall research trend in high-energy physics experiments currently underway (at CERN, Switzerland) or planned (at Fermilab, US) has been introduced, and these large international scientific collaborations are expected to greatly contribute to the discovery of new physics phenomena and, ultimately, to the understanding of the nature of the universe. Thus, it would be beneficial to bring more physicists to attend the Physics Symposium sessions.

CRITICAL CHALLENGES:
It is necessary to understand clearly the similarity and the difference between the fundamental physics and the emergent physics. 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 fundamental physics that was originally aimed at, when the researchers are indulged in the instrumentation itself too much. In the development of quantum information science, it is challenging to realize the simulated results of qubits in real experiments. The nation-wide development of the quantum computing in US may need an effective balance between the competition and the collaboration among the developers. In Korea, the construction timeline of the RAON is approaching fast. More in-depth discussions on the physics research program to utilize the RAON facility should be enhanced vigorously involving world experts both in the experimental areas and the theoretical areas. More dialogues and networking opportunities among the experts in Korea and US need to be highly encouraged for the broader user base.
FUTURE DIRECTIONS:
More networking opportunities among the experts in the fundamental physics, the emergent physics and the quantum information science 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. A broad base of support for more opportunities of networking and research collaborations is highly desirable.
Chemistry is crucial to the understanding of the behavior of materials on the atomic and molecular level. It is also of paramount importance for 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. Interdisciplinary research is becoming increasingly more important in solving important and complex problems.

At UKC 2019 held at Hyatt Regency O’Hare, Chicago, IL, the Technical Group of B (TGB), Chemistry (CHM), has organized and hosted symposium sessions over two days. The scientific topical areas covered during the symposium ranged from Biophysics and Nanobiomedicine, to Nanomaterial Self-Assembly and Characterization, to Solid Catalyst and Solar Cell Applications. Experimental and theoretical/computational approaches addressing the current issues on the material design and property characterization were covered. Application of the materials such as those in biomedical, catalysis, and energy fields were also discussed.

Overall, fourteen oral presentations were delivered by speakers from academic and national laboratories in USA and Korea. They came from US and Korean universities such as Purdue, Texas A&M, Penn State, Dongkkuk, Chung Ang, as well as from US government research laboratories such as NIST, NIH, and Argonne.

**KEY MESSAGES:**
The Chemistry symposium covered broad issues in chemistry and pertinent research topics from its related disciplines by hosting highly interdisciplinary technical sessions during UKC 2019. Presentations from the experts from US and Korea discussed a range of important research topics as summarized above, 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 more environmentally sustainable and more economical has also been noted.

**FUTURE DIRECTIONS:**
Continued effort in understanding the atomic and molecular origin and obtaining the nano-/micro-scopic picture of new phenomena, and the development of new measurement tools for probing the structure and dynamics observed in biological systems and newly developed materials will be important to translate basic science of Chemistry into useful technology.

The Chemistry symposium has been successful for multiple years now in effectively addressing the aforementioned critical challenges. The TGB leadership and organizing team of Chemistry will continue to make such efforts in the coming years for the continued success of the Chemistry symposium at UKC, fostering scientific interactions and exchanges between different research communities having common scientific interests.
The Mathematics, Applied Mathematics, and Statistics (MAS) Symposium brought together many leading researchers and young scientists from the United States and South Korea to exchange new ideas and invaluable information. The symposium offered many opportunities to present and learn the latest advances in various fields, showing their applicability to science, engineering, and health.

Specifically, topics covered in the MAS symposium are:

1. Fibonacci numbers, nilpotent operators, Riemannian manifolds, and binomial coefficients in pure mathematics;
2. Image dehazing, CS-MRI, HIV models, image colorization, and deep learning in applied mathematics;
3. Population correlation matrices, financial time series, resampling, penalized regression, and effects of muscle retraining program in statistics;
4. Graphical models in science, applications to neuroscience, machine learning techniques in medical imaging, and prediction in lung disease in biostatistics.

In addition, the MAS symposium participants discussed opportunities to use our expertise to contribute to the community outside of academia and industry to raise public awareness of mathematics and statistics.

KEY MESSAGES:
As described above, the MAS Symposium covered various topics and highlighted both purely academic and applied aspects of research, providing the latest advances as well as many real-world applications of mathematics and statistics.

CRITICAL CHALLENGES:
One of the most important challenges within our symposium is how to use pure research in real life. To this end, participants in the MAS symposium made great efforts to address both theoretical and applied aspects of mathematics and statistics leading to practical implementations of their research.

FUTURE DIRECTIONS:
We promote public awareness of mathematics and statistics as well as their real-world applications, educate both researchers in other fields and younger generations on the importance of these subjects, and attempt to solve real-life issues through collaboration with people in different disciplines.
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 6th 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, exosome, Lab-on-chip & Organ-on-chip, and immunotherapies & drug delivery. BME and MPS also co-organize Joint forum on medical device development and KHIDI Forum.

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 the 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 from 2014 to 2018, 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 data base will 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 pharmaceutic industries.
FOOD, AGRICULTURE AND NUTRITION SYMPOSIUM

This 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 advances in agricultural science including agronomy, animal sciences, crop science, entomology, plant science, and other agricultural areas; and (3) scientific information and 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.

KEY MESSAGES:
• Fabrication of LSPR sensor chip based on glass substrate can selectively detect Salmonella typhimurium and melamine in food samples.
• Gut oxidative responses by chronic exposure to pollutants enhance IgE production via PGE2-dependent mechanism.
• Agricultural products and plant-based materials can be utilized as green resources to produce plastics and other materials.
• Real-time optical imaging techniques can support conventional detection tools for accurate plant disease diagnosis.
• Genetically modified agricultural products such as high value soybeans with high oleic acid vegetable oil can enhance nutrition.
• Research on productivity and aroma characteristics of essential oil of wild houttuynia produced in Korea can facilitate commercialization of this oil.
• Quality of meat, microbial safety of broiler, and chilling efficiency can be improved by the new sub-zero saline chilling method.
• Blood pressure can be lowered, and many other diseases can be controlled newly developed grape seed polyphenols.

CRITICAL CHALLENGES:
• Although research has provided important information to the industry, there is still a considerable gab between fundamental research and commercial applications.
• Improvement of nutrient, processes, and food safety required not only fundamental research, but also profound understand on problems in the industry.
• Collaborations between academia, industry, and government are critical to fill this gap.

FUTURE DIRECTIONS:
• To address the challenges, the FAN program committee will keep a close relationship with companies such as CJ and Samyang to continue the CJ forum and to accommodate presentations from companies to learn about current problems.
• The program committee will continue the tradition of balancing three key areas (Food, Agriculture, and Nutrition) with an emphasis of interdisciplinary collaboration.
• New innovative solutions are needed to solve the current problems and the committee will look for novel technologies and invite speakers for these topics.
The Chemical Engineering Symposium was designed to provide a forum for leading experts and young researchers from U.S. and Korea to present and discuss recent advances in Chemical Engineering and closely related fields. Topics included energy technology, nanobiotechnology, advanced polymeric and nanomaterials, electronic devices and process modeling. In this year, we have integrated the SK Forum with our Chemical Engineering Symposium in order to openly discuss both future energy challenges and key future technology developments needed to address them.

KEY MESSAGES:
The CHE symposium covered advances in important areas including but not limited to novel polymeric materials and catalysts, synthetic biology and biotechnology, and advanced modeling and computations for addressing our health, energy and environmental issues. A large number of invited talks by prominent senior participants from Korea further improved the quality of the presentations and discussions from last year.

CRITICAL CHALLENGES:
Despite the success of integration between the SK Forum and CHE symposium, a limited opportunity was presented for in-depth discussions or large participation on new and potential collaborations due to the constrained schedule; for example the number of technical sessions was limited to one per day, thus the need to run two parallel sessions prevented the CHE participants from participating in multiple relevant sessions reducing the audience size from recent years.

FUTURE DIRECTIONS:
In the future UKC conferences, we plan to expand our present success with the SK Forum and coordinate more integrated venues between the CHE symposium and the sponsored forums, particularly CJ forum. Additionally, we plan to re-continue joint sessions with other symposia (e.g. Chemistry) in order to promote interdisciplinary research discussions. It would also be very beneficial to increase the number of sessions to cover more topic areas so that more invited speakers with quality research content 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.
This year’s Materials Science and Engineering (MSE) Symposium has covered the frontiers of emerging disciplines of materials science and engineering. Leading experts from both the U.S. and Korea have delivered exciting and motivating presentations on cross-cutting topics ranging from bio-sensing, neuron-inspired electronic devices, materials physics in two dimensional materials, and energy and materials processing technologies, and, finally, advanced polymers and metallic materials. The MSE symposium held three sections and had 18 speakers and seven poster presenters in total. The networking dinner on Thursday evening also has provided an opportunity for networking among participants and nurturing future collaborations.

**KEY MESSAGES:**
The progress of cutting-edge materials research is increasingly inspired by synergistic merging of diverse research disciplines. The neuron-inspired electronic devices that can interface conventional electronic circuits and bio systems or perform computations emulating the way brain works are good examples. Prof. Tae-Woo Lee from Seoul National University and Prof. Jang-Sik Lee from POSTECH have presented fascinating examples of organic-semiconductor-based neural interface systems integrated to insects; and ferroelectric-based high-performance neuromorphic devices, respectively. Conventional materials research and technologies also remain critical for addressing important issues of technologies currently being utilized in practice. Prof. Chung-Un Kim from UT Arlington, Prof. Duck-Joo Yang from UT Dallas, and Prof. Byeong-Soo Bae from KAIST each have showcased exciting examples of addressing the microelectronics’ solder problems through fundamental metallurgical phase study; developing new, more cost-effective manufacturing processes for carbon nanofibers; and developing ultra-tough siloxane-based polymer coating for flexible electronic and display devices.

**CRITICAL CHALLENGES:**
Advance and discovery of new materials and associated science and technologies will be hinged on systematic interdisciplinary research efforts that attempt to combine and integrate various disciplines. This is still a new frontier that needs significant innovations and big ideas. Global issues like trade disputes between nations and impending energy and environmental problems are also necessitating for both the U.S. and Korea to stay at the forefront of science and technologies to ensure our future security and prosperities. Materials are often related with key issues, and it is critical for the MSE researchers in both countries to further strengthen the ties and collaboration to make tangible and lasting impacts.

**FUTURE DIRECTIONS:**
Critical scientific and technological issues in MSE fields must be identified and effectively communicated among the researchers to enhance the crosspollination of ideas and to nurture interdisciplinary collaborations. The information also must be clearly explained to the public at large to enhance their understanding and to corral their support for the investment of public resources to science and research & development. Raising and training next-generation scientists, researchers, and engineers in MSE fields will be also critical to sustain the efforts. Overall, we need a steady and enduring overarching science and technology policy as well as a complementary grassroot approach that connects, assembles, and train likeminded scientists, researchers, and engineers of various disciplines in MSE to work together towards big problems and prepare the challenging and exciting future.
CEA technical symposium brought five technical sessions and one special session sponsored by Korea Transport Institute (KOTI) in UKC 2019.

- Environmental Engineering/Water Resources
- Geotechnical and Infrastructure Material Engineering
- Mobility big data and transport policy
- Infrastructure and construction management
- Architecture and Structural Engineering
- Transportation

32 podium speakers and 13 poster presenters presented the various topics in Civil, Environmental Engineering and Architecture fields. Over 60 CEA members participated in network dinner on Thursday (August 15). Smart and intelligent technologies, big data analysis and implementation, engineering fundamentals, artificial intelligence, machine deep learning technologies, environmental impact assessment were discussed throughout the sessions. Each session had a world-leading renown professional (non-Korean heritage) as an invited speaker, and they presented cutting-edge technologies and research topics in the session.

KEY MESSAGES:
The emerging technologies – smart, artificial intelligent (AI), machine learning- contribute to enhance the engineering research arms and broad-widen future direction of Civil, Environmental and Architecture areas. The CEA symposium covered the topics for implementing these state-of-art technologies into research, industry, and practical projects. As we encounter the era of connected and autonomous vehicles, infrastructure and transportation system should be prepared in prior to their implementation. The air quality now becomes the paramount of human life and the engineers and scientists are required to collaborate to mitigate the increase of greenhouse gas in worldwide.

CRITICAL CHALLENGES:
As advanced technologies grows faster than anytime earlier, engineers and scientists’ roles and contribution become more important. We discussed that timely adopting these advanced technologies and taking their advantages in civil, environmental, and architecture fields can bring the safer, better, and more convenient human lives. We, the professionals in CEA, are smart enough to lead smart world.

FUTURE DIRECTIONS:
The attendants’ common interests were in sustainable environment protection, infrastructure management, and connected autonomous vehicles with artificial intelligence using big data available in the fields. However, lack of methodology and technology for properly processing a humongous data and using them in practical engineering exists. The scientists and engineers will need to focus on utilizing bid data in each engineering field. The CEA symposium will also focus on AI with the robust data management for sustainable civil, environmental, and architecture fields in UKC 2020.
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 2 EEC sessions with 12 oral presentations and 2 poster presentations.

**KEY MESSAGES:**
EEC sessions covered contemporary state-of-art technologies including sensor, system, electronics, nanofabrication and energy harvesting. Particularly, various bio-medical applications, wireless technology, nanofabrication for energy devices and energy systems including ultrasonically powered system, 360-degree video streaming, wireless power transfer, new energy harvesting concepts, high-aspect ratio micro fabrication and energy stability. Two invited speakers addressed bio-medical applications and energy harvesting systems.

**CRITICAL CHALLENGES:**
Key areas were identified and discussed, including wireless telecommunication, biomedical applications, energy system and stability. Those technical areas require further global collaboration and complimentary expertise that will bring synergetic 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.
The Computer Sciences and Information Technologies (CIT) symposium encompasses diverse areas of research and development in CS/IT fields as well as the arts and social sciences. The symposium also provides variety of opportunities to emerge entertainment and other technology related areas such as connected vehicles, smart city and bio-medical. 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 include artificial intelligence, machine learning, data science, connected vehicles, augmented reality/virtual reality, art technology, software engineering, human computer interaction, big data and data analytics, Internet of Things (IoT), cybersecurity, robotics and computer educations. The CIT Symposium consisted of 3 technical sessions, one sponsored session and poster session.

**KEY MESSAGES:**

- The CIT symposium had 24 talks in 4 sessions (including 1 special session sponsored by KICS) and 30 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 artificial intelligent, machine learning, cyber security and automated and connected vehicles.
- 10 speakers from CIT poster session were invited as lightning talks (2 or 3 minutes), and the lightning talks were great opportunities for your scholars or students to introduce their early research to CIT participants.
- Some of the researches were commercially viable and in the process of seeking investment.
- Special session sponsored by KICS (Korea Information and Communications Society) provided cutting-edge technologies in the field of 5G and network security.

**CRITICAL CHALLENGES:**

- It was hard to balance diverse spectrum of CS and IT research, e.g., from students to senior level researchers, from classical subjects of CS to state-of-the-arts technology, and from industry to academia. To address this, the UKC level supports are critical.
- When there were two or more related sessions offered in parallel, the number of participants noticeably went down, specifically on Saturday morning.
- The networking opportunities in Tech group level are needed in addition to technical sessions since most of participant in CIT know only people in Tech-L. Currently, the networking dinner is only networking opportunity (except technical sessions).
- As organizers, it is still challenging to deal with “No show”, “No registration”, “Last minute request” and “Delay of presentation.”

**FUTURE DIRECTIONS:**

- Education and artificial intelligent 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.
- In order to for CIT to contribute on the community, CIT session can offer data science summer camp during UKC, in which students in middle school and high school in local area can participate.
- 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.
Biomedical and pharmaceutical sciences has 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 goal of Technical Group F symposium is 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. We will focus on introducing latest developments in not only biomedical principles but technologies to enrich our understanding. This year our symposium is designed to cover topics ranging from basic biology to translational science to clinical medicine. Specifically we will focus on cardiovascular science, cancer, diabetes, immunology, neuroscience, systems biology and bioinformatics, and drug discovery. We will also collaborate with leaders in other symposiums to create interdisciplinary forums. I believe that this symposium will offer an invaluable opportunity for a wide range of scientists, engineers, and physicians to broaden their perspectives and to facilitate collaboration among participants.

The Mechanical, Aerospace, and Naval Engineering (MAN) Symposium covers a wide range of areas including mechanics, materials, controls, manufacturing, and energy transport. The MAN symposium sessions are composed of Manufacturing, Micro-Nano-Measurement/Control, and Thermal/Fluid Engineering sessions. Particularly, this symposium focuses on Additive Manufacturing/3D Printing and Nano-Micro Fabrication for Energy/Material. The symposium provides the opportunity to discuss the latest cutting-edge researches in mechanical, aerospace, and naval engineering with the researchers from across the U.S. and Korea.
KEIT (Korea Evaluation Institute of Industrial Technology)

GLOBAL TECHNOLOGY PLANNING FORUM

Chair: Joseph Kim (California State University Long Beach)
Co-Chair: Jong Park (Moffitt Cancer Center/Univ. of South Florida), Jaehong Choi (KEIT)

The Korea Evaluation Institute of Industrial Technology (hereafter as ‘KEIT’) is the leading organization contributing the growth of manufacturing industry through development, application & commercialization of manufacturing technologies and supports in Korea. Its roles include planning, assessing, and managing of national industrial R&D programs under the Ministry of Trade, Industry and Energy (hereafter as ‘MOTIE’). Since 2014, KEIT along with MOTIE has organized the KEIT Global Technology Planning Forum (KEIT Forum). By promoting the participation of Korean-American scientists and engineers in the planning of Korea national R&D projects, we hope to improve the productivity and global cooperation in its R&D programs. As a successful case from a past project, the South Korean MOTIE, thought KEIT, award is Global R&D grant of $4 million to a foreign participant for a 4.5-year grant. This grant was triggered by the KEIT technical demand survey and KEIT forum in UKC 2017 held at Washington DC. To better identify and promote creative and innovative ideas for its national R&D projects planning, the major industry and technology trends will be discussed with Korean-American scientists and engineers in various areas and Korean government organization including KEIT. This year’s KEIT Forum topics includes presentation of MOTIE’s R&D roadmap and KEIT’s policies and programs for promoting the emerging industries with focus on five industrial technology areas such as Bio, Metallic materials/Advanced equipment, Chemical process, Semiconductor, and Autonomous vehicles.
**Highlights of Presentations:**

1. **Welcome & Introduction of KEIT by Dr. Jaehong Choi (Vice President of KEIT) and Dr. Junseok Oh (President of KSEA)**
   Dr. Jaehong Choi delivered the welcoming remarks and presented the introduction of KEIT and its roles regarding the R&D programs under MOTIE. Dr. Junseok Oh, KSEA President, thanked the continuous support of KEIT since 2014 and welcomed the PDs and the invitees from KSEA. Dr. Oh briefly explained the history of KEIT Global Technology Planning Forum and encouraged the attendees to explore the win-win strategies for both KEIT and KSEA.

2. **Current KEIT’s R&D Trends and Planning by Mr. Su-Kap Lee (Team Leader, Core Industry Division of KEIT)**
   Mr. Su-Kap Lee presented the overall planning and direction of KEIT research projects along with R&D strategies and Alchemist projects.

3. **International Collaboration Success Case Presentation by Martin Byung-Guk Jun (Purdue University)**
   Dr. Martin Byung-Guk Jun at Purdue University made a presentation about his experience in securing the research funds from KEIT. He presented his research projects and shared how he got awarded the two research projects such as Development of Manufacturing System for CFRP (Carbon Fiber Reinforced Plastics) Machining and Development of hybrid manufacturing system for high melting point alloys.

4. **Breakout Sessions with PDs at KEIT and Invitees from KSEA**
   KEIT forum had five closed sessions for the selected five areas such as Bio, Advanced equipment/Metallic materials, Chemical process, Semiconductor, Autonomous vehicles. Attendees and PDs had face-to-face discussions and teleconference meetings to discuss in depth the demand surveys submitted by the forum attendees.

**Items Identified for next “important” Research:**

Two areas such Advanced equipment/Metallic materials and Autonomous vehicles were selected as two working groups out of 11 research topics chosen by KEIT to further explore and find the research topics. Each working group will consist of at most four KSEA members and operate the working groups with KEIT PD via video conference and emails in order to conduct an oversea technology trend survey in each group and help identify a group’s RFP necessary for a new mid- and long-term business.
The Association of Korean Women Scientists & Engineers (KWSE) and Korean-American Women in Science and Engineering (KWiSE) participated in the “Joint Forum on BT Convergence.” The main purpose of the forum was to foster collaboration and networking between Korean and Korean-American women in science and engineering fields. This year’s topic was on Biotechnology Convergence, which aimed to bring on synergistic interaction between bioscience, data science and nanotechnology. Technical talks were followed by a general discussion, which allowed interactions between the participants to promote collaborations and partnerships.

**Highlights of the Presentations:**

The forum opened by introduction of KWiSE by Dr. Hey-Kyoung Lee (KWiSE president) and KWSE by Dr. Hye-On Yoon (KWSE president). Dr. Dong-Yun Kim (National Heart Lung and Blood Institute, NIH) was the first speaker, who introduced a statistical method that allows data monitoring, which will benefit large scale clinical trials by allowing scientists to enroll enough subjects in a rolling manner that can yield statistical power. This method, termed SPRM (sequential patient recruitment method), could in principle be adopted to any experimental data that will benefit from statistical monitoring of results. The second speaker, Dr. Jinah Park (School of Computing, KAIST) followed by describing her research on computational visualization of biomedical data. She presented sample visualization methods that work on the scale of anatomical data from medical imaging to fine scale cellular compartmentalization images. The power of one of her methods was that it not only can work for 3 dimensional image data, but will work in 4D by incorporating time sequence images. Dr. Jayoung Kim (Cedars-Sinai Medical Center, UCLA) followed by presenting her research on adopting various “omics” approaches to urological diseases. In particular, she talked about the microbiome and mycobiome diversity in urine that can be used as biomarkers for different urological diseases. Dr. Jinyoung Jeong (Environmental Diseases Research Center, KRIBB) talked about her research on developing nanotechnology based biosensors, which has the potential benefit of fast real time detection. In addition, she talked about her research trying to use zebra fish for nanotoxicity study. Dr. Jungsun Yun (Convergence Service Center, KISTI) mediated the discussion.

**Items Identified for next “important” Research:**

Overall, the research projects presented has the potential for forging collaborations. For example, nanotechnology based biosensors could benefit detection of biomarkers for various urological diseases. Image analysis could be adopted to analyze biosensor data sets, and statistical analysis method introduced in this forum could be useful for monitoring changes in the biomarkers across a patient population. In general, the main challenge for fostering collaboration across biotechnology disciplines is identifying groups of scientists that can benefit from each other, which requires frequent exchange of information and establishing a database of research interests. In addition, support for workshops or seed grants will be necessary to initiate effective collaborations.
CJ (CHEILJEDANG) FORUM

This is the fifth CJ Forum hosted during UKC since 2015. This year CJ Forum consisted of CJ CheilJedang session and technical seminar session. CJ CheilJedang session introduced CJ CheilJedang’s history, business and R&D strategy. Kim Sung-woo presented the topic of “Nutritional and functional values of lysed Corynebacterium mass in animal feeding”. In the technical seminar session, Huh Jun-Ryul, a Harvard Medical School professor who is a microbiome master, explained “Immune cell function in the context of neurodevelopmental disorders”. Kim Jin Ryoun, an associate professor at New York University presented, “Stabilizing enzymes by insertional fusion and with amyloid aggregation inhibitors”.

INNOVATIVE SOLUTIONS FOR NATURE AND HUMAN DRIVEN BY BREAKTHROUGH FUTURE TECHNOLOGY

Technical Seminar Session _ Abstract

**Immune cell function in the context of neurodevelopmental disorders** - Jun R. Huh / Harvard Medical School

My laboratory has previously discovered a critical pathway linking gut bacterial species to an inflammatory cascade that ultimately leads to behavioral abnormalities including deficit in social behaviors. Remarkably, this communication between the gut and the brain occurs during prenatal development and has a very specific effect: the bacteria that drive the inflammation reside in the maternal gut, and lead to the aberrant development of a sub-region of the primary somatosensory cortex. This work is one of the first studies to describe a mechanistic pathway linking the gut-immune-brain axis. Ongoing work in the lab focuses on a particular class of immune cells called Th17 cells to determine if these cells and the signals they produce drive the observed inflammation-induced abnormal behavioral phenotypes. We are also trying to elucidate mechanisms by which host- and bacteria-derived small molecules modulate inflammation and how they affect neural activity and animal behaviors.

**Is your enzyme healthy? Stabilizing enzymes by insertional fusion and with amyloid aggregation inhibitors** - Jin Ryoun Kim / New York University

Application of an enzyme is frequently limited by its insufficient stability. While several approaches have been reported for stabilization of enzymes, they are usually target-specific, not generally applicable to various classes of enzymes. In this talk, I will describe our findings that insertional fusion to a thermophilic host protein can stabilize a wide range of enzymes. I will discuss a mechanism by which an enzyme become stabilized by the insertional fusion and an application of this method for the creation of xylanase with increased enzymatic activity and thermostability toward alkaline pH. I will also discuss our recent finding that Bacillus Circulans xylanase (BCX) aggregates to form amyloid fibrils under non-denaturing conditions, and the amyloid aggregation is directly related to a loss of enzymatic activity during incubation. I will discuss possibility of modulating the amyloid aggregation of BCX by an amyloid aggregation inhibitor.
KHIDI (Korea Health Industry Development Institute)

KHIDI FORUM ON ARTIFICIAL INTELLIGENCE IN MEDICINE & HEALTH CARE
This is the fourth annual forum supported by Korea Health Industry Development Institute (KHIDI). A major goal of this forum is to bring together academics, research institutes, and healthcare leaders in Korea and USA to highlight R&D efforts in AI applications in medicine and healthcare. within the session, the research activities in different healthcare sectors, including imaging, EMR and genomics were introduced and discussed. The recently established Korean Society of AI in medicine was introduced as well. Most importantly, this forum discussed future directions and strategies for AI-based approaches in medicine and healthcare suitable for Korea.

Presentations:
1. Welcoming Remark by Hyun Chul Kim (Director, Department of R&D Planning, KHIDI) started the presentation session. He presented the reasons behind setting up the forum and expressed his interest in discussing how KHIDI, AI and machine learning researchers from both academia and industry can collaborate to identify problems and solutions on healthcare topics.

2. Keynote and general schema of current situations of AI and healthcare was provided by Dr. Joon Beom Seo (Asan Medical Center, Korean Society of Artificial Intelligence in Medicine). The title was AI Applications in Healthcare: Current Status in Korea.

3. Dr. Hwiyoung Kim (Yonsei University) showed a variety of how compilation of imaging data and follow up data analyses can bring benefits to patient care. The title was Imaging: Artificial Intelligence Applications in Medicine: Challenges and Benefits.

4. Edward Yoonjae Choi (Google Brain) provided insights of how Google takes on Electronic Medical Record systems and showed current problems that they are facing with potential solutions as we move into the future. The title of his talk was EMR: How to Handle Electronic Health Records with Deep Learning.

5. Dr. Tae Hyun Hwang (Cleveland Clinic) talked about how in-depth genomics data analytics can help identifying potential drug targets and how all these data can be fed into AI and machine learning. The title of the talk was Genomics: Translational Machine Learning and AI approaches for Genome-driven precision oncology care.

6. The final session was about a 30-min discussion session that brought a lot of participation from the audience and the panel of speakers.

7. Key points of the discussion were directed to topics that can bring advantages and disadvantages to patient care when AI and machine learning is implemented on treatment sides.
   • There are various types of patients with multiple and combination of diseases and with and without specific symptoms. Patients with diabetes, hormonal therapy, alcoholics, heavy smokers, secretive drug users and other types of combinatorial medical situations are complex. Audience and speakers discussed potential pitfalls and solutions to resolve such type of complex problems by using proper normalization of data and applications to AI and machine learning.

   • All medical data and information are simply put into machine and AI process is implicated in multiple ways without any set of standards. Audience and speakers discussed how to identify junk data and high-quality data. Low ranking hospital data does not mean low quality data and high-ranking medical center does not guarantee high quality data. Many participated in a heated discussion on how to standardize such type of data prior to AI processing and machine learning.

   • Biomarkers are identified for drug development, patient treatment and other medical purposes. However, the data sets generated from Korea represents near 100 Asian and conversely, the data
sets coming from elsewhere around the world can represent Hispanics, Blacks and Caucasian. Such type of complex population data sets should be standardized somehow, so that Korea does not make biomarker-based drugs that could only fit to suit Korean population and not for the global population. AI and machine learning process should reflect such type of complexity when biomarkers are used for new drug discovery for many types of human diseases.

- May types of -omics and genomics data sets are put into AI system, but Korean data represents mainly for Korean. Many ethnic groups may have different -omics data representing genomics, proteomics and metabolomics, thus these -omics data should be pooled and compared systematically to figure out the best ways to pour medical data sets to AI and machine learning purposes.

- Deep-learning and AI process generates data output that eventually leads to doctor’s clinical decision making and follow up treatment options. However, if the data output is misguided by bad datasets and wrong clinical decision was made by clinicians, then who will be responsible for these medical errors? The discussion lead to the quality of patient samples used for various medical research because most of data generated today does not have critical quality control system in place to separate all these issues. The clustering of medical data sets should be carefully analyzed, so that only high quality of data is entered for machine learning process. Such type of systematic set up is needed and guided by government entity like KHIDI.

- Medical imaging data is present everywhere and sometimes the second diagnosis or follow up visits conclude a different diagnosis. All these data are separated and sometimes not corrected in the EMR. Who will be responsible to feed in only the verified and finally validated clinical data sets for patients, so that AI and machine learning provide meaningful suggestions that benefits patients? Some kind of middle layer and regulatory process should be in place to control all of these and KHIDI can be involved from the government side to inform government policy makers.
Korea Astronomy and Space Science Institute (KASI), one of the Government-funded Research Institutes in Korea, and the National Aeronautics and Space Administration (NASA) agreed to extend the collaborations to the fields of Astrophysics and Space Exploration, in addition to the existing KASI-NASA heliophysics partnership. Space research toward science questions is the important motivation for international collaborations in space activity. Also, KASI-NASA collaboration is stimulating further chain-reaction joint activities as a perfect example between US-Korea S&T communities. In the forum, we discussed what questions are interesting in space research and how we can answer them based on current progress such as recently selected NASA medium-class explorer SPHEREx mission in collaboration with Caltech, science opportunities in space exploration to lunar orbit and its surface, and in heliophysics.

Chair: Young-Jun Choi, Korea Astronomy and Space Science Institute
Co-Chair: Steven W. Clarke, National Aeronautics and Space Administration

The highlights of the Presentations:
1. Korea Astronomy and Space Science Institute, or KASI, a successor of royal astronomical observatory over 1,000 years having numerous astronomical records, contributes the research on astronomy and space science field and support national/international science communities providing various ground/space-based research facilities since 1974.

2. NASA HQ Science Mission Directorate (SMD) is collaborating with KASI in Heliophysics and Exploration field in the form of working group and during UKC2019 signed another working group in Astrophysics.

3. Collaborative research highlight in Heliophysics is joint development of coronagraph to understand the physical conditions in solar wind acceleration region. A technology demonstration mission, BITSE, or Balloon-borne Investigation of temperature and speed of electrons in the solar corona, will be launched in September, 2019.

4. In Astrophysics, KASI is the only international partner of the Spectro-Photometer for the history of the universe, epoch of deionization and ices explorer, SPHEREx mission proposed by Caltech/JPL, selected by NASA in February 2019.

5. The Exploration Working Group between KASI and NASA, recently signed at May 2019, is seeking for the science instrument candidates for Commercial Lunar Payload Service (CLPS), which is one of NASA Lunar Discovery and Exploration Program.

Items Identified for next “important” Research:
The forum identified what we want and should do for further cooperation and drew the implications below
1. The first Astrophysics Working Group will be held in Korea, next year.
2. The heliophysics Working Group will be held in Korea, on 7 October.
3. The Exploration Working Group will select the science instrument for CLPS by March 2019.
SMARTER TECHNOLOGY FOR AGING INFRASTRUCTURE AND NEW CONSTRUCTION

Infrastructure around the world isn’t getting any younger. Population growth and migration, urbanization and climate change put further strains on the assets required to continuously deliver resilient-safe structures, clean water, and needed power. Aging infrastructure brings with it risk – in terms of potential failure and poor environmental compliance. U.S. infrastructure earned near failing grades in the recent Report Card for America’s Infrastructure from the American Society of Civil Engineers. The concerned situation is not very different from Korea. How to resolve the issues of aging infrastructure due for renewal is truly a grand challenge that must require a number of proven technologies, new paradigm-shifting ideas, and convergent approaches among fields. Toward the challenge, sponsored by the KICT that is a sole Korean National Research Institute in charge of construction and infrastructure, this Forum will touch the challenging issues of aging infrastructure and its renewal (rehabilitation, repair, and replacement) together with smarter technologies for new construction of infrastructures. More specifically, this Forum brings thoughts, perspectives, and directions to advance the current aging infrastructure systems and to build better infrastructure systems in future through smarter construction-management-renewal technologies. Several experts in US and South Korea are invited to give talks and join the brainstorm panel discussion to seek more effective strategies and future directions to the grand challenge. It is also our purpose to develop follow-up R&D collaborative opportunities between Korea and US.

Highlights of Presentations:
Introduction to the Forum and Welcome Address
Dr. Hyu-Sung Shin (Director, Future Tech. & Convergence Research, KICT)

[INVITED] Aging Infrastructure and Its Renewal in US
Dr. Zachary Grasley (Director, Center for Infrastructure Renewal; Professor, Texas A&M University)
• The rate of technological innovation in the field of civil infrastructure has historically lagged other industries. In order to accelerate advancements and address aging infrastructure, it is necessary to adapt our approach to innovation through enhanced interdisciplinarity and greater collaboration.

Innovative Technologies for Maintenance of Aging Infrastructures in South Korea
Dr. Byeongcheol Kim and Dr. Ki Tae Park (Director, Sustainable Infrastructure Research Center, KICT)
• Big data utilization in aging infrastructure maintenance is necessary for preventive maintenance based on future behavior prediction. In the US, as in Korea, maintenance budget is limited, so it will be necessary to introduce an efficient and economical maintenance system through Asset Management System in the future.

Multiscale-Convergent Approach for Enhancing Aging Infrastructure and Its Renewal
Dr. Yong-Rak Kim (Professor, University of Nebraska-Lincoln)
• The first challenge in understanding the role of age in infrastructure resiliency is to know the causes of failure and the extent to which these causes can be related to age. The challenge can much better be resolved by multidisciplinary approaches and strong collaborations. The better understanding will reduce costs and time, extend life of aging infrastructure, and provide advanced plans for renewal.
Smart Earthwork System with Intelligent Virtual Borehole and Compaction Technology
Dr. Jinyoung Kim and Dr. Changho Choi (Construction Automation Research Center, KICT)

• In South Korea, the 4th Industrial revolution is national issue to support the innovations for opening new technical markets. The main technical challenges focuses on ‘Hyper-connected and Intelligence’ for various engineering fields. With this national movement, ‘Smart Construction’ must be defined with the frame of ‘Hyper-connected and Intelligence’ and Digitalization. The roles and goals for better technical development in the field of construction are discussed.

Panel Discussion
Moderator: Dr. Hyu-Sung Shin (Director, Future Tech. & Convergence Research, KICT)
Panel Members: Dr. Zachary Grasley (TAMU), Dr. Ki Tae Park (KICT), Dr. Yong-Rak Kim (University of Nebraska), Dr. Changho Choi (KICT)

Items Identified for Next “Important” Research:
• Collaborative research on data sharing for smarter construction and maintenance;
• Smart Construction defined in the framework of “Hyper Connected and Intelligent Revolution” + Digitalization;
• Strong and practical collaborative research activities between the two countries (US and Korea): the KICT’s Sustainable Infrastructure Research Center and the TAMU’s Center for Infrastructure Renewal can develop a partnership to serve core roles for such strong collaborations.
KOFST Plastic Waste Forum

Growth in living standards increases the use of plastic products, results a remarkable impact on the environment. Plastics have now become indispensable materials, and the demand is continually increasing due to their diverse and attractive applications in household and industries. Mostly, plastics polymers make up a high proportion of waste, and this amount is continuously increasing around the world. Hence, waste plastics pose a very serious environmental challenge because of their large quantity and disposal problem as it do not biodegrade for a very long time.

Land filling, being the most used disposal route is undesirable due to poor biodegradability and causing the secondary soil and ground water contamination. Incineration of plastic waste also possesses serious air pollution problems by releasing the harmful gases like dioxins, hydrogen chloride, and airborne particles. This special forum at UKC will discuss the various US and Korea perspective on the plastics waste issues. Forum will cover the plastic waste policy, outlook, management, the state of operational practice in both country as well as the recycle and conversion technology to the chemical and energy.

Highlights of Presentations:

1. Welcome & Introduction of Plastic Use Issue in Korea by Dr. Myung-Ja Kim (President of KOFST)
   Dr. Myung-Ja Kim discussed the various Korea perspective on the plastics waste issues, covering the plastic waste policy, outlook, management, the nation-wide operational practice in Korea as well as the recycle and conversion technology to the chemical and energy.

2. Current Technologies in Korea for Disposal of Waste Plastics by Dr. Hang Seok Choi (Professor, Yonsei University)
   • Dr. Choi presented the current situation of waste plastics in Korea, how the plastic waste was dealt with.
   • The generation of waste plastics, the collection system and final disposal technologies were examined.
   • Also, the promising technologies for the disposal of waste plastics were discussed in terms of environment, technical robustness and economy.

   • Mr. Biderman discussed the impact of China’s National Sword initiative on U.S. recycling programs, and the various market and governmental responses.
   • He also discussed how some local governments are eliminating plastic from curbside recycling, while others are embracing new technologies.
   • He reviewed U.S. EPA and Congressional activity, and explore the impact of recent revisions to the Basel Convention on American plastic recycling.
   • Also, the promising technologies for the disposal of waste plastics were discussed in terms of environment, technical robustness and economy.

4. Waste Plastic to Energy by Dr. Gupta, Ashwani K (Professor, University of Maryland)
   • Dr. Gupta presented the synergistic effects in Steam Gasification of Combined Biomass and Plastic Waste Mixtures
   • He reported the plastics use in the society continue to increase in all sectors. While we use approximately 8% of the total oil to produce plastics. In the US this represents approximately 2 million barrels of oil per day used for making plastics. The use of circular economy for use in managing plastic wastes is appropriate. Despite much efforts, significant amounts of plastic material still remained so that we must find technical and economical solution to handle the large amounts of plastics produced every year. The energy content in plastics is high so that the conversion of waste plastics to energy offers a good viable solution to manage the waste plastics.
In the talk after describing the issues and challenges with the plastics, new scheme along with some laboratory scale data was presented to reform the waste plastics to clean fuel.

5. **Panel Discussion with the panelist from US, panelists from Korea and audience.**

- Prof. Gupta, Ashwani K (University of Maryland) / Mr. David Biderman (SWANA)
- Prof. Hang Seok Choi (Yonsei University) / Dr. Jinyong Jeong (KRIIBB) / Dr. Sanghyun Cho (SK Innovation)

**Items Identified for next “important” Research:**

- **Education and Outreach**
  - Develop consistent messages for key recycling issues
- **Improve Materials/Waste Management Infrastructure**
  - Create a digital library of info/best practices/funding
  - Upgrade to equipment such as optical sorter, robots, AI
- **Strengthen Secondary Materials Markets**
  - Explore regional and local market development
- **Increase interest in Plastic-to Fuel and polymer level recycling**
- **Develop a national recycling framework**
ARTIFICIAL INTELLIGENCE (AI) IN ROBOTICS AND AUTONOMOUS VEHICLES

FORUM 1: CONNECTED AUTOMATED VEHICLES

With the advances in sensors, communications, machine learning and artificial intelligence technologies, automobile industries and related start-ups have been rapidly moving into the development, evaluation and commercialization of fully connected and automate vehicles. In order to realize these connected automated vehicles on public road in a near future, many technology, policy, legal and economic challenges need to be properly addressed.

The main purpose of this forum sponsored by INNOPOLIS is to bring experts in the area of Artificial Intelligence (AI) and connected and automated vehicles (CAV) from US and Korea to discuss the current status and future challenges of CAV.

Highlights of Presentations:
Machine learning and AI Challenges for Connected Automated Vehicles
Jaerock Kwon (Kettering University)
- Covered fundamental knowledges on machine learning and artificial intelligence technologies
- Presented a history on driverless (i.e., autonomous) cars, and its technologies in terms of intersection between artificial intelligence and robotics
- Concluded the presentation with challenges of AI in autonomous vehicles (e.g., adversarial attacks, explainable AI and decision making capability)

V2X Future Infrastructure for Connected/Autonomous Vehicles
Nathan Byun (Fluxity)
- Transportation infrastructure is the vein of cities, and current systems are at their limits. Given that physical improvements especially near metropolitan areas are practically impossible, an innovative approach is needed
- Connectivity can significantly improve not only mobility
- Redundancy through infrastructure could be of help, while it is still possible to have vehicle malfunctions/errors
- We need to improve accuracy of real time location (e.g., GPS accuracy) and communication latency with infrastructure

Panel Discussion Session
Panel members: Yun Jae Cho (BOSCH), Dongwook Jang (Here Technologies), Jae Young Jung (Ford), Hani Mahmassani (Northwestern University), Tom Oh (Rochester Institute of Technology)

Key Items Discussed:
- While there are concerns about safety and security of autonomous vehicles, the decision (to allow autonomous vehicles on general public roads) by government and adoption by the general public will be based on “relative” benefits (maybe compared to human driven vehicles).
- Several questions from participating small and medium business representatives from Korea include: (i) why not consider using infrared based sensor for recognizing human objects on the road and (ii) the use of digital twins for assuring calibration and fair evaluations.
- Connectivity improves mobility and safety – such as cooperative adaptive cruise control that allowing cars moves like a train, and crash can be avoided through cooperative control.
Forum 2: Artificial Intelligence and Robotics

Beyond the excitement, Artificial Intelligence (AI) already proved its value and potential capability and started delivering significant Return on Investment (ROI) for business. AI is believed to have profound impact on various functions across all industries, creating unrivalled efficiencies in human productivity. AI and its core component, machine learning, are now a must in every IT strategy in business. Robots equipped with AI and a number of innovative techniques could do much complex actions and tasks comparing to the robots that currently dominate repetitive works in factories.

This forum touched trends of AI and Mechanical Intelligence for Robotics and showcased many creative robots and promising applications of robots in the near future. We understand that AI and Robotics are very broad in both technology components and applications and we were able to address only a slice of the topics in this forum. We hope to hold the forum around AI and Robotics at every UKC in the next few years.

This LG forum consists of two presentations. In the first presentation titled, Artificial Intelligence and Robotics Research at LG Electronics, Dr. Eugene Kim of LG Electronics briefly reviewed AI for robotics and its core technologies, and then shared with the audience his professional view of current AI and its future especially in the application to robotics. He also introduced several robot products of LG Electronics that are already in the market or under development. There was an active discussion on the availability of big data that are critically important in enhancing the AI part of robotics. Issues discussed included acquisition of various data, self-learning, personalized service, interconnection among AI robots and AI appliances, edge or cloud in AI access, accuracy, and security. The presentation was very informative, and the audience as well as the speaker raised a few tough issues that should be resolved to make robots play an important role in our lives.

In the next presentation titled, Mechanical Intelligence for Robotics, Prof. Dennis Hong of University of California Los Angeles started his talk introducing the terminology of Mechanical Intelligence that seem to mimic Artificial Intelligence from the mechanical perspective of robotics. Prof. Hong presented many inspiring robots of various shapes (look) and creative motion that his team has developed for the last 20 years. He also showed us a couple of robots that he claimed had never been exposed to public. Especially impressed to the audience was how he came up with the shapes of his robots. His habit that carefully watches little things around him, his ability to apply his findings from the little things to his research, and his everlasting efforts to develop them to innovative robots inspired the audience – especially young engineers who attended the forum. The presentation was a very interactive lecture with a lot of questions and answers in both directions.

The audience of more than fifty enjoyed the presentations and active discussions. We will continue the forum in UKC 2020.
The Seoul City Forum was held in UKC 2019 Chicago. It was the 5th event at the annual US-Korea Conference (UKC). The Seoul Business Agency (SBA) has actively participated in the KSEA’s UKC conference since 2015. SBA and KSEA have worked together and held the forums inviting experts in various disciplines, especially the ones closely related to the issues and technologies that cities always deal with. This year’s topic was “Identifying Impending Problems in Seoul and Finding Potential Solutions.” An RFP for presentations was sent out to KSEA members with the potential topics in fourteen areas provided by SBA. The SBA reviewed the fourteen proposals submitted and selected six proposals for presentations at the UKC on Friday afternoon. The forum was held in Korean. Three SBA officials (Kwang Yeol LEE, Managing Director; Seongmin KIM, R&D Director; and Gyu Chel JUNG, R&D Manager) participated in the forum. The six presentations were judged on the day-of presentation by three groups of people; i.e., 5 invited field professionals, 3 SBA officials, and 35 forum attendees.

Drs. S. Kim at University of Southern California and J. Kim at George Mason University received the 1st place award. They presented “Integrated Platform of Visual Data for Smart City,” addressing the current problems and proposed solutions. The critical issues identified were the limitation of manual acquisition of visual data, high expense of data gathering, lack of open data sharing, and inefficiency of data processing. They proposed an integrated platform of visual data and its effectiveness, which includes improved operation efficiency, time and cost savings, resiliency, and startup opportunities. The technological barriers and future development were also presented; i.e., the proposed platform’s capability and scalability, its accuracy and uncertainty, inter-operability and compatibility of equipment, and privacy and security issues.

Dr. S. Na at Marshall University received the 2nd place award. He presented “New Renewable Plastic Materials to Replace Aged Water/Sewer Pipes.” He addressed the issue of aged old pipes buried under ground more than 20 years. A High-Density PolyEthylene (HDPE) pipe was proposed, which can be produced using recyclable plastic materials. Dr. Na explained its strengths, weaknesses, economic feasibility, and sustainability. He proposed to develop new HDPE pipes combined with Nanoclay, which is eco-friendly and cost-effective. The 3rd place was awarded to Drs. J. Lee and J. Park at New Jersey Institute of Technology. The presentation topic was “VR Guide Dog Service for Blind People.” They introduced a virtual guide dog system and its enabling technologies. A proof-of-concept test was demonstrated and its potential applicability to City of Seoul. Its feasibility was addressed including potential issues and solutions.

The first-place winners received $1,000 cash award, second-place $500, third-place $350, and 4th through 6th places $200 each. The first through the third-place winners also received award certificates issued by the CEO of SBA. The managing director of SBA Mr. Kwang Yeol LEE gave the awards to the winners on Saturday at the time of the KSEA award ceremony.
THE ROLE OF WOMEN IN STEM, EDUCATION, AND POLICY FOR THE 4TH INDUSTRIAL REVOLUTION

Korean-American Women in Science and Engineering (KWise) and Korea Federation of Women’s Science & Technology (KOFWST) held the Women’s Forum entitled “The Role of Women in STEM, Education, and Policy for the 4th Industrial Revolution.” This forum is open to both genders, and its goal was to exchange ideas on how to promote and empower women scientists in the various STEM fields, and to share information on education and policy needed for this process. KWise-KOFWST forum provided an environment for open discussion and nurturing of partnerships and friendships. The forum was designed to be an interactive and engaging event to foster networking and mentoring among the attendees. It was an excellent opportunity to learn and get inspiration from each other in order to allow women scientists and engineers to engage effectively as leaders and active participants in the 4th Industrial Revolution.

Highlights of Presentations:
The forum started by brief introduction of KWise by Dr. Hey-Kyoung Lee (KWise president) and KOFWST by Dr. Myeong-Hee Yu (KOFWST president). The first speaker was Dr. Myoungsook Oh (WISET president, Hongik University), who talked about challenges and strategies to provide a more inclusive STEM education. Her main point was focused on how to encourage female in male-dominated STEM education. She explained that we need to avoid male-oriented curriculum, which can alienate female students. One way to achieve this is to put the emphasis on social relevance of engineering solutions, which taps into the innate emphasis women put on social values. In addition, early exposure to STEM disciplines was pointed out as key, as well as putting effort on designing gender inclusive content in class syllabus. Arranging student forum that allows male and female students to exchange their own perspectives on gender issues was pointed out as one idea to promote diversity. The second speaker, Dr. Elizabeth Quinlan (University of Maryland), unfortunately had to cancel her talk due to a family emergency. The third speaker was Attorney Junhwan Chang (Chang Law Group), who talked about how to invest in intellectual property (IP). One of the points brought up was that scientists, especially women scientists, are not well informed of profitability of IP investment. He suggested that starting investment on IP that is close to one’s research area is likely a good strategy. The fourth speaker was Dr. Hee-Jung Chung (University of Illinois Urbana-Champaign). She provided lists of challenges faced by women in STEM in academia. Promotion gap, disproportionate time spend on various service activities, unconscious biases, and difficulty in balancing work & family were pointed out as major hurdles that negatively impact promotion and career advancement of STEM women faculty in academia. Dr. Chung discussed a few potential solutions to overcome these challenges, which ranged from raising awareness of disproportionate service burden, responding to negative stereotypes in an objective and professional manner, actively promoting one’s own research, and gaining help from partner/family that can help maximize work efficiency. The talks were followed by a panel discussion, which were moderated by Dr. MiHyee Kim (Chungbuk National University) and Dr. Suk Kyoeng Lee (Catholic University of Korea). Dr. In-Sun Lee (Commissioner of DGFEZ) shared her experience that led to various leadership positions, and how she managed her demanding career by focusing on networking and building relationships that can mutually benefit each other. She also emphasized that women can use their emotions to engage others effectively in group settings. Dr. Dong-Yun Kim (NIH) emphasized effective communication across all fronts as key to success. Dr. Jayoung Kim (Cedar-Sinai Medical Center, UCLA) shared her view how venues such as this forum allows women scientists to gain comfort and support from each other.

Items identified for next “important” Research:
Clearly there are challenges at multiple levels that need effective management in order for women in STEM to advance in their career path to be leaders in their fields. This has to happen across multiple fronts ranging from education, mentoring, raising awareness in work places as well as in society. The greatest challenge is figuring out how to break innate negative biases set against women in STEM fields, which would require continuing discussions that can lead to creative solutions.
KSEA HISTORY FORUM: KSEA 50-YEAR HISTORY BOOK PROJECT

KSEA was born on the 11th of December in 1971. KSEA will celebrate its 50th year birthday in 2021. KSEA 50-year History Book Project is the project of the whole KSEA community marking its stature as a mainstream science and engineering organization in the United States and shining its inspiration for young generations. KSEA History Committee recently launched the Editorial Board on a standing basis to allow the physical publication of the KSEA 50-year History Book. This forum reviews the recent development of the Editorial Board and discusses with the YG leaders for their aspiration and vision for the future KSEA.

Chair: Chueng-Ryong Ji (North Carolina State University)

KEY MESSAGES:
KSEA as a whole should think about the following questions and try to answer in preparation for the KSEA 50-year history book project:
- Why did those 69 elder colleagues gather at DC on December 11th, 1971, to initiate this organization KSEA?
- Can we take the opportunity of 50th anniversary to rejuvenate the spirit of KSEA?
- Can we learn the lesson from the past and inspire the future?

Inspiring the young generations and listening to the aspiration from the young generation leaders is important or the meaningful preparation of the KSEA 50-year history books. The timeline of the project has been updated by the editorial board (EB) to publish a soft-bound book ~250 pages just before UKC2021 and a hard-bound book ~650 pages before Dec. 11, 2021. Contents of 7 parts and 24 chapters were laid out, which will require lots of various data collection, effective EB workloads, efficient KSEA networks, and more. Budget request for 50th Anniversary Activities and Books Preparation is under Executive Committee’s discussion for the Council decision. Fundraising opportunities for campaigning the financial independence of KSEA may be open.

CRITICAL CHALLENGES:
Not much time is left for a decent preparation for this landmark project of KSEA 50-year history books. KSEA's IT technical support issue should be resolved soon. Without the strong support on the EB’s face-to-face meeting expenses, EB won’t be sustainable and cannot continue to work on the 50-year book project. KSEA’s enthusiastic approval of the ongoing standing EB’s composition and activities is the key for any reasonable progress of the book project.

FUTURE DIRECTIONS:
More face-to-face meeting opportunities for the book project are necessary. Not only the discussions among EB members but also the dialogue with YG leaders are highly desirable for the meaningful progress of the book project. KSEA’s IT technical support are crucial for the call and collection of the historical materials.
The 2nd KSEA Forum on the University Leadership Forum

Advancement of Science and Technology through the Cooperation between Korea and US Universities

Format:
- The forum consisted of two 1-hour panels of 5 panelists each including the moderators.
- Each panelist delivered opening/introductory remarks on the panel’s topic with 400 words.
- Each panelist submitted the speeches beforehand so that the moderator can prepare for the panel session in advance.
- Following individual remarks, the moderator led the panelists in a guided discussion of the common themes in their remarks, along with other prepared questions.
- Finally, the moderator opened the conversation to the audience for Q&A.

Theme 1: “Future-Proofing” the Workforce

Background:
- Advances in artificial intelligence, quantum computing, and other technologies are paving the way for transformative changes in the way we live and for dramatic changes that will disrupt the socio-economic and educational order. The central role of educational institutions will be to provide the skills needed by graduates to navigate and benefit from these changes -https://www.weforum.org/reports/the-future-of-jobs-report-2018
- Due to demographic changes and shifting social expectations, there has been a growing mismatch between the supply and demand of the labor market in Korea. In the context of higher education, this has often led to highly-specialized university graduates who struggle to find employment and/or adapt to the workforce.
- Recent government initiatives have promoted the implementation and/or expansion of universities’ liberal arts programs, citing their tendency to enhance the social adaptability of graduates from such programs. Others have worked to restructure academic programs based on employment prospects, adjusting overall entrance quotas, and establishing new departments or majors that align more closely with industrial demands.
- In some cases, universities and industries collaborate directly in implementing and developing a customized curriculum, creating an employment “pipeline” for the industry and providing needed expertise for the university.

Discussion questions included:
- How are higher education institutions working to address this challenge both in Korea and the US?
- What have your institutions been doing thus far to address these mismatches, and what do you see as the next steps for higher education institutions?
- What qualities of a strong undergraduate liberal arts program qualify it as a solution to this problem? What are the important hallmarks of such a program?
- How can universities effect broader cultural and societal change through undergraduate education and graduate education?

Panel
- Moderator and Panelist: President Robert Zimmer, the University of Chicago
- Panelists:
  - President Timothy Killeen, the University of Illinois System
  - President Se-Jung Oh, Seoul National University
  - President Heisook Kim, Ewha Womans University
  - President Hyungju Park, Ajou University
Theme 2: Creating an Ecosystem for Innovation and Entrepreneurship in Higher Education

Background:
• Many universities have pursued innovation and industry partnerships as a means to create a new source of revenue as well as to improve institutional reputation. But, what has been the success of innovation programs at universities? https://www.chronicle.com/interactives/20190611-vinsel
• Many universities both in Korea and the US are working to create a “startup culture” on campus by creating a more entrepreneurship-friendly environment and instituting resources such as makerspaces, pitch contests, technology transfer offices, intellectual property consulting services, funding mechanisms, and beyond.

Discussion questions included:
• How has your institution approached this change in focus both in terms of education and support for faculty researchers and student learners?
• How does your institution address the friction between the missions of basic research and that of development fostered through industry partnerships?
• What benefits have you seen from increased industry collaborations thus far, and what concerns should higher education institutions be aware of going forward?
• What skills and training are critical creating an innovation and entrepreneurship mindset among faculty and students?

Panel
• Moderator and Panelist: President Mun Y. Choi, the University of Missouri System
• Panelists:
  President Timothy Killeen, the University of Illinois System
  President Jin-taek Chung, Korea University
  President Mooyoung Jung, UNIST
  President Kiseon Kim, GIST
SHALE GAS CHEMICAL CONVERSION

Recent developments in hydraulic fracturing have not only increased non-traditional supply of petroleum for fuels, but also opened up doors for unprecedented revolution in the utilization of shale gas hydrocarbon reserves. This abundant and previously untapped source of hydrocarbons has already made significant shift in the natural gas supply, yet the vast potential for economical production of electricity, value-added chemicals and fuels for the next century still remains to be realized. There exist daunting technical challenges toward efficient shale gas conversion; innovative scientific and/or engineering approaches, most likely in collaborative team efforts, need to be exploited to successfully tackle these challenges.

This special forum on shale gas conversion at UKC 2019 will serve as the first stepping stone for SK’s drive to promote technological advances and open innovation among researchers from industry and academia in Korea and the U.S. alike. Particularly, one of the World’s top experts in heterogeneous catalysis along with two emerging investigators will offer invited talks providing broad and insightful perspectives as well as sharing transformative scientific discoveries on topics ranging from single atom and alloy catalysis to novel membrane reactors. Ample discussions and networking opportunities through this forum are expected to trigger exciting interactions and collaborations toward next generation approaches in efficient and scalable shale gas hydrocarbon conversion.

Highlight of Presentations:
The special forum sponsored by SK Innovation featured three invited talks in the broad area of efficient shale gas conversion into value-added chemicals and fuels as well as innovative catalytic materials, novel reactor schemes and platform technologies. The plenary talk was offered by Professor Maria Flytzani-Stephanopoulos, a world-renowned expert on heterogeneous catalysis. She provided a broad overview of the energy and shale gas utilization status and future outlook from decades of pioneering research as a member of the U.S. National Academy of Engineering and an Editor of one of the top journals in the field, Applied Catalysis B: Environmental, along with recent groundbreaking discoveries in her research group. Professor Seok-Jhin Kim presented novel membrane reactor technologies his group developed recently, which could overcome critical challenges in ethane gas conversion. The final speaker, Dr. Jin Ki Hong, offered insights into his patented platform reactor technology for large scale continuous operation of aromatic hydrocarbons from shale gas feeds. In sum, this forum served as the first catalytic platform to establish academia-industry liaisons from both U.S. and Korea toward next generation shale gas utilization technologies.
PROMOTION OF KOREA-US TECHNICAL COOPERATION FOR THE FUTURE WITH K-TAG

The Korea Institute for Advancement of Technology (KIAT) is a comprehensive technology support organization committed to promoting industrial technology growth in Korea. Korea-Technology Advisory Group (K-TAG) USA launched by KIAT in July 2014, consists of Korean Science and engineering experts in USA. Main activities of K-TAG are 1) to assist Korean Small and Medium-sized Enterprises (SMEs) in finding USA Innovative partners, 2) to provide advice as well as information related to Korea-USA R&D cooperation and 3) to develop and participate in Korea-USA joint R&D projects. In UKC 2018, the members of K-TAG USA in various technical areas will get together to 1) seek research collaborations, 2) present/propose innovative research projects and 3) discuss R&D projects planning with delegates of KIAT in this forum.

Chair: Pomjin Lee (KIAT)

Chair: Donghoon Yoon (Univ. of Arkansas)
The Young Generation Forum (YGF) and Professional Forum (PF) at the US-Korea Conference (UKC) are forums under the Career and Leadership Track called the “Young Generation and Professional Forums (YG/PF).” YG/PF aimed to provide career development and leadership training to next-generation students and career professionals. The goal of YG/PF was to address topics that will help them grow professionally, regardless of the career track, academia or industry. YG/PF also facilitated networking among the student participants of UKC 2019 by inviting them to the YG/PF networking dinner.

This year, YG/PF collaborated with the Innovation & Entrepreneurship Symposium (IES) to bring a startup panel and workshop.

The YG/PF was comprised of 5 sessions:

“Immigration Law Information Session” by Renee M. Burek (Principal & Managing Director, Immigration Law Associates P.C.)

This presentation provided an overview of temporary work visa options for foreign STEM professionals and employer and self-sponsorship options for obtaining permanent residence/green card. The presenter discussed issues in maintaining status and current trends in immigration processing. As this session was relevant to many participants who were seeking to apply for visas and permanent residence, a robust Q&A session followed the presentation.

“Entrepreneurs in Information Technology Panel & Entrepreneurship Workshop (Joint Session with IES)” by Sid Chung, (Professor, Korea University), Young Lee (CEO, Telochain); Heopsoo Rhee, (President, Korea Innovation Center Silicon Valley)

YG/PF collaborated with the Innovation and Entrepreneurship Symposium (IES) to organize and execute this session. A panel of experienced entrepreneurs discussed the early stages of their entrepreneurial journeys, followed by a hands-on and engaging workshop that brought participants to create their own startup ventures. Guidance from mentors and moderators helped participants put together a general business plan and experience the pitching experience to “venture capitalists.”

Despite it being the first year of execution, we received excellent participant feedback, even from those who had no experience or interest in startups.
“Networking Dinner”
YG/PF invited all students, young professionals, and post-docs attending UKC to enjoy delicious Chicago deep-dish pizza at Giordano’s. This was an opportunity for conference attendees to engage with each other and organically network.

“Career Panel Session & Breakouts” by Troy Sandidge (International Speaker, Social Media Jedi), Marie Pawlak (Managing Principal, Planning101), Arika Clark Alejo (Founder and CEO, ThriveEpic)
YG/PF invited speakers who provided advice and insight about their career paths. After a brief panel discussion, the participants were split into breakouts to directly interact with the panelists and ask them questions.

“Lightning Talks” by YG/PF selected participants
19 YG/PF applicants were selected to host Lightning Talks on subjects related to their intimate experience in career or leadership development. Lightning Talks last about 5 minutes with Q&A discussions ranging from “how to navigate tough conversations around racial identity and micro-racial aggressions” to “How to write a personal statement for the NSF and beyond” and about “Health Equity and Inclusion, Why minorities need a stronger voice in public health.”
Jina Yoon, Program Manager, Microsoft
This was my first time attending UKC 2019 and I really enjoyed the conference. It was inspiring to see so many Koreans and Korean-Americans from across the globe coming together to share their knowledge! Every single person I met seemed so hardworking and motivated, and this really shone through in their posters and lightning talks. I particularly had a lot of fun at the IES + YG/PF joint entrepreneurship session. In this program, we listened to three panelists speak about their experiences working in startups and entrepreneurship. I was really moved by Young Lee, the first female Korean CEO I have ever seen in my life, and her emphasis on health and people-oriented success. In the latter half of the session, we worked in teams of 4-5 participants each to deliver 2-minute startup pitches for imaginary products. I had no experience in this skill to say the least but thanks to my team and the guidance of the panelists, we ended up with a solid pitch. Each panelist had congratulatory marks for each team. It was an intense but rewarding experience. I look forward to attending UKC again!

Eugene Yoon, PhD Student, University of Southern California
This was my first UKC YP/PF and I am so incredibly happy that I attended! The perfectly balanced pace of the programming allowed me to meet new contacts, reconnect with old friends, and provided valuable nuggets of information that I could never have learned about by myself. In particular, the inaugural innovation and entrepreneurship symposium (IES) proved to be a valuable experience. The pitch workshop put participants like me outside of our comfort zone, but pushed us to learn by doing rather than passively listening/reading about a topic. I think this is extremely important for scientists and engineers because it is unconventional training that improves communication skills. Thank you to all the organizers! I can’t wait to attend next year’s UKC.

Sunny Jungyeon Lee, Undergraduate Student, University of North Texas
This 2019 UKC was my first time at UKC conference as a KSEA member, as an undergraduate, as an aspiring professional, and as a YG. I learned diverse perspectives from academia through industries that I would not have gained if it was not from this conference. I met many valuable people who I want to learn from and have common aspects so that I could talk through about my career/goal/life in general. I was able to be open-minded and expand my network. From this experience I would like to continue getting involved in KSEA, and see myself grow within all of our members. I appreciate everyone’s effort in this conference, amazing programs, events, and having a chance to meet amazing people.

Jason Kim, Research Associate, Medical Scribe
This year’s UKC was my third consecutive UKC, and I certainly do not expect it to be my last. Having the opportunity to converse with and learn from young professionals who are further down the career path I am pursuing has already proven to be invaluable as I apply to medical school this year. I was shocked by how many of the participants are genuinely willing to mentor the younger attendees in any way they can, and it’s an amazing feeling when you can offer someone else (who’s younger) the same help and attention that you were given when you were his/her age. In addition to the great opportunity to learn from experts of different backgrounds, I would say that one of the major reasons I apply every year is the camaraderie. Seeing my friends from around the world sparks a joy that even Marie Kondo cannot fathom.

TJ Park, Design Engineer, GE Aviation / MS Student, MIT
UKC 2019 YG/PF was a great opportunity to make new acquaintances and reconnect with friends. This forum provided a unique opportunity to learn from young scientists and engineers outside of my field which is quite unusual. I appreciated the leadership and career development focus of the lightning talks that dozens of participants gave which made it accessible and applicable for everyone. The career panel and breakout sessions also gave a good balance of group lecture and individualized Q&A on advancing your career and avoiding burnout. Thank you for the wonderful experience and I hope to attend UKC YG/PF again in the future.

Cindy (Jungeun) Lee, PhD Candidate, Northeastern University
As a first time organizer and attendee of UKC, I had a great time at the conference overall, learning from others and networking with aspiring students and young professionals. The YG/PF forum allowed a unique, yet comfortable environment for attendees to network, gain leadership skills, as well as hear stories and advice from professionals out in the field. Specifically as an organizer, I had a great experience - the team worked well together to provide the best experience for participants and the sessions proceeded with no major hiccups. All organizers were always willing to help, friendly, and motivated throughout the time we were planning and preparing and all pulled their weight during the conference. I strongly believe this conference is a great opportunity for students and young professionals and I hope to attend again next year!
2019 KSEA-KUSCO Graduate Scholarship Winners

Jung Park  
Columbia University

Dennis Cha  
University of California, Los Angeles

Eugene Yoon  
University of Southern California

Seung Hwan Lee  
Rice University

Jaehyeok Jin  
The University of Chicago

Soojin Kim  
Northwestern University

Youngkwon Song  
University of Illinois at Chicago

Yujin Park  
The Ohio State University

Hana Kim  
University of Cincinnati

Yongjin Shin  
Northwestern University

Min-hwan Oh  
Columbia University

Hyun Gi Yun  
California Institute of Technology

Dongheon Lee  
Texas A&M University

Youlim Ha  
Johns Hopkins University

Yuri Park  
University of Houston

Isaac Kim  
Alpert Medical School of Brown University

Jieun Chon  
Virginia Tech

Matthew Shin  
University of Chicago

Donggeun Tak  
University of Maryland

Junghyun Park  
New York University
Korean-American Scientists and Engineers Association (KSEA) is pleased to announce competition for the 2020 KSEA Young Investigator Grants (YIGs), which intend to recognize those who have demonstrated outstanding early career development in science, engineering and/or technology. Two grants will be awarded this year as follows:

Grant
US $10,000 for each awardee with an additional travel support up to $1,000 to attend the award ceremony at UKC 2020.

Application Period
From October 15, 2019 to December 1, 2019

Description
The KSEA Young Investigator Grant is 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. Two YIGs will be awarded this year: one grant selected from Science, and the other from Engineering. Applicants should select either Science or Engineering based on their research field.

Eligibility
Each applicant should have received a Ph.D. degree within six years of the application (On or after January 1, 2014).

Application
Application for the grant should be received through the KSEA website, http://yigrant.ksea.org. The required materials are a curriculum vita, a research or technology development plan for one year (five pages), and three reference letters. The application package must specify the pertinent Technical Group (A though M) in which it is to be evaluated. A list of 13 Technical Groups may be found at https://ksea.org/us/organization/technical-groups/

Evaluation
Evaluation of the applications and selection of the successful applicants will be conducted by the KSEA Honors & Awards Committee (HAC) in collaboration with Technical Group Councilors and their representatives. The recipients will be announced through the KSEA web page and via email by March 31, 2020.

Administration
The grant is awarded through the recipient’s institution in the United States, not directly to the recipient. The recipient must submit a final report, which summarizes the achievements supported through the grant and expenditure details. An additional travel reimbursement up to US $1,000 will be provided to the recipient to attend the award ceremony at UKC 2020.

For any questions, please contact HAC Chair, Kang-Wook Lee, kangwook.lee.ibm@gmail.com.
Korean-American Scientists and Engineers Association (KSEA) is pleased to accept nominations for 2020 Distinguished Service Membership (DSM), Distinguished Sponsor Membership (DSpM) and Honorary Membership (HM) to recognize those who have contributed exemplarily to KSEA with distinction.

Eligibility

- Distinguished Service Membership (DSM): KSEA members who have served KSEA with distinction.
- Distinguished Sponsor Membership (DSpM): Individuals or organizations who have made substantial financial contributions to KSEA.
- Honorary Membership (HM): KSEA members at least 75 years old who have retired with a distinguished career.

Application Period: January 15, 2020 to 11:59 PM EST on Sunday, March 1, 2020

Nomination

Fill out the nomination form together with the KSEA Service-Point Table available at http://hac.ksea.org. One may nominate himself or herself. To be considered favorably, the total service points earned by a nominee should be greater than 100 for DSM, and the sum of his/her age and total service points should be greater than 100 for HM. A substantial financial contribution is required for DSpM.

Evaluation Procedure

Honors & Awards Committee (HAC) will evaluate the nominated candidates and recommend the finalists to the Executive Committee (EC). The EC will approve the recommended DSpM and HM. The EC will confirm the recommended DSMs and present them to the KSEA Council for approval. The finalists will be notified via email by June 15, 2020.

Recognition

The DSM, DSpM and HM awardees will receive KSEA certificates while additional KSEA Gold Medals will be bestowed on the DSM awardees. Membership dues are waived for Distinguished Service and Honorary members. It is noted that there is no voting right for non-paid members.

For any questions regarding preparation of a nomination package, please contact Chair of KSEA Honors and Awards Committee (HAC), Dr. Kang-Wook Lee, kangwook.lee.ibm@gmail.com.

The Korean-American Scientists and Engineers Association (KSEA) is pleased to accept nominations for the annual KSEA Awards that recognize and honor those members/non-members who have made outstanding contributions to KSEA, advances in science and engineering, international cooperation especially between the U.S. and Korea, and general welfare of the society.

Awards to be made are:

- Outstanding Contribution to KSEA Award to a member who has made exceptional contributions to KSEA in particular and the society in general through dedicated and exemplary services in science and engineering including international cooperation (Joint Award with Minister of MSIT).
- Scientist of the Year Award to a member who has made outstanding technical contributions in the areas of science (Joint Award with President of KOFST).
- Engineer of the Year Award to a member who has made outstanding technical contributions in the areas of engineering (Joint Award with President of KOFST).
- Entrepreneur of the Year Award to a member who has demonstrated stellar performance in the areas of entrepreneurship (Joint Award with Maeil Business Newspaper).
- Outstanding Chapter and Chapter President Award to a local chapter which has contributed significantly to enhance KSEA activities through novel and exemplary programs and services.
- Outstanding Community Service Award to a member who has provided outstanding services to a greater community on behalf of KSEA.
- Young Generation Leadership Award to a young generation member who has provided outstanding membership development and services for the young generation.

Each nomination form (in MS Word) can be downloaded from the KSEA website http://hac.ksea.org. Please carefully follow the instructions in the form. Nominations must be uploaded onto http://hac.ksea.org between January 15, 2020 and March 1, 2020. The recipients will be notified via email by June 15, 2020. Awards will be presented at UKC 2020 to be held in August 2020.

For any questions regarding preparation of a nomination package, please contact Chair of KSEA Honors and Awards Committee (HAC), Dr. Kang-Wook Lee, kangwook.lee.ibm@gmail.com.
NMSC 2020
National Mathematics & Science Competition and National High School Physics Contest

KSEA proudly presents 2020 National Mathematics & Science Competition (NMSC) and National High School Physics Contest. We call for your active participation and support for this annual event.

Date
Saturday, April 18, 2020

Online Registration & More Information
http://nmsc.ksea.org

Online Registration Period
Feb. 3- Apr. 5, 2020

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7PM Evening Entertainment, Dinner, Awards Ceremony & Raffle
8PM Red Carpet Celebration

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Young professional discounts also available
2020 KSEA General Election Candidates

49th President-Elect Candidates

Young-Kee Kim, PhD
Louis Block Distinguished Professor, University of Chicago
PhD in Physics, University of Rochester
Chicagoland Chapter

Byungkyu Brian Park, PhD
Associate Professor, Director of Traffic Operations Laboratory, University of Virginia
PhD in Civil Engineering, Texas A&M University
Central Virginia Chapter
UKC Program Chair (2017) / Auditor (2014-17) / Vice President 1 (2012-13) / Publication Director (2011-12) / Founding Chapter President of Central VA (2009-10)

49th Vice-President Candidates

Haejung An, PhD
Chemist/Program Specialist, US FDA/Pacific Southwest Food and Feed Laboratory
Ph.D in Human Nutrition & Food Science, University of Florida
Southern California Chapter

Do-Gyoon Kim, PhD
Professor, Orthodontics, Ohio State University
PhD in Mechanical Engineering, Rensselaer Polytechnic Institute (RPI)
Ohio Chapter

Young B. Choi, PhD
Professor of Engineering and Computer Science & Information Systems Technology Program Coordinator., Regent University
Interdisciplinary Ph. D. in Computer Networking and Telecommunications Networking, The University of Missouri-Kansas City
Washington Metro Chapter
KSEA Publication Director (The 34th, 35th, 36th, and 41st) / Technical Group Councilor (TG L & TG M) / Election, NMSC, and YG Committee Member (current)

Young-sup Yoon, PhD
Professor & Director, Emory University
PhD in Medicine, Yonsei University
Georgia Chapter

Auditor Candidates

Changmo Kim, PhD
Project Engineer & Lecturer in Dept. of Civil and Environmental Engineering, University of California, Davis
PhD in Civil and Environmental Engineering, University of California, Davis
Sacramento Chapter

Donghoon Yoon, PhD
Assistant Professor in Myeloma Center, Univ. of Arkansas for Medical Sciences
PhD in Immunology, Univ. of Texas MD Anderson Cancer Center
Arkansas Chapter
Learning Across Differences: Reflections from the 22nd Future Leaders Conference

From September 2nd to the 6th, over 100 Koreans from all over the world came together for the 22nd annual Future Leaders Conference (세계한인차세대대회). Hosted by the Overseas Koreans Foundation, this five-day conference included talk concerts where participant panels shared their experience of living abroad, such as in Brazil, Russia, Australia, and China, as well as “Future Leaders Network Forums” where participants wrestled with questions about the impact of the Korean Wave abroad and our role in the fourth industrial revolution and technology.

I was honored to be nominated by the Consulate in Los Angeles and join such an incredible community. The people at the Future Leaders Conference ranged from prosecutors, engineers, lawyers, as well as individuals who ran their own businesses, created their own startups, and produced film and media. One of the highlights for me, during these five days, was the “Global Citizenship Forums” where participant panelists shared their perspectives and ideas on what made them “Korean” and what it means to “be Korean.”

As a second-generation Korean-American who grew up speaking the language and who has been fortunate to live in cities with robust populations of Koreans, I found these conversations to be especially insightful. The panelists included individuals who were parents and considered what it meant to raise third generation children as “Koreans,” a fourth-generation Korean-Russian who was reclaiming and reintroducing Korean culture and heritage into her community, as well as a Uzbekistan-Korean educator who discussed how she incorporated Korean culture into her classroom.

The five days of the Future Leaders Conference, was not merely limited to building community and networks (though this alone, was incredible). In addition to these inspiring and thought-provoking conversations were cultural excursions like seeing Yoon Dong-Ju’s literary house, visiting the War Memorial of Korea, and exploring Incheon Songdo International City. While the conference ended all too quickly, many of us have continued to stay in touch, knowing that the relationships we have built, the conversations we have had, and the collaborative projects we started planning, will remain long after. I look forward to hearing about the 23rd Future Leaders Conference and the ways our generation continues to shape and define our heritage, culture, and future.
The Membership Drive is the most important event among various other events offered by the KSEA Wisconsin Chapter (KSEA-WI). It provides great opportunities to introduce the KSEA organization itself, announce upcoming events from KSEA-HQ and KSEA-WI, get to know KSEA-WI executive officers, and socialize with other members, including students and several professionals in both academia and industry.

In general, the KSEA-WI Membership Drive happens around one week after the New Student Orientation hosted by the Korean Students & Scholars Association (KSSA) around the end of August. During this KSSA New Student Orientation, KSEA-WI officers introduce KSEA briefly to all incoming graduate students regardless of their majors and advertise the KSEA-WI Membership Drive event.

In 2019, the KSEA-WI Membership Drive event was at Tripp Commons, Memorial Union on Saturday, September 7th. We tried to make this event more interactive and sociable among participants rather than a lecture format. There was a short presentation about the organization for 15-20 minutes followed by team games.

The timeline of the event was as follows: As participants checked in at the front table, based on the RSVP status, they were randomly assigned to teams which were differentiated by colored wristbands. Also, we highly recommended signing up for new membership or renewing their membership. We even had laptops provided to do so. Ice cream was provided (catered from the campus) so people could freely interact with each other before the event officially started.

The KSEA-WI President kicked off the event by giving a presentation containing information about KSEA, benefits of joining the organization, KSEA-HQ upcoming events, KSEA-WI events and benefits, and an introduction of the executive officers. Afterwards, there were three main team games; Paper Pipe Game, Electrical Resistance Game, and a 4-Legged Race. Between the games, we added a few mini games utilizing a spinning wheel and team betting.

Dinner was catered from campus and none of the food went to waste since people were quite hungry after the few physical activities. When people were having dinner, officers went around the tables and reminded them about membership. Also, a powerpoint slideshow presenting information regarding membership was up on the screen. First and second place winners of the team games were awarded with Amazon gift cards and cups embeded with the KSEA-WI logo. After dinner and a concluding message, people mingled and continued to network more.

People could introduce themselves and network with other students/professionals freely throughout the games which would encourage them to participate in more of our upcoming events together. The event was successful with about 50+ participants and most of them either became members or renewed membership. After the event, we received great positive feedback from participants, and they also seemed to have high expectations of what we would provide next. I strongly believe we could not grow this far without previous and current executive officers’ efforts. I would like to appreciate and acknowledge all of their time and passion toward the organization.

We are already planning on more fun events for next year. Stay tuned!
Fall in Florida is usually marked with a series of hurricanes and hurricane warnings. The fall semester started with Hurricane Dorian, but fortunately, it changed its projected path, sparing a large swath of Florida. After the dust settled, the KSEA Orlando Central Florida Chapter held its annual membership drive picnic event together with the University of Central Florida faculty and students at Red Bug Lake Park in Casselberry, Florida on Saturday, September 14, 2019. The park is located near a big road, but a picnic pavilion in a little deeper part of the park against the backdrop of a big lake provides a serene landscape. Some volunteers who arrived early started setting up a registration desk for the daylong event. Still there were heavy rain showers, but the sky eventually cleared up.

Young men and women, married couples, families with children approached the picnic pavilion where a registration desk was set up. People started chatting and the space was eventually filled up with adults with nametags and children who were running and tagging each other. The fall picnic kicked off!

The Orlando Central Florida Chapter was founded in 2010 and has become the platform for community interactions among 1st and 2nd generation Korean-American scientists and engineers in Orlando and Central Florida.

Chapter President, Hyoung Jin Cho, welcomed new members and briefly introduced the history of KSEA and its activities. Attendees took turns and introduced their names and family. Smiles, clapping sounds and laughter continued. Around noon time, catered food arrived. Student volunteers led by Jeman Park, who is President of the Korean Graduate Student Association at UCF and a PhD candidate in Computer Science, set up food on picnic tables.

Due to the recent rapid growth of the University of Central Florida and industries in the region, the event drew a lot of new members and provided an opportunity for the existing members to renew their memberships. Including family members, over 60 people participated in this picnic and 24 either joined or renewed their memberships through this event.

Over heartwarming meals, many attendees could make new friends and enjoy their time playing recreational games and activities organized by volunteers. A lot of cheers and big sounds of laughter filled the picnic pavilion where everybody was nervously waiting for their numbers to be called when raffle drawing concluded the event. People waved goodbye, packed up, and started leaving. Some children insisted they should play at the playground next to the pavilion.

“I am so happy to see many new faces,” said the new Chapter President Elect, Sam Song, who would serve in the next term. He and his wife volunteered for this event and brought gift-wrapped hand soap bottles they prepared on the day before the event.

“Is there anything I can help?”, a newly elected Chapter Councilor, Hwan Choi who was stationed at the registration desk the whole time, asked.

“Let’s move this together”, answered Cho, who was holding a big icebox.

Well, it seems that they are moving things together already.
The Membership Drive Golf Tournament, sponsored by the KSEA New England Chapter, was held on September 21, 2019, Saturday with 40 attendees at Stow Acres Golf Course, Stow, Massachusetts. The event was organized to recruit new members and encourage existing members to participate in various KSEA New England Chapter events. Additionally, it promoted networking together through social events during the dinner and golf outing.

Local enterprise, as well as some well-known Korean companies, and several individual contributors sponsored the event, and it was a good opportunity to be recognized in New England communities. These sponsors were SK, Hyundai Motors, Seoul National University New England Chapter, Dwight Roh, JS Koh (Genesco), TJ Ahn (Cronin’s Dental), Je Lee (New Star Realty), Wayne K Lee, SL Yoon, Spencer Name, Jay Kim, Thomas Hwang, JH Yoon (SIMACRO), and NH Sung.

The champion prize winner of the KSEA New England Chapter Membership Drive Golf Tournament was SH Cho with a score of 77. KT Kim and HH Lee were the winners of the #2 prize.

After the golf events, the annual meeting of KSEA New England Chapter was held and Dwight Roh (Axcelis Technologies, Inc) and Jongkeun Park (Dupont) were endorsed by members as President and Vice President for the 48th Administration. Financial Director, Dr. Younghoon Kim, reported the financial report of the 47th Administration, and it was approved by the attendees. Chapter President Dr. Roh announced the executive directors and annual plan including upcoming events such as monthly seminars and the National Mathematics and Science Competition.

The Chapter President then delivered the greeting, “Thanks to one of the best weather in Fall season today, we were able to conclude this event successfully and appreciated all sponsorship received, including from KSEA Headquarters.” All volunteers were acknowledged, and it was reported that 24 new members (application and renewal) were recruited. All participants were recommended to visit kseane.org frequently to take advantage of upcoming events organized by KSEA.
KSEA-NJ/KASBP-NJ EARLY MEMBERSHIP DRIVE & FAMILY PICNIC

The KSEA & KASBP New Jersey Chapters hosted the 2019 KSEA-NJ & KASBP-NJ Early Membership Drive and Fall Family Picnic at Donaldson Park in Highland Park, NJ from 12pm on October 5 (Sat) until 4pm. More than 70 regular, graduate, and undergraduate members and their family members joined the event. After a brief introduction of KSEA-NJ and KASBP-NJ, the participants had BBQ and Korean food for lunch. After lunch, we had several events such as interest group and family social and university introduction. While these events were going on, new members were recruited. This event also invited many local undergraduate and graduate students from Rutgers and Princeton Universities. A lot of members in local companies, such as IBM, Bell Labs, AT&T, and JP Morgan, Pharmaceutical areas, and professors and post-doctors in the universities joined the event. This event is now well-known locally, and this year, we successfully invited many existing and new members. We hope that this membership drive & picnic will continue and also contribute to the membership drive as well as promoting the local networking among people with different backgrounds.
In the evening of October 11th, 2019, two hundred well-dressed, smart, and passionate young minds gathered at the Korean-American Association in the Greater New York Building in Manhattan for the Third annual Young Scientists’ Night. It was hosted by the New York Metropolitan Chapter (NY Metro Chapter) to network, connect, and share ideas and expertise with others.

This event is a continuation of the annual flagship event for the NY Metro Chapter, Young Scientists’ Night (YSN), which was kick-started with great success in 2017. This event is a membership drive event, attracting more of the younger generation of KSEA members, including but not limited to, young professionals and graduate students to bridge the gap between undergraduate/graduate KSEA members and regular members. With this aim, the event was held in Manhattan on a Friday evening and marketed towards young professionals and students working/studying in and near NYC. This year, the young scientists’ event was more fruitful with great sponsorships from Asiana Airline, SK, CJ, More Labs, NYKB, Kotra, and Hite Jinro.

The event concluded successfully with approximately 200 attendees from various institutions; a total of 87 different affiliations. The career field of attendees varied from Computer/Data Science to Engineering to Finance to Business with the top 3 being the following: 30% Health/Medical, 22% Life Science, 12% Engineering. 45% of attendees held a doctoral degree, 19% held a master’s degree, 14% were current graduate students, 12% were current undergraduate students, and 10% held a bachelor’s degree. Participants were mostly from New York, but we also had participants from New Jersey and Philadelphia. In addition to the participants from diverse backgrounds, the event was even more meaningful this year with approximately 40 regular members and 30 VIPs from organizations including but not limited to, United Nation, Consulate General of the Republic of Korea, Samsung, CJ, KPMG, JP Morgan, and Woori American Bank. They all participated to provide mentorship and guidance to emerging young minds.

Our proposed membership drive goal was met, having 61 new members (22 Regular, 30 Graduate, and 9 Undergraduate), and 31 membership renewals. It was also a great event connecting returning members with new members and bringing back old members to KSEA, encouraging them to actively participate again.

The event started with a cocktail hour, where attendees were welcomed, and they socialized with others as they arrived. Dinner followed, and the evening program began, hosted by Kevin Kim, Young Professional Director of NY Metro Chapter. Attendees were welcomed by remarks from Dr. Ju-Hyun Lee, KSEA New York Metro Chapter President, Sung-Kyu Woo, Deputy Consul-General of Consulate General of the Republic of Korea, and Charles Yoon, President of the Korean-American Association of Greater New York. There was also an immigration law session from CL Attorneys to discuss the new immigration law changes.

Saeju Jeong, CEO of Noom was a guest speaker for 2019 Young Scientists’ Night. He spoke about his experiences in the startup industry, and his life journey. His talk consisted of a brief overview presentation followed by an interactive question and answer time. After the guest speaker, attendees participated in a networking game, where they were encouraged to find new people that they have never met and get to know each other.

The event was a huge success with a lot of positive feedback. The momentum built up from this event will continue to strengthen the young generation and young professional group in New York City, while also improving and strengthening other KSEA events, such as KMSO (KSEA Math and Science Olympiad), NRC (North Regional Conference), Ygnite, UKC (US-Korea Conference), and others. This annual event Young Scientist’s Night will continue to grow and improve to become a “must-attend” event for young generations and professionals not only in New York, but the East Coast and the entire United States.
KSEA North Texas Fall Seminar was held on October 19, 2019 at the Korean Culture Center in Texas Dallas. In the seminar event supported by the Korean-American Scientist and Engineer Association (KSEA) and the Korean Society of Dallas, around 60 professionals in Engineering, Biology, Medicine, and Business attended and broaden their network with other scientists and engineers.

Two seminar speakers were invited. The first speaker was Dr. Young Hoon Kim, who is currently a professor in the Department of Hospitality and Tourism Management at the University of North Texas. He started his talk by introducing his career path. He travels more than 100,000 miles every year to reach out to inspire students, consult with clients, and explore new findings with researchers in the field. With more than 12 years of industry experience, he holds a Ph.D. in Hospitality Administration from Texas Tech University, and both Masters and B.S. in Hotel, Restaurant, and Tourism Management from the University of South Carolina. In his talk, he also talked about the local collaboration and research with the DFW area focusing on business and convention development.

The second speaker was Dr. Sunyoung Shin who is currently an assistant professor in the Department of Mathematical Sciences at the University of Texas at Dallas. She presented her research on a statistical approach to cancer research. She showed her methodology to reveal the combination of nucleic acid sequence that may induce cancer in non-coding proteins. Her talk was followed by many academic questions.

This year, the KSEA NT Fall Seminar served as a place where local Korean communities could share their information and activities. After the two seminars, Mr. Taek Wan Kim who is the Chairman of Board of Directors of the Greater Dallas Korean School introduced the importance and activities of the Dallas Korean School. The Chairperson of the Dallas Korean Association, Ms. Myeong Hee Park also advertised a couple of events for the Korean community. Dr. Jin Tae Jo, who has been an active member of KSEA North Texas Chapter for about 20 years gave a short talk about being a good communicator in an English environment. He also introduced his recent book about the Cannabis plant.

A Korean Gold-Bell style quiz event was also held, which was planned to promote the attendees’ networking and communications. Groups of two or three members were formed, and competed against each other in the quiz event. One of the North Texas Chapter officer, Dr. Moon, organized this quiz event, and brought very interesting and intellectually entertaining problems ranging from math and science problems to questions about the seminar contents.
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### UKC (US-Korea Conference) 2019

**KHIDI Forum on Artificial Intelligence (AI) in Medicine & Healthcare**

**Thursday, August 15, 16:00-18:00**

Room London, Hyatt Regency O’Hare Rosemont (suburb of Chicago), IL, USA

This is the fourth annual forum supported by Korea Health Industry Development Institute (KHIDI). A major goal of this forum is to bring together academics, research institutes, and healthcare leaders in Korea and USA to highlight R&D efforts in AI applications in medicine and healthcare. Particularly, the research activities in different healthcare sectors, including imaging, EMR and genomics will be introduced and discussed. Most importantly, this forum will discuss future directions and strategies for AI-based approaches in medicine and healthcare suitable for Korea.

Chair: Joon Been Seo (Asan Medical Center)
Co-Chair: Stephen Su (KHIDA)

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<th>Time</th>
<th>Title and Speaker</th>
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<td>16:00-16:05</td>
<td>Welcoming Remark&lt;br&gt;- Hyun Chul Kim (Director, Department of R&amp;D Planning, KHIDI)</td>
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<td>16:05-16:30</td>
<td><strong>Keynote</strong>&lt;br&gt;AI Applications in Healthcare: Current Status in Korea&lt;br&gt;- Joon Been Seo (Asan Medical Center, Korean Society of Artificial Intelligence in Medicine)</td>
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<td>16:30-16:55</td>
<td><strong>Panel</strong>&lt;br&gt;AI Applications in Medicine: Challenges and Benefits&lt;br&gt;- Hyun Chul Kim (Asan Medical Center)</td>
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<td>16:55-17:20</td>
<td><strong>SPE</strong>&lt;br&gt;How to Handle Electronic Health Records with Deep Learning&lt;br&gt;- Edward Chai (Google Brain)</td>
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<td>17:20-17:45</td>
<td><strong>Session</strong>&lt;br&gt;Translational Machine Learning and AI approaches for Genome-driven precision oncology care&lt;br&gt;- Tao-Yuan Huang (Cleveland Clinic)</td>
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<td>17:45-18:00</td>
<td><strong>Discussion</strong></td>
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Hosted by: Korean American Scientists and Engineers Association (KSEA) and the Korean Federation of Science & Technology Societies (KFST)

Organized by: Bureau of IT R&D Planning and Budget, Korea Health Industry Development Institute (KHIDI)

Inquiries: Sang Eun Kim, Bureau of IT R&D Planning and Budget, KHIDI (e-mail: shin1959@kki.re.kr)
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