# THE 27TH KSEA NORTHEAST REGIONAL CONFERENCE

(NRC 2018)

*Shaping Future: Bio-Nanotechnology, Artificial Intelligence, and World's Tallest Building Design*

**March 24, 2018**

**Conference Center of University Hall Building, Montclair State University**

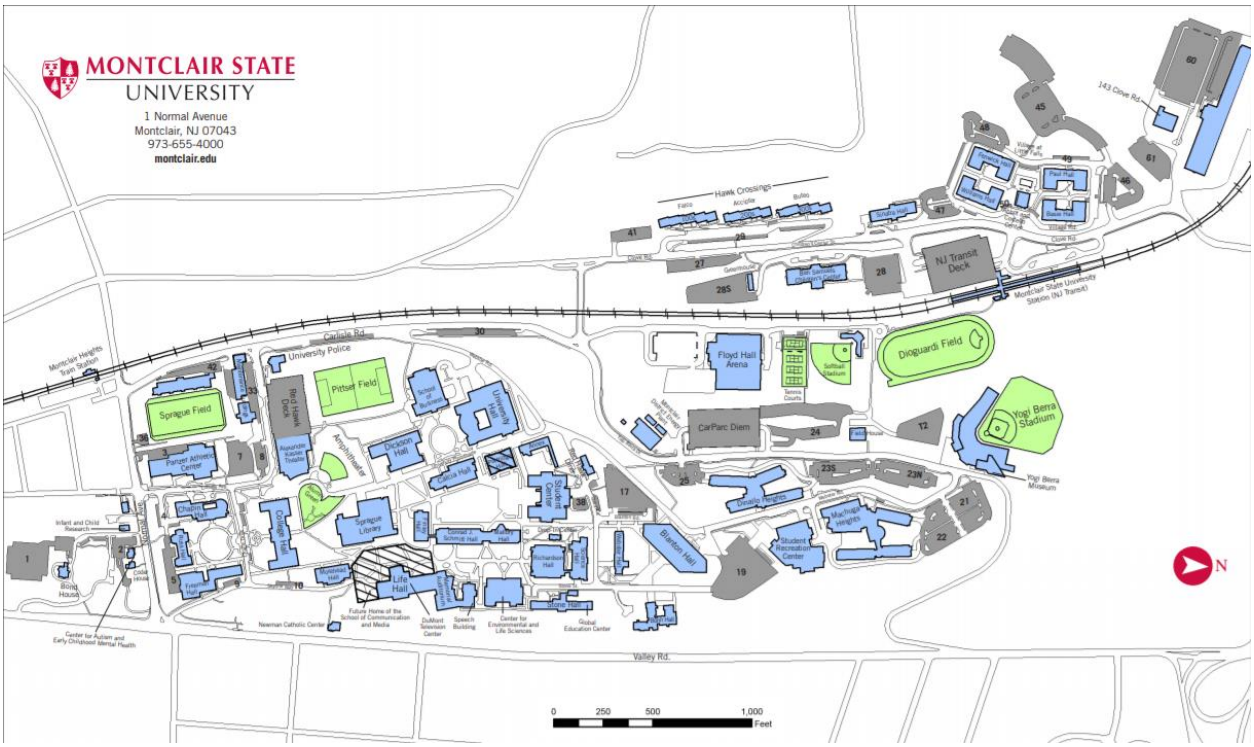
**Hosted by**

**Korean-American Scientists and Engineers Association**
**New Jersey, New York Metropolitan and Philadelphia Chapters**

**Partnered with**

***Korean-American Society in Biotech and Pharmaceuticals (KASBP)***
***Korean-American Innovative Technology Engineers and Entrepreneurs (KITEE)***
***Korean-American Women in Science and Engineering (KWiSE)***
***Philadelphia Korean Scholars Association (PKSA)***
***New York Korean Biologists (NYKB)***

## Montclair State University CAMPUS MAP





*** Parking only at Red Hawk Deck parking garage is allowed for NRC 2018.**

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The 26th KSEA Northeast Regional Conference
New Jersey Institute of Technology (NJIT), Newark, NJ, April 29, 2017

## CONGRATULATORY MESSAGE FROM THE KSEA PRESIDENT

It is my great pleasure to welcome you to the 27th Northeast Regional Conference (NRC 2018), organized by the Korean-American Scientists and Engineers Association (KSEA) New Jersey, New York Metropolitan, and Philadelphia Chapters. I am proud of these chapters for collaborating closely with our Affiliated Professional Societies (APSs) such as Korean American Society for Biotech & Pharmaceuticals (KASBP), New York Korean Biologists (NYKB), Korean American Innovative Technology Engineers and Entrepreneurs (KITEE), and Korean-American Women in Science and Engineering (KWISE).

Since its foundation in 1971, KSEA has grown impressively to have ~ 10,000 members with 70 local chapters and branches, 30 affiliated professional societies and 13 technical groups covering all major areas of science and engineering. KSEA serves the community by promoting science and technology for the society's welfare, US-Korea cooperation, career development, and professional networking. Helping the Young Generation (YG), including those who are just beginning their careers, develop their full career potential is one of our primary missions.

Following the successful US-Korea Conference on Science, Technology and Entrepreneurship (UKC 2017), which brought together over 1,000 participants, the Scientists' and Engineers' Early-Career Development (SEED) Workshop was successfully held in December, 2017. SEED is offered by experts and mentors from academia and industry, who truly understand the needs and challenges facing young Korean-American scientists and engineers to provide valuable opportunities for successful career development. SEED provides an effective platform to "seed" our future leaders. The Young Generation Technical and Leadership Conference (Ygnite 2018), which was held in January 2018, set a record of the highest number of applications in Ygnite history. It is organized by our YG for the YG to "ignite" participants' passion and creativity to realize their full potential. Our upcoming events include the National Math and Science Competition in April and the Professional Development Forum in May.

In addition to the national level activities mentioned above, numerous local events are held across the US throughout the year. So far, the 46th Administration processed over 150 event proposals from Chapters and APS. We are publishing KSEA Letters quarterly during the 46th Administration, whereas it had been published three times per term in recent years, to stay closer to the community through frequent publication, and thereby to build a stronger organization.

I am happy to report that the number of members has increased to surpass the level at the same time period of the last Administration. I would like to thank the Chapter Presidents, APS Presidents and devoted members for their dedicated efforts. NRC is one of the largest regional conferences with a great tradition. As an annual conference, it brings together scientists and engineers in the northeast region to provide valuable opportunities for technical interchange and professional networking. I hope NRC 2018 will empower the members in the region, recruit new members to share benefits, and develop future generation leaders by fostering peer networking and mentoring.

I would like to thank and congratulate the NRC 2018 organizers led by Young Jin Kim, NJ Chapter President, and all the volunteers who made NRC 2018 possible. Their dedication and commitment for service to the community is truly inspiring. I hope that NRC 2018 will be a rewarding and memorable experience for each of you.

Thank you for your participation, and I look forward to seeing you at NRC 2018!

Eun-Suk Seo, Ph.D.
46th KSEA President

## WELCOME TO THE 27TH KSEA NORTHEAST REGIONAL CONFERENCE

Distinguished Guests and Fellow KSEA Members,

Welcome to all of you to the Northeast Regional Conference (NRC) 2018 at Montclair State University, jointly organized by **Korean-American Scientists and Engineers Association (KSEA) New Jersey, New York Metropolitan** and **Philadelphia**.

The NRC 2018 is collaborated with KSEA affiliated professional societies (APSs) including KASBP, KITEE, KWiSE, PKSA, and NYKB. The Theme of NRC 2018 is "Bio-Nanotechnology, Artificial Intelligence, and World's Tallest Building Design" and its goal is to promote the spirit of service in pursuing technical excellence by exemplifying those who have led such a life of service. The objective of this conference is to provide a forum in which scientists and engineers in major areas present their research findings and share ideas.

We are hoping that the NRC 2018 will also contribute greatly to the advancement of research and development in both US and Korea. In addition, the NRC 2018 will provide an opportunity for women and young generation professionals in science and engineering to establish professional networks, as well as to explore career opportunities. On behalf of the NRC organizing committees, we express sincere gratitude to all the distinguished guests and KSEA NJ, NY and PA members for their participation in NRC 2018.

On behalf of the NRC organizing committees, we express sincere gratitude to all the distinguished guests and KSEA NJ, NY and PA members for their participation in NRC 2018.

Thank you again for participating in the NRC 2018.

| | | |
|---|---|---|
| **Young-Jin Kim, Ph.D.** | **Min Suk Kang, Ph.D.** | **Moses Noh, Ph.D.** |
| KSEA New Jersey | KSEA New York Metropolitan | KSEA Philadelphia |
| Conference Chair | Conference Chair | Conference Chair |

## NRC 2018 ORGANIZING COMMITTEE

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| | | Sung Soo Kim (KSEA-NY) | andrew@hrcap.com |

# INTRODUCTION TO PROFESSIONAL ASSOCIATIONS

## KITEE

***Myung Jong Lee**, CUNY City College and Graduate Center*
*President of KITEE (42nd KSEA president)*

KITEE (Korean-American Iinnovative Technology Engineers and Entrepreneurs) was established in May 2015 to become the center of startup ecosystem for Korean-Americans in the IT, BT, FT and other fields in the greater NY metropolitan area. NY-NJ hub is the most favorable environment with strong growth in startups, IT, BT, FT research and development, and business. The KITEE's business ecosystem will have features essential to any startups: human capital in many innovative technologies, finance, business service, education, startup incubation and collaboration with Korea. KITEE is meeting monthly on every third Thursday, carrying out the series of initiatives toward creating startups by offering seminars and sharing and supporting members' startup ideas. KITEE is open to anyone who is interested in the entrepreneurship. Current KITEE Members comprise IT, BT, FT engineers and researchers, entrepreneurs, developers, designers, investors, marketing and business development, financial and legal service experts, and students. I welcome you to join KITEE today and look forward to meeting you at the next monthly meeting.

Please send your inquiry to info@kitee.org
Home page: www.kitee.org
Facebook: https://www.facebook.com/kitee.org

## KASBP

***Yun Choe**, Lucas & Mercanti*
*President of KASBP*

KASBP (Korean American Society in Biotech and Pharmaceuticals) is a non-profit organization founded in May 2001 and the current members include Korean-American professionals working throughout the US, mostly in Biotech or Pharmaceutical field. There are about 1000 KASBP members currently registered. The member profile includes not only professionals working in 100 pharmaceutical industries (BMS, Novartis, GSK, Merck, Sanofi, J&J, Pfizer, etc.) but also 60 academics in universities as faculties, researchers, post-docs, or graduate students; government employees in FDA, NIH, or other local and federal government organizations; and employees in Korean corporation or sponsoring companies even in Korea. Currently, KASBP has six local chapters in New Jersey, Philadelphia, Boston, Connecticut, San Francisco and Washington DC.

KASBP's goal is to promote networking, collaboration and information exchange among members in the life science related fields. For this matter, KASBP organizes and hosts various activities to assist networking among its members. KASBP also aims to contribute to the growth of drug discovery, development and other pharmaceutical technology in Korean and US companies. Especially, through a collaboration and information exchange with Korean Biotech companies, pharmaceutical companies and government funded research centers, KASBP has been helping new drug discovery, technology transfer, drug development and commercialization by Korean companies in Korea and US. One important goal of KASBP

is to identify and nurture young Korean researchers to grow up to become future leaders for Korean Biotech and Pharmaceutical industries.

KASBP holds two symposiums every year, one in spring and one in fall, focusing on the new issues and trends in drug discovery and development. During the symposium, KASBP also holds a panel discussion, with invited experts from all over the US working in various stages in drug discovery and development, to share updated information and their experience. Moreover, various collaborations in recent years with Korean pharmaceutical companies and research institutes promoted high level information exchange, providing assistance for drug discovery research and development in Korean companies. In addition to the above-mentioned technical activities, KASBP actively involved providing employment information for job seekers and employers. Furthermore, KASBP partners with other Korean-American Organizations hosting The National Math Competition in conjunction with other KSEA local chapters

Home page: http://www.kasbp.org/

## KWiSE

***Yeon Bai**, Montclair State University*
*KWiSE NY/NJ Chapter President*

KWiSE (Korean Women in Science and Engineering) is a non-profit organization of Korean-American women professionals in the science and engineering fields. Our mission is: (1) To establish and strengthen the network of Korean-American women scientists and engineers, (2) To provide opportunity for collaboration and career development, and (3) To promote international cooperation especially between the United States and Korea. We assist members in realizing their full potential through professional activities and training such as scientific journal writing, grant proposal writing, and interviews. We also identify and acknowledge successful women scientists and engineers as role models for the young generation. KWiSE serves the community to promote close networking of Korean-American Women in Science and Engineering fields: technical excellence, US-Korea cooperation, professional networking, and career development

Any inquiries or questions can be submitted to baiy@mail.montclair.edu
Home page: https://www.kwise.org/

## PKSA

***Junil Kim**, University of Pennsylvania*
*President of PKSA*

The Philadelphia Korean Scholars Association (PKSA) is aimed at promoting networking among Korean scholars in the greater Philadelphia area. PKSA holds bi-weekly meetings on Friday either at 6pm at the Smilow Translational research building (12th floor). PKSA warmly welcomes new Korean scholars in the region regardless of research fields and affiliations.

Any inquiries or questions can be submitted to pksa.scholar@gmail.com
Please sign up at Facebook: https://www.facebook.com/home.php?sk=group_169144909800932 for receiving seminars and other events.

## NYKB

***Ji Yeun Hur**, Memorial Sloan Kettering Cancer Center*
*President of NYKB*

NYKB (Society of New York Korean Biologists) was established to construct academic and social networking between Korean biologists in the New York metropolitan area. NYKB supports each member to pursue academic and professional excellence in their research and career. Currently, Albert Einstein College of Medicine, Stony Brook University, Cold Spring Harbor Laboratory, Columbia University, Weill Cornell Medical College, Memorial Sloan Kettering Cancer Center, Icahn School of Medicine at Mount Sinai, New York University, Rockefeller University, Rutgers University are affiliated with over 250 members. NYKB organizes various events including an annual conference, career night, and social networking events.

For more information, please contact: nykb2008@gmail.com
Home page: http://nykb.org/
Facebook: https://www.facebook.com/newyorkkoreanbiologists

## PROGRAM AT A GLANCE

| | |
|---|---|
| 08:30 AM - 08:55 AM | Registration & Networking |
| 08:55 AM - 09:00 AM | Opening Remarks |
| 09:00 AM - 09:45 AM | Plenary Session I (Science) |
| 09:45 AM - 10:30 AM | Plenary Session II (Engineering) |
| 10:30 AM - 10:45 AM | Coffee Break I |
| 10:45 AM - 11:00 AM | Congratulatory Remarks (KSEA President) |
| 11:00 AM - 11:45 PM | Plenary Session III (Industry) |
| 11:45 AM - 12:15 PM | Introduction: NRC Idea Pitch Competition |
| 12:15 PM - 01:15 PM | Lunch & Scholarship Award Ceremony |
| 01:15 PM - 01:30 PM | Group Photo |
| 01:30 PM - 03:00 PM | Technical Session I |
| 03:00 PM - 03:20 PM | Coffee Break II |
| 03:20 PM - 05:00 PM | Technical Session II |
| 05:10 PM - 05:30 PM | Closing Remarks |
| 06:00 PM - 08:00 PM | Networking Dinner |

*- Have a Safe Trip Home and See You Next Year -*

## NRC 2018 PROGRAM

**Registration & Breakfast Networking** — **Hall**

8:30 AM - 8:55 AM

*Coordinators:* **Dahea Diana You**, **PharmD,** Rutgers University

**Opening & Welcoming Address** — **Main Ballroom**

8:55 AM - 9:00 AM **Young-Jin Kim, Ph.D.,** KSEA New Jersey President
**Min Suk Kang, Ph.D.,** KSEA New York Metropolitan President

## MORNING SESSION

**Plenary Session I - Keynote Speech** — **Main Ballroom**

9:00 AM - 9:45 AM **Ki-Bum Lee, Ph.D.**
Dept. of Chemistry and Chemical Biology, Rutgers University
"Nanotechnology approaches to control stem cell fate"

**Plenary Session II - Keynote Speech** — **Main Ballroom**

9:45 AM - 10:30 AM **Daniel Lee, Ph.D.**
School of Engineering and Applied Science, University of Pennsylvania
"Artificial Intelligence and Robotics"

**Coffee Break** — **Main Ballroom**

10:30 AM - 10:45 AM

**Congratulatory Remarks** — **Main Ballroom**

10:45 AM - 11:00 AM **Eun-Suk Seo, Ph.D., KSEA President**
University of Maryland

**Plenary Session III - Keynote Speech** — **Main Ballroom**

11:00 AM - 11:45 AM **Hi Sun Choi, P.E.**
Thornton Tomasetti, Inc.
"Challenges in the Structural Design of the World's Tallest Towers: Jeddah Tower and Shanghai Tower"

**Introduction: NRC Idea Pitch Competition** — **Main Ballroom**

11:45 AM - 12:15 PM

**Myung Jong Lee**, **Ph.D.,** KITEE President

**Networking Lunch & Scholarship Award Ceremony** — **Main Ballroom**

12:15 PM - 1:15 PM

*Coordinators:* **Min Suk Kang**, **Ph.D.,** Columbia University Medical Center

**Group Photo** — **Main Ballroom**

1:15 PM - 1:30 PM

*Coordinators:* **Sahee Kim**, **PharmD,** RevHealth

# ATERNOON TECHNICAL SESSION

## BIO & PHARMA SCIENCE FORUM

**Bio & Pharma Science Forum I** **Room A**

1:30 PM - 3:00 PM Chair: **Ji Yeun Hur**, Memorial Sloan Kettering Cancer Center

**Mingzhu Fang**, Rutgers University– School of Public Health
"Central Role of NAD+-SIRT1 in Circadian Response to Environmental Stresses"

**Kisa Sung,** Icahn School of Medicine at Mount Sinai
"The ATE1 regulates p62-mediated autophagy and innate immune response by cytosolic dsDNA"

**Kihyun Lee**, Memorial Sloan Kettering Cancer Center
"Chromatin Landscapes Reveal a Genetic Interaction between FOXA2 and GATA6 in Human Pancreatic Development"

**Scholarship Competition Awards Winner #1**, Science

**Coffee Break** **Room A**

3:00 PM - 3:20 PM

**Bio & Pharma Science Forum II** **Room A**

3:20 PM - 5:00 PM Chair: **Junil Kim**, University of Pennsylvania

**SungKyoung Lee**, School of Medicine at Mount Sinai
"Esrp1 splicing regulation is required for tight junction integrity through epithelial Arhgef11 isoforms that activate RhoA and myosin phosphorylation"

**Kyoung-Jae Won**, University of Pennsylvania
"Seq-ing Gene Regulation"

**Albert Kim**, Temple University
"A Wireless Chemical Sensing Scheme using Ultrasound Imaging of Silica-Beads-Embedded Hydrogel"

**Scholarship Competition Awards Winner #2-3**, Science

## INFORMATION TECHNOLOGIES FORUM

**Information Technology** **Room B**

1:30 PM - 3:00 PM Chair: **Seungjoon Lee**, Google

**Jong-Hoon Ahn**, Bell-Labs, Nokia

"Compressive Sensing and its Application to Digital Photography"

**Junho Cho**, Bell-Labs, Nokia
"Taking Light to the Limit of Communication"

**Hyojoon Kim**, Princeton University
"Software-Defined Border Router on Campus"

**Scholarship Competition Awards Winner #1-2**, Engineering

## ENGINEERING FORUM

**Engineering** **Room B**

3:20 PM - 5:00 PM Chair: **Ohbong Kwon**, New York City College of Technology (CUNY)

**Bharath Babu Nunna**, Mechanical and Industrial Engineering Department, New Jersey Institute of Technology
"Point-of-Care (POC) Nano Biochip for Enhanced Cancer Screening"

**Changkyu Kim**, MECSEE LLC
"Korean Speech recognition algorithm based on phonetical features and the acoustic variables"

**Harsimranjit Singh**, Mechanical and Industrial Engineering Department, New Jersey Institute of Technology
"New Metal-reduced Organic Framework-supported Nitrogen-doped Graphene Catalyst for OXYGEN Reduction Reaction"

**Minkyu Kim**, ASML
"Artificial Intelligence: Future, Ethics & Contributors' role"

**Scholarship Competition Awards Winner #3**, Engineering

## NRC 2018-2019 Committee Meeting

**NRC 2018-2019 Committee Meeting** **Room C**

2:00 PM - 3:00 PM Chair: **Young-Jin Kim**, Vencore Labs

**NRC 2018-2019 Committee members**

## ENTREPRENEURSHIP FORUM

**Panel Discussion** **Room C**

3:30 PM - 4:30 PM Moderator: **Kyeong Ho Yang**, KITEE Vice President

## YOUNG GENERATION FORUM

**YG Session Organizing Committee Chair:** Aria SoHyun Rhee
**YG Session Organizing Committee Members:** Hojun Ryu, Hyunkyung Kathy Lee, Jamie JiYoung Park, Jenny Jung, J. Alexander Bae, Ryan Won, Shinyoung Yun, Stella Eunjung Kim, Seo Young (Sophia) Lee, Sung Ki Kim, Yoonji Baek

**Opening Remarks** — **Main Ballroom**

1:30 PM - 1:35 PM — Moderator: **Aria SoHyun Rhee**, PharmD, Celgene Corporation

**YG Session I** — **Main Ballroom**

1:35 PM - 1:50 PM — **YG Spotlight**
Moderator: **Aria SoHyun Rhee**, PharmD, Celgene Corporation

1:50 PM - 2:25 PM — **Icebreaker**
Moderator: **J. Alexander Bae**, Ph.D. Candidate, Princeton University

2:25 PM - 2:30 PM — **Group Photo**

2:30 PM - 3:00 PM — **Engineering Session**
Speaker: **JoongHeum Park**, MD, NYP-Columbia University Medical Center
"Artificial Intelligence in Healthcare: From Buzzword to Reality"
Moderator: Stella Eunjung Kim, PharmD, SA Pharmacy

**Coffee Break** — **Main Ballroom**

3:00 PM - 3:20 PM

**YG Session II** — **Main Ballroom**

3:20 PM – 3:50 PM — **Biopharmaceutical Session**
Speaker: **Nurgul Kilavuz**, MSc, Celgene Corporation
"Fight against Cancer: CAR-T cell therapy"
Moderator: Yoonji Baek, PharmD Candidate, MCPHS University

3:50 PM - 4:30 PM — **Start-up Panel Session**
*Panelists:*
**Jaeyoon Chung**, Ph.D., Myota, Inc
**Artem Petakov**, Noom, Inc
**Jason Ki**, Veripad, Inc
**Khee Lee**, Kiswe Mobile
Moderator: Ryan Won, Drexel University

4:30 PM - 5:00 PM — **Personal Finance Session**
Speaker: **Khee Lee**, Kiswe Mobile
Moderator: Sung Ki Kim, PharmD Candidate, MCPHS University

**Closing Remarks** — **Main Ballroom**

5:00 PM - 5:10 PM — Moderator: **Aria SoHyun Rhee**, PharmD, Celgene Corporation

## **Andrew Kim Memorial Foundation Scholarship Awardees** (2018)

### Engineering

- **Chris Lim, Ph.D. Candidate, NYU School of Medicine**
  "Application of sensors and wearables for modeling the relationship between the environment and health"

- **J. Alexander Bae, Ph.D. Candidate, Princeton University**
  "Digital museum of retinal ganglion cells with dense anatomy and physiology"

- **Ji Sun Park, Ph.D. Candidate, Columbia University**
  "Promoting Myogenic Potential of Human Endothelial Progenitor Cells by Transactivation of Endogenous MYOD1 *In Vivo*"

### Science

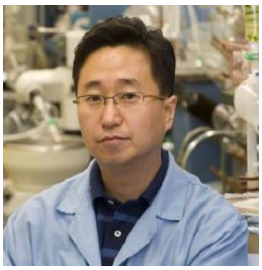
- **Hojoon Lee, Ph.D., Columbia University Medical Center**
  "Re-Wiring the Taste System"

- **Eunju Im, Ph.D., NYU School of Medicine/Nathan S. Kline Institute**
  "Lysosomal dysfunction in a-synuclein related Parkinson's disease models; Focusing on the regulation mechanism of lysosomal acidification and v-ATPase function"

- **Dahea You, PharmD, Rutgers University**
  "MDR1 Transporter Regulation at the Human Blood-Brain Barrier: Interaction of Histone Acetylation and Aryl Hydrocarbon Receptor Signaling"

# Keynote Speech

## KEYNOTE SPEECH I



**Ki-Bum Lee, Ph.D.,**
Professor, Dept. of Chemistry and Chemical Biology, Rutgers University

### Nanotechnology approaches to control stem cell fate

Abstract

This talk will focus on the interface between nanoscience and stem cell biology. Even though it is well-established that stem cell fate is regulated by interactions that occur between microenvironmental cues and intrinsic cellular programs, our understanding of the function of the microenvironment and gene expression in stem cells is hampered by the limitations of conventional methods and the lack of extensive knowledge of multiple regulatory signals.

Addressing these challenges, the goal of our recent research program is to develop both approaches from nanotechnology—the "top-down" patterning of extracellular matrix (ECM) and signal molecules (e.g. ECM compositions, nanotopography, pattern geometry, and pattern density), and the "bottom-up" synthesis of multifunctional nanoparticles and their surface modification with specific signal molecules, which can be combined synergistically. Addressing the aforementioned challenges, our research mainly focuses on the synthesis and utilization of multifunctional nanoparticles as drug and gene delivery vehicles to manipulate the expression of key genes in stem cells and somatic cells for cellular reprogramming. Another approach includes combinatorial nanoarrays of graphene-nanoparticle hybrid structures using nanoparticles and chemically derived graphene and graphene-nanofiber hybrid scaffolds were developed and utilized to deliver genetic materials into stem cells for controlling their neural-differentiation pathways and neuronal behavior.

In this presentation, a summary of the most updated results from these efforts and future directions will be discussed.

Biography

Ki Bum Lee, Ph.D., is a professor of Chemistry and Chemical Biology at Rutgers University, where he has been a faculty since 2008. He received his Ph.D. in Chemistry from Northwestern University (with Chad. A. Mirkin; 2004) and completed his postdoctoral training at The Scripps Research Institute (with Peter G. Schultz; 2007). The primary research interest of Dr. Lee's group is to develop and integrate nanotechnologies and chemical functional genomics to modulate signaling pathways in stem cells towards specific cell lineages or behaviors. In particular, his group is exploring critical problems in cancer research and stem cell biology pertaining to the cell-microenvironmental interactions, and how to control these interactions at the subcellular and single cell level using chemical biology and nanotechnology. From this research effort, he has developed innovative technology platforms that may overcome the critical barriers to harnessing the full therapeutic potential of stem cells. In recognition of his outstanding scientific achievement at Rutgers, Dr. Lee has received several awards including NIH Director's New Innovator Awards (2009) and American Chemical Society New Directions (ND) Award (2015). He is the first author, co-author, and corresponding author of approximately 67 articles published in high-profile journals including Science, Cell Stem Cell, Nature Chemical Biology, J. Am. Chem. Soc., Angew. Chem, Int. Ed., Nano Letters, ACS Nano, Advanced Materials, Accounts of Chemical Research, Chemical Reviews, Biomaterials, Scientific Reports, Lab Chip, Small, Phys. Chem. Chem. Phys., Nanomedicine, and Cancer Research, which are highly cited (>6000). [Total 74 publications, >6000 citations, h-index: 31; 22 Patents/applications]

## KEYNOTE SPEECH II

**Daniel Lee, Ph.D.,**
Professor, School of Engineering and Applied Science, University of Pennsylvania

### Artificial Intelligence and Robotics

Abstract

Artificial intelligence systems use a number of learning algorithms for perception and action. I will briefly describe and demonstrate some of these methods for autonomous driving and for legged and flying robots, and contrast these models with neural representations and computation in the brain. I will also highlight and discuss the similarities and differences between machine intelligence and human intelligence.

Biography

Daniel Lee, Ph.D, is the UPS Foundation Chair Professor in the School of Engineering and Applied Science at the University of Pennsylvania. He received his B.A. summa cum laude from Harvard University and his Ph.D. in Condensed Matter Physics from the Massachusetts Institute of Technology. Before coming to Penn, he was a researcher at AT&T and Lucent Bell Laboratories in the Theoretical Physics and Biological Computation departments. He is a Fellow of the IEEE and AAAI and has received the National Science Foundation CAREER award and the University of Pennsylvania Lindback award for distinguished teaching. He was also a fellow of the Hebrew University Institute of Advanced Studies in Jerusalem, an affiliate of the Korea Advanced Institute of Science and Technology, and has organized the US-Japan National Academy of Engineering Frontiers of Engineering symposium and the Neural Information Processing Systems (NIPS) conference. As director of the GRASP Laboratory and founding director of the CMU-Penn University Transportation Center, his group focuses on understanding general computational principles in biological systems, and on applying that knowledge to build autonomous systems.

## KEYNOTE SPEECH III

**Hi Sun Choi, P.E.,**
Senior Principal,
Thornton Tomasetti, Inc

### Challenges in the Structural Design of the World's Tallest Towers: Jeddah Tower and Shanghai Tower

Abstract

The world's next tallest building, Jeddah Tower, to be located in Kingdom of Saudi Arabia, will exceed the 1 kilometer mark in height upon construction completion in 2019. This tower will bring the world to uncharted territory noting that the sky will be the limit. Jeddah Tower will have a three-legged (Y shaped) geometry similar to the world's current tallest tower, Burj Khalifa in Dubai. Each of Jeddah Tower's three sides will feature a series of notches that create pockets of shadow, shielding areas of the building from the sun, and providing outdoor terraces with stunning views overlooking the city of Jeddah and the Red Sea. A 632m tall Shanghai tower is the world's current second tallest tower and one of the world's most distinctive and innovative super tall buildings since it was topped out in 2015. This tower is comprised of a twisted and tapered geometry built with double skin creating 14-stories tall interior atriums throughout nine vertical zones. The major structural materials are steel and composite steel sections for the Shanghai Tower as compared to the reinforced concrete for the Jeddah tower.

This presentation will feature two distinct structural systems and materials utilized while designing two of the world's tallest towers. The unique challenges for the design and construction of these towers, as well as the spectacular construction images will also be featured.

Biography

Hi Sun Choi, P.E., is a senior principal at Thornton Tomasetti, Inc. She has about 25 years of experience in structural analysis, investigation, and design of a variety of building types. Her expertise in the design of supertall buildings has led to her being featured in the CTBUH Journal's special edition: Women in the Tall Building industry, 2017. She was also recognized for Business Achievements and named a 2012 recipient of the Outstanding Asian American in Business Award. Choi has worked on remarkable projects in multiple continents. Her primary work includes Barclay Headquarters in New York City; New Songdo City development and Incheon Airport projects in South Korea; Shanghai Tower in China; Socar tower and Baku Olympic Stadium in Azerbaijan; and Lotte Hanoi Center in Vietnam; Al Thumama World Cup Stadium in Qatar. She has lectured on super tall building design at several universities such as MIT and Lehigh University as well as universities in South Korea including Korea, Yonsei, Ewha, and Seoul National University. She currently serves as a special lecturer and judge for the MIT graduate design project course. Her publications include, "CTBUH Technical Guides: Outrigger Design for High-Rise Buildings" in 2012 and it's 2nd Edition in 2017 as well as "Design of Steel Structures" in 2016.

# TECHNICAL SESSION

## BIO PHARM SCIENCE FORUM

### SESSION I

***Ji Yeun Hur, Ph.D.,*** *Memorial Sloan Kettering Cancer Center (NYKB president)*

### Central Role of NAD+-SIRT1 in Circadian Response to Environmental Stresses

**Mingzhu Fang**, M.D., Ph.D., D.A.B.T.
Department of Environmental & Occupational Health, Rutgers University– School of Public Health

Abstract

The circadian clock regulates biological processes ranging from gene expression to sleep behavior in a precise and sustained rhythm, with a periodicity of approximately 24 hrs. Accumulating evidence suggests that disruption of circadian rhythm by shift work increases the risk of breast, prostate, and colon cancers, prompting the International Agency for Research on Cancer to classify shift-work as a probable human carcinogen. Therefore, identification and validation of mechanistically-based molecular targets are essential to the development of preventive strategies for individuals who may be at elevated risk of breast cancer due to shift work. About 10% of mammalian genes, including many involved in DNA damage responsive and repair (DDRR), show circadian patterns of expression. Environmental stressors (e.g., carcinogen and shift work) that disrupt circadian rhythm are associated with an increased risk of breast cancer. We demonstrated, at the first time to our knowledge, that mammary specific carcinogen reduced intracellular NAD+/NADH and SIRT1 activity in a dose-dependent manner, resulting in disruption of circadian expression of core circadian genes (CGs) (e.g., Per2) and circadian controlled genes (CCGs), including DDRR genes. In contrast, a dietary chemopreventive regime of methylselenocysteine (MSC) counteracted the inhibitory effects of carcinogen on NAD+/NADH and SIRT1 activity and restored the circadian expression of these genes during the early stage of carcinogenesis, leading to 63% reduction of mammary tumor incidence in rats. In consistent with our findings, accumulating evidences indicate that modulation of NAD+/NADH levels by pharmacological inhibitors or NAD+ precursors significantly alter mammary tumor growth and metastasis. Taken together, these results suggest that NAD+-dependent SIRT1 activity functions as a central integrator of cellular circadian responses to environmental stressors. It has significant implication in the development of mechanistically-linked regulatory biomarkers for disrupted circadian rhythm in shift workers and in the development of intervention strategies for individuals who may be at elevated risk of breast cancer due to exposure to environmental stresses, such as shift work.

Biography

Sciences Institute at Rutgers University. Dr. Fang holds an M.D. in clinical medicine and Ph.D. in Toxicology, and received postdoctoral training in Cancer Research. She is a full member of the Societies of Toxicology (SOT), American College of Toxicology (ACT), American Association of Cancer Research (AACR), and Society for Research on Biological Rhythm (SRBR). Dr. Fang has received many international and national awards and has been invited to present her research findings at many international conferences. She has more than 45 publications in prestigious international journals, including *Cancer Res*. Dr. Fang teaches graduate courses in Toxicology, Risk Assessment, and Environmental Health at Rutgers University. She is also an experienced board certified consulting toxicologist with expertise in conducting safety assessment for pharmaceutical drugs, dietary supplements, food additives, and household consumer products.

## The ATE1 regulates p62-mediated autophagy and innate immune response by cytosolic dsDNA

**Kisa Sung,** Ph.D.
Department of Pharmacological Sciences, Icahn School of Medicine at Mount Sinai

Abstract

The N-end rule pathway is one of the proteolytic systems. In this mechanism, N-terminal residues of proteins act as recognition sites (called N-degrons) by specific UBR box-containing E3 ubiquitin ligases. The ATE1 (Arginyl- transferase) leads N-terminal arginylation of many proteins. N-terminal arginylation of target protein by ATE1 is a major N-degron. We here show that arginylation of ER resident proteins such as Bip, CRT and PDI are induced by ATE1. Cytosolic misfolded proteins and cytosolic dsDNA induce the N-terminal arginylation of Bip (R-Bip). The arginylation residue of Bip binds to autophagic adaptor p62 through the p62 ZZ domain. This binding induces aggregation of p62 and increases interaction between p62 and LC3. These results suggest that N-terminal arginine acts a delivery determinant and activating ligand in p62-mediated autophagy. And, N-terminal arginylation of ER proteins by ATE1 is triggered cytosolic dsDNA and ER stress. The exposed to the cytosol of external and internal double-stranded DNA induces cellular innate immune response. The introducing of dsDNA into the cells induces productions of type I interferon (IFN) and other cytokines through phosphorylated-IRF-3 by TBK1 and STING complex. Here, we verify that knock-down and knock-out of ATE1 impaired productions of IFN-beta and reduced phosphorylation status of IRF-3 by cytosolic dsDNA. These results suggest that ATE1 is a key regulator in cytosolic dsDNA-mediated innate immune response.

Biography

Dr. Kisa Sung is postdoctoral research fellow at the Icahn School of Medicine at Mount Sinai and formerly postdoctoral fellow at University of Pittsburgh. He studied biological sciences at the Sungkyunkwan University, and received his Ph.D. in Molecular and Cell Biology from Sungkyunkwan University. During his Master and Ph.D. studies, he was conducting research on post-translational protein modification and various signaling pathways in cells. He is an expert in the signal transduction and in post-translational modification area. As a postdoctoral fellow at University of Pittsburgh, he determined that arginylation of Bip protein by ATE1 can bind to p62 protein through its ZZ domain. It can induce cellular p62-mediated autophagy. His results describe a previously unknown selective autophagy pathway that may be complementary to the removal of ubiquitylated protein aggregates. Now, his research focuses on how cells respond to nutrient changes and what mechanisms they occur in human diseases, including cancer at the Icahn School of Medicine at Mount Sinai.

## Chromatin Landscapes Reveal a Genetic Interaction between FOXA2 and GATA6 in Human Pancreatic Development

**Kihyun Lee**, Ph.D.
Developmental Biology Program, Memorial Sloan Kettering Cancer Center

Abstract

Embryonic development requires precise transcriptional regulations for patterning, which are governed by key transcription factors (TFs) and epigenetic changes. As it has not fully understood yet, we decided to study TF occupancy and epigenome by assessing chromatin accessibility during pancreatic

development. We performed assay for transposase-accessible chromatin using high-throughput sequencing during directed pancreatic differentiation from human pluripotent stem cells and found that FOXA motifs were enriched in pancreatic progenitors. To elucidate the importance of FOXA factors during human pancreatic development, we generated FOXA2-deficient human pluripotent stem cells and found that KO cells showed significantly reduced PDX1 expression at the pancreatic progenitor stage. At the preceding foregut stage, FOXA2 KO cell showed a significantly reduced chromatin accessibility compared to wild-type (WT) cells. Furthermore, several pancreatic TFs motifs were enriched in these less accessible loci, suggesting that the bindings of these crucial pancreatic TFs were compromised after FOXA2 inactivation. To investigate the interaction between FOXA2 and other TFs involved in pancreatic differentiation, we decided to focus on GATA6, which we have previous found that it is critical for PDX1+NKX6-1+ pancreatic endoderm formation. Loss of one allele of FOXA2 resulted in exacerbated GATA6 haploinsufficiency, resulted in decreased expression of PDX1 at the PP1 stage prior to pancreatic endoderm formation. As double heterozygous mutants showed phenotypes at the earlier stage than GATA6 single heterozygous mutant, it suggests the genetic interaction between two factors during human pancreatic development. This work reveals the developmental competence established by FOXA2 plays an essential role for pancreatic development in human, which can play a role in genetic predisposition for human diseases.

Biography

Prior to joining Weill Cornell Graduate School, Dr. Kihyun Lee graduated from Ewha Womans University with B.S. in Pharmacy in 2008. During her master's degree which she obtained in 2010 from in Ewha Womans University, she investigated how reactive oxygen species affect immune system and progression of autoimmune diseases using murine model. After joining Dr. Danwei Huangfu's lab in Memorial Sloan Kettering Cancer Center, she has been working on how genetic variants found in human affect development of diabetes using human embryonic stem cells and CRISPR/Cas9 genome editing technology.

**SESSION II**

***Chair: Junil Kim**, Ph.D., University of Pennsylvania (PKSA president)*

## Esrp1 splicing regulation is required for tight junction integrity through epithelial Arhgef11 isoforms that activate RhoA and myosin phosphorylation

**SungKyoung Lee**, Ph.D., Dept. of Medicine, University of Pennsylvania

Abstract

The epithelial-specific splicing regulators Esrp1 and Esrp2 are required for mammalian development, including establishment of epidermal barrier functions. Esrp ablation leads to a disruption of epithelial tight junction (TJ) integrity in vivo and in vitro, indicating that alterations in TJs underlie epidermal permeability defects in Esrp KO mice. TJ located at stratum granulosm regulates the passage of water and other molecules between epithelial cells and integrity of TJ is a biophysical parameter of skin disease such as atopic dermatitis or psoriasis. One example of a splicing change in Esrp KO epidermis occurs in the Rho GTP exchange factor Arhgef11, which maintains tight junctions via RhoA activation and myosin light chain (MLC) phosphorylation. Esrp1/2 ablation inhibits MLC phosphorylation and expression of the epithelial, but not mesenchymal, isoform of Arhgef11 rescued MLC phosphorylation in Esrp KO epithelial cells. The Esrps induce skipping of a C-terminal exon in Arhgef11 transcripts that is required for binding of p21-activated kinase 4 (PAK4), which inhibits RhoA activation. These results illustrate how cell type-specific

splicing can be functionally and mechanistically linked to disease related phenotypes that are associated with impaired functions of splicing regulators.

Biography

Dr. SungKyoung Lee has studied signaling pathways and alternative splicing in various organ systems. Undergraduate and Doctoral studies at the University of Wisconsin-Madison focused on investigating the interaction between Planer Cell Polarity genes and FGF receptors mechanism in adherens junction formation during the lens development. This experience led him to join Dr. Carstens lab at UPenn as a Postdoc. Carstens lab discovered the Esrps and showed that Esrp medicated cell-type-specific isoform changes are crucial in embryo development and life maintenance. The Esrps are required for patterning and organogenesis of multiple organ systems Including face and skin. Sungkyoung Lee is investigating roles of Esrp in the face and skin development to uncover important post-transcriptional regulatory networks and molecular pathways. He was honored to be the 2017 JSID/SID (Society in Dermatology) Collegiality Young Investigator Award Winner.

## Seq-ing Gene Regulation

**Kyoung-Jae Won**, Ph.D., Dept of Genetics, University of Pennsylvania

Abstract

Current development of sequencing technology has enabled us to ask new question about molecular biology and physiology. I would like to introduce how our views about transcriptional mechanisms have been evolved by the sequencing technology.

Biography

Dr. Kyoung-Jae Won is a Research Assistant Professor of Genetics at the University of Pennsylvania. He will join BRIC at the University of Copenhagen, Denmark as an Associate Professor from Jun, 2018. He earned his B.S. and M.S. degree of Electronics at the Chung-Ang University in 1996 and 1998, respectively. He received his Ph.D at the University of Southampton, UK in 2005. During his Ph.D he applied the Genetic Algorithm to learn the structure of hidden Markov models (HMMs) for biological sequence analysis. After spending one year at the Bioinformatics Center, University of Copenhagen, Denmark as a postdoctoral researcher, he moved to the University of California San Diego (UCSD) where he developed computational algorithms to study gene regulation using (epi)genome-wide sequencing data. Since joining Penn in 2011, he has performed large-scale analyses using various types of datasets including ChIP-seq, DNase-seq and RNA-seq. He aims to further our understanding of the genome by integrating large-scale genomic datasets. He develops computational methods to exploit multi-dimensional genomic/epigenomic landscapes to understand cell-type specific or spatio-temporal gene regulation.

## A Wireless Chemical Sensing Scheme using Ultrasound Imaging of Silica-Beads-Embedded Hydrogel

**Albert Kim**, Ph.D., Department of Electrical and Computer Engineering, Temple University

Abstract

In-vivo wireless electrochemical sensing techniques have been extensively investigated since the ingestible “radio pill” first demonstrated by MacKay in 1957. Most such techniques demand an onboard power source to activate the electrochemical sensing element. More recently, however, the chemo-mechanical transduction of hydrogels, water-absorbable polymers, have been employed to fabricate passive wireless chemical sensors eliminating the need for the onboard power source. Environmentally sensitive-hydrogels are able to transduce a chemical signal (e.g., pH or blood glucose level) to a mechanical one (e.g., pressure or volume change), enabling in-vivo battery-less operation. However, the complicated fabrication process associated with a hermetically sealed MEMS capacitor led to a low yield and high manufacturing costs.

In this talk, a novel wireless chemical sensing technique featuring ultrasound imaging of a silica-bead-embedded hydrogel, named “silicagel” is introduced. By incorporating silica beads within a hydrogel network, its volume change in response to environmental stimuli can be remotely interrogated by ultrasound imaging, either by directly measuring its dimensions (cross-section of the silicagel) or indirectly evaluating the back-scattered wave intensity. Various sizes and concentrations of silicagel fabricated with pH-sensitive poly (methacrylic acid-co-acrylamide) hydrogel is studied in vitro, using a 40 MHz ultrasound imaging system. It is anticipated that the same technique can be applied to hydrogels sensitive to other stimuli (e.g., glucose, specific ions, biomarkers, etc.).

Biography

Dr. Albert Kim is a director of Albert Bioelectronics Lab and is an assistant professor in the Department of Electrical and Computer Engineering, Temple University. Prior to joining Temple University, he was a research and development engineer at Intel Corp. His research is centered on biomedical applications of micro and nanotechnology. This includes a variety of device and microsystems to address important clinical problems. He collaborated closely with physicians in order to transfer the technology to the clinic. Dr. Albert Kim graduated from Purdue University with Ph.D. in Electrical and Computer Engineering.

## INFORMATION TECHNOLOGIES FORUM

***Chair: Seungjoon Lee**, Google*

### Compressive Sensing and its Application to Digital Photography

**Jong-Hoon Ahn**, Bell-Labs, Nokia

Abstract

In digital photography, while cameras take uncompressed images in their raw format, which is followed by compression, the compressive sensing theory provides a new way to take compressed images directly with a smaller number of sensor elements and less power consumption. To realize it, two main issues should be addressed: namely, the issue of long acquisition by using a single-pixel sensor, and that of high complexity due to the use of a very large sensing matrix for high resolution images. In this talk, I review some of pioneering works that have been made to try to resolve those issues and talk about a recent progress and further issues we have to solve.

Biography

Jong-Hoon Ahn received the B.S. and Ph.D. degrees in physics from POSTECH, Korea, in 2000 and 2007, respectively. He was a postdoctoral fellow in dept. of computer science, Yonsei University in 2007. He was a research professor in dept. of biomedical engineering, Hanyang University from 2010 to 2012. He worked as a member of technical staff at Alcatel-Lucent Bell Labs in Seoul from 2013 to 2014 and now he is working at Nokia Bell Labs in Murray Hill. He is interested in data and computational science for multidisciplinary research work and is currently solving fundamental problems in computer vision and machine learning.

## Taking Light to the Limit of Communication

**Junho Cho**, Bell-Labs, Nokia

Abstract In this talk, we introduce recent substantial progress in optical fiber communication technologies, and interesting theories that enabled the breakthrough.

Biography

Junho Cho received the B.S., M.S., and Ph.D. degrees in electrical engineering and computer science from Seoul National University, Seoul, South Korea. He has been with Bell Laboratories, Seoul, Korea since 2010, and with Bell Laboratories, Holmdel, NJ, USA since 2014, as a member of technical staff. He was a Ph.D. dissertation committee member for Seoul National University. He has authored or coauthored numerous papers and was a Reviewer for a wide range of IEEE journals, the scope of which includes the optics, communications, circuits and systems, and computer. His current research interests include probabilistic constellation shaping, forward error correction, and signal processing. He was the recipient of the Outstanding Research Award under the Brain Korea 21 Project while studying with Seoul National University in 2009, and the Outstanding Reviewer Award from the IEEE/OSA Journal of Lightwave Technology in 2017.

## Software-Defined Border Router on Campus

**Hyojoon Kim**, Princeton University

Abstract

The research and education network community has seen a handful of Software-Defined Networking (SDN)-based solutions deployed in production campus networks. However, most of them primarily focus on dynamic traffic steering in layer 2 (e.g., middlebox bypass for science traffic). To take production-grade SDN solutions to the next level, Princeton University has deployed a layer 3 SDN solution in its network: a software-defined border router. The router is built with an OpenFlow-enabled switch and an OpenFlow controller with Quagga, an open-source software routing protocol suite. In this talk, I will present the technology and architecture behind our software-defined border router, and share our deployment experience. I will present applications and use cases that leverage the benefit of having extensive control over the software that defines our routing and forwarding policy. Then, I will switch gears and briefly talk about a more bleeding-edge technology that is coming our way: P4 language and programmable data planes.

Biography

Hyojoon Kim is a Cyber Infrastructure Engineer (CIE) at Princeton University. His role is to improve Princeton University's network infrastructure to better support scientific research, especially research

that has high network demands in terms of throughput, latency, security, and reliability. His expertise is in network configuration analysis and Software-Defined Networking (SDN). He has received his Ph.D. degree in Computer Science from Georgia Tech under the supervision of Dr. Nick Feamster and his Bachelor degree in Computer Science from the University of Wisconsin-Madison. He did several research internships at HP Labs in Palo Alto, USA, during graduate school. Prior to graduate school, he worked as a software engineer in South Korea for several years.

## ENGINEERING FORUM

***Chair: Ohbong Kwon,*** *CUNY/New York City College of Technology*

### Point-of-Care (POC) Nano Biochip for Enhanced Cancer Screening

**Bharath Babu Nunna**, Mechanical and Industrial Engineering Department,
New Jersey Institute of Technology

Abstract

The inexpensive nano biochip by taking advantages of the unique sensing technology in microfluidic platform, detects the tumor biomarkers in the patient bodily fluids and produces instantaneous results at the physician's office. The simple continuous monitoring of the level of cancer biomarkers helps oncologists understand the cancer progression and make the decision for the next level of examination in order to manage the cancer treatment more efficiently. The tumor biomarkers tested on the biochip are cancer antigen CA-125. The cancer antigens in the microfluidic platform (300um width and 107 um depth), conjugate with the antibodies that are immobilized on the sensing platform using carboxylic gold nano particles. The changes in the dielectric constant of the media due to the antigen-antibody conjugation make a difference in the capacitance in the interdigitated electrodes of the sensing platform in the microchannel. The change in the capacitance due to the interaction of the antigen-antibody (Ag-Ab) provides the evidence of the existence of the antigens in the biofluid sample. The tumor biomarker detection with a point of care device helps enhance the cancer screening and thus the enhanced cancer care.

Biography

Mr. Bharath Babu Nunna is the leading PhD Candidate of the biochip research in Dr. Eon Soo Lee's Advanced Energy Systems and Microdevices Laboratory. His research interests include the biosensing, microfluidics, nanofabrication and microelectronics. He is currently working on the understanding of the fundamental mechanism of point-of-care (POC) micro biochip devices to detect the complex diseases like cancer at the early stages using micro volume of blood sample from the finger prick. He has received the prestigious Best Design Award at Healthcare Innovations and Point-of-Care Technologies (HI-POCT 2017) conference held jointly by NIH & IEEE-EMBS at Bethesda, MD in November 2017.

### Korean Speech recognition algorithm based on phonetical features and the acoustic variables

**Changkyu Kim**, MECSEE LLC

Abstract

As the Korean is phonemically classified according to the characteristics and the sounding structure, a Korean phoneme can be distinguished by acoustic features. In this study, the first and the second formants frequencies of speech are utilited to distinguish the Korean phonemes. The relation of formants shows different features for voiced vowels. The divided phonemes are analyzed by using the methods of traditional speech recognition. speech recognition algorithm is based on additional analysis of feature parameters.

Biography

Dr. Changkyu Kim is the co-founder of MECSEE LLC, an algorithm development and robotics firm. Before devoting his work fulltime, he earned a Doctoral degree in NYU Tandon school of engineering. His research interest includes wireless communication, machine learning, and information theory. A contact email is changkyu.kim@nyu.edu.

## New METAL-REDUCED ORGANIC FRAMEWORK-SUPPORTED NITROGEN-DOPED GRAPHENE CATALYST FOR OXYGEN REDUCTION REACTION

**Harsimranjit Singh**, Mechanical and Industrial Engineering Department,
New Jersey Institute of Technology

Abstract

Our research is focusing on the investigation of an advanced metal-reduced organic framework-supported N-G catalyst (N-G/MOF-x) prepared by functionalizing ZIF-8 and N-G using the nanoscale high energy wet ball milling method. The chemical structure control of the N-G/MOF was studied by characterizing the variation of the chemical structure of synthesized samples throughout targeted grinding speeds. The results proved that the chemical interaction between ZIF-8 and N-G caused the reduction of nitrogen, oxygen and zinc atoms, and also the variation of chemical bonding composition in N-G/MOF-x. The reduction rate of zinc was gradually increased with the increasing grinding speed and reached to 82% of zinc loss at 650 RPM. The characterization of carbon and nitrogen bonding composition confirmed that the loss of nitrogen, oxygen and zinc atoms was caused by the decomposition of C-N-Zn heteroatom contents in ZIF-8 and the O-containing functional groups in N-G, and influenced by the grinding speed. The decomposition ZIF-8 not only influenced the pore structure but also modified the chemical structure and the surface distribution of N functional groups-constituted active sites in N-G/MOF-x. The N-G/MOF catalyst has comparable electrochemical performance to 10 wt% Pt/C catalyst. The successful accomplishment of the N-G/MOF catalysts will provide the substantial way to the cost-effective energy conversion system.

Biography

Mr. Harsimranjit Singh is Ph.D. student at New Jersey Institute of Technology since 2017. He received his M.S in Mechanical Engineering from NJIT and his B.S from PEC University of Technology, Chandigarh, 2016. His research is primarily focused on the synthesis and characterization of Non-precious Metal (Graphene) catalysts for electrochemical applications, and the physical, chemical and electrochemical characterizations primarily using XPS, Raman, Zetasizer, SEM, TEM, and RRDE. Also, he will work on Molecular Dynamics Simulations of Catalysis.

### Artificial Intelligence: Future, Ethics & Contributors' role

**Minkyu Kim**, ASML

Abstract

Artificial Intelligence (AI) is coming into our life as main part of the 4th industrial revolution. Everybody agrees AI will change our future significantly. Some people, however, believe rosy future, but other people believe gloomy one.

In this research, first, the potential of AI is investigated. Then the positive and negative effects of AI are discussed. Last but not least, based on a self-fulfilling prophecy, views for all scientists, engineers and community members about AI in future are proposed.

Biography

Education:

Ph.D. University of Texas at Austin
M.S. Seoul National University
B.S. Chung-Ang University

Major Work Experience:

2007-Present ASML
2006-2007 Tokyo Electron America
1997-2002 Samsung Electronics

## ENTREPRENEURSHIP FORUM

***Chair: Kyeong Ho Yang**, KITEE Vice President*

### NRC 2018 Idea Pitch Competition Panel

Abstract

The Entrepreneurship Session will review the recent startup activities and startup ecosystem in the northeast region and will discuss how we can effectively promote entrepreneurship of Korean-American scientists, engineers, and students studying engineering and science, and successfully create promising startups and grow them to next level together. The discussion panel of entrepreneurs, scientists, technologists, and IP attorneys will try to find ways to achieve the goal through the Annual NRC Idea Pitch Competition that we start on April 27, 2018.

# YOUNG GENERATION (YG) FORUM

***Kindle the Spark Inside: Envision and Innovate***

In a perpetually changing world such as the one we live in today, how can we predict what the future holds or what opportunities will arise? How do we innovate ourselves to become pioneers of new technology and research that are introduced every minute, every day? There are numerous groundbreaking fields for professionals to enter that you may have never been exposed to that may sculpt your passion. You may have an idea of what needs to be improved, and how, in order to reach your career goals but there is only so much you can accomplish alone.

The 2018 NRC YG Session aims to share the current trends in innovative sciences and technologies in the real world and provide you with an opportunity to discuss your ideas in these intriguing areas with experts in the field. In addition, we will also hold a forum for students and young professionals to network and exchange bright ideas. We hope that these diverse sessions will guide you to envision a grander future in the sciences and inspire you to innovate by kindling the spark inside.

Please join us during this thrilling time and get inspired to innovate!

#WhatsNext
NRC 2018 YG Session Organizer Committee

## Engineering Session

### "Artificial Intelligence in Healthcare: From Buzzword to Reality"

**JoongHeum Park, MD**, *NYP-Columbia University Medical Center*

**Abstract:** Artificial intelligence (AI) – the ability of computers to learn human-like functions or tasks – has shown great promise. The industry successfully implemented AI into areas which were previously considered the sole domain of human cognition, including automatically driving cars, recognizing spoken language, and detecting credit card fraud. Now, we are witnessing a new wave of interest for how machines might shape the future of health and healthcare. But in the hype cycle of most of emerging technologies, AI now rides atop the peak of inflated expectations. We can soften a subsequent crash into a trough of disillusionment by fostering a stronger appreciation of the technology's capabilities and limitations. I will discuss the current state art of AI and its applications in medicine, illustrating multiple examples of AI solving several contemporary medical problems. We will discuss specific areas of medicine that stand to benefit optimally from AI, as well as AI's limitations and future directions in healthcare.

**Biography:** Joongheum Park, MD is a physician with professional software development experience. He continues to practice Internal Medicine for the concrete rewards of caring for real people and to inspire his research focused on improving the quality of care with digital technology. Dr. Park earned a Bachelor of Arts in biology, from Seoul National University, followed by the medical degree from the CHA University, South Korea. He came to the US in 2014 for internal medicine residency at Seton Hall-Hackensack Meridian School of Medicine. During the residency, Dr. Park developed multiple mobile apps to help clinicians make decisions at the point of care and won several academic awards. He went to NewYork Presbyterian Columbia University Medical Center to start Clinical Informatics Fellowship, which is designed to train clinicians who are specialized in digital health technology, while he is practicing as an

internal medicine specialist at the Section of Hospital Medicine at Columbia/NYP. He is presenting at national conferences, including CHEST and American Medical Informatics Association (AMIA). He leads artificial intelligence projects in collaboration with Columbia University, Rutgers University and Albert Einstein School of Medicine to develop and integrate AI-driven technologies into healthcare in a meaningful and scalable way. Dr. Park is an official mentor of a computer science class for developing healthcare software at the Georgia University of Technology. He is a founding organizer of Digital Health Grand Rounds at Columbia University, which is a monthly conference on digital healthcare technology. Dr. Park is one of seven Executive Board members of National Association of Clinical Informatics Fellows (ACIF).

## Biopharmaceutical Session

### "Fight against Cancer: CAR-T cell therapy"

**Nurgul Kilavuz, MSc**, *Celgene Corporation*

**Abstract:** Chimeric antigen receptor T-cell (CAR-T) therapy is a "disruptive innovation"- an incredible advancement- in the treatment of cancer. CAR-T cells are genetically reengineered versions of a patient's own immune cells that have been programmed to recognize and kill some of the hardest to treat cancers. Currently, there are two FDA approved CAR-T therapies available for treatment of certain blood cancers.

**Biography:** Nurgul is a Director, Program Lead Scientist, at Celgene Clinical R&D. Her biopharmaceutical career spans over 15 years and her wealth of experience includes designing and executing global Phase 1-3 clinical trials for pharmaceutical drug development for various indications. Prior to joining Celgene, she worked in Novartis Global Oncology R&D for over 5 years as well as in Merck and Pfizer. She is a pharmacist by training and holds a Master of Science degree in pharmacology.
She works actively towards and is passionate about introducing more effective and accessible treatment options to patients with unmet medical needs.

## Start-up Panel Session

**Jaeyoon Chung, Ph.D.**, *Myota, Inc*

**Abstract:** Myota Inc. was established in May, 2017, based on the research at Princeton University. Myota solution is a superior data security management solution that leverages artificial intelligence while exponentially increasing the protection of critical data as well as providing cost and operational efficiencies. With Myota, users are able to define their own storage systems and store critical data across the storage nodes, regardless of storage type such as public cloud or private cloud, while dynamically transforming the data security infrastructure with artificial intelligence.

**Biography:** Jaeyoon Chung is a Co-founder and Inventor at Myota Inc. in Chesterbrook, PA, USA. His research interests include client-defined distributed storage, software-defined networking, and network traffic monitoring and analysis. He received his B.S. and Ph.D. degrees in Computer Science and Engineering from POSTECH, South Korea in 2009 and 2015, respectively. In 2015, he joined Edge Lab in Princeton University, supervised by Prof. Mung Chiang, as a Postdoctoral Research Associate. He also actively participated in OpenFog Consortium as a Co-chair of Testbed Working group in 2016. Since 2017

July, he has worked for Myota Inc. As an inventor of Myota's technology, he is in charge of research and development.

**Artem Petakov**, *Noom, Inc*

**Abstract:** Noom, Inc has created a behavior change platform that uses AI and human coaches to prevent chronic conditions like obesity and diabetes. Their results are superior to any product in the market (e.g. 64% lose 5%+ weight and 60% keep it off over 1 year+), and are 20% better than CDC's in-person requirements. Their scalable coaching engine combines human and AI coaching to deliver these great results at scale of 270 active users to 1 coach targeting 500:1 in 1.5 years. Noom is international with programs in 5 languages and are in use by governments in Korea and Japan. Noom is growing quickly and investing heavily in consumer marketing, while expanding from digital channels to TV this year.

**Biography:** Artem has been interested in the intersection between technology and psychology his whole life. He started programming when he was 9 and has always enjoyed building AI and brain simulations. At Princeton, he studied Computer Science, and applied it to psychology, politics and finance. He did robotics & AI after graduation, working on the world championship Robocup robotic-soccer team. After that, he was a Tech Lead on the Google Maps team, applying big data to geographic search. In 2008, he left to co-found WorkSmart Labs, which incubated Noom. At Noom, Artem oversees all Product, Engineering and Solution Development.

**Jason Ki**, *Veripad, Inc*

**Company Abstract:** Counterfeit medicine is a global health crisis. It's estimated that over 40% of medication in the market is falsified, and this problem is prevalent especially in developing regions and online pharmaceutical markets. Many people are getting sick and even dying from taking inauthentic medication. It is Veripad's mission to provide an affordable, portable, and easy-to-use method to help verify the quality of essential medicines. With just our chemical testing paper and a free mobile app, you can identify falsified medicines before they reach your communities.

**Biography:** Jason Ki is a co-founder and CTO of Veripad. Jason's involvement with the company began prior to its inception as he advised the co-founders (then undergraduate seniors) in building a prototype app for their graduation thesis. Jason has since joined the company full time as the technical lead. He and the product team are working ecstatically towards developing innovative engineering solutions and customer products for detecting falsified medicine and improving quality assurance. Jason is currently a PhD candidate in biomedical engineering at the City College of New York. His research interests are neuroscience, machine learning, and blockchain.

**Khee Lee**, *Kiswe Mobile*

**Biography**: From deal making with global partners for Google to operations strategy for technology startups, Khee has spent his career on the front lines of the global digital revolution. Khee is currently the Chief Marketing Officer at Kiswe Mobile. Previously, Khee spent nearly a decade at Google where he was head of agency business development: overseeing executive relationships and signing deals with some of Google's largest global partners. Previous to Google, Khee held senior positions at multiple startups

including Active Health Management, a healthcare analytics startup that was acquired by Aetna. Khee continues to serve as an advisor to numerous startups and is currently a Venture Partner at Entrepreneurs Roundtable Accelerator, the leading tech accelerator in New York City.

Khee is a speaker and thought leader on corporate diversity. Khee is a former board member for the Asian American Federation. Khee is also the founder of the Asian American Googler Network in New York, which promotes Asian American culture within the professional community. Khee also serves on the diversity committee of The Public Theater and was co-chair of the Tiger Woods Foundation Gala.

Khee graduated with a degree in pharmacy from the Philadelphia College of Pharmacy and Science.

**Personal Finance Session**

**Khee Lee,** *Kiswe Mobile*

**Biography**: From deal making with global partners for Google to operations strategy for technology startups, Khee has spent his career on the front lines of the global digital revolution. Khee is currently the Chief Marketing Officer at Kiswe Mobile. Previously, Khee spent nearly a decade at Google where he was head of agency business development: overseeing executive relationships and signing deals with some of Google's largest global partners. Previous to Google, Khee held senior positions at multiple startups including Active Health Management, a healthcare analytics startup that was acquired by Aetna. Khee continues to serve as an advisor to numerous startups and is currently a Venture Partner at Entrepreneurs Roundtable Accelerator, the leading tech accelerator in New York City.

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## NOTE

# Call for Participation: The NRC 2018 / KITEE Idea Pitch Competition


To promote entrepreneurship of Korean-American scientists, engineers, and students studying engineering and science and encourage them to build a promising startup, the KSEA Northeast Regional Conference (NRC) plans to hold an ***annual Idea Pitch Competition*** with support from KITEE. In the first competition on **April 27, 2018**, future Korean-American entrepreneurs compete individually or as a team to win **a cash award of $2,000 plus continuous assistance, upon requests**, from KITEE Angel Committee in various areas including formation, business plan, fundraising, legal, accountant and financial, marketing & channel introduction, and related technologies until they grow to the next phase of business.

**Scope**: Any compelling idea for business that is NOT commercialized yet and may be at an idea level.

**Winners** (up to 3)

- 1st place: $2,000 plus continuous assistance, upon requests, from KITEE Angel Committee
- 2nd place: $1,000
- 3rd place: $500

**Eligibility**: Any KSEA and KITEE member as of April 16th, 2018 can compete as an individual or a team (one or more KSEA or KITEE members).

**Schedule:**

- April 16th, 2018 — Application due (by email)
- April 18th, 2018 — Pre-screening result (document review)
- April 27th, 2018 — Presentation (7:00 PM ~ 8:00 PM)
- April 27th, 2018 — Interview and Q&A for finalists (8:15 PM ~ 9:00 PM)
- April 27th, 2018 — Winner announcement (9:30 PM)

**Place:** LG Electronics USA, Main Conference Room @ 920 Sylvan Ave., Englewood Cliffs NJ 07632

**Application Method**:

- ***By April 16th, submit a one-page plan*** to event@kitee.org with the following: title, team members, market need (problem to solve), solution (product or service), why now, market validation, competition and advantage, etc.
- Those who pass the pre-screen will be provided a template for presentation on 4/27/2018.

**Evaluation**:

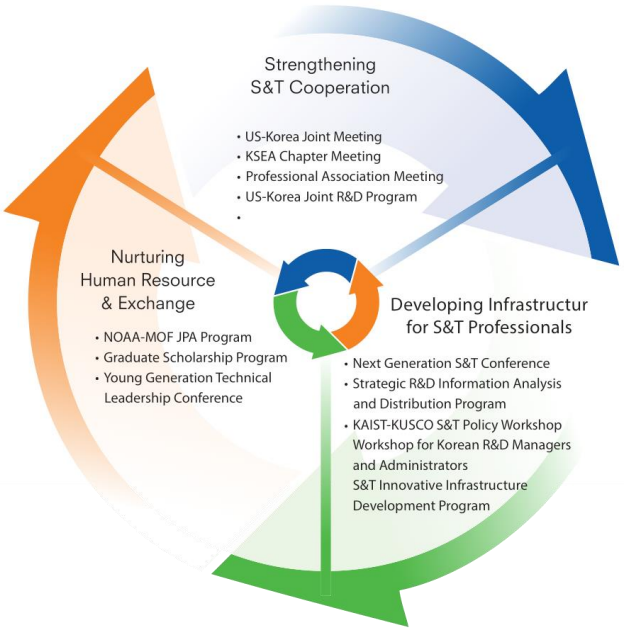
- A Competition Committee will pre-screen applications, select up to five finalists who will compete in the second round, Interview and Q&A, and choose up to three winners.
- Confidentiality: Protection of intellectual property (IP) is up to the contestant while the Competition Committee will make its best efforts to protect IP of the presenters.

Updated information is available at the KITEE website, http://www.kitee.org

# "Frontier of Korea -U.S. S&T Cooperation!"

**The Korea-U.S. Science Cooperation Center (KUSCO)** is a non-profit organization, established in Vienna, Virginia in 1997.

KUSCO was established to accomplish two major missions: to enhance cooperative efforts in S&T between Korea and the U.S. and to support Korean-American scientists & engineers here in the United States.


## KUSCO Programs

KUSCO Programs are composed of three categories; Nurturing Human Resource & Exchage, Strengthening S&T Cooperation, and Developing Infrastructure for S&T Professionals.

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