CONFERENCE PROGRAM

The 24th KSEA Northeast Regional Conference (NRC)

2015 KASBP Spring Symposium

June 12-13, 2015

Sheraton Edison Hotel-Raritan Center
125 Raritan Center Parkway, Edison, NJ 08837, USA

Hosted by

Korean-American Scientists and Engineers Association
New Jersey, New York Metropolitan Chapters
(KSEA-NJ and KSEA-NY Metro) and
Korean American Society in Biotech and Pharmaceuticals (KASBP)

Sponsored by


Global · R&D 선도
Hanmi 한미약품
Hanmi
도전하겠습니다!
개척하겠습니다!
• 매출 18% 신약 R&D 투자
• 신약 프로젝트 21건 임상 시험
• 글로벌 개량신약 국내 최초 개발
모두가 쉬운 길을 택할 때,
아무도 가지 않는,
새로운 길만을 개척했던 한미약품!
인류건강을 위한
혁신신약 연구개발로
삶의 가치를 높이는데 앞장서겠습니다

Welcome to 24th NRC & 2015 KASBP Spring Symposium

The Korean-American Scientists and Engineers Association (KSEA) NJ, NY Metro Chapters, and KASBP will hold the 24th KSEA Northeast Regional Conference (2015 NRC) and 2015 KASBP Spring Symposium at Sheraton Edison Hotel-Raritan Center, NJ, USA on June 12-13, 2015. 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. The 24th KSEA Northeast Regional Conference (2015 NRC) and 2015 KASBP Spring Symposium will also contribute greatly to the advancement of research and development in both USA and Korea. In addition, it will provide an opportunity for members and other subject matter experts to establish professional networks, as well as to explore career opportunities.

The 24th KSEA Northeast Regional Conference (2015 NRC) and 2015 KASBP Spring Symposium Committee would like to extend an invitation to you to this wonderful forum and would appreciate if you would accept this invitation. We are looking forward to seeing you all at the 24th KSEA Northeast Regional Conference (2015 NRC) and 2015 KASBP Spring Symposium.

Jaeyoung Kwak, Ph.D.	**K. Stephen Suh, Ph.D.**	**Youngsun Kim, Ph.D.**
KSEA-NJ	KSEA-NY Metropolitan	KASBP
Conference Co-chair	Conference Co-chair	Conference Co-chair

2015 KASBP 봄 심포지엄 환영사

유한양행, 한미약품, 한국제약협회를 비롯한 여러 기관의 후원과 협조로 치루어지는 2015 KASBP 봄 심포지엄에 참가하신 여러분 모두를 진심으로 환영합니다. 예년과 같이 올해도 한국과 미국의 제약 및 관련 생명과학 분야에서 종사하시는 제약관련 전문가들이 저희 심포지엄에 참석하여 주셨습니다. 이번 행사가 여러분들에게 신약 개발에 대한 최근 동향, 임상시험 및 신약 인허가 과정에서의 현안에 대한 열띤 토론의 장이 되기를 기대해 봅니다.

아울러 저희 협회는 이번 심포지엄을 통해 미국의 대학과 다양한 연구기관에서 신약개발에 직·간접적으로 연관된 분야에서 우수한 연구 성과를 보여준 젊은 과학자들을 찾아 격려하는 자리도 마련하였습니다. 또한 제약관련 현장에서 연구하는 전문가들과 학교에 계신 학부, 대학원생과 박사후 연구원 과정에 있는 젊은 연구자들의 만남의 장을 마련하여 젊은 과학자들의 career development 를 돕는 자리도 준비하고 있습니다.

2001 년에 설립한 KASBP (재미한인제약인협회)는 미국과 한국의 제약산업 현장에서 활동하고 있는 전문인들의 모임입니다. 그 동안 저희 협회는 봄, 가을 두차례의 심포지엄을 통해 제약관련 전문가들이 한자리에 모여 관련 분야의 유익한 최신 정보를 공유하고 네트워킹을 할 수 있는 장을 마련하였습니다. 이를 통해 미약하나마 조국 대한민국의 제약산업 발전에 일조할 수 있기를 기대해 봅니다. 그 동안의 성공적인 심포지엄 개최에 이어 열리는 이번 2015 년도 봄 심포지엄도 여러분들의 성원과 관심 속에 풍성한 결실을 맺게 되기를 기대합니다. 끝으로 저희 협회를 향한 참가자 여러분의 지속적인 관심과 따뜻한 격려를 부탁드립니다.

감사합니다.

김영선
11th KASBP 회장

Congratulatory Message from the KSEA President

Greetings fellow members of KASBP, KSEA NY and NJ Chapter!

Time flies! It just feels like only yesterday that I attended and gave a congratulatory remark. I would like to thank you all participants of the 24th Northeast Regional Conference (NRC) and KASBP Symposium 2015. I know this continued success owing to many organizing committee members for their hearts and dedication.

The NRC/KASBP 2015 joint conference uniquely places itself, taking the best of the locality and the regional technical strength. I believe the evolution of technology, as with all other sectors of our society, inevitably follows the 2nd law of thermodynamics or the entropy theory, which means that the entropy continues to increase. The entropy is the "leveling" force, lowing barriers of technical disciplines and blurring vertical market segmentations, and promoting interdisciplinary trend in our society. In this view, the theme of this year's conference *Convergence and Interdisciplinary of IT and BT* is timely and representing well the direction that we should pursue. We must explore the hidden treasures at the boundaries of IT and BT. Entrepreneurship is another vital components to be considered. This harmonization effort calls for open minds and collaborative spirits of people. I believe this joint conference will help revitalize activities and solidarity of NJ, NY Metro Chapters and KASBP and become the flagship region of the KSEA.

I hope your experience with the KASBP/NRC joint conference will be an exciting one, whether it is learning opportunities, discovering new ideas, cultivating research and development collaborations, or appreciating rare networking opportunities to make new friends or renew bonds with old colleagues.

Lastly, I would like to thank the conference co-chairs Drs. Jaeyoung Kwak, Stephen Suh, and Youngsun Kim, Program co-chairs, Jae Uk Jeong, Seungyeul You (BT), Seungjoon Lee and Jaewon Kang (IT), YG program chairs, Sahee Kim, Dahea You, Jason Ki and Michael Kim, and organization Dr. Yun Choe, and all other organizing committee members, advisors, invited speakers, session chairs, volunteers for their dedication for this great conference. I appreciate the generous supports from sponsors, without which this event is not possible.

All the Best!

Thank you.

Myung Jong Lee

Myung Jong Lee
Former (42nd) KSEA President

Organizing Committee

Conference Co-Chairs	Jaeyoung Kwak (KSEA-NJ)	Alcatel-Lucent, jaeyoung.kwak@alcatel-lucent.com
	K. Stephen Suh (KSEA-NY)	Hackensack UMC, KSuh@HackensackUMC.org
	Youngsun Kim (KASBP)	VaxInnate, Youngsun.Kim@vaxinnate.com
Conference Advisors	Heechang Kim (KSEA-NJ)	ACS, kimheechang@yahoo.com
	Young-Choon Moon (KASBP)	PTC Therapeutics, ymoon@ptcbio.com
	KangWook Lee (KSEA-NY)	IBM, kangwook.lee.ibm@gmail.com
Program Chairs	Jae Uk Jeong (KASBP) -BT	GSK, jaeukjeong@gmail.com
	Seungjoon Lee (KSEA-NJ) - IT	Two Sigma Investments, seungjoon@gmail.com
	Jaewon Kang (KSEA-NJ) - IT	ACS, jaewonkang@gmail.com
	Seungyeul Yoo (NYKB)	Mount Sinai Sch of Med, seungyeul.yoo@mssm.edu]
	Dahea Diana YOU (YG)	Rutgers University, dhyou21@gmail.com
	Sahee KIM (YG)	RevHealth, LLC, kimsahee@gmail.com
Fund raising Chairs	Yun H. Choe (KSEA-NJ)	Lucas & Mercanti, LLP, ychoe@lmiplaw.com
	Jae-Hun Kim (KASBP)	IFF, jkim7813@gmail.com
	K. Stephen Suh (KSEA-NY)	Hackensack University Medical Center , KSuh@HackensackUMC.org
Publication Coordinator	Jae Uk Jeong (KASBP) -BT	GSK, jaeukjeong@gmail.com
	Seungjoon Lee (KSEA-NJ) - IT	AT&T, seungjoon@gmail.com
Local arrangement Coordinators	Sahee KIM (YG)	RevHealth, LLC, kimsahee@gmail.com
	K Stephen Suh (KSEA-NY)	Hackensack University Medical Center, KSuh@HackensackUMC.org
	Yun H Choe (KASBP)	Lucas & Mercanti, ychoe@Lmiplaw.com
Treasurers	Yeon-Jun Kim (KSEA-NJ)	AT&T, Yjkim@research.att.com
	Seongwoo Hwang (KASBP)	PTC Therapeutics, shwang@ptcbio.com
Registration Coordinators	Young Jin Kim (KSEA-NJ)	Alcatel-Lucent, young.jin_kim@alcatel-lucent.com
	Alex Kim (KASBP)	Merck, alexander_kim@merck.com
	Jun Hyuk Heo (KASBP)	Merck, jun.heo@merck.com
	K Stephen Suh (KSEA-NY)	Hackensack University Medical Center , KSuh@HackensackUMC.org
Auditors	Heechang Kim (KSEA-NJ)	ACS (Applied Communication Sciences), hee_chang_kim@yahoo.com
	Hak M. Lee (KASBP)	Shire, haklee60@yahoo.com
	Sung Soo Kim (KSEA-NY)	HRCAP, andrew@hrcap.com
Bylaw Committee	KangWook Lee (KSEA-NY)	IBM, kangwook.lee.ibm@gmail.com

2014-2015 KSEA-NY Metropolitan Officers

Title	Name	Affiliation
President	K. Stephen Suh	Hackensack Med Center
1st Vice President	Sae Woong Park	Cornell Medical Center
2nd Vice President	Ju-hyun Lee	Nathan Kline Institute
Executive Director	HyunMo Kim	Hanahreum Group
Financial Director	Chang-Young Nam	Brookhaven Nat Lab

2014-2015 KSEA-NJ Officers

Title	Name	Affiliation
President	Jae-young Kwak	Alcatel-Lucent
1st Vice President	Youngsun Kim	VaxInnate
2nd Vice President	Jaewon Kang	ACS (Applied Communication Sciences)
General (Media) Director	Jaewon Kang	ACS (Applied Communication Sciences)
Finance Director	Yeon-Jun Kim	AT&T
Membership Director-IT	Young Jin Kim	Bell Laboratories
Membership Director-BT	Jun Hyuk Heo	Merck
Technical Director-IT	Seungjoon Lee	Two Sigma Investments
Technical Director-BT	Chang-Sun Lee	PTC Therapeutics
YG Co-Directors	Diana Dahea You	Rutgers University
	Sahee Kim	RevHealth, LLC
Audit	Heechang Kim	ACS (Applied Communication Sciences)

2014-2015 KASBP Officers

Title	Name	Affiliation
President	Youngsun Kim	VaxInnate
President Designated	Jae Uk Jeong	GSK
1st Vice President	Yun H. Choe	Lucas & Mercanti
2nd Vice President	Chang-Sun Lee	PTC Therapeutics
Executive Director	Suktae Choi	Celgene
General Director	Dongweon Song	Novartis
Science Director	Eunsung Junn	Rutgers University
Program Director	K. Stephen Suh	Hackensack Med Center
Financial Director	Seongwoo Hwang	PTC Therapeutics
Web Director	Alex Kim	Merck
YG Director	Diana Dahea You	Rutgers University
Public Relations Director	Sahee Kim	RevHealth, LLC
1st Membership Director	Jun Hyuk Heo	Merck
2nd Membership Director	Chris Lee	Bristol-Myers Squibb
Auditor	Hak-Myung Lee	Shire
Legal Director	Elizabeth Lee	Lucas & Mercanti
Boston Chapter President	Sean Kim	Novartis
Philadelphia Chapter President	Yong-Hwan Jin	GSK
Connecticut Chapter President	Seungwon Chung	Pfizer
DC Chapter President	Luke Oh	Mallinckrodt Pharmaceuticals
Councilor	Hak-Myung Lee	Shire
Councilor	Young-Choon Moon	PTC Therapeutics
Councilor	Je-Phil Ryoo	Handok
Councilor	Yong-Hae Han	ENZYCHEM
Councilor	Jae-Hun Kim	IFF

Program at Glance

<table>
<tr><th rowspan="2"></th><th rowspan="2"></th><th colspan="2">Friday</th><th colspan="4">Saturday</th></tr>
<tr><th>KASBP</th><th>KSEA</th><th>KASBP</th><th>IT</th><th>NYKB</th><th>YG</th></tr>
<tr><td rowspan="13">AM

PM</td><td>7:30-8:30</td><td colspan="2" rowspan="6">Arrival
Hotel Self Check-In</td><td colspan="4">Registration/Breakfast</td></tr>
<tr><td>8:30 -9</td><td rowspan="3">AM Session / Coffee Break</td><td rowspan="3">AM Session / Coffee Break</td><td rowspan="3">Join with KASBP/IT</td><td rowspan="3">Join with KASBP/IT</td></tr>
<tr><td>9-10</td></tr>
<tr><td>10-11</td></tr>
<tr><td>11-12</td><td colspan="2" rowspan="5">Lunch / Poster</td></tr>
<tr><td>12-1</td></tr>
<tr><td>1-2</td><td colspan="2" rowspan="5">PM Session / Coffee Break</td><td rowspan="5">PM Session / Coffee Break</td><td rowspan="5">PM Session / Coffee Break</td><td rowspan="5">PM Session / Coffee Break</td></tr>
<tr><td>2-3</td><td colspan="2" rowspan="4">Arrival
Hotel Self Check-In</td></tr>
<tr><td>3-4</td></tr>
<tr><td>4-5</td></tr>
<tr><td>5-6</td><td colspan="2">Registration</td></tr>
<tr><td>6-7</td><td colspan="2" rowspan="3">Banquet / Keynote Speech
Sponsor Presentation</td><td colspan="4" rowspan="3">Dinner: Ichiumi Restaurant (Tel. 732-906-2370)
352 Menlo Park Dr (Menlo Park Mall), Edison, NJ 08837</td></tr>
<tr><td>7-8</td></tr>
<tr><td>8-9:30</td></tr>
<tr><td>9:30-12</td><td>Round Table Session & Networking</td><td>Round Table Session & Networking</td><td colspan="4">Have A Safe Trip and See You Again…</td></tr>
</table>

Program Summary

June 12, 2015 (Friday)

04:00 PM – 05:30 PM	Job Fair/Interview and Booth set-up (KASBP Only)
05:30 PM – 06:30 PM	Registration & Networking
06:30 PM – 07:40 PM	Opening & Congratulatory Remarks & Dinner
07:40 PM – 08:30 PM	Keynote Speech
08:30 PM – 09:00 PM	Yuhan Presentation
09:00 PM – 09:30 PM	Hanmi Presentation
09:30 PM – 11:00 PM	**KASBP:** Round Table Discussion (Pharma industry –Academia)
	IT: Round Table Session & Networking
	YG: Join KASBP or IT

June 13, 2015 (Saturday) (ALL)

07:30 AM – 08:30 AM	Registration & Breakfast
10:10 AM – 10:30 AM	Coffee Break
12:00 AM – 12:10 PM	Photo time
12:10 PM – 02:30 PM	Lunch & Poster Presentation
03:30 PM – 03:50 PM	Coffee Break
06:00 PM – 09:00 PM	Dinner

June 13, 2015 (Saturday) (KASBP)

08:30 AM – 08:40 AM	Opening Remarks
08:40 AM – 09:10 AM	Session A-1: Discovery of Novel SYK inhibitor
09:10 AM – 09:40 AM	Session A-2: Next Generation ADCs
09:40 AM – 10:10 AM	Session A-3: Open Innovation Concept in Korea
10:10 AM – 10:30 AM	Coffee Break
10:30 AM – 11:00 AM	Session B-1: Korean Clinical Trials Initiatives
11:00 AM – 11:30 AM	Session B-2: Early Phase Clinical Trials in Korea
11:30 AM – 12:00 PM	Fellowship Award Ceremony
12:00 AM – 12:10 PM	Photo time
12:10 PM – 02:30 PM	Networking Lunch / Poster Session
02:30 PM – 03:00 PM	Session C-1: Breakthrough Anti-Cancer Therapy
03:00 PM – 03:30 PM	Session C-2: Global Clinical Trial Trends
03:30 PM – 03:50 PM	Coffee Break
03:50 PM – 04:20 PM	Session D-1: Biosimilar Development
04:20 PM – 04:50 PM	Session D-2: Quality Control for the Biologics in Global Markets
04:50 PM – 05:20 PM	Session D-3: Regulations of Pharmaceutics in US and Europe
05:20 PM – 05:40 PM	Closing Remarks

June 13, 2015, Saturday (IT)

09:00 AM – 09:15 AM	Opening Remarks
09:15 AM – 10:30 AM	Information Technology I-I: Big Data, Clouding, and Mobile Computing
10:30 AM – 10:45 AM	Coffee Break
10:45 AM – 12:00 AM	Information Technology I-II: Big Data, Clouding, and Mobile Computing
12:00 PM – 12:10 PM	Photo time
12:10 PM – 02:30 PM	Networking Lunch/ Poster Session
02:30 PM – 03:45 PM	Information Technology II-I: Systems
03:45 PM – 04:00 PM	Coffee Break
04:00 PM – 05:15 PM	Information Technology II-II: Systems
05:15 PM – 05:30 PM	Closing Remarks

June 13, 2015, Saturday (NYKB)

07:30 AM – 12:00 PM	Breakfast, Registration, KASBP session
12:00 PM – 12:10 PM	Photo time
12:10 PM – 02:30 PM	Networking Lunch / Poster Session
02:30 PM – 03:30 PM	NYKB Session I
03:30 PM – 03:50 PM	Coffee Break
03:50 PM – 05:00 PM	NYKB Session II
05:00 PM – 05:15 PM	Closing Remarks

June 13, 2015, Saturday (YG)

07:30 AM – 12:00 PM	Breakfast, Registration, KASBP or IT session
12:00 PM – 12:10 PM	Photo time
12:10 PM – 01:50 PM	Networking Lunch / Poster Session
01:50 PM – 03:40 PM	Young Generation Session I
03:40 PM – 03:50 PM	Coffee Break
03:50 PM – 05:00 PM	Young Generation Session II
05:00 PM – 05:15 PM	Closing Remarks

Dinner and Networking — Ichiumi Restaurant

6:00PM ***Ichiumi Restaurant***
352 Menlo Park Dr (Menlo Park Mall), Edison, NJ 08837
(Tel. 732.906.2370)

Program

June 12, 2015 (Friday)

Job Fair/Interview and Booth set-up — **2nd Floor Board Room/Lobby**

4:00 PM – 5:30 PM

Coordinator: Dongwon Song (Norvatis) and Sahee Kim (RevHealth, LLC)

Registration & Reception — **Lobby**

5:30 PM - 6:30 PM

Coordinators: *Jun Hyuk Heo, Merck*
Alex Kim, Merck
Sahee Kim, RevHealth, LLC
Yun Choe Lucas & Mercanti
Dahea You, Rutgers University
Young Jin Kim, Bell Laboratories, ALU

Opening Ceremony & Banquet — **Ballroom**

6:30 PM - 7:40 PM

Coordinator: Youngsun Kim, KSEA-NJ Vice President, KASBP President

Opening Remarks:

Jaeyoung Kwak, KSEA-NJ President, K. Stephen Suh, KSEA NY Metro President &
Youngsun Kim, KASBP President

Congratulatory Remarks:

- *Dr. Myung Jong Lee, KSEA Former President*
- *Jung-hoon Woo, KHIDI USA General Director*

Keynote Speech — **Ballroom**

7:40 PM - 8:30 PM

"Medical Cyber-Physical Systems for 21st Century Health Care"
Insup Lee, IEEE Fellow, Department of Computer and Information Science, University of Pennsylvania

Sponsor Talk **Ballroom**

8:30 PM – 9:30 PM

"Value Creation through L2POC", *Su Youn Nam, Chief Scientific Officer, Managing Director of R & D*
Yuhan Presentation

"Introduction to Hanmi R&D", *Se Chang Kwon, Managing Research Director*
Hami Presentation

Networking **General –Ballroom**
IT – Pioneer Room
KASBP/YG – 2nd Floor Meeting Room

9:30 PM - 12:00 AM

KASBP Small Group Discussion
(Pharma industry –Academia, and Career Development) **2nd Floor Meeting Room**

9:30 PM – 11:00 PM

Moderator: Sean Kim, Novartis

IT Small Group Discussion **Pioneer Room**

9:30 PM - 12:00 AM

Moderator: Seungjoon Lee, Two Sigma Investments

June 13, 2015 (Saturday)

Breakfast & Registration (8AM) **Lobby**

7:30 AM ~ 8:30 AM

Coordinators: *Jun Hyuk Heo, Merck*
Alex Kim, Merck
Sahee Kim, RevHealth, LLC
Yun Choe Lucas & Mercanti
Dahea You, Rutgers University
Young Jin Kim, Bell Laboratories, ALU

TECHNICAL SESSION

INFORMATION TECHNOLOGIES FORUM

Opening Remarks **Pioneer Room**

09:00 AM – 9:15 AM

Seungjoon Lee, Two Sigma Investments

Information Technology I-I: Big Data, Clouding, and Mobile Computing **Pioneer Room**

09:15 AM - 10:30 AM

Chair: Seungjoon Lee, Two Sigma Investments

"Cyber Security Analytics Research and Applications"
Jiyong Jang, T. J. Watson Research Center, IBM

"Automatic training data generation for "big" data classification"
Youngja Park, T. J. Watson Research Center, IBM

AM Coffee Break **Lobby**

10:30 AM - 10:45 AM

Information Technology I-II: Big Data, Clouding, and Mobile Computing **Pioneer Room**

10:45 AM - 12:00 PM

Chair: Seungjoon Lee, Two Sigma Investments

"Sparse Bayesian Method for Sound Signal Processing in Time-Frequency Domain"
Jeongran Lee, Bell Laboratories, Alcatel-Lucent

"Ostro: Scalable Placement Optimization of Complex Application Topologies in Large-Scale Data Centers"
Gueyoung Jeong, AT&T Lab-Research, AT&T

Photo Time **Ball Room**

12:00 PM – 12:10 PM

Networking Lunch / Poster Session **Lobby / Ball Room / Pioneer Room**

12:10 PM – 02:30 PM

Information Technology II-I: Systems **Pioneer Room**

02:30 PM - 3:45 PM

Chair: Jaewon Kang, Applied Research, ACS

"Reliability Issues of Tin Whisker Growth in Microelectronic Applications"
Sung K. Kang, T. J. Watson Research Center, IBM

"Vision of Korea 5G Services and Technologies"
Nakjung Choi, Bell Laboratories, Alcatel-Lucent

PM Coffee Break **Lobby**

3:45 PM - 4:00 PM

Information Technology II-II: Systems **Pioneer Room**

4:00 PM - 5:15 PM

Chair: Jaewon Kang, Applied Research, ACS

"Multi-path Transport as SDN applications in Service Provider Packet-Optical Networks"
Young Jin Kim, Bell Laboratories, Alcatel-Lucent

"Planning & Design of Routing Architectures for Military Networks"
John Junghoon Lee, Applied Research, ACS

Closing Remarks **Pioneer Room**

5:15 PM - 5:30 PM

Jaewon Kang, Applied Research, ACS

BIO & PHARMA SCIENCE FORUM

Opening Remarks **Ballroom**

8:30 AM- 8:40 AM
Program chair: Jae Uk Jeong, GSK

Session A **Ballroom**

8:40 AM- 10:10 AM
Chair: K Stephen Suh, Hackensack Med Center

"Novel SYK inhibitor for treatment of Rheumatoid Arthritis & Systemic Lupus Erythematosus (SLE)"
Jong Sung Koh, Genosco

"Next generation ADCs: Expanding the ADC target space by enabling ADCs against tumors with low target expression"
Peter Park, Mersana Therapeutics, Inc.

"Open Innovation in Korea: Back to BASIC"
Jin Keon Pai, Handok, Inc.

AM Coffee Break **Lobby**

10:10 AM- 10:30 AM

Session B **Ballroom**

10:30 AM- 11:30 AM
Chair: Eun-Ju Ryu, Pfizer

"Transformation to Hub for Global and Asia Clinical Trials - Korea Clinical Trial Initiatives"
Dong Hyun Chee, Korea National Enterprise for Clinical Trials (KoNECT)

"Strategic Approaches to Boost Early Phases Clinical Trials"
Min Soo Park, Korea Clinical Trials Global Initiative (KCGI), Yonsei University College of Medicine

Fellowship Awards Ceremony **Ballroom**

11:30 AM- 12:00 PM
Chair: Eunsung Junn, Associate Professor, Rutgers-Robert Wood Johnson Medical School

Photo Time **Ball Room**

12:00 PM – 12:10 PM

Networking Lunch & Poster Presentation **Ballroom**

12:10 PM –2:30 PM

Session C **Ballroom**

2:30 PM – 3:30 PM
Chair: Dongweon Song, Novartis

"A breakthrough therapy"
Peter Kang, Merck & Co., Inc.

"Changing landscape of global clinical trials?"
Soo Bang, Celgene Corporation

PM Coffee Break **Lobby**

3:30 PM –3:50 PM

Session D **Ballroom**

3:50 PM – 5:20 PM
Chair: Chang-Sun Lee, PTC Therapeutics

"Development of NESP biosimilar, CKD-11101"
YeoWook Koh, CKD Research Institute

"The Requirement of the Quality Control Testing for the Biologics Drug Application in the Global Markets"
KernHee Chang, GlaxoSmithKline R&D

"Regulatory Pathways of Pharmaceutics in US and Europe"
Hae Suk (Hess) Suh, Millennium: The Takeda Oncology Company

Closing Remarks **Ballroom**

5:20 PM –5:40 PM
KASBP President: Youngsun Kim, VaxInnate

NYKB FORUM

NYKB will participate in KASBP or IT session in the AM of Saturday.

Networking Lunch / Poster Session **Lobby / Pioneer Room**

12:10 AM – 2:30 PM

NYKB session I **2nd F Meeting Room**

02:30 PM - 03:30 PM

Chair: Sae Woong Park (Weill Cornell Medical College)

"Three Dimensional Cancer Culture Model for Drug Test"
Daniel S. Oh, Columbia University

"A mouse model for gene-environment interaction in holoprosencephaly: synergy between loss of *Cdon* and fetal alcohol exposure"
Mingi Hong, Icahn School of Medicine at Mount Sinai

Coffee Break **Lobby**

03:30 PM – 03:50 PM

NYKB session II **2nd F Meeting Room**

03:50 PM – 05:00 PM
Chair: Patrick Hong (Icahn School of Medicine at Mount Sinai)

"Reduction of increased calcineurin activity rescues impaired homeostatic synaptic plasticity in presenilin 1 M146V mutant"
Seonil Kim, New York University

"Primary cilia ablation regulates functionality of mature dentate granule cells in adult brain"
Soyoung Rhee, Stony Brook University

"*CYFIP1* regulatory variants at the 15q11.2 disease locus associated with inter-individual variation in brain regions implicated in schizophrenia and dyslexia"
YoungJae Woo, Albert Einstein College of Medicine

Closing Remarks **Ballroom**

5:00 PM – 5:15 PM
NYKB President: Seungyeul Yoo, Icahn School of Medicine at Mount Sinai

Young Generation (YG) FORUM

YG will participate in KASBP or IT session in the AM of Saturday.

Networking Lunch / Poster Session **Lobby**

12:10 AM – 01:50 PM

Young Generation Session I **2nd F Meeting Room**

01:50 PM - 03:40 PM

NRC YG Committee: Jason Ki, Michael Dohyun Kim, Sahee Kim, Richard Oh, and Dahea Diana You

"Young Generation Session Welcome and Overview"

Richard Oh & Dahea Diana You

"Job Search in the midst of Career Planning"

Richard Park – HRCap

"Preparing for What's Next"

Katherine Cho - Colin Powell School at the City University of New York- CCNY

PM Coffee Break **Lobby**

3:40 PM - 3:50 PM

Young Generation Session II **2nd F Meeting Room**

03:50 PM - 05:00 PM

NRC YG Committee: Jason Ki, Michael Dohyun Kim, Sahee Kim, Richard Oh, and Dahea Diana You

"KSEA YG Overview"

Jason Ki

"Local YG Chapter Spotlights"

KSEA-CCNY- Honggi Moon

KSEA-Rutgers- Jeffrey Cho and Sophia Seoyoung Lee

YG Session Keynote:

"The Academic Hiring Process and The Meaning of a Faculty Position"

Won H. Suh, Ph.D. Assistant Professor, Bioengineering Department, Temple University, Philadelphia, PA

"Career Development and Panelist Discussion"

SungEun Choi, Ph.D.(Professor, Queens College, Food Sensory Science with Nutritional Science)

Anthony Han (Mechanical Engineer, Becton, Dickinson, and Company, Product development)

Hyun Ik Kim (Drug Safety Associate, Taro Pharmaceuticals)

Michael DoHyun Kim (Mechanical Engineer, Strong Arm Technologies, Tech Start-up)

Closing

Dahea Diana You

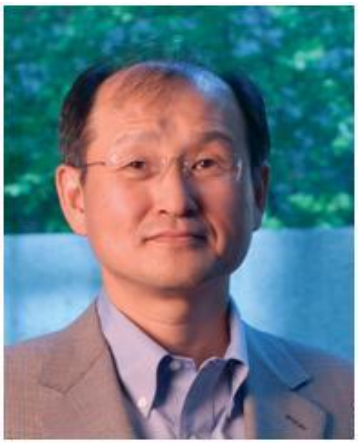
Closing Remarks **2nd F Meeting Room**

05:00 PM - 05:15 PM

Yun H. Choe, 2013-2014 KSEA-NJ President

Abstract and Biography

KEYNOTE SPEECH



Medical Cyber-Physical Systems for 21st Century Health Care

Insup Lee

PRECISE Center
Department of Computer and Information Science
University of Pennsylvania

Abstract: Medical devices are undergoing significant transformations, embracing the potential of embedded software and network connectivity. Instead of stand-alone devices that can be designed, certified, and used independently of each other for patient treatment, networked medical devices will work as distributed systems that simultaneously monitor and control multiple aspects of the patient's physiology. The combination of embedded software controlling the devices, networking capabilities, and complicated physiological dynamics exhibited by patient bodies makes modern medical device systems a distinct class of cyber-physical systems (CPS). We refer to these as medical cyber-physical systems (MCPS). The goal of MCPS is to improve patient safety and treatment outcomes by leveraging diverse capabilities of individual devices to gain a more detailed and accurate picture of the evolving patient state. A distinguishing feature of MCPS, compared to other CPS domains such as avionics, is their reliance on a multitude of medical devices, separately developed for specific intended use. This plethora of choices gives a lot of flexibility for the clinical personnel to select a clinical scenario and a set of devices, best suited for treatment of a particular patient. However, traditional medical devices are developed as monolithic stand-alone systems. Due to lack of interoperability between medical devices, clinicians have to carry out manually such coordinated uses in practice. Numerous cases have been reported, where patient safety has been compromised due to an error that could have been prevented or mitigated if these devices were networked and properly coordinated by software that ensure some sort of safety-lock. There are several on-going efforts to support interoperability between medical devices using open standards. Based on standards, it is envisioned that MCPS would be assembled on-demand since they should be put together for a particular clinical scenario using available medical devices as needed, instead of having dedicated a set of medical devices developed and pre-configured for each clinical scenario. Such an on-demand assembly of MCPS requires a new paradigm to guarantee the safety of clinical applications using the MCPS. In contrast, currently practiced technologies for safety-critical systems assume that the system will be fully designed, manufactured, and tested prior to the customer. The main reason is that safety and effectiveness are emergent system-level properties and whether the properties are satisfied depends on the interactions among the system's components. This talk will explain what medical device interoperability is, why the traditional approach would not scale for on-demand MCPS and then present a newly emerging approach based on medical application platforms. In particular, this talk will

describe the needs, challenges, and architecture of medical application platforms and example clinical scenario apps.

Biography: Prof. Insup Lee is the Cecilia Fitler Moore Professor of Computer and Information Science and Director of PRECISE Center, which he founded in 2008, at the University of Pennsylvania. He received B.S. in Mathematics with Honors from UNC-Chapel Hill and Ph.D. in Computer Science from University of Wisconsin at Madison. His research interests include cyber-physical systems (CPS), real-time and embedded systems, high-confidence medical-device systems, formal methods and tools, run-time verification, and trust management. The theme of his research activities has been to assure and improve the correctness, safety, and timeliness of life-critical embedded systems. He received best paper awards in IEEE RTSS 2003, CEAS 2011, IEEE RTAS 2012, IEEE RTSS 2012, and ACM/IEEE ICCPS 2014. Recently, he has been working in medical cyber-physical systems and security of cyber physical systems. He has served on many program committees, chaired many international conferences and workshops and served on various steering and advisory committees of technical societies. He has also served on the editorial boards on the several scientific journals, including Journal of ACM, IEEE Transactions on Computers, Formal Methods in System Design, and Real-Time Systems Journal. He is a founding co-Editor-in-Chief of KIISE Journal of Computing Science and Engineering (JCSE). He was a member of Technical Advisory Group (TAG) of President's Council of Advisors on Science and Technology (PCAST) Networking and Information Technology (2006-2007). He is a member of the National Research Council's committee on 21st Century Cyber-Physical Systems Education (Dec 2013-May 2015). He received an appreciation plaque from Ministry of Science, IT and Future Planning, South Korea, for speaking at the Universal Linkage for Top Research Advisor (ULTRA) Program Forum in 2013. He is IEEE fellow and received IEEE TC-RTS Outstanding Technical Achievement and Leadership Award in 2008.

TECHNICAL SESSION

INFORMATION TECHNOLOGIES FORUM

Session I-I: Big Data, Clouding, and Mobile Computing

Chair: Seungjoon Lee (Two Sigma Investments)

Cyber Security Analytics Research and Applications

Jiyong Jang, Thomas J. Watson Research Center, IBM

Abstract: The cyber threat landscape, controlled by organized crime and nation states, is evolving rapidly towards evasive, multi-channel attacks, as impressively shown by malicious operations such as GhostNet, Aurora, Stuxnet, Carbanak, or Equation. As threats blend across diverse data channels, their detection requires scalable distributed monitoring and cross-correlation with a substantial amount of contextual information. With threats evolving more rapidly, the classical defense life cycle of post-mortem detection, analysis, and signature creation becomes less effective. In this talk, I present the design, architecture, and implementation of a novel analysis engine, called Feature Collection and Correlation Engine (FCCE), that finds correlations across a diverse set of data types spanning over large time windows with very small latency and with minimal access to raw data. FCCE scales well to collecting, extracting, and querying features from geographically distributed large data sets. FCCE has been deployed in a large production network with over 450,000 workstations for 3 years, ingesting more than 3 billion events per day and providing low latency query responses for various analytics. We explore several security analytics use cases to demonstrate how we utilize the deployment of FCCE on large diverse data sets in the cyber security domain. Both evaluation results and our experience with real-world applications show that FCCE yields superior performance over existing approaches, and excels in the challenging cyber security domain by correlating multiple features and deriving security intelligence.

Biography: Jiyong Jang is a Research Scientist in the Security Services Team (formerly Global Security Analysis Lab, GSAL) at the IBM Thomas J. Watson Research Center. Jiyong received his Ph.D. in Electrical and Computer Engineering from Carnegie Mellon University in 2013. His research interests include most areas of computer security, with an emphasis on system and network security. His current research focuses on big data security analytics and its applications to malware analysis, network security, and web security in complex networking systems.

Automatic Training Data Generation for "Big" Data Classification

Youngja Park, Thomas J. Watson Research Center, IBM

Abstract: Supervised machine learning methods are increasingly used as a key technique for big data analysis. One of the key challenges to the widespread application of ML is the lack of labeled samples from

real applications. Labeling a large amount of samples is very expensive and time consuming. To address this data bottleneck problem, I have developed three techniques for automatically and semi-automatically generate labeled samples from unlabeled data sets. In this talk, I will introduce these methods and share experimental results.

Biography: Youngja Park is currently a research staff member at IBM T. J. Watson Research Center in NY. She received a Ph.D in Computer Science from Yonsei University. Her research interests lie with the design and implementation of natural language processing (NLP), information extraction and machine learning applications. Her current research focuses on applying NLP and cognitive computing to information and data security.

Session II: Session I-II: Big Data, Clouding, and Mobile Computing

Chair: Seungjoon Lee (Two Sigma Investments)

Sparse Bayesian Method for Sound Signal Processing in Time-Frequency Domain

Jeongran Lee, Bell Laboratories, Alcatel-Lucent

Abstract: In this talk, a Bayesian time-frequency surfaces modeling of sound signals will be presented. The model is based on decomposing a signal into time-frequency domain using Gabor frames, which requires a careful regularization through a sparse variable selection. A time-line beta-Bernoulli prior on the time-frequency coefficients of Gabor frames is imposed to create dependency structures. To achieve sparsity, recently developed stochastic search variable selection method has been applied. Theoretical aspects of the prior specification are investigated and an efficient MCMC algorithm is developed. Performance of the proposed model with other popularly used models is compared through analyzing simulated and real signals.

Biography: Jeongran Lee has been a Member of Technical Staff at Bell Labs since 2013. She received her PhD and MSc in Statistics at Seoul National University in 2013 and 2008 respectively, and BS in Statistics and Business Administration at Ewha Womans University in 2004. Her research interest is on big data analytics, statistical learning, nonstationary time series estimation and prediction, time-frequency analysis, high-dimensional data analysis, and etc. She is currently working at Telecom Data Analytics team in Network Algorithm, Protocol and Security group, Bell Labs, Murray Hill.

Scalable Placement Optimization of Complex Application Topologies in Large-Scale Data Centers

Gueyoung Jeong, AT&T Lab-Research, AT&T

Abstract: A complex cloud application consists of VMs running software such as web servers and load balancers, storage in the form of disk volumes, and network connections that enable communication between VMs and between VMs and disk volumes. The application is also associated with various requirements, including not only quantities such as the sizes of the VMs and disk volumes, but also quality of service (QoS) attributes such as throughput, latency, and reliability. This talk presents Ostro, an OpenStack-based scheduler that optimizes the utilization of data center resources, while satisfying the requirements of the cloud

applications. The novelty of the approach realized by Ostro is that it makes holistic placement decisions, in which all the requirements of an application are considered jointly. Specific placement algorithms for application topologies are discussed including an estimate-based greedy algorithm and a time-bounded algorithm. These algorithms can deal with complex topologies that have heterogeneous resource requirements, while still being scalable enough to handle the placement of hundreds of VMs and volumes across several thousands of host servers.

Biography: Gueyoung Jung is a Senior Scientist at AT&T Labs Research. He received Ph.D. degree in Computer Science from Georgia Tech in 2010. Before joining AT&T, He was a senior research scientist in PARC for 4 years, and occasionally served as an adjunct professor at University of Rochester teaching Cloud Computing. He also worked as a system developer for 5 years in industry. Gueyoung's current research interests are in distributed computing systems and QoS optimization based on Artificial Intelligence and Data Analysis Modeling. Gueyoung has authored and co-authored 30+ technical publications in prestigious conferences and journals, and has 8+ US patents.

Session II-I: SYSTEMS

Chair: Jaewon Kang (ACS)

Reliability Issues of Tin Whisker Growth in Microelectronic Applications

Sung K. Kang, Thomas J. Watson Research Center, IBM
Jaewon Chang, Dept of Materials Science & Engineering, KAIST, Daejeon, Republic of Korea
Hyuck Mo, Lee, Dept of Materials Science & Engineering, KAIST, Daejeon, Republic of Korea
Jae-Ho, Lee, Dept of Materials Science & Engineering, Hongik University, Seoul, Republic of Korea
Keun-Soo Kim, Fusion Technology Lab., Hoseo University, Asan, Republic of Korea

Abstract: Sn whiskers are becoming a serious reliability problem in microelectronics where Pb-free solder technology is being implemented with pure Sn or Sn-rich alloys. Numerous investigations have been performed to understand the whisker growth mechanisms and thereby to mitigate Sn whisker growth. Among many Sn whisker mitigation strategies, minor alloying additions to Sn have been found to be most effective. One challenge in evaluating Sn whisker growth is a time-consuming aging test, such as 4000 h testing condition recommended by the JEDEC standard. In this study, several commercial Sn and Sn-Ag baths of low whisker formulation are evaluated. The effects of plating variables and aging conditions on Sn whisker growth are investigated with matte Sn, Sn-Ag, and bright Sn-Ag electroplated on a Cu/Ni/Si substrate. In addition, the effect of plastic deformation on Sn whisker growth is investigated as an acceleration method for Sn whisker testing. Microhardness indentation technique is applied to electroplated Sn and Sn-Ag samples to plastically deform them before T/H testing. Plastic deformation is found to significantly accelerate Sn whisker growth both in pure Sn and Sn-Ag samples. The method of plastic deformation can be employed to accelerate the time-consuming Sn whisker growth testing.

Biography: Sung K. Kang is a senior research scientist at the IBM Thomas J. Watson Research Center, Yorktown Heights, NY. He received a B.S. degree in metallurgical engineering from Seoul National Univ., Korea (1969), and Ph.D. degree in materials science and metallurgy from the Univ. of Pennsylvania (1973). He was a post-doctoral research fellow at Carnegie-Mellon University, research scientist at Nova Scotia Technical Univ., Halifax, Canada, assistant professor at Stevens Institute of Tech., NJ, and senior scientist at the International Nickel Company, Suffern, NY. In 1984, he joined IBM Research Center, where he has worked on microelectronic interconnection technologies, and recently on environmentally friendly electronic materials. Dr. Kang is an author/coauthor of more than 130 technical papers and produced more than 140 inventions. He received an IEEE CPMT Society Award ('09), and IEEE Fellow award in recognition of his research contributions to lead (Pb)-free solders in microelectronics ('09). He also received TMS (the Minerals, Metals & Materials Society Distinguished Service Award ('08), and TMS Fellow award (2012). He served as the 35th President of KSEA (Korean-American Scientists & Engineers Association, '06-'07), and NY Metro Chapter President ('81-'82). As community service, he organized educational seminars for parents at KMSO ('94-'13). In 2013, he received the 17th KBS Global Korean Award (in science & technology). In 2014, he received Community Service Award from KAAGNY (The Korean American Association of Greater New York).

Vision of Korea 5G Services and Technologies

Nakjung Choi, Bell Laboratories, Alcatel-Lucent

Abstract: The paradigm shift to 5G mobile network in year 2020, is expected as the explosion of traffic and mobile devices. For the success of 5G systems, it should be designed and operated on extremely challenging environment. Recently, Korea government announced a goal towards to 5G as "Quadruple x1000"; a thousand times-increased mobile traffic, a thousand time-reduced Latency, a thousand times-increased mobile devices and a thousand times-efficient energy savings. In this talk, I overview 5G vision, requirements, service scenarios and candidates of technologies Korea is taking into account at this moment. The high level requirements for 5G will be discussed and several key technology issues including KPI and killer-service applications will be presented to cover Korea's Quadruple x1000.

Biography: Nakjung Choi received the B.S. and Ph.D. degrees in computer science and engineering from Seoul National University (SNU), Seoul, Korea, in 2002 and 2009, respectively. From September 2009 to April 2010, he was a postdoctoral research fellow in the Multimedia and Mobile Communications Laboratory, SNU. Since April 2010, he is a member of technical staff at Bell Labs, Alcatel-Lucent, Korea and US. He has more than 60 papers/patents and is serving as TPC members/reviewers at many conferences/journals. He received two Best Paper Awards and Bell Labs Awards of Excellences 2014. His recent research interests are 5G mobile network, network functions virtualization/software defined networking, future Internet such as information centric networking, and green networking.

Session II-II: SYSTEMS

Chair: Chair: Jaewon Kang (ACS)

Multi-path Transport as SDN applications in Service Provider Packet-Optical Networks

Young Jin Kim, Bell Laboratories, Alcatel-Lucent

Abstract: Large-scale data-center (DC) operators such as Google, Microsoft, or Amazon are exchanging increasingly high-volumes of data among their data centers, which are often connected via metro networks and long-haul optical links, for purposes such as distributed query processing, load-balancing, and data back-up. Due to high service availability requirements, communication links between DCs are typically 3-4 times over provisioned incurring high capital expenditure. These links typically carry traffic volumes in the order of multiple wavelengths, have a high peak-to-mean traffic ratio, and have application-specific delay requirements. Reconfigurable optical transport networking such as multi-protocol label switching (MPLS) over a dense wavelength division multiplex (DWDM) are being used to support the DC operators, who are concerned with multi-tenancy in clouds, bandwidth elasticity, operational efficiency, and cost. However, in the discussion of the reconfigurable optical transport, none/little attention is paid to resilient and cost-efficient packet transport service that are aware on path diversity, impairments, failures, or topology changes. Networking with multi-path diversity has been the subject of several prior studies, but this work had limited cross-layer awareness. Existing multi-path transport schemes typically used in communication industry generate a single traffic flow per-application and use hashing schemes at the switches to distribute the flows across multiple paths, which require a large number of simultaneously-communicating applications to ensure good throughput. Motivated by these limitations, we introduce new software-defined networking (SDN) based cross-layer multi-path transport (SCMT) that covers layer 4-3 (i.e., TCP/IP layer), layer 2 (i.e., Ethernet), and layer 1-0 (i.e., physical layers). The method ensures service availability without requiring expensive and sometimes computationally-intensive schemes (i.e., 1+1 or 1:N protection). In this work, we show that multi-path TCP as a promising SDN application is significantly improved by cross-layer awareness in terms of throughput and reliability under link impairment environments.

Biography: Young Jin Kim is a Member of Technical Staff of Network Algorithms, Routing, and Security (NARS) Department at Bell Labs, Alcatel-Lucent, USA. Dr. Kim received a Doctorate in Computer Science from University of Southern California and his B.S./M.S. degree in Computer Science from Yonsei University respectively. By 2007, He had worked as a senior software engineer at Samsung Electronics Telecommunication R&D center, Korea. Since joining Bell Labs in 2010, he has been contributing to machine-to-machine (M2M) communications in the context of Smart Grid and Electric Vehicles. His work specifically involved the secure and resilient system design for mission-critical communication applications. His current research interests include software-defined networking (SDN) based methods that address problems in the context of IP-optical communication and inter-data center networking. His research has been published in IEEE/ACM conference proceedings and journals, and has been distributed as publicly-available software.

Planning & Design of Routing Architectures for Military Networks

John Junghoon Lee, Applied Research, ACS (Applied Communication Sciences)

Abstract: Design and planning Military networks requires complex cost-performance trades involving several functions ranging from subnet creation, topology generation, routing hierarchy design & protocol choice, waveform and frequency planning and MAC choices. In this talk, we focus on a subset of the design problems pertaining to routing architecture design that is critical to military networks. The choice of routing architecture including choice of subnets, routing areas and gateways involves complex cost-performance trades. To this end, we use a MANET network design toolset Cognitive Network Engineering Design Analytic Toolset (CNEDAT) which generate/synthesize alternative network designs/plans given a set of network resources, objectives and constraints, by orchestrating various combinations of Waveform, MAC, and network algorithms & protocols, and analyze the resulting network performance to provide options for suitable network stacks and architectures to meet mission objectives.

Biography: John Lee has over 17 years of professional experience in networking and communication systems. He has made major contributions to network architecture design to support vehicular and UAV communications, developing unicast, multicast, and broadcast protocols for vehicular and UAV ad-hoc network environments, and also significant contributions to hybrid simulation-emulation testbed design for testing and evaluating network applications and protocols on various simulation network environments including mobile ad-hoc networks.

BIO & PHARMA SCIENCE FORUM

Session A

Novel Selective SYK Inhibitor for Treatment of Rheumatoid Arthritis and Systemic Lupus Erythematosus (SLE)

Jong Sung Koh, Ph.D., GENOSCO

Abstract: Spleen tyrosine kinase (SYK) is a key mediator of immunoglobuline and B cell receptor signaling in various inflammatory and autoimmune pathway. These immunoreceptors play important roles in the pathological changes of immune diseases, such as rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), allergy and asthma. Recently, inhibition of SYK has been considered as a promising pathway for treatment of immune diseases. SKI-O-703 (SKI-592 salt), a promising novel and oral SYK-selective inhibitor is developed for therapy of RA and SLE. SKI-O-592 shows potent SYK inhibitory activity (IC_{50} of 6.2 nM) in kinase enzymatic assay and high selectivity of SYK over 293 kinases. SKI-O-592 effectively inhibited FcγR-, FcεR- BCR- and TLR9-mediated signaling pathways with IC_{50} ranging from 52 to 118 nM in immune cells and hPBMC. In the mouse and rat CIA models, oral q.d. administration of SKI-O-703 showed excellent inhibition of clinical score/paw edema and histological analysis, which was better than R788 in anti-arthritic effect. Furthermore in the mouse SLE model, oral q.d. administration of SKI-O-703 showed dose dependent improvement of skin lesion, kidney size, proteinurea, and BUN, suggesting that it is high therapeutic value by inhibiting SYK

signaling pathway playing a crucial role in SLE pathology. SKI-O-703 showed desirable *in vivo* pharmacokinetic profiles in rat and dog. Furthermore, no significant toxicity (cardiac, hepatotic, and genotoxicity) was observed even at high dose (≥400 mg/kg/day in rats and ≥150 mg/kg/day in dogs). In conclusion, oral administration of SKI-O-703 displays potent anti-arthritis and anti-SLE effect along with good pharmacokinetic and desirable safety profiles. Therefore, SKI-O-703 is a novel and promising new oral drug candidate with great safety and high therapeutic window for therapy of RA, SLE and other SYK mediated immune diseases. FDA IND filing for SKI-O-703 is in progress.

Next generation ADCs: Expanding the ADC target space
by enabling ADCs against tumors with low target expression

Peter Park, Ph.D., Mersana Therapeutics, Inc.

Abstract: Mersana has developed novel, next-generation antibody-drug conjugation platforms which enable the creation of highly differentiated ADCs for a variety of solid tumor targets and that overcome many of the limitations of existing ADC approaches. The development and application of Mersana's Fleximer-based Dolaflexin ADC platform will be described, and its potential to address low-expression antigens and potentially improve clinical outcomes for a variety of cancer patients will be highlighted.

Open Innovation in Korea: Handok Style

Jin Keon Pai, Ph.D., Handok, Inc

Abstract: The Korean pharmaceutical R&D-landscape with its focus on the less expensive development of over-the-counter drugs and neglect of specialized drugs is thus yet lacking in competitiveness. The government has further provided a framework plan for supporting the pharmaceutical sector: The "Pharma Korea 2020"-plan drawn up by the Ministry of Health and Welfare envisions Korea to join the global top 7 pharmaceutical producers while strengthening development of innovative drugs and increasing pharmaceutical exports. According to the plan, however, three Korean companies will belong to the global top 50 while the pharmaceutical sector will develop a total of 50-60 new drugs by 2020. Interleukin 1 (IL-1), one of the representative pro-inflammatory cytokines that induce fever, pain, and inflammation, plays a significant role in the initiation of inflammatory reactions and immune activation by attracting monocytes, macrophages, and neutrophils to an area where inflammation occurs, activating macrophages, and by promoting the growth and proliferation of T and B cells. Since IL-1 is a direct cause of various autoinflammatory and/or autoimmune diseases or is associated with the progression of these diseases, treatments have been developed to inhibit IL-1 activities. IL-1 receptor antagonist (IL-1Ra) is an intrinsic IL-1 family protein. As it has a similar amino acid sequence and protein structure as IL-1, IL-1Ra competitively inhibit IL-1's binding to IL-1 receptor, thereby suppressing the effects of IL-1. Anakinra (Kineret®), a recombinant protein of Human IL-1Ra (hIL-1Ra), has been approved by the Food and Drug Administration (FDA) for the treatment of rheumatoid arthritis and Cryopyrin Associated Periodic Syndromes (CAPS) and is currently being used for these indications. 1 However, due to its short half life of 2 to 4 hours, anakinra has a shortcoming of having to be administered every day. To improve this inconvenience, Handok Pharmaceuticals Co., Ltd. has been developing HL2351 (hIL1Ra-hyFc), a long acting hIL-1Ra characterized by prolonged half life in the body since 2010. HL2351 is a recombinant protein formed by the fusion of hIL-1Ra into an antibody derived Fc. The hinge of the Fc used in this substance was derived from IgD known as a flexible antibody and the rest of the Fc was derived from G4 (IgG4) known to have a long half life without antibody dependent cell cytotoxicity (ADCC) or complement dependent cytotoxicity (CDC). Therefore, this hybrid Fc (hyFc) was designed to minimize ADCC and CDC. As IL-1Ra is known not to induce internalization of the receptor during its binding to Interlukin 1 receptor I (IL-1RI),

removing ADCC and CDC activities has a significant implication. HL2351, a glycoprotein produced from CHO (chinese hamster ovary DG44) cell line, has two hIL-1Ra components combined to one Fc. Molecular weight of HL2351 is approximately 97kDa. HL2351 was designed have a long half life through reduced elimination by renal glomerular filtration as well as through recirculation resulting from its Fc region binding to neonatal Fc receptor (FcRn). In toxicity studies in rats and monkeys, no significant toxicities were observed at doses studied. Therefore, maximum tolerated dose (MTD) was determined at 100mg/kg or above and no observed adverse effect level (NOAEL) was determined at 100mg/kg (Cmax: 350 μg/ml). Cmax within the range of NOAEL is approximately 350 times PAD, an estimated effective concentration, which, therefore, is considered to ensure sufficient safety. Human equivalent dose (HED) of NOAEL in monkeys is approximately 32mg/kg, which is 30 times PAD in a Phase 1 study. To assess the safety and PK profiles of HL2351 based on the above non-clinical study results, a phase 1 study is performed in a single ascending dose design at a dose range of 1to 12mg/kg in healthy adults. The structure of HL2351 contains hIL-1Ra, an active ingredient of the existing anakinra product. Therefore, HL2351 retains the same pharmacological mechanism of action as anakinra while having a longer half life. Based on these characteristics, HL2351 was designed to have a better dosing regimen than the inconvenient once daily dosing regimen of anakinra. Additionally, HL2351 is also expected to bring about excellent therapeutic outcomes as an effective concentration lasts longer. IL-1Ra, known to be relatively safe, has been approved by the European Medicines Agency (EMA) and the US FDA and is currently being used. Use of IL-1Ra combined with Fc fusion technology that has already been applied in various treatments is expected to address the safety concerns. Since the antagonistic mechanism of HL2351 does not involve amplification loops, its toxicity burden as a long lasting drug also tends to be small. Results from various in vitro and in vivo pharmacology and toxicity studies conducted up to present indicated sufficiently outstanding efficacy and prolonged half life of HL2351, which demonstrates the safety appropriate for the conduct of a Phase 1 study.

Session B

Transformation to Hub for Global and Asia Clinical Trials - Korea Clinical Trial Initiatives

Dong Hyun Chee, MD, Ph.D., MBA, Korea National Enterprise for Clinical Trials (KoNECT)

Abstract: Korea government reformed clinical trial related regulations including introduction of IND process adoption of ICH guidelines, especially E5 and E6 in early 2000. The regulatory reform enabled Korea to participate in multinational clinical trials. Korea MOHW also has invested in clinical trial infrastructure since 2004 by building clinical trial centers across the country and by establishing the Korea National Enterprise for Clinical Trials (KoNECT) in 2007 to foster clinical research in Korea. Originally focused on developing infrastructure for clinical trials in Korea, the decision was made to transform KoNECT into a new sustainable organization in April, 2014. The continuing mission of Korean government and KoNECT is to further develop country's capabilities for clinical trials not only for the recognition of Korea as a hub for global simultaneous development but for supporting Korean industry including clinical development of drug candidates from Korea. KoNECT is dedicated to building stronger collaboration with internal and external partners seeking excellence in clinical trials. The new national initiatives include the Korea Clinical Trials Global Initiative (KCGI) and the Korea Innovation and Collaboration Center for Global Clinical Trials (KICC), which are core components of a matrix of collaborative efforts seeking to engage national and international partners. The KCGI aims to secure and strengthen clinical trial capabilities by identifying and supporting the driving factors necessary for the establishment of early clinical trial capabilities and the conduct of complex clinical trials with five consortia formed with selected ‘Korea Clinical trials Global Center of Excellence’. Along with these national efforts, the

mission of the KICC is to create an unprecedented extensive clinical trial support system enabling sponsors of clinical trials to plan and conduct in Korea by providing a variety of services and systems. KoNECT's services for foreign clinical trial sponsors includes a one-stop shop providing comprehensive access to basic and essential information about Korea, matching with selected local service providers, concierge services for smooth entry into the country, as well as a convenient business space and facilities. The establishment of Asia-wide CT networks and the development of a national clinical trial integrated information system and database are also underway. With significant investments in infrastructure, global quality standards and outstanding biomedical research professionals, Korea is establishing itself as an international leader in clinical trials and global drug development country as new growth drivers for Korea's future.

Korea Clinical Trials Global Initiative - Strategic Approaches to Boost Early Phases Clinical Trials

Min Soo Park, MD, Ph.D., Yonsei University College of Medicine; Clinical Trials Center, Severance Hospital; Korea Clinical Trials Global Initiative (KCGI)

Abstract: Korea certainly has made a successful debust in the global clinical development world in the past 10 years. We are now facing challenges from the waves of change in the global drug development paradigm as well as global clinical trials environment. Drugs fail for many different reasons. But the damage from failures can be minimized when it occurs early in the stage; or failure can be minimized if we know more and better about investigational products early on. The value of early phases clinical development is that how much and how relevant information gathered in this stage will decide the developmental strategies and eventually the fate of the investigational products. However, there are conceptual and operational hurdles to overcome especially in the early phases clinical trials; that is, limited time and resources, difficulties in designing of studies that can demonstrate proof/confidence of concepts/mechanisms/safety, selection or development of appropriate biomarkers or surrogate endpoints, technical complexities, and scientific rigor associated with the aims of early phases clinical trials. Korea Clinical Trial Global Initiative (KCGI) has launched not just to cope with the changing environment, but to lead the waves of changes. KCGI endorses and bolsters the global centers of excellence in their efforts for achieving operational excellence in early phases clinical trials through efficiency, maximization of utility of combined and shared resources, and innovation in trial R&D. Furthermore, KCGI strongly encourages the convergence of clinical and nonclinical experts both from academia and industry in the earliest possible stage in new drug development that will prevent, or at least minimize future failures and difficulties in clinical development.

Session C

A breakthrough therapy

Peter Kang, MD, Merck & Co., Inc.

Abstract: Cancer is a leading cause of death. Melanoma, the second fastest growing cancer worldwide, is a malignant tumor of melanocytes. The 5-year survival rate for patients with visceral involvement is under 10% and the goal of treatment for this incurable condition is palliative therapy with marginal survival benefit. There is a great need for an immunotherapy with an improved therapeutic index. High level biology and clinical data of immunotherapy in melanoma will be reviewed.

Changing landscape of global clinical trials?

Soo Bang, MSHA, Celgene Corporation

Abstract: What are the key trends in changing the landscape of clinical trials? This session will discuss current paradigm shifts in the conduct of clinical trials in study startup, patient engagement, site performance and quality. Impact of changing landscape will be discussed in the context of global clinical trials.

Session D

Development of NESP biosimillar, CKD-11101

YeoWook Koh, Ph.D., CKD Research Institute

Abstract: Biologics market is largely divided into 4 groups: 1) protein therapeutics including small recombinant proteins and monoclonal antibodies; 2) vaccines; 3) gene therapies; 4) cell-based therapies. Protein therapeutics occupies a very significant position in the biologics market. The market for protein therapeutics including therapeutic antibodies is expected to grow from 120 trillion won in 2010 to approximately 260 trillion won in 2020, accounting for more than 80% of the total biologics market revenue.
After the expiration of the patents for the top 5 blockbuster biologics (insulin, growth factor, EPO, G-CSF, interferon alpha) released from 1982 to 1989, biosimilars for these 1st-generation protein therapeutics had been released in Europe from 2006 to 2008. Since then, biobetters, long acting products (2nd-generation recombinant proteins) for the above 1st-generation products and therapeutic antibodies have continued to be released and entered the ranks of the blockbuster one after another. More than 13 kinds of representative originator therapeutic proteins are currently generating the market of over 100 trillion won. Since patents for most of them released from the late 1990s will expire sequentially by early 2020, the market for the biosimilars, generic versions of these originator drugs, has been received a lot of attention. Since there was the boom in biosimilar development in Korea in 2005, biosimilar has now become a very attractive business area in some Korean biopharmaceutical companies. However, contrary to expectations of mid-2000 when there was the biosimilar boom, those developing biosimilars are facing a considerable challenge as competition for the limited items is getting stronger at home and abroad. In addition, there are other challenges: differences in regulatory approval pathways between countries, proving biological equivalence to the reference product in a limited time, various technical barriers such as the development of manufacturing technique with high level of difficulty to scale up production and acquire cost competitiveness, a long development period, enormous investment in plants and manufacturing equipment, and financial barriers such as limited investment in R&D. This presentation will discuss biosimilar development in Korea and abroad and issues to be considered during the development process, and additionally introduce development case of a biosimilar of NESP/Aranesp, CKD-11101 that CKD pharm has been developing as the first biosimilar product in Korea.

The Requirement of the Quality Control Testing for the Biologics Drug Application in the Global Markets

KernHee Chang, Ph.D.,GlaxoSmithKline R&D

Abstract: Every international market has its own requirement for the analytical (quality control) testing as a part of the application of the new drug (NDA). Different approaches have been taken for the application of large molecule (biologics) drugs in order to meet market's expectation. In this talk, a typical process and operations of the quality control testing in the markets (including US, EU, Japan and the other major markets) managed by the global pharmaceutical companies will be discussed.

Regulatory Pathways of Pharmaceutics in US and Europe

Hae Suk (Hess) Suh, MS, MBA Millennium: The Takeda Oncology Company

Abstract: This session will provide an overview in the US and the EU of marketing application pathways of pharmaceutical product. The overview will include requirement that a product and an indication will need to meet in order to qualify for specific review process.

NYKB FORUM

Three Dimensional Cancer Culture Model for Drug Test

Daniel S. Oh, Ph.D., Columbia University

SUMMARY

A large three-dimensional cancer cell culture was formed using a three-dimensional template and a bioreactor system. The template was strategically composed of macro-pores, micro-channels, and nano-pores. After 6 days cultivation, the cancer cell colony grew to about 1.7 mm^3 in volume. About 50% of the osteosarcoma cells survived even after chemotherapy.

I. INTRODUCTION

Over 90% of promising preclinical drugs fail to translate into efficacious human therapeutics, resulting in a large waste of resources. During preclinical studies, reliable *in vitro* models are critical for weeding out non-efficacious drug candidates, but most *in vitro* cell culture methods are done on 2-dimensional (2D) model systems. These 2D models do not reflect the true 3-dimensional (3D) tumor microenvironment and therefore lose many critical cues normally present *in vivo* such as dimensionality, cancer phenotype, aggressiveness, and drug resistance. This technology is an engineered 3D culture platform made of macro-pores, micro-channels, and nano-pores. Together, the highly porous and interconnected platform creates a template for the 3D growth of cancer cells. Thus, this technology offers an alternative cancer culture model system that is the most native representation of complex cancer signatures than currently used models, ultimately improving cancer research and accelerating chemotherapy drug development.

II. MATERIALS AND METHODS

A. Fabrication of a three-leveled template structure

Polyurethane templates (60 pore per inch; mean pore size = 320 μm) were coated with nano-sized HA powders in a distilled water-based slurry. After being dried for 24 hours at room temperature, the template was heat-treated at 1230^{o}C for 3 hours.

B. 3D culture

To create a cellular microenvironment throughout the template, $5x10^4$ MC3T3 cells were seeded on top of the template in 400 µl of media. The cells seeded templates were incubated for 4 hours in the humidifier 37°C CO_2 incubator to enhance cell attachment. The templates were transferred to a new well. Then, 2 ml of media were added and incubated for 3 days. Thereafter, the templates were transferred to a 20 ml tube connected to a perfusion bioreactor. The transferred templates were incubated for 3 days while circulating the osteosarcoma cells into the templates using bioreactor in the 37°C incubator.

C. Chemotherapy

After 3 days of static and 3 days of dynamic culture, the cancer colonies that were formed were treated with 15 µM of doxorubicin. The media containing the doxorubicin was circulated through the templates for 1 day on the bioreactor.

III. RESULTS AND DISCUSSION

In the 3 days static culture, the MC3T3 cells expansively proliferated throughout the templates with abundant matrix formations. In the 3 days dynamic culture, osteosarcoma cells colonized in the matrix. The colonized osteosarcoma cells survived even after chemotherapy. Hence, the developed 3D dynamic culture system can be an alternative in mimicking *in vivo* conditions to test new chemotherapeutics.

A mouse model for gene-environment interaction in holoprosencephaly: synergy between loss of *Cdon* and fetal alcohol exposure

Mingi Hong, Ph.D., Icahn School of Medicine at Mount Sinai

Holoprosencephaly (HPE) is a common birth defect in which the midline of the forebrain and/or midface are lacking. HPE phenotypes are extremely variable in humans. HPE is a multi-factorial disorder caused by a complex interaction of multiple genetic and environmental factors. Human epidemiological studies and animal models suggest that several factors including disruption of *Shh* signaling and *Nodal* signaling, maternal diabetes, and binge drinking during pregnancy are associated with HPE. Currently the most accepted model for human HPE is a mutation plus synergistic modifier model.

We have modeled the etiology of HPE in mice. CDON is an immunoglobulin superfamily membrane protein and SHH coreceptor. CDON binds directly to SHH and other SHH binding proteins. *Cdon* mutations are found in HPE patients. *Cdon* mutant mice develop HPE in a strain-dependent manner. *Cdon* mice in HPE resistant background have a sub-threshold level of *Shh* signaling. Therefore, they are sensitized to potential HPE-inducing factors. Penetrance and expressivity of HPE phenotypes of *Cdon* mutants can be enhanced by a second mutation or a synergistic environmental factor.

For example, though individual loss of *Cdon* or alcohol exposure during gastrulation in HPE-resistant mice does not cause HPE, the combination of the two produces defects in early midline patterning, inhibition of *Shh* signaling in the developing forebrain and a broad spectrum of HPE phenotypes in later stages of development. Removal of one copy of *Ptch1*, an inhibitor of Shh signaling, rescued HPE phenotypes of alcohol-treated *Cdon* mutants. These findings suggest that first, lack of *Cdon* and alcohol exposure have synergizing effects on HPE induction, and second, *Shh* signaling is rate limiting in a gene-environment model of HPE.

However, the first sign of diminished *Shh* activity occurred after ethanol was cleared. Expressions of the downstream target genes of the *Nodal* signaling pathway were decreased specifically in alcohol-treated *Cdon* embryos before *Shh* expression. We report that CDON directly interacts with CRIPTO, a coreceptor of the *Nodal* signaling pathway. *Nodal* signaling is critical to initiate and maintain gastrulation. The precordal mesendoderm (PCM) and the notochord, which produce active SHH ligands, cannot be formed properly without Nodal signaling. We hypothesize that transient disruption of Nodal signaling during gastrulation by loss of *Cdon* and alcohol exposure results in defective *Shh* signaling and HPE in later structures.

Reduction of increased calcineurin activity rescues impaired homeostatic synaptic plasticity in presenilin 1 M146V mutant

Seonil Kim, Ph.D., New York University

Alzheimer's disease (AD) is one of the most common neurodegenerative diseases characterized by memory loss and cognitive impairment. While the majority of AD cases are sporadic, some are caused by mutations in early-onset familial AD (FAD) genes. One FAD gene encodes presenilin 1 (PS1), the subunit of the γ-secretase complex. Although mutant PS1-induced pathogenesis in FAD is mediated by multifactorial mechanisms, PS1 mutations in methionine 146 have been interpreted in terms of the AD Ca^{2+} hypothesis. Here, we describe that reduction of activated calcineurin, a Ca^{2+}-dependent phosphatase, rescues impaired homeostatic synaptic plasticity (HSP) in the PS1 M146V mutant by promoting synaptic trafficking of Ca^{2+}-permeable AMPA receptors (CPARs). We find that ER-mediated Ca^{2+} signals are increased in the mutant hippocampal neurons, leading to hyperactivation of calcineurin. Pharmacological inhibition of increased calcineurin activity stabilizes GluA1 phosphorylation, promoting synaptic trafficking of CPARs, contributing to the recovery of impaired HSP found in the mutant. Because HSP is suggested to have a role during learning and memory formation, increased calcineurin activity-induced impairment of HSP can cause cognitive decline in FAD. Thus, reducing abnormally increased calcineurin activity in AD brain may be beneficial for improving AD and aging-related cognitive decline.

Primary cilia ablation regulates functionality of mature dentate granule cells in adult brain

Soyoung Rhee, Ph.D., Stony Brook University

In adult born neurons within hippocampal dentate gyrus, primary cilium starts to being assembled at day 14 and mostly expressed after day 21 in adult born neurons. Although the importance of this small microtubule based structure during early neuronal development has been well studied, the role in matured neurons within hippocampal dentate gyrus is elusive. Here, we investigated the function of primary cilia in matured dentate granule cells (GCs) with in hippocampus by selectively and transiently ablating primary cilia by transducing virus under CAMKII promoter. We found that IFT20 fl/fl mice without primary cilia in mature GCs exhibit impairment in spatial memory, contextual fear conditioning and pattern completion. In contrast, removal of primary cilia in matured GCs enhanced discriminating similar contextual environment. To examine mechanism of behavior responses, we performed electrophysiology recording. Ablation of primary cilia in matured GCs increases synaptic plasticity from dentate gyrus to CA3 circuit. This enhanced synaptic plasticity was diminished when neurogenesis was ablated. Our findings show mice with primary cilia removed in matured GCs show encoding impairment in spatial and contextual memory, on the other hand, enhanced in pattern separation. Absence of primary cilia silences synaptic activity of matured GCs, which consequently increases the portion of synaptic activity of young GCs that are hyperactive than matured neurons. Furthermore, decreased activity of matured GCs leads to the failure of encoding contextual and spatial memory. Therefore, we conclude that primary cilia regulate mature GCs activity in adult hippocampus.

***CYFIP1* regulatory variants at the 15q11.2 disease locus associated with inter-individual variation in brain regions implicated in schizophrenia and dyslexia**

YoungJae Woo, Albert Einstein College of Medicine

Rare multigene copy number variants (CNVs) are well established to increase risk for neurodevelopmental disorders (NDDs), but translational efforts have been hindered by an incomplete understanding of how individual genes and regulatory elements within such intervals contribute to risk. The 15q11.2 locus, spanning

~ 500 kb and encompassing four genes, is exemplary with deletions associated with increased risk for schizophrenia, dyslexia, and other NDDs in which language is compromised. Towards mechanisms, we looked for relationships between quantitative measures of brain structures obtained by MRI and 15q11.2 common variants in a discovery cohort of 100 healthy adults. Analyses in our discovery cohort revealed multiple associations between brain structure and single nucleotide polymorphism (SNP) genotype. Of particular interest were associations between volume ($p=2.4 \times 10^{-3}$) and surface area ($p=7.5 \times 10^{-4}$) of the left supramarginal gyrus (lh.SMG), a brain region implicated in schizophrenia, dyslexia and language processing, and a variant 2 kb upstream of a transcriptional start site for the cytoplasmic FMR1 interacting protein 1 gene (*CYFIP1*). Consistent with a possible regulatory function in this variant, *in silico* analyses determined the signal to fall within a neural progenitor specific DNase I hypersensitive sites. Further support for regulatory potential comes from analyses showing a relationship between genotype at this site and seven linked SNPs and *CYFIP1* mRNA levels in human brain ($p=7.5 \times 10^{-5}$). In an attempt to understand how genetic variation in this region might come to impact *CYFIP1* expression, we looked for transcription factor binding sites predicted to show allele specific binding. Strikingly, these investigations revealed that one of the seven *CYFIP1* regulatory variants we identified is predicted to show allele specific binding for *FOXP2*, a transcription factor well known for its role in language. Separate analyses showing a strong correlation between *FOXP2* and *CYFIP1* levels in human brain ($r^2=0.6$), is consistent with *FOXP2* being a key regulator of *CYFIP1*. Taken together, we hypothesize that allele specific binding of FOXP2 to a regulatory element upstream of *CYFIP1* modulates gene expression in a CNV-like fashion, altering lh.SMG patterning which in turn impacts language processing and NDD risk. Separate analyses in an independent cohort of 2622 typically developing adults showing an association between lh.SMG surface area and the variant identified in our discovery cohort provides additional support for this idea ($p=3.3 \times 10^{-2}$). Taken together, this work represents the first molecular dissection of the 15q11.2 interval with regard to human brain structure.

Young Generation (YG) FORUM

YG Session 1

NRC YG Committee: Jason Ki, Michael Dohyun Kim, Sahee Kim, Richard Oh, and Dahea Diana You

Job Search in the midst of Career Planning

Richard Park, HRCap

Abstract: A job search for an entry or advanced level is no longer a simple task. If you're looking for not just any job but a career that will last and fulfilling, you should start with career planning and navigate through a network of people and online tools to seek and find that right job. There are many educational and advisory services to help you plan and build your career. HRCap would like to share its career advice and job market perspective to assist you with your lifelong career planning.

Biography: As Vice President and COO, Mr. Richard Park oversees operations and planning of HRCap, the leading Korean-American executive search and recruiting firm in the U.S. Prior to joining HRCap, Mr. Park spent 25 years as a business development and operations executive with companies ranging from technology start-ups to global enterprises including SK Group. His expertise includes strategic planning, business &

product development, project management, and resource planning. Mr. Park graduated from Cooper Union with a B.E. in Mechanical Engineering and M.B.A. in Finance from NYU Stern School of Business.

Preparing for What's Next

Katherine Cho, Colin Powell Center, The City University of New York- CCNY

Abstract: Strategize and learn tips for networking, resumes, and cover letters. Craft your experiences and shape your narratives for a more effective job search and career development.

Biography: Katherine Cho is a Program Manager at the Office of Student Success in the Colin Powell School (formerly division of Social Sciences). In her role, she manages two undergraduate fellowship programs and teaches on civic engagement, leadership, social activism, and project development. Additionally, she focuses on the career and professional development through student workshops and the Involvement Conference series. Concurrently, she is a graduate student at Teachers College, Columbia University, studying education policy and social analysis. Prior to this role, Katherine worked with an educational nonprofit on philanthropy. She received a B.A. in public policy from Duke University with a concentration on global health and community development.

YG Session 2

NRC YG Committee: Jason Ki, Michael Dohyun Kim, Sahee Kim, Richard Oh, and Dahea Diana You

The Academic Hiring Process and The Meaning of a Faculty Position

Won H. (Jon) Suh, Bioengineering Department, Temple University, Philadelphia, PA.

Abstract: The presentation will highlight some of the key aspects associated with the academic hiring process that (to an extent) can be applied to any professional job interview and hiring process. Details will be conducive to the STEM (Science, Technology, Engineering, and Mathematics) fields and include information about what really gets discussed during the faculty selection process. Briefly, some details about what faculty members really do and discuss during an academic year will be shared.

Biography: Won H. (Jon) Suh is an assistant professor in the Bioengineering Department at Temple University, Philadelphia, PA. Prior to joining Temple as a faculty member, Dr. Suh was an assistant project scientist and postdoctoral fellow at the University of California, Berkeley (2009-2012) in the Department of Bioengineering. He was an Otis Williams Postdoctoral Fellow in Bioengineering at the University of California, Santa Barbara (2008-2010), which is where he started working in the area of stem cell engineering, biomaterials research, bionanotechnology, nanomedicine, and nanotoxicology. He received his Ph.D. from the University of Illinois at Urbana-Champaign (2006) and received his M.S. (2002) and B.S. (1998) degrees from Seoul National University. His current research focuses on developing enabling technologies (e.g., biomaterials, nanomaterials, biomolecules) for adult stem cell research. Dr. Suh is currently serving on the editorial board of Biomaterials Research

Career Development and Panelist Discussion
SungEun Choi, Food Sensory Science, Queens College
Anthony Han, Becton, Dickinson, and Company
Hyun Ik Kim, Taro Pharmaceuticals
Michael DoHyun Kim, Strong Arm Technologies

POSTER SESSION

KASBP-Hanmi, KASBP-Yuhan & KASBP Fellowship Awards

TSC2 controls neuronal development through FOXO1 in ASD patient derived human neurons.
Min-Joon Han, Ph.D., Harvard Medical School

The tuberous sclerosis complex (TSC) is a negative regulator of mTOR signaling pathway, and when disrupted may contribute to some types of Autism Spectrum Disorders (ASD). TSC is a hereditary harmatoma syndrome with a high prevalence (~60%) of ASD caused by mutations in either *TSC1* or *TSC2.* Loss of these genes results in overactivation of mTOR signaling which modulates neurodevelopmental processes such as proliferation of neuronal stem cell, synaptic plasticity, and axon formation. We have collected fibroblasts from an ASD patient bearing a *TSC2* mutation and a parental control to allow us to reprogram these cells into inducible pluripotent stem cells (iPSCs) using episomal plasmids. Subsequently we have differentiated these lines into mixed neuronal lineages to investigate the role of *TSC2* function in human neurons. Here we describe the preliminary characterization of these neurons and identify FOXO1, one of the Forkhead box class O family transcription factors which regulate neuronal differentiation and neurogenesis, as an up-regulated protein in neurons bearing *TSC2* mutations. We also observe abnormal neuronal development and demonstrate that treatment with the mTOR inhibitor rapamycin during differentiation is able to reduced FOXO1. These results suggest that TSC2 activity is required for appropriate regulation of the transcription factor FOXO1 which is known to play a crucial role of the neural development.

Heterogeneities in *Nanog* Expression Drive Stable Commitment to Pluripotency *in vivo*
Minjung Kang, Cornell University

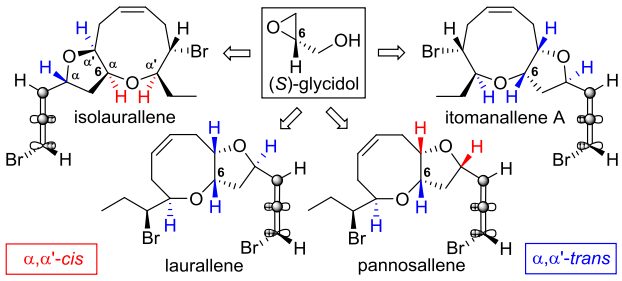
In mammals, pluripotency is defined as the capacity to self-renew and differentiate to all somatic cell types. Therefore, pluripotent stem cells hold enormous promise for patients with various types of cancer, Alzheimer's and other degenerative diseases or injuries. However, the application of stem cells in patient treatment requires in depth understanding on how pluripotency is established and maintained and how it is lost during differentiation. For this purpose, investigating early mammalian development is crucial. Pre-implantation embryos represent the in vivo system, in which pluripotency initially arises as a natural state and is then extinguished to allow differentiation towards all somatic tissues.From fertilization to the 8-cell stage, each cell in the developing embryo is totipotent, meaning that it maintains its potential to develop into an entire organism including extra-embryonic tissues. At the 16-cell stage, embryos start to differentiate their outer polarized cells towards the extra-embryonic lineage of trophectoderm (TE). The remaining unpolarized inside cells (Inner Cell Mass, ICM) have the choice to either become epiblast (EPI) or primitive endoderm (PrE);

true pluripotency is established only within the embryonic EPI lineage whereas PrE undergo differentiation towards an extra-embryonic tissue. Although the role of the gene regulatory network composed of Nanog-Gata6-Fgf4 during this cell lineage commitment process has been extensively studied, the dynamic cellular behaviors accompanying lineage specification within ICM cells have not been investigated quantitatively at single-cell resolution. To study the behaviors operating during ICM lineage specification, we applied a single-cell resolution 3D time-lapse (i.e. 4D) live imaging approach, coupled to an automated quantitative image analysis platform we recently developed.Using single-cell resolution quantitative imaging of a Nanog transcriptional reporter, we observed an irreversible commitment to EPI/PrE lineages in vivo. A period of apoptosis occurred during the period of ICM fate choice, followed by a burst of EPI-specific cell proliferation. PrE-to-EPI transitions were very rarely observed. Their unidirectionality suggesting they were regulated, not stochastic. In sum, our data suggest that the unidirectionality and time-scale of embryo development may not permit fluctuations in cell fate. These dynamic cell behaviors were affected when lineage decisions were changed through the modulation of FGF signaling.

Concise Substrate-Controlled Asymmetric Total Syntheses of Dioxabicyclic Marine Natural Products with 2,10-Dioxabicyclo[7.3.0]dodecene and 2,9-Dioxabicyclo[6.3.0]undecene Skeletons

Mi Jung Kim, Ph.D., Duke University

Species of the red algal genus Laurencia (Rhodomelaceae, Ceramiales) have been a prolific source of halogenated C15 acetogenins based on diverse skeletons such as 2,10-dioxabicyclo[7.3.0]dodecene and 2,9-dioxabicyclo[6.3.0]undecene [1]. Asymmetric total synthesis of representative dioxabicyclic bromoallene marine natural products with either a 2,10-dioxabicyclo[7.3.0]dodecene or 2,9-dioxabicyclo[6.3.0]-undecene skeleton has been accomplished starting from commercially available (*S*)-glycidol in a substrate-controlled fashion. The former include (−)-isolaurallene, the enantiomeric form of natural (+)-neolaurallene, and (+)-itomanallene A, and the latter are (+)-laurallene and (+)-pannosallene [2]. Our general approach to establish the ???'-relative stereochemistry of the medium-ring (oxonene or oxocene) and tetrahydrofuran, respectively, involved the judicious pairing of our protecting-group-dependent intermolecular amide enolate alkylation (either chemoselective chelation-controlled or dianion alkylation) with either our intramolecular amide enolate or nitrile anion alkylation .



An Ancient Riboswitch Class in Bacteria Regulates Purine Biosynthesis and One-carbon Metabolism

Peter B. Kim, Yale University

Over thirty years ago, ZTP (5-amino-4-imidazole carboxamide riboside 5'-triphosphate), a modified purine biosynthetic intermediate, was proposed to signal 10-formyl-tetrahydrofolate (10f-THF) deficiency in bacteria. However, the mechanisms by which this putative alarmone or its precursor ZMP (5-aminoimidazole-4-carboxamide ribonucleotide, also known as AICAR) brings about any metabolic changes remain unexplained. We report the existence of a widespread riboswitch class that is most commonly associated with genes related to de novo purine biosynthesis and one carbon metabolism. Biochemical data confirms that members of this riboswitch class selectively bind ZMP and ZTP with nanomolar affinity, while strongly rejecting numerous

natural analogs. Indeed, increases in the ZMP/ZTP pool, caused by folate stress in bacterial cells, trigger changes in the expression of a reporter gene fused to representative ZTP riboswitches in vivo. The wide distribution of this riboswitch class suggests that ZMP/ZTP signaling is important for species in numerous bacterial lineages.

Reduction of increased calcineurin activity rescues impaired homeostatic synaptic plasticity in presenilin 1 M146V mutant

Seonil Kim, Ph.D., New York University

Alzheimer's disease (AD) is one of the most common neurodegenerative diseases characterized by memory loss and cognitive impairment. While the majority of AD cases are sporadic, some are caused by mutations in early-onset familial AD (FAD) genes. One FAD gene encodes presenilin 1 (PS1), the subunit of the γ-secretase complex. Although mutant PS1-induced pathogenesis in FAD is mediated by multifactorial mechanisms, PS1 mutations in methionine 146 have been interpreted in terms of the AD Ca^{2+} hypothesis. Here, we describe that reduction of activated calcineurin, a Ca^{2+}-dependent phosphatase, rescues impaired homeostatic synaptic plasticity (HSP) in the PS1 M146V mutant by promoting synaptic trafficking of Ca^{2+}-permeable AMPA receptors (CPARs). We find that ER-mediated Ca^{2+} signals are increased in the mutant hippocampal neurons, leading to hyperactivation of calcineurin. Pharmacological inhibition of increased calcineurin activity stabilizes GluA1 phosphorylation, promoting synaptic trafficking of CPARs, contributing to the recovery of impaired HSP found in the mutant. Because HSP is suggested to have a role during learning and memory formation, increased calcineurin activity-induced impairment of HSP can cause cognitive decline in FAD. Thus, reducing abnormally increased calcineurin activity in AD brain may be beneficial for improving AD and aging-related cognitive decline.

All Posters

MDR1 protects against paraquat-induced dopaminergic neurodegeneration.

Dahea You, Rutgers University

Parkinson's disease (PD) is a chronic, neurodegenerative disorder affecting around seven million people worldwide, but its etiology has not been fully understood and there is no cure currently available. The interaction of genetic factors and environmental factors including the exposure to pesticides such as paraquat (PQ) has been implied to contribute to the pathogenesis of PD. Prior studies have indicated that a loss-of-function genetic polymorphism and overall reduction in the expression and function of the multidrug resistance protein 1 (MDR1), also known as P-glycoprotein, are observed in PD patients. MDR1 may be a key element in the pathogenesis of PD. In this project, we aimed to evaluate the role of MDR in the transport of neurotoxicants and in mediating neurotoxicity, and also the mechanism involved in MDR1 regulation in the brain. In an immortalized human brain capillary endothelial cell line (hCMEC/D3) which endogenously expresses efflux transporters, there was up to 200% greater accumulation of PQ with the reduction of MDR1 transport. Also, Mdr1a/1b-null mice showed increased susceptibility to PQ-induced neurotoxicity and neuroinflammation: they started having such neurodegenerative presentation even with a single dose of PQ unlike the control group. And further evaluations indicated that such increased toxicity was not due to alteration in dopamine transport (Dat) or organic cation transporter 3 (Oct3) which are transporters involved in the transport of paraquat in the brain. These results indicated that MDR1 plays a major role in the efflux of PQ and protection against PQ-induced neurotoxicity. Future studies will be focused on enhancing the understanding of: (1) the role of MDR1 and its genetic variants in regulating cellular concentrations of the

substrates; (2) the epigenetic regulation of MDR1 in the brain and its effects on neurotoxicity of PQ; and (3) interplay between epigenetic modifications, MDR1 regulation, and neuroinflammation, a key event in the pathogenesis of PD.

Development of a decision tree based prediction algorithm for tissue to plasma partition coefficients

Yejin Esther Yun, University of Waterloo**,** Canada

Physiologically based pharmacokinetic (PBPK) modelling is a useful tool in drug development and human health risk assessment. PBPK models are mathematical representations of the anatomy, physiology and biochemistry of an organism. PBPK models, using both compound and physiologic inputs, are used to predict pharmacokinetic characteristics of a drug. One of key inputs of PBPK model is a tissue to plasma partition coefficient (Kp) that define the steady state concentration differential between the tissue and plasma and Kp is used to predict the volume of distribution. Experimental determination of these parameters is very costly and time consuming therefore, *in silico* prediction methods were introduced to overcome the problem. In this study, two Kp prediction algorithms are introduced. The first prediction algorithm is a correlation based and requires only readily available input parameters. The second one is a decision tree based Kp prediction method. In this novel approach, six previously published algorithms were utilized including the first proposed method. The aim of the developed classifier was to identify the most accurate tissue-specific Kp prediction algorithm for a new drug. Three versions of tissue specific classifiers were developed and were dependent on the necessary inputs. The use of the classifier resulted in a better prediction accuracy as compared to the use of any single Kp prediction algorithm for all tissues. In addition, two user friendly web based calculator applications for the algorithms were developed. These freely available web-applications can be beneficial for academic and industrial researchers in drug development. In conclusion, the two presented innovative methods will improve prediction accuracy of tissue distribution thus leading to appropriate parameterization of PBPK models.

KSEA NRC PAST KEYNOTE SPEAKERS

2014 Sang-Wook Cheong, Ph.D., Professor, Department of Physics and Astronomy, Rutgers University
2013 S. Chan Choi, Ph.D., Professor, School of Business, Rutgers University
2012 Jeong-Sun Seo, M.D. Ph.D., Professor, College of Medicine, Seoul National University
2011 Choong-Seok Chang, Ph.D., Principal Physicist, Plasma Physics Laboratory, Princeton University

KASBP 2015 SPRING SYMPOSIUM AWARDEES

KASBP-Hanmi Fellowship Awardees

2015 *Dr. Seonil Kim (New York University), Peter B. Kim (Yale University)*

KASBP-Yuhan Fellowship Awardees

2015 *Dr. Min-Joon Han (Harvard Medical School), Minjung Kang (Cornell University)*

KASBP Fellowship Awardee

2015 *Dr. Mi Jung Kim (Duke University)*

KASBP PAST AWARDEES

KASBP-DAEWOONG ACHIEVEMENT

2009 Choung Un Kim, Gilead Sciences, Inc. (Kainos Medicine Inc, Korea, Current)
2010 Chung K. (David) Chu, University of Georgia
2011 Sung-Hou Kim, University of California, Berkeley
2012 Dennis Choi (MD, PhD) Stony Brook Medicine and Stony Brook University
2013 Joseph Kim Inovio Pharmaceuticals
2014 Kinam Park, Ph. D. Purdue University

KASBP-DAEWOONG SCHOLARSHIP

2006 James J. Pai, Schering-Plough (Handok Pharmaceuticals, Korea, Current)
2007 Young-Whan Park, Merck (National Cancer Center, Korea, Current)
2008 Young-Choon Moon, PTC Therapeutics
2009 Hong-Yong Kim, Novartis

KASBP-DAEWOONG FELLOWSHIP

2006 Jaeki Min, New York University; Hahn, Kim, Princeton University;
Hye-Jin Park, Rutgers University
2007 Jisook Moon, Harvard University; Sung-Yeon Park, Rutgers University;
Seok-Geun Lee, Columbia University

2008 Heung Kyu Lee, Yale University; Jung-Hwan Kim, Rutgers University;
Min Sik Kang, Columbia University

2009 Jin-Ah Park, Harvard University; Je-Min Choi, Yale University;
Deok-Ho Kim, Johns Hopkins University

2010 JungMin Ki, Rockefeller University; Hyung-Wook Kim, NIH;
Se Jin Ahn, Harvard University

2011 Muri Han, University of California, LA; Hwanjong Jang, Boston College

2012 Jeong Ho Chang, Columbia University; Jaewoo Choi, Oregon State University

2013 Jang Eun Lee (University of Pennsylvania), Eun Chan Park (Rutgers University)

2014 Kimberly H. Kim (Harvard University), Seung Koo Lee (Weill Cornell Medical College),
Min-Sik Kim (Johns Hopkins University)

KASBP-HANMI FELLOWSHIP

2011 Hyung Jin Ahn, Rockefeller University; Chang-Hoon Cho, Abramson Research Center

2012 Yuna Kim, University of North Carolina; Hyun Seop Tae, Yale University;
In Hye Lee, NIH

2013 Ju-Hee Lee, Memorial Sloan-Kettering Cancer Center;
Kyeong-Ryoon Lee, Rutgers University; Man Ryul Lee, Indiana University

2014 Young Chan Cha (Wistar Institute), Min-Kyu Cho (New York University)
Lark Kyun Kim (Yale University), Yu Shin Kim (Johns Hopkins University)

KASBP-YUHAN FELLOWSHIP

2011 Ki-Young Kim, Boston University; Joong Sup Shim, Johns Hopkins University

2012 Yeamin Huh, University of Michigan; Sookhee Bang, University of Pennsylvania;
Jungho Back, Columbia University

2013 Dong Jun Lee (University of Chicago), Ingyu . Kim (Yale University),
Ja Yil Lee (Columbia University)

2014 Seouk Joon Kwon (Rensselaer Polytech Institute), Jeongmin Song (Yale University)
Jae-Hyun Yang (Harvard Medical School), Wan Seok Yang (Columbia University)

KASBP-GREEN CROSS FELLOWSHIP

2011 Hansang Cho, Harvard Medical School; Sung Ung Kang, Johns Hopkins University;
Mi-Yeon Kim, Columbia University; Jae Young So, Rutgers University;
Sung-Yong Hwang, NIEHS/NIH

2012 Wonjin Jo, Drexel University; Hyo Jung Kang, Yale University;
Junghyun Lee, Columbia University; Yong Jae Lee, Yale University; Je-Hyun Yoon, NIH

2013 Yunjong Lee (Johns Hopkins University), Jun-Dae Kim (Yale University),
Bae-Hoon Kim (Yale University), Ja Young Kim-Muller (Columbia University)

2014 Catherine Rhee (University of Texas at Austin), Ji-Seon Seo (The Rockefeller University),
Sehyun Kim (New York University)

KASBP FELLOWSHIP

2009 Sang-Ho Choi, National Institutes of Health (NIH)

2010 Sang Ryong Kim, Columbia University; Tae-Sook Yoon, Rutgers University; Eun Mi Hur, Cal. Tech.

KASBP-KSEA FELLOWSHIP

2013 Sung In Lim, University of Virginia

2014 Keun-woo Jin, Temple University

KASBP-KUSCO FELLOWSHIP

2008 Hyeon Ho Kim, National Institutes of Health; Takbum Ohn, Harvard Medical School; Wona Joo, Wistar Institute

KASBP-KRICT FELLOWSHIP

2009 Seung-Shick Shin, Rutgers University; Un Ju Jung, Columbia University; Kyuwon Baek, University of Pennsylvania

KASBP-KHIDI FELLOWSHIP

2010 Jae Hyun Bae, Yale University; Hee Yeon Cho, Boston College

NOTE

SPONSORS


yuhan
CORPORATION


Hanmi


DAEWOONG
PHARMACEUTICAL CO.,LTD.


GREEN CROSS


ST PHARM


KHIDI
한국보건
산업진흥원


KUSCO
KOREA - U.S. SCIENCE COOPERATION CENTER


TAEJOON PHARM


KPMA 한국제약협회
KOREA PHARMACEUTICAL MANUFACTURERS ASSOCIATION


ILDONG 일동제약


LUCAS
&
MERCANTI
LLP
Intellectual Property Law


BSRC
Bio-Synergy Research Center


Hire Quality™
HRCap


TAEJOON PHARM


CURACHEM
Radiolabeling & ADME


ENZYCHEM LIFESCIENCES
Make your life complete.
Leading APIs and Global New Drugs


DGMIF
대구경북첨단의료산업진흥재단
Daegu-Gyeongbuk Medical Innovation Foundation


SK biopharmaceuticals


KBIO
오송첨단의료산업
진흥재단


藥明康德
WuXi AppTec


창업자 유일한 박사
"좋은 약을 만들어 동포에게 도움을 주자"
유일한 박사의 창업정신은
신뢰받는 유한양행을 이룬 밑거름입니다.
유한의 제품은
언제나 믿음을 줍니다.
우수의약품 생산을 위해 오직 한길만 걸어온 유한양행 – 베풀어주신 고객의 사랑에 보답하도록
더욱 정성을 다 하겠습니다.
신뢰의 상징-버들표
유한양행
www.yuhan.co.kr