THE 29th KSEA NORTHEAST REGIONAL CONFERENCE

# NRC 2020

# Innovation through Connectivity

## Webinar Conference

**Saturday, March 28, 2020**

**9 am - 1 pm EDT**

KUSCO KOREA - U.S. SCIENCE COOPERATION CENTER

AKF Andrew Kim Foundation

KOSEN www.kosen21.org

KITEE Innovation to Business

LG Life's Good

SK

## CONTENTS




The 28th KSEA Northeast Regional Conference
Montclair State University, Montclair, NJ, March 23, 2019

## CONGRATULATORY MESSAGE FROM THE KSEA PRESIDENT

Dear KSEA members,

Congratulations on the hosting the 29th Northeast Regional Conference (NRC) in New Jersey. First of all, I would like to thank the NRC organizers for their decision to hold the NRC online during this difficult time with the coronavirus. The health and safety of all NRC participants are KSEA's highest priorities. I believe the decision to hold NRC online is the appropriate action to protect participants from potential exposure to the coronavirus. It certainly is a challenge hosting the conference online, but I hope this year's NRC is successful overcoming all difficulties. This unique experience may open a new way of KSEA activities. This year's NRC marks its 29th event. I believe that NRC has contributed to strengthening the unity among KSEA members and providing collaboration opportunities to advance science and technology.

As the 48th President of the Korean-American Scientists and Engineers Association (KSEA), I am pleased to welcome you to the NRC. NRC is one of the 250 events that KSEA puts together annually, but is one of the most significant regional events that connects young scientists and engineers with established senior members. This year's theme of "Innovation through Connectivity." I believe that NRC provides a platform for current and future leaders to form meaningful partnerships and friendships. I hope all participants continue to network with other KSEA members and help each other even after the event, so that we empower ourselves in our respective field in the U.S.

I truly appreciate the organizing committee's dedication and willingness for making this conference possible. I would like to thank the Korean-U.S. Science Cooperation Center (KUSCO) for their sponsorship and supports. I would also like to thank the Andrew Kim Memorial Foundation who sponsors scholarships for our YG members. I would like to mention LG Electronics, SK, and Mara Nanotech for their continuous interests. I hope that the 29th NRC is a rewarding and memorable event for each of you.

I thank you for your participation and hope you all are safe in this global health crisis!

Jun-Seok Oh
KSEA 48th President

## WELCOME TO THE 29TH KSEA NORTHEAST REGIONAL CONFERENCE

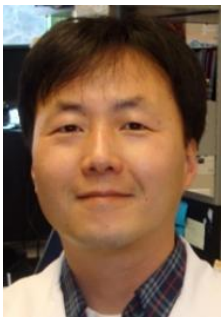
Distinguished Guests and Fellow KSEA Members,

Welcome to all of you to the Northeast Regional Conference (NRC) 2020 jointly organized by New York Metropolitan, New Jersey, and Philadelphia Chapters of Korean-American Scientists and Engineers Association (KSEA).

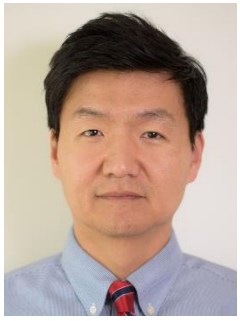
This year's NRC is collaborated with KSEA affiliated professional societies (APSs) including KASBP, KITEE, KWiSE, NYKB, and PKSA. Due to the impact of the coronavirus outbreak, NRC 2020 is held as an online-only conference for the first time in the NRC history of 29 years. The main theme of NRC 2020 is "Innovation through Connectivity" 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 the conference is to provide open forums where scientists and engineers in major areas present their research findings and share ideas.

We are hoping that this conference will also contribute greatly to the advancement of research and development in both U.S. and Korea. In addition, the NRC 2020 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 NY, NJ and Philadelphia members for their participation in NRC 2020.

Thank you again for participating in the NRC 2020.



**Ju-Hyun Lee, Ph.D.**
KSEA New York Metropolitan
Conference Co-Chair



**Kooksang Moon, Ph.D.**
KSEA New Jersey
Conference Chair

**Albert Kim, Ph.D.**
KSEA Philadelphia
Conference Co-Chair

## NRC 2020 ORGANIZING COMMITTEE

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## KASBP

***K. Stephen Suh, Ph.D.,*** *DiagnoCine*

*President of KASBP*

Dear colleagues and friends,

As the 16th president of the Korean-American Society in Biotech and Pharmaceuticals (KASB), I congratulate all members of the Korean-American Scientists and Engineers Association (KSEA) members and organizers for opening the 29th Northeast Regional Conference (NRC). Due to the Coronavirus crisis, all preparation matters related to the NRC conference are extremely difficult, but the organizers and the members came together to set up an online-based event through hand-in-hand coordination and cooperation. Many of KASBP members are also the members of KSEA, and I am delighted to provide this congratulatory letter to the NRC. This event brings together New Jersey, York Metropolitan and Philadelphia chapters and regional members. I am thankful to all organizers, members, contributing sponsors and students that are volunteering and donating countless hours for this event.

KASBP will be 20 years old in 2021 and has grown to 7 chapters (Boston, Connecticut, New Jersey, Philadelphia, Washington DC, Illinois/Chicago, and San Francisco) with over 1500 national members. Nearly all KASBP members are actively participating in the chapter, regional and national events. The two major events are Fall and Spring KASBP Symposiums, and I encourage all KSEA members for joining KASBP events. As one of 30 partners of Affiliated Professional Societies (APS) in KSEA, KASBP continues to work diligently to support the cooperation of US-Korea collaboration and promoting many community services. KASBP members represent scientists, engineers, government officials, industry executives, and policy-makers from both the US and Korea. I encourage everyone from the field of biomedicine to join KASBP (https://kasbp.org).

The Northeast region of KSEA has near 30 years of history, and I am proud to mention that KASBP always worked alongside with KSEA, performing a remarkable partnership on events such as regional conference and US-Korea Conference. KASBP wants to sincerely thank all sponsors, especially Andrew Kim Foundation for the scholarship for supporting young bio-pharmaceutical students. Because we are sacrificing our precious time and tireless efforts, many of KASBP, other APS and KSEA members of the Northeast region can enjoy the conference and programs. Again, KASBP appreciates the dedication, extreme commitment, and inspiring spirit for service by NRC organizers. We are always proud of your young generation/professionals that are volunteering. Although NRC2020 is opening online due to the public health crisis, KASBP wishes the best and a huge success.

## KITEE

***Myung Jong Lee, Ph.D.,*** *CUNY City College and Graduate Center*

*President of KITEE*

KITEE (Korean-American Innovative 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. The 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 various 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 graduate 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

## KWiSE

***HeaYeon Lee, Ph.D.,***
*Mara Nanotech NY, inc.*

*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 h.lee@mara-nanotech.com.

Home page: https://www.kwise.org/

## NYKB

***Sung Yun Cho, Ph.Dc.,*** *Weill Cornell Medicine*

*President of NYKB*

NYKB (New York Korean Biologists) is an independent non-profit scientific organization based in New York Manhattan. NYKB is dedicated to advancing science and developing scientific careers in academia and industry, in hopes to strengthen Korean American scientific communities in New York area. NYKB's current membership of over 250 scientists includes faculty members, postdoctoral fellows, graduate and undergraduate students at ten academic institutions (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, and Rutgers University) in New York. Since its re-establishment in 2008, NYKB's membership is growing each year through attraction of more scientists. NYKB organizes various events including an annual conference, Bio Night, and social networking events to encourage networking among NYKB members.

For more information, please contact: nykb2008@gmail.com.

Home page: http://nykb.org

Facebook: https://www.facebook.com/newyorkkoreanbiologists

**NYKB Annual Conference**
TBA

## PKSA

***SungKyoung Lee***
***Ph.D.,*** *University of Pennsylvania Perelman School of Medicine*

*President of PKSA*

The Philadelphia Korean Scholars Association (PKSA) is aimed at promoting researches and networking among Korean scholars in the greater Philadelphia area. PKSA holds twice a monthly diverse seminar talk on Friday at 6 PM at the UPenn Smilow Translational research building (10th 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 event information.

## PROGRAM AT A GLANCE

| NRC 2020 Program Schedule | | | | |
|---|---|---|---|---|
| 8:00AM-9:00AM | Registration / Conference preparation | | | https://bit.ly/2y7rqih |
| 9:00AM-9:10AM | Opening Ceremony / Congratulatory Remarks | | | |
| 9:10AM-9:50AM | **Plenary Session I (Dr. Kiho Im)** | | | |
| 9:50AM-10:30AM | **Plenary Session II (Dr. Frank Lee)** | | | |
| 10:30AM-11:10AM | **Plenary Speaker III (Rahae Kim, Esq)** | | | |
| | Concurrent Sessions | | | |
| 11:20AM-12:50PM | Bio/Pharma<br>https://bit.ly/3afnom8 | KWiSE<br>https://bit.ly/2Uv11m7 | IT<br>https://bit.ly/2Uk50Db | Engineering<br>https://bit.ly/2UdCLpD |
| 12:50PM-1:00PM | Closing Ceremony | | | https://bit.ly/2y7rqih |

**Opening Ceremony & Congratulatory Remarks** **https://bit.ly/2y7rqih**

9:00 AM - 9:10 AM **Kooksang Moon, Ph.D.,** NRC Chair, KSEA New Jersey President
**Jun-Seok Oh, Ph.D.,** KSEA President

## PLENARY SESSIONS

**Plenary Session I** **https://bit.ly/2y7rqih**

9:10 AM - 9:50 AM **Dr. Kiho Im, Ph.D.**, Assistant Professor, Harvard Medical School
"Quantitative *in vivo* MRI assessment of prenatal cortical development in the human brain "

**Plenary Session II** **https://bit.ly/2y7rqih**

9:50 AM - 10:30 AM **Frank J. Lee, Ph.D.,** Professor, Drexel University
"Skyscraper Games Trilogy: City-Wide Mixed-Reality" Games

**Plenary Session III** **https://bit.ly/2y7rqih**

10:30 AM - 11:10 AM **Raeha Kim, Esq**, Funder & CEO, Millennials Chamber of Commerce (MC2)
"Transcending the Norm and Wearing Multi-Hats"

## CONCURRENT SESSIONS

**Bio & PHARMA Forum** **https://bit.ly/3afnom8**

**Chair: Sungkyung Lee, Ph.D.,** University of Pennsylvania

11:20 AM - 12:05 PM **Yangkyun Oh, Ph.D.,** Skirball Institute of Biomolecular Medicine
NYU School of Medicine
"A pair of glucose-sensing neurons regulate glucose homeostasis by coordinating the release of insulin and glucagon in *Drosophila*"

12:05 PM - 12:50 PM **Kwang Hyeon Eom, M.D., Ph.D.,** Chonnam National University
University of Pennsylvania
"S-NOylation of HDAC2 by nNOS as a mechanism for HFpEF"

**KWiSE Forum: *Science Advancement for Humanity*** **https://bit.ly/2Uv11m7**

**Chair: HeaYeon Lee, Ph.D.,** Mara Nanotech NY, inc.

11:20 AM - 11:50 AM **Trishnee Bhurosy, Ph.D.,** Rutgers University
"She can breastfeed: A systematic review on the feasibility and challenges of breastfeeding among breast cancer survivors"

11:50 AM - 12:20 PM **Teryn Cha, Ph.D.,** Essex Country College
"Artificial Intelligence in Taxation"

12:20 PM - 12:50 PM **Moori Han, Ph.D.,** GC Pharma
"Development of upstream cell culture process for the production of biologics"

**IT Forum** **https://bit.ly/2Uk50Db**

**Chair: Seungjoon Lee, Ph.D.,** Google

11:20 AM - 12:05 PM **Jang Sun Lee (Karl Stratos), Ph.D.,** Rutgers University
"Maximal Mutual Information Predictive Coding for Natural Language Processing"

12:05 AM - 12:50 PM **Howon Lee, Ph.D.,** Rutgers University
"Digital 4D Printing for Engineered Living Materials"

**ENGINEERING Forum** **https://bit.ly/2UdCLpD**

Chair: **Ohbong Kwon, Ph.D.,** New York City College of Technology

11:20 AM - 12:05 PM **Eui-Hyuk Yang, Ph.D.,** Stevens Institute of Technology
"*In situ* Iron-doping of $MoS_2$ via Chemical Vapor Deposition toward Room Temperature Ferromagnetism"

12:05 AM - 12:50 PM **Albert Kim, Ph.D.,** Temple University
"Ultrasonically Powered Smart Stent for Abdominal Aortic Aneurysm"

## Andrew Kim Memorial Foundation Scholarship Awardees (2020)

- **Young Jae Woo, Ph.D., Icahn School of Medicine at Mount Sinai**
  "Multi-scale models of neurological diseases based on big biomedical data"

- **Huensuk Kim, Ph.D., Icahn School of Medicine**
  "Oncogenic role of SFRP2 in p53-mutant osteosarcoma development via autocrine and paracrine mechanism"

- **Yeongsu Cho, M.S., Columbia University**
  "Optical properties of the layered perovskites derived from properties of the bulk perovskites"

- **David K. Park, Ph.D. Candidate, Columbia University**
  "Characterization of Risk Genes for Alzheimer's Disease via Image-driven Brain Morphology and Function"

- **Jae Gyun Oh, Ph.D., Icahn School of Medicine at Mount Sinai**
  "Analysis of Extracellular Vesicle miRNA Profiles in Heart Failure"

- **Yongtaek Oh, Ph.D. Candidate, Drexel University**
  "Investigation on the brain dynamics of insight and neural correlates of associated reward processing"

**Closing Ceremony** **https://bit.ly/2y7rqih**

12:50 PM - 1:00 PM **Albert Kim, Ph.D.,** KSEA Philadelphia President

***- See You Next Year -***

# Abstract and Biography

# Quantitative *in vivo* MRI assessment of prenatal cortical development in the human brain

**Kiho Im, Ph.D.,**
Assistant Professor, Pediatrics, Harvard Medical School

Staff Scientist in the Division of Newborn Medicine, Fetal-Neonatal Neuroimaging & Developmental Science Center (FNNDSC) at Boston Children's Hospital (BCH)

**Abstract**

Prenatal brain development is associated with postnatal neurodevelopmental outcomes, and if defective, can cause high-risk neurodevelopmental disabilities. As fetal interventions for brain malformations and psychiatric/neurological brain disorders are emerging, it is of great interest to develop technologies to characterize early brain development in the fetal brain using *in vivo* magnetic resonance imaging (MRI); investigate several disease and genetic/environmental effects; detect abnormal brain development early and understand its underlying mechanisms. We developed state-of-the-art techniques to automatically process fetal MRI including deep-learning-based automatic fetal brain extraction and cortical tissue segmentation, accurate 3D cortical surface reconstruction; and automatic parcellation and labeling of cortical areas. Moreover, innovative MRI-based features and methods for cortical growth analysis have been developed. We examined regional cortical thickness and gyrification as well as geometric and topological patterns of cortical folds in typically developing fetal brains and fetuses with developmental disorders: cortical malformations, agenesis of the corpus callosum, congenital heart disease, ventriculomegaly, and Down syndrome. Our novel technologies have demonstrated superior sensitivity in explaining the inter-subject variability of fetal brain structural development and detecting early brain abnormalities compared to conventional technologies.

**Biography**

**Dr. Kiho Im** received his PhD in Biomedical Engineering from Hanyang University in 2009 and began postdoctoral training as a Research Fellow in the HMS/BCH, FNNDSC. During his tenure at BCH, his expertise lies within neuroimaging analysis using structural and diffusion magnetic resonance imaging (MRI). His goal is to provide unique and biologically relevant imaging biomarkers that not only help us to better understand normal and abnormal brain development, but also aid in the detection and diagnosis of disease. He developed advanced methodologies for quantifying the complex topology of brain cortical folding patterns and brain white matter connectivity/network. These methods led to the discovery that different brain disorders such as polymicrogyria; tuberous sclerosis complex; TUBB3 syndrome; developmental dyslexia; traumatic brain injury; cerebral palsy, have different effects on brain folding and connectivity. Dr. Im has collaborated with world-renowned neuroscientists and geneticists including Dr. Christopher Walsh and Dr. Elizabeth Engle at BCH, providing a more accurate unbiased characterization of brain folding and connectivity in patients with these disorders as well as in genetically-modified animal models of disease. These collaborations have resulted in co-authored papers in Science (2014), Nature (2018), Neuron (2018), and Cerebral Cortex (2018) where Dr. Im's contribution is his unique image analysis.

# "Skyscraper Games Trilogy: City-Wide Mixed-Reality" Games

**Frank J. Lee, Ph.D.,**
Professor of Digital Media at Drexel University

Director of Entrepreneurial Game Studio

**Abstract**

In my talk, I will discuss my Skyscraper Games Trilogy, a series of projects that span 10 years including: (1) Pong on the Cira Center in 2013, where I recreated a large-scale interactive installation on the Cira Centre, a 29-story skyscraper in Philadelphia, by reprogramming its LED lights, to create an interactive game of Pong, (2) Skyscraper Tetris in 2014, where I recreated a multi-player Tetris on the Cira Centre as part of the 30th year anniversary Tetris, and (2) Skyscraper Games by Kids in 2019, where I showcased new games designed and programed by middle school students from Philadelphia on the Cira Centre as part of a STEAM outreach effort to get girls and other underrepresented students interested in computer science.

**Biography**

**Dr. Frank Lee** received his PhD in Cognitive Psychology in 2000 from Carnegie Mellon University, and his AB with Highest Honors in Cognitive Science in 1994 from UC Berkeley. Lee co-founded Drexel's Game Design Program in 2008, which since its founding has been ranked as one of the Top 10 Game Design Programs in the US. Lee is also the founding director of the Entrepreneurial Game Studio (EGS) at Drexel University in 2013, a unique university-wide initiative to teach students entrepreneurship by helping them to start their own game companies. Students in EGS have won over 40 national and international awards and recognitions in the last 5 years making it one of the most awarded university game labs in the US. Lee's own past projects have won national and international awards and recognitions and have received extensive media coverage. His installation project, Skyscraper Tetris in 2014, was mentions in over 1500 news stories worldwide and an estimated 2.2 Billion views with a publicity value of over $22M. It was also recognized as a Guinness World Record for the Largest Architectural Videogame Display. He was selected as one of the Smartest People in Philadelphia by Philadelphia Magazine in 2012, Hacker of the Year by Geekadelphia in 2013, and one of the 50 Most Admirable Gaming People by Polygon in 2014.

## Transcending the Norm and Wearing Multi-Hats

**Raeha Kim, Esq**
Founder and CEO of Millennials Chamber of Commerce & Raeha International

Future workplace and Diversity Consultant

**Abstract**

We live in an exciting time unprecedented by global innovations of all kinds. Many next gen leaders, coming from first or second generation immigrant backgrounds and or diverse cultural upbringings are caught between the traditional ways of how they were raised and what they were taught within their households, cultures and communities and a new world that lies beyond what they are familiar with - what lies beyond the "norm." Two groups emerge: those that choose to remain "normal" in familiarity and those that choose to break the tradition and decide to transcend beyond the "norm." The latter group often wear multi-hats walking in their unconventional paths to explore the road less travelled. We will discuss how such choices play into and correlate with career development, networking skills, self-confidence and satisfaction with one's career and life.

**Biography**

**Raeha Kim, Esq.** is the Founder & CEO of Millennials Chamber of Commerce and Raeha International. As a global thought leader, an entrepreneur and a connector, Raeha utilizes her platforms and professional accolades to empower the Next Generation and Women. She has served as an attorney, author, consultant, speaker and executive coach.

Raeha is an unconventional Korean - American Woman. Finding MC2, short for Millennials Chamber of Commerce, was an organic process that turned into a candid and honest answer to provide a sense of community and belonging for the Next Gen Global Citizens, who, like Raeha, did not seem to "fit-in" in the traditional molds.

MC2 was created as a result of diverse Global Millennials coming together to create one Movement: To improve the economic welfare, life-quality and cultural well-being of students and young professionals with special emphasis on career success.

Raeha has served as a speaker and a thought leader on many global platforms on various topics relating to Future Leadership, Women Empowerment, Millennials, Next Gen Workforce, Bridging Generations, Diversity & Inclusion, Entrepreneurship, Financial Literacy and New Media.

Raeha is the recipient of the 2018 Global Humanitarian Award as well as the 2017 Atlanta City Council's City Proclamation where Millennials Chamber of Commerce Day has been officially recognized by the city of Atlanta. In 2018, Raeha has been featured in Chosun Daily, the oldest South Korean newspaper. Raeha's books are scheduled to be released in 2020 and 2021.

Raeha continues to give back by volunteering her time and expertise in global conversations and serving on various boards, advisory boards and task forces including the American Red Cross, Alliance of Women Directors & more.

To learn more visit www.raeha.com, www.millechamber.com,
www.instagram.com/raehakim and https://www.linkedin.com/in/raehakim

## BIO & PHARM FORUM

***Session Chair: SungKyung Lee, Ph.D.,*** *University of Pennsylvania*

# S-NOylation of HDAC2 by nNOS as a mechanism for HFpEF

**Kwang Hyeon Eom, M.D., Ph.D.**

Department of Pharmacology, Chonnam National University Medical School
Department of Cardiovascular Medicine, Perelman School of Medicine, University of Pennsylvania

**Abstract**

Although the clinical importance of heart failure with preserved ejection fraction (HFpEF), which makes up half of heart failure, has been extensively explored, most therapeutic regimens, including nitric oxide (NO) donors, lack therapeutic benefit. Here we report that neuronal nitric oxide synthase (nNOS, also known as NOS1) induces HFpEF by S-nitrosylation of histone deacetylase 2 (HDAC2). Two animal models of HFpEF—SAUNA (SAlty drinking water/Unilateral Nephrectomy/Aldosterone) and mild transverse aortic constriction (TAC) mice—were used for the study. Among the post-translational modifications tested, S-nitrosylation was dramatically increased. Both models showed increased nNOS expression and NO production, which resulted in the S-nitrosylation of HDAC2 C262/274. HFpEF was alleviated in S-nitrosylation-resistant HDAC2 knock-in mice. Pharmacologic intervention by either nNOS inhibition or HDAC2 denitrosylation attenuated HFpEF. Our observations are the first to demonstrate a completely new mechanistic aspect in HFpEF, which may provide a novel therapeutic approach to HFpEF. Our results also provide evidence to explain the ineffectiveness of conventional NO-enhancement trials for improving HFpEF.

**Biography**

**Dr. Gwang Hyeon Eom** is current visiting professor of University of Pennsylvania. He obtained his medical doctor degree from the Chonnam National University Medical School and also completed his Doctor of Philosophy degree at Chonnam National University Medical School. He has studied the role of histone deacetylase 2 in the development of cardiac hypertrophy and thereby cardiac fibrosis. Recently, he mainly focused on evaluation of pathophysiology of heart failure of preserved ejection fraction. He is He also has much interests in epigenetic modification of histone and transcription regulation by spatial changes of chromatin. He now investigates aberrant derangement of histone H3 methylation in triplet repeat disease and develops novel modality to visualize spatial repositioning of chromatin in disease contexts at University of Pennsylvania

# A pair of glucose-sensing neurons regulate glucose homeostasis by coordinating the release of insulin and glucagon in *Drosophila*

**Yangkyun Oh, Ph.D.**
Skirball Institute of Biomolecular Medicine,
Department of Cell Biology, Neuroscience Institute,
New York University School of Medicine

**Abstract**
We identified a pair of glucose-sensing neurons in the *Drosophila* brain that monitor internal glucose levels and regulate the release of the *Drosophila* equivalents of two hormones that are essential for glucose homeostasis: insulin and glucagon. We have found that these neurons have a unique projection pattern: one axonal branch innervates insulin-producing cells (IPCs), and the other innervates glucagon-producing cells (AKH-producing cells). When glucose levels are elevated, the stimulated glucose-sensing neurons send excitatory signals to the IPCs, which then secrete *Drosophila* insulin-like peptide 2 (dilp2), and simultaneously sends inhibitory signals to the glucagon-producing cells, which is followed by a decrease in the amount of glucagon-like peptide (AKH) by these cells. Further evidence demonstrating that inactivation of those neurons results in hyperglycemia, suggest that the coordinated regulation of insulin and glucagon by these neurons is essential for proper glucose homeostasis in the fly. These findings are the first discovery of the neuronal control of the glucose homeostasis which is coordinated by the secretion of insulin and glucagon and it sheds light on the biological function of glucose-sensing neurons, which has been elusive for more than 50 years since their first discovery.

**Biography**
**Dr. Yangkyun Oh** is a postdoctoral fellow working with Dr. Greg Seong-Bae Suh in the Skirball Institute of Biomolecular Medicine, Department of Cell Biology, in a program of neuroscience at New York University School of Medicine. Prior to my work at NYU, he obtained his doctoral degree from KAIST in South Korea. When he was a graduate student, He found an ancestral sleep regulatory function of sex peptide receptor (SPR) and its novel ligand MIP (Oh et al. PLoS Biology 2014). This work made a meaningful contribution of field of evolution of sleep and sexual behaviors of the flies. As a postdoc, he broadened his research interest to understand how innate behaviors of animals are controlled by the internal metabolic condition to maintain homeostatic balance of the body. Particularly, he focused on energy homeostasis which is controlled by the internal metabolic and physical sensors and the effect of communication between neurons in the brain and endocrine organs for preventing diabetes in various animals. In his recent paper (Oh et al. Nature 2019), he showed that ablated function of specific glucose-sensing neuron makes a diabetic phenotype in flies and found those neurons are essential to maintain the glucose concentration in the blood by manipulating the secretion of insulin and glucagon-like peptide in flies.

## KWiSE FORUM

***Session Chair: HeaYeon Lee, Ph.D.,*** *Mara Nanotech*

# She can breastfeed: a systematic review on the feasibility and challenges of breastfeeding among breast cancer survivors

**Trishnee Bhurosy, Ph.D.**
Rutgers Cancer Institute of New Jersey

**Abstract**
*Background* Breastfeeding can improve the survival rates and overall health of breast cancer survivors and is beneficial for babies even after a cancer diagnosis. However, breastfeeding has been minimally studied among breast cancer survivors of reproductive age. *Purpose* The aim of this systematic review is to assess whether breast cancer survivors breastfeed after their treatment has been initiated and to explore their experiences regarding breastfeeding. *Methods* A literature search was performed online using PubMed, Embase, CINAHL, PsychInfo and Web of Science databases. Inclusion criteria for the studies were: original research articles published in peer- reviewed journals from January 01, 1990 to November 25, 2019, studies written in English, priority population included breast cancer survivors who got pregnant and the proportion of women who attempted breastfeeding following breast cancer diagnosis. *Results* Based on the inclusion criteria, thirteen studies were included in the systematic review. Despite having successful births, between 7.7% and 90.9% of women attempted breastfeeding. Breastfeeding among participants varied from a few weeks to about two years. Participants reported limited breast milk production from the treated breast. Successful contralateral breastfeeding was reported in three studies. Reported facilitators of breastfeeding included lactation counselling, being motivated to breastfeed, bonding with their infant, advice from an International Board of Certified Lactation Consultant (IBCLC), support from family and friends, frequent feedings and use of galactagogues. Personal choice, medical counseling against breastfeeding, insufficient milk production, voluntary milk cessation through hormones, and refusal of infant to breastfeed from the treated breast were reasons cited for not breastfeeding. *Conclusions* Breastfeeding is healthy and feasible among breast cancer survivors of reproductive age. Successful breastfeeding among breast cancer survivors requires support at multiple levels and expert advice from healthcare professionals including IBCLCs. There is a need for interventions that promote safe and feasible breastfeeding in this population. *Keywords*: breastfeeding, lactation, breast cancer survivors, contralateral breastfeeding Registration ID on PROSPERO (under review): 163896

**Biography**
**Dr. Bhurosy** is a behavioral scientist who specializes in applied research to design and evaluate theory-driven and technology-based nutrition intervention programs. Her research interests include behavioral and intervention research on dietary and other health behaviors which underlie obesity and cancer among populations in the United States (US) and in developing countries. Specifically, her research 1) identifies the belief factors of dietary and other health behaviors, 2) tests change processes through technology-based dietary interventions and builds an understanding of how these processes improve dietary behaviors and 3) examines disparities in population-level health behaviors. Her aim is to conduct research that informs the development of effective behavior change programs in the field of cancer prevention. Prior to that, her research included designing and assessing intervention programs that improve access to local fruits and vegetables among women and older adults in Mauritius.

# Artificial Intelligence in Taxation

**Teryn Cha, Ph.D.**
Assistant Professor, Computer Sciences, Essex County College

**Abstract**
In increasingly digital culture, software about U.S. Income Tax can not only calculate tax effects where the legal results of transactions are known, but also incorporate perspectives from individual taxpayers. In this paper, how AI-enabled software can take on a role in understanding individual taxpayers' behaviors and recommending ways of saving taxes. To forecast the likely outcome of individual tax deduction and/or credits, multivariate regression with neural networks is applied to historical tax filing data that taxpayers have made. Besides, utilizing ontologies that represent computerized knowledge, tax software can be extended to explain its computation and also educate the user about the domain, individual tax with smart reasoning.

**Biography**
**Dr. Teryn Cha** is an assistant (tenured) professor of Computer Sciences at Essex County College, Newark, New Jersey. She received her Ph.D. degree in Computer Science from the New Jersey Institute of Technology (NJIT) in 2008, with a focus on AI/Knowledge Representation. She has published over 20 journal and conference papers in Semantic Web Technology, Knowledge Representation, Health Informatics and Machine Learning, etc.
Dr. Cha has served as an committee member for international conferences, including the workshop chair at the IEEE Joint Conference on E-Commerce Technology and Enterprise Computing, E-Commerce and E-Services (2008) and the Web and Publicity chair at Int. Conference on Digital Government Research (dg.o 2017). She is a member of the IEEE Computer Society, the Association for Computing Machinery, High Technology Crime Investigation Association and Korean American Woman in Science and Engineering.

# Development of upstream cell culture process for the production of biologics

**Muri Han, Ph.D.**
Director, GC Pharma

**Abstract**
Upstream cell culture is one of the key processes to control productivity and quality in the production of the biological products. Bioprocesses are developed at lab-scale and then scaled-up to the pilot and production scales. Conventional development of bioprocess is not efficient anymore since it involved cost- and time-consuming works. Expeditious development of bioprocess becomes more important in order to advance to the next stage in the highly competitive biologics market and also to provide appropriate treatment for the patients in a timely manner. Automation and miniaturization of cell culture process require comprehensive knowledge on system biology and big data analysis.

**Biography**
**Dr. Muri Han** has achieved her B.S. in Chemical Engineering at Yonsei University, M.S. in Chemical Engineering (Bacterial Fermentation) at KAIST, and Ph.D. in Biomaterials Engineering at the University of Tokyo with the theme of gene therapy & DNA delivery using polymetric system and 3D culture of mammalian cells. She was a post-doc in Biological Chemistry department at Graduate School of Medicine, UCLA and her research topic at that time was gene therapy & DNA delivery using proteins.
Dr. Han is currently working as Director at GC Pharma (in Boston office) from Oct. 2019, supporting business development & HR recruiting, and previously her role was a Team Lead Manager for upstream process in mammalian cell culture and bioprocess engineering from 2016. Before joining GC Pharma, she worked at Baxter (Baxalta) as a upstream process development Scientist (2013-2016) and Bristol Myers Squibb as Analytical development role (2011-2012).

## IT FORUM

***Session Chair: SeungJoon Lee, Ph.D.,*** *Google*

# Maximal Mutual Information Predictive Coding for Natural Language Processing

**Jang Sun Lee (Karl Stratos), Ph.D.**
Assistant Professor, Computer Science, Rutgers University

**Abstract**
Neural predictive coding is an enormously successful approach to unsupervised representation learning in natural language processing. In this approach, a large-scale neural language model is trained to predict the missing signal (e.g., next word, next sentence) and the trained model is used in downstream tasks to produce useful text representations. While effective, it is computationally difficult to work with and yields uninterpretable representations. In this talk, I will present a novel approach to neural predictive coding based on maximal mutual information (MMI). Instead of predicting the raw missing signal, we define a set of interpretable latent "codes" and directly predict the underlying code of the missing signal. The model is trained by maximizing the mutual information between the predicted codes. I will first present a simple and effective MMI predictive coding neural model that pushes the state-of-the-art performance in unsupervised part-of-speech tagging. In the general case in which exact calculation of entropy is intractable, a popular workaround is to maximize a sample-estimated lower bound on mutual information. I will next show that this approach suffers from fundamental statistical limitations and present an alternative approach free of these limitations.

**Biography**
**Dr. Jang Sun Lee (Karl Stratos)** is an Assistant Professor in the Computer Science Department at Rutgers University. His research centers on statistical approaches to unsupervised learning in natural language processing. He completed a PhD in computer science from Columbia University in 2016. During PhD, he was advised by Michael Collins and worked closely with Daniel Hsu. After PhD, he was a senior research scientist at Bloomberg LP (2016-2017) and a research assistant professor at Toyota Technological Institute at Chicago (2017-2019).

# Digital 4D Printing for Engineered Living Materials

**Howon Lee, Ph.D.**
Assistant Professor, Mechanical and Aerospace Engineering, Rutgers University

**Abstract**
Engineered living materials refer to artificial materials systems that have attributes of living systems, including the ability to sense the presence of external stimuli and adapt to the changing environment. Such materials systems offer tremendous potential for autonomous and intelligent engineering systems when precisely manufactured in specific architectures with programmed responses. Emerging pathway to create dynamic and adaptive mechanical systems involves additive manufacturing (often called 3D printing) of responsive materials. This approach has been recently termed “4D printing”, with the 4th dimension being time.
In this talk, 4D printing of responsive materials using projection micro-stereolithography (PμSL) will be presented. PμSL is a micro 3D printing technique that turns light into a complex 3D structure by utilizing the state-of-the-art digital display. Combining rapid, versatile, and scalable micro 3D printing technique with smart materials, design principles and mechanics inspired by exquisite motions and morphologies in nature are physically realized. Micro-structures that can transform, move, and even jump are demonstrated by programming of dynamic response of various responsive hydrogels. In addition, unprecedented access to micro- and nano-scale afforded by precision micro 3D printing allows for implementation of mechanics-driven design principles in micro-architectures, leading to mechanical properties far superior to those found in nature, such as ultra-low density and high stiffness. Furthermore, geometrically reconfigurable, functionally deployable, and mechanically tunable lightweight material is created through 4D printing with a shape memory polymer.

**Biography**
**Dr. Howon Lee** is an Assistant Professor in the Department of Mechanical and Aerospace Engineering at Rutgers University – New Brunswick. He received his BS and MS degrees from Seoul National University, and PhD degree from the University of Illinois at Urbana-Champaign, all in mechanical engineering. He then held a Battelle/MIT Postdoc Fellow position at MIT before he joined Rutgers in 2014. His research group at Rutgers is currently involved in a wide spectrum of research including advanced manufacturing, stimuli-responsive materials, 4D printing, mechanics of smart materials, mechanical metamaterials, and biomedical engineering.

## ENGINEERING FORUM

*Session Chair: Ohbong Kwon, Ph.D., New York City College of Technology*

# *In situ* Iron-doping of $MoS_2$ via Chemical Vapor Deposition toward Room Temperature Ferromagnetism

**Eui-Hyuk Yang, Ph.D.**
Professor, Mechanical Engineering, Stevens Institute of Technology

**Abstract**
The two-dimensional (2D) atomic crystals exhibiting magnetic properties provide an ideal platform for exploring new physical phenomena in the 2D limit. This new approach represents a substantial shift in our ability to control and investigate nanoscale phases. Experimental studies have shown doping of dissimilar atoms into transition metal dichalcogenides to create 2D dilute magnetic semiconductors, which are a promising candidate for spintronics applications. The success of these previous attempts, however, was fairly limited, resulting in either a Curie temperature well below room temperature or random local clustering of magnetic precipitations, *i.e.*, lacking uniformity for integration into devices. Here our work demonstrates a 2D dilute magnetic semiconductor at room temperature via an in situ synthesis and characterization of Fe-doped $MoS_2$ monolayers. We simultaneously achieve the *in situ* doping of Fe and the growth of $MoS_2$ monolayers via low-pressure vapor deposition growth. Using advanced characterization techniques, we show that Fe incorporates substitutionally into Mo lattice sites, and probe ferromagnetism at room temperature. This new class of van der Waals ferromagnets finds critical applications, including on-chip magnetic manipulation of quantum states or in spintronics.

**Biography**
**Dr. Eui-Hyuk Yang** is a Professor of the Mechanical Engineering Department at Stevens Institute of Technology. The first to receive a MEMS Ph.D. in his native South Korea, he joined Stevens in 2006 following tenure as a senior member of the engineering staff at NASA Jet Propulsion Laboratory, where he was awarded, among other honors, the Lew Allen Award for Excellence for developing MEMS-based actuators and microvalves for large-aperture space telescopes and deformable mirrors capable of correcting for optical aberrations to improve high-resolution imaging. Through the Stevens Micro Device Laboratory, Dr. Yang facilitates student research and hands-on education in emerging nanotechnologies. In addition to his role as a faculty advisor of the nanotechnology graduate program, he spearheaded the design of Stevens' first undergraduate nanotechnology research-track training program. Dr. Yang has secured more than 35 federal grants and contracts totaling approximately $8.5 million, including funding from the National Science Foundation, Air Force Office of Scientific Research, National Reconnaissance Office, US Army, and NASA. Dr. Yang's professional service credits include editorial or editorial board positions for several journals, including Nature's Scientific Reports and multiple track chair positions for ASME International Mechanical Engineering Congress and Exposition (IMECE). He has produced more than 300 journal papers, conference proceedings, and presentations and has delivered 86 keynote or invited talks. He holds 17 issued or pending patents in the fields of micro- and nanotechnology. Dr. Yang was a featured Micro- and Nano-Systems Engineering and Packaging track plenary speaker at IMECE in 2018. He received the Award for Research Excellence at Stevens in 2019. Dr. Yang has been elected a Fellow of the National Academy of Inventors, the highest professional distinction for academic inventors. He has also been elected a Fellow of the American Society of Mechanical Engineers (ASME) for his extensive contributions to the fields of micro- and nanotechnology.

# Ultrasonically Powered Smart Stent for Abdominal Aortic Aneurysm

**Albert Kim, Ph.D.**
Assistant Professor, Electrical and Computer Engineering, Temple University

**Abstract**
Endovascular aneurysm repair (EVAR) is an established and reliable surgical treatment of abdominal aortic aneurysm (AAA), where a covered stent is implanted to prevent blood flow in the aneurysm sac. Although current EVAR is an effective technique, it requires long-term monitoring for the post-operative complications (e.g., endoleak, stent occlusion), which usually requires expensive radiologic imaging techniques such as ultrasonography, computed tomography (CT), or magnetic resonance imaging (MRI).

In this paper, I present an accessible and continuous post-EVAR surveillance scheme by developing a smart stent that features ultrasonic powering, blood flow sensing, and integrated wireless electronics. Based on polyvinylidene fluoride (PVDF) thin film that can be surface machined, it has negative Poisson's ratio and is able to expand up to 130% in diameter when stretched. The benefits of this piezoelectric thin film include the expansion and contraction to comply with a minimally invasive procedure and enhanced ultrasonic powering and sensing capability due to the embedded pore architectures. The ultrasound powering generates sufficient electrical power for operating a low power wireless electronics. A comprehensive operation of the smart stent is demonstrated in vitro. The integrated flow sensor can measure blood flow ranging between 30 mL/min to 980 mL/min with an average sensitivity of 0.11mV/mL/min. The wireless electronics transmit and receive such blood flow rate data by modulating the carrier frequency from 81 to 88 MHz from 1 m away. The proposed smart stent is expected to minimize post-EVAR complications by providing convenient early and frequent access to diagnostic information to both patients and physicians.

**Biography**
**Dr. Albert Kim** is a director of Acousto-Micro 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.

## Andrew Kim Memorial Foundation Awardees

**Young Jae Woo, Ph.D.**
Icahn School of Medicine at Mount Sinai
"Multi-scale models of neurological diseases based on big biomedical data"

**Huensuk Kim, Ph.D.**
Icahn School of Medicine
"Oncogenic role of SFRP2 in p53-mutant osteosarcoma development via autocrine and paracrine mechanism"

**Yeongsu Cho, M.S.**
Columbia University
"Optical properties of the layered perovskites derived from properties of the bulk perovskites"

**David K. Park, Ph.D. candidate**
Columbia University
"Characterization of Risk Genes for Alzheimer's Disease via Image-driven Brain Morphology and Function"

**Jae Gyun Oh, Ph.D.**
Icahn School of Medicine at Mount Sinai
"Analysis of Extracellular Vesicle miRNA Profiles in Heart Failure"

**Yongtaek Oh, Ph.D. candidate**
Drexel University
"Investigation on the brain dynamics of insight and neural correlates of associated reward processing"

## Past Andrew Kim Memorial Foundation Awardees

| Year | Awardee | Award | Affiliation |
|---|---|---|---|
| 2018 | Eunju Im | Science | Nathan S. Kline Institute/New York University |
| | Hojoon Lee | Science | Columbia University Medical Center |
| | Dahea You | Science | Rutgers, The State University of New Jersey |
| | Junhwan Alexander Bae | Engineering | Princeton University |
| | Chris Chaeha Lim | Engineering | NYU School of Medicine |
| | Ji Sun Park | Engineering | Columbia University |
| 2019 | Howook Hwang | Science | Columbia University |
| | Heuijoon Park | Science | Fred Hutchinson Cancer Research Center |
| | Yoonhee Lee | Engineering | Columbia University |
| | Taewan Kim | Science | Memorial Sloan Kettering Cancer Center |
| | Youngwan Kim | Engineering | Columbia University |
| | Tae-Hyeon Shin | Science | University of Pennsylvania |

The 2nd Andrew Kim Memorial Foundation Award
Montclair State University, Montclair, NJ, March 23, 2019

# Call for Participation: The KITEE Idea Pitch Competition

The Korean-American Innovative Technology Engineers and Entrepreneurs (KITEE) holds the fourth KITEE Idea Pitch Competition on **June 25th, 2020** in New Jersey. This competition aims to promote entrepreneurship of Korean-American scientists, engineers, and students studying engineering and science and encourage them to pursue building a promising startup. Of the many that apply, selected budding entrepreneurs will go head-to-head to compete individually or as a team to win an 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 & Eligibility**

- Any compelling idea for business that has not been commercialized yet
- Any KITEE member or KSEA member with KITEE as his/her KSEA APS as of May 31st, 2020
- Has not received more than US$300K in funding
- Is less than 3 years old as of May 31st, 2020


**Winners** (up to 3)

- 1st place: $2,000 plus, upon requests, continuous assistance from KITEE
- 2nd place: $500
- Idea Award: $500

**Timeline**

- April 5th, 2019 Due of Notification of Intention (*optional*)
  *(The Committee will provide support for preparation upon requests.)*
- May 31st, 2020 Application due (by email)
- June 7th, 2020 Finalists notification
- June 25th, 2020 Pitch!
- June 25th, 2020 Winner announcement

**How To Apply**

- ***By May 31st, submit a one-page description*** to event@kitee.org with the following:
  - Your startup's value proposition
  - Problem(s) your product and/or service is solving
- A one-page description template and an evaluation rubric are available at http://www.kitee.org.

**Evaluation**

- Finalists will showcase their innovative solution, idea, or technology and will be assessed by a panel of judges on site.
- Each will have a total of 10 minutes (6 minutes to pitch and 4 minutes for Q&A with the panel).
- Confidentiality: Protection of intellectual property (IP) is up to the contestant.

*Updated information will be available at the KITEE website, http://www.kitee.org.*

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KITEE Innovation to Business


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# "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.

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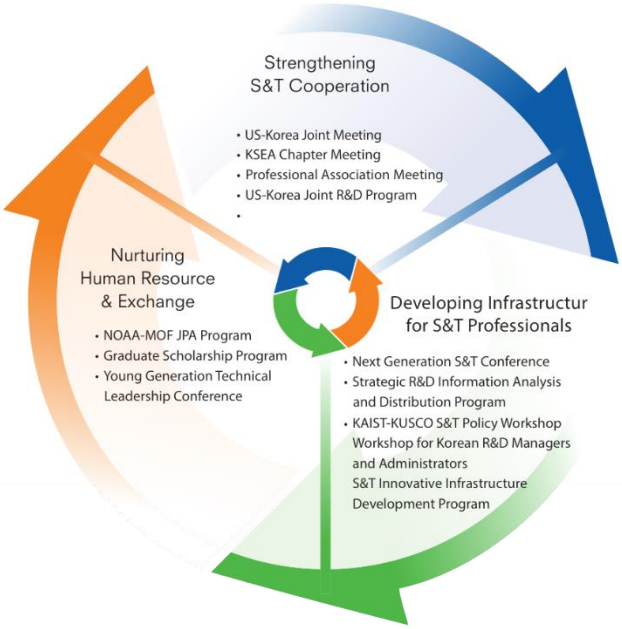


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