2019 KOLIS-KSEA JOINT Conference

KOLIS

KOREAN LIFE SCIENTISTS IN THE BAY AREA

STANFORD | UC BERKELEY | UC DAVIS | UCSF

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BERKELEY LAB Lawrence Berkeley National Laboratory

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BERKELEY CHAPTER

Lawrence Berkeley National Laboratory
Berkeley, CA 94705
Building 66

November 16th, 2019

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Lawrence Berkeley National Laboratory, Building 66
| November 16th, 2019 |

Full Map Link

Route to Building 66

https://goo.gl/maps/c4behXyqJmv

(Come to the Blackberry Gate, other gates are locked)

Parking Spaces

Lot T2 (Option 1)

https://goo.gl/maps/6cyTFPXamC12

Lot S (Option 2)

https://goo.gl/maps/A5yqcKsQcCD2

Lot W (Option 3)

* Authorized Parking Spaces: All **general parking spaces** (NOT Blue or Orange Triangles) unless otherwise reserved

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Greeting from the KOLIS President

2019 KOLIS President
Mangyu Choe, Ph.D.

11월 16일, 버클리로 여러분을 초대합니다.

KOLIS 회원 및 인근 지역 과학자들의 관심과 성원에 힘입어 KOLIS에서 겨울 총회를 개최합니다. 특히나 이번에는 재미과학자협회(KSEA) 버클리 지부와 함께 기획, 준비하고 있어 더욱 다양한 주제로 여러분들을 만날 준비를 하고 있습니다. 이번 재미과학자협회 버클리 지부와의 공동개최가 더욱 다양한 연구자들께서 KOLIS 총회에 참여하실 수 있는 계기가 되기를 희망합니다.

이번 2019 KOLIS-KSEA Joint Conference의 테마는 "Beyond Fundamental Science"입니다. 총회가 열리는 11월 16일 하루만큼은 연구실에서 벗어나 다양한 분야, 커리어 레벨에 계신 분들과 만나서 최신 여구 트렌드 및 아이디어와 정보를 공유하고, 더 나아가 앞으로의 커리어를 계획하시는데 도움을 얻을 수 있는 다양한 분들과 교류할 수 있는 의미있는 네트워크의 기회를 얻으셨으면 좋겠습니다.

총회에 참석하시는 연구자들께서 다양한 지적 경험과 함께 네트워킹을 하실 수 있도록 다양한 분야에서 연사분들을 모셨습니다. 학계에서 연구를 수행하고 계시는 분들부터 스타트업에 종사하고 계시는 연구자분들까지 다양한 연사분들의 발표를 통해 지적 갈증도 해소하시고 다양한 간접 경험 또한 얻어가실 수 있는 재밌고 유익한 시간이 되시기를 바랍니다.

다양한 분야의 연구자들과 좋은 추억을 만드시고, 새로운 동료 또한 만드시면서 이번 2019 KOLIS-KSEA Joint Conference를 진정으로 의미있고 유쾌한 기억으로 안고 가시기를 기원합니다. 항상 많은 관심을 가져주시고 저희 KOLIS 행사에 적극적으로 참여해주시는 연구자 분들께 감사하다는 말씀을 드리고 싶습니다. 여러분께서 성원해주시고 참여해주시는 덕에 저희 행사가 큰 의미를 가질 수 있게 되었다고 생각합니다. 더불어 저희 KOLIS가 다양한 행사를 기획할 수 있도록 후원해주시는 후원 기관 및 업체들께도 감사의 말씀을 전합니다.

한해 마무리 잘 하시고 내년에도 KOLIS에 꾸준한 관심 부탁드립니다. 감사합니다.

2019 KOLIS President

최 만 규

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BERKELEY CHAPTER

Greeting from the KSEA Berkeley Chapter President

Dear Invited Speakers and Participants,

2019 KSEA Berkeley Chapter President
Won Jun Jo, Ph.D.

Welcome to Lawrence Berkeley National Lab! It is truly my pleasure to welcome you all to the 2019 KOLIS-KSEA Joint Conference. I sincerely thank Dr. Mangyu Choe, the KOLIS President, Dr. Kyueui Lee, Mr. Jinse Kim, and Dr. Myeong Hwan Oh for their continuous support and participation as co-chair and co-organizers.

The theme of the 2019 KOLIS-KSEA Joint Conference is "Beyond Fundamental Science". We would like to address technological challenges in the era of the 4th industrial evolution in a bid to improve the quality of life. Under this theme, we have four major tracks: Medical Science, Neuroscience, Alternative Food, Smart Science. This year, we have invited many renowned speakers in these four areas, emphasizing technological innovations to build more livable communities. the 2019 KOLIS-KSEA Joint Conference will come up with opportunities for participants to discuss many emerging issues in these fields through various research talks.

The conference participants range from the academia, industry, and national institutes in the Bay Area, thereby supporting all of the participants to broaden their network and exchange their ideas and insight. Particularly, we did our best to offer a cooperative environment for networking with high-profile scholars and entrepreneurs as well as exploring cross-disciplinary future research initiatives. I am confident that the 2019 KOLIS-KSEA Joint Conference will provide a productive and memorable experience to each of the participants.

I would like to give special thanks to the sponsors, committee members, and volunteers for making this conference possible. I hope you enjoy your visit to the vibrant City!

Sincerely,

WON JUN JO

KSEA BERKELEY CHAPTER PRESIDENT

MOLECULAR FOUNDRY PRIMARY RESEARCHER

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09:30 - 09:50	**Registration**
09:50 - 10:00	**OpeningRemarks&Lottery**
10:00 - 11:50	**Session#1**
	Prof. Chang-il Hwang I University of California, Davis
	Sung-Soo Jang, Ph.D I University of California, San Francisco
	Hyeonyu Kim, Ph.D I Stanford University
	Changman Kim, Ph.D I Lawrence Berkeley National Laboratory
11:50 - 12:00	**Greetings from Korean Consulate General San Francisco**
12:00 - 13:00	**Lunch&Networking**
13:00 - 14:50	**Session#2**
	Kee-Hyun Paik, Ph.D I Multerra Bio, Inc.
	Ara Hwang, Ph.D I Memphis Meats
	John Kim, Ph.D I Berkeley Lights
	Jae Hyung Lee, Ph.D I Stratio, Inc.
	+ lightening talk speakers I TBD
14:50 - 15:50	**Coffeebreak&Networking**
15:50 - 17:40	**Session#3**
	Prof. Jin Hyung Lee I Stanford University
	Kyu-Sun Lee, PhD I Korea Research Institute of Bioscience & Biotechnology
	Hijai Regina Shin, Ph.D I University of California, Berkeley
	Prof. Dong-Hyun Kim I Northwestern University
	+ lightening talk speakers I TBD
17:40 - 18:00	**ClosingRemarks&Lottery**
18:00 - 19:00	**Dinner&Networking (sponsored by KRIBB)**

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ABSTRACTS

Research Talk

EN1 and Pancreatic Ductal Adenocarcinoma

Prof. Chang-il Hwang
University of California, Davis

Pancreatic ductal adenocarcinoma (PDA) is one of the most deadly human malignancies. Using pancreatic organoid models, we have shown that enhancer reprogramming allows pancreatic cancer cells to acquire aggressive characteristics during disease progression. Here, we show that Engrailed-1 (EN1), a neuro-developmental transcription factor (TF), is up-regulated in metastasis-derived organoid cultures and confers cell survival when grown in the reduced condition. Gain- and loss-of-function experiments further show that EN1 is responsible for the aggressiveness of pancreatic cancer cells in vitro (anchorage-independent growth, migration and invasion) and in vivo. EN1 interacts with KDM6A, a component of COMPASS (Complex Proteins Associated with Set1) and regulates H3K4me3 in the promoter regions of a subset of genes associated with differentiation, suggesting that the regulation of COMPASS activity by EN1 might be critical in this process. In addition, gene regulation of EN1 contribute to the squamous-PDA identity, which is consistent with the gene signature found in Kdm6a deficient PDA mouse model. Finally, in combination with FOXA1, EN1 can fully reprogram pancreatic cancer cells into highly aggressive pancreatic cancer cells. In sum, we report that EN1 confers the aggressiveness of pancreatic cancer cells via H3K4me3 regulation and contributes to the squamous type identity and PDA progression.

Research Talk

NOVEL ROLES OF STRIATAL ENRICHED PROTEIN PHOSPHATASE (STEP) IN NEURONAL INTRINSIC PROPERTIES AND HOMEOSTATIC SYNAPTIC PLASTICITY

Sung-Soo Jang, Ph.D
University of California, San Francisco

STriatal Enrich Protein Phosphatase (STEP) is a brain specific protein tyrosine phosphatase, expressed in the central nervous system (CNS). STEP has two major isoforms, including STEP46 and STEP61, and membrane-bound STEP61 is implicated in multiple neurologic disorders. It has been reported that STEP61 protein is elevated in animal disease models and postmortem samples of Alzheimer's disease and Schizophrenia, whereas its activity is reduced in brain ischemia and Huntington's diseases. STEP61 regulates Hebbian forms of synaptic plasticity, which has been considered as a mechanism by which the information is encoded and stored at the synapse. STEP61 is involved in the internalization of the N-methyl-D-aspartate receptors (NMDARs) and the α- amino-hydroxy-5-methyl-4-isoxazolepropinoic acid receptors (AMPARs) via dephosphorylating Tyr1472 of GluN2B subunit in NMDAR and 3 Tyr (Tyr869, Tyr873, and Tyr876) of GluA2 subunit in AMPAR.

Despite extensive studies on the role of STEP61 in activity-dependent synaptic plasticity, it was unknown whether STEP contributes to homeostatic synaptic plasticity, a compensatory mechanism by which neurons adjust their synaptic strength within a normal range in response to chronic activity challenge. In addition, whether STEP regulates somatic intrinsic properties of hippocampal pyramidal neurons has to be addressed. In this study, we found that STEP61 is altered in response to chronic alteration of hippocampal network activity under in vitro and in vivo conditions, playing a role in adjusting synaptic strength against unexpected activity challenge. Furthermore, our whole-cell patch clamp recording reveals that STEP regulates intrinsic excitability of hippocampal neurons and determines seizure propensity under in vivo, implying that manipulation of STEP expression and/or activity could be a novel therapeutic option to treat a variety of neurological diseases such as epilepsy and Alzheimer's diseases.

Research Talk

Enhancing functionalities of engineered muscle tissues by recreating natural environmental cues

Hyeonyu Kim, Ph.D
Stanford University

Engineered muscle tissue is a three-dimensional contractile tissue made from muscle cells and the extracellular matrix (ECM). It can be used as a drug testing platform or an implantable tissue, but its practical use has been limited by inferior contractile performance and small size compared to natural muscles. This thesis aims to implement environmental cues and essential elements of natural muscles to improve the contractile performance and increase its size beyond the diffusion limit. Firstly, inspired by the observation that the natural muscles are exposed to electric potentials from neurons in combination with mechanical stretching from surrounding muscles, a new muscle training system was developed to apply coordinated electrical and mechanical stimulation. Secondly, large-sized natural muscles are fully vascularized so that oxygen and nutrients can be supplied. We modeled the natural fluid compartments by creating an in vitro perfusable vasculature running through a skeletal muscle tissue with physiologic cell density. The tissue is designed to have a coaxial three-layered structure in which myoblasts are placed in an outer layer, endothelial cells are in an inner layer, and fibroblasts mixed with ECM are in the middle layer sandwiched by the other two. Lastly, a vascularized pulsatile cardiac chamber model for drug testing and disease modeling will be briefly introduced.

Research Talk

Electro-fermentation: new technology for bioproduction by regulation of microbial redox balance

Changman Kim, Ph.D
Lawrence Berkeley National Laboratory

Recent biotechnological advances enable/manufacture the control of the bacterial transcription, translation and even post-translation for various biosynthesis and biorefinery processes. Although regulation of mRNA synthesis, enzyme expression and activity with pathway optimization could enhance the production yield and titer, those genetic and enzymatic controls do not always bring the expected results. Indeed cellular redox state is the one of the most important factors for the determination of fluxes in metabolic pathways, however little advances of the intracellular redox state control has been reported. Conventional strategies for change the redox state (e.g. NAD+/NADH ratio) need to provide external oxidants such as oxygen or chemical reductases/oxidases which are non-sustainable, and frequently produce toxic byproducts. In this respect, the metabolic flux control using bacteria-electrode interactions makes progressive regulation of metabolic fluxes. In this presentation, bioelectrochemical regulations of central metabolic fluxes with the control of intracellular redox state and the increased the productivity of the platform chemicals, 3-hydroxypropionic acid and 1,3-propanediol, will be presented. The suggested strategy for practical regulation of bacterial redox state can provide not only the improvement of productivity and yield/titer but also the opportunity for overcoming thermodynamic balances in bioprocess. The results could contribute to the further improvement of bioproduction and the possibility of the industrial applications of biorefinery process.

Research Talk

Catching up to nucleic acids: addressing multiplexability in proteomics

Kee-Hyun Paik, Ph.D
Co-founder and C.S.O.
Multerra Bio, Inc.

Both nucleic acids and protein provide clinically important information. In the past 3 decades, nucleic acids research has seen growth that surpassed the Moore's law in pace, resulting in valuable advances in life sciences. However, our ability to perform protein research largely remain stagnant. An organism's nucleic acids is said to provide its blueprints, its current condition is represented by its proteomic state, knowledges of both areas are required for complete understanding of its health. Despite incremental advances in proteomic research, a commercial four plex antibody co-localization assay remains the de facto standard in immunoassays due to lack of alternatives with sufficiently high reproducibility and accuracy. Because immunoassays rely on antibody antigen affinity, the ubiquity of cross-reactivity (CR) of antibodies to non-target proteins limits the degree with which immunoassays can be multiplexed while maintaining accuracy. Multerra Bio, Inc. is developing a novel chip-based platform that counteracts the effects of cross-reactivity on assay accuracy enabling massively multiplexed immunoassays.

Career Talk

Transitioning from academia to startup world at Memphis meats

Ara Hwang, Ph.D
Memphis Meats

In this talk, I will introduce how I transitioned from my postdoc position at UCSF to an industry job at a small startup company. Since I've joined Memphis meats, the company had grown from a 10 people company to almost 40 people. I will share some of the pain points that I had experience that would hopefully be helpful for others who are seeking jobs at an early stage startup. In addition, I will share a brief overview of alternative meat industry, including some of the common struggles that these alternative meat companies are facing and what is known to be the holy grail of alternative meat.

Career Talk

Berkeley Lights – Advancing Automation for Biology

John Kim, Ph.D
Berkeley Lights

As experimental procedures have become increasingly complex and brought immense data, automation has become key to accelerate biological findings and drug discovery. In Berkeley Lights, we have developed versatile platforms that automate complex procedures by integrating machine vision, microfluidics, optoelectronics. Our fast and high-throughput manipulation of single cells and phenotypic profiling accelerate cellular therapy and drug discovery workflows. Here, I will talk about Berkeley Lights technology and my role as a development engineer. In addition, I will share any opportunities for working at Berkeley Lights and my general experience in transitioning from academia to mid-stage biotech start-up.

Career Talk

Founding a hardcore R&D Start-up as a Ph.D. student

Jae Hyung Lee, Ph.D
CEO
Stratio, Inc.

The Stratio, Inc. (Stratio) idea was conceived by three Ph.D. students in a small corner desk at Stanford University. As Ph.D. students in Electrical Engineering, we knew about the myriad of advantages with infrared imaging – from material analysis to night vision. However, the technology was prohibitively expensive so that only a few could benefit from it. One day, we discussed how a new sensor material called germanium (Ge) could be responsive to infrared light waves in real life. We began digging deeper, consulted experts, and conducted countless experiments to find out how they would achieve low cost, small size, and low power consumption. It turned out to be a years-long journey, but a fruitful one. Hence Stratio was born, in January 2013.

Stratio has received U.S. National Science Foundation (NSF) SBIR and U.S. Airforce SBIR funding for the core technology as well as multiple grants from South Korea, France, and Chile for the applications. Stratio is currently a team of >25 full-timers. CEO and Co-founder, Jae Hyung Lee, is a Stanford EE Ph.D., and Stratio's core team includes two other Stanford EE PhDs, and a Stanford MBA. Our small team is nonetheless versatile and collectively makeup all the skill sets we need from hardware & software engineering, business, and design.

Research Talk

New Opportunities in Nanomedicine and Image-guided Medicine

Prof. Dong-Hyun Kim
Northwestern University

Cancer is the 2nd most common cause of death. Various therapeutics including conventional surgery, chemotherapy and radiation therapy and immunotherapy have been developed and studied for the treatment of cancer. However, the efficacy of targeting and therapeutic delivery is still poor that results in various side effects and inevitably stopping the treatment. Nanomedicine using multifunctional nanocarriers has offered exciting potential to overcome the limitations of conventional cancer therapies. Image guided therapeutic technique will provide another great potential to overcome the low tumor targeting and poor uptake efficiency of therapeutics and nanocarriers. Combining newly designed multifunctional carriers and interventional image guided approaches will be a new opportunity in both image guided cancer medicine and nanomedicine. We will discuss our recent progresses on the development of multifunctional carriers that is designed for clinical interventional image-guided therapeutics.

Research Talk

Nano interfacing technology in biomedical application for diagnosis and therapy

Kyu-Sun Lee, PhD
Director & Principal Research Scientist
Korea Research Institute of Bioscience & Biotechnology

Bionanotechnology research center aims to develop effective biosensor technology for detection of hazards and disease diagnosis based on interfacing bio-contents and nanomaterials. For enabling the continuous and convenient detection system for hazards and human diseases, we develop new biomarkers, innovative nanomaterials and an integrated system. We are developing new methods of molecular diagnostics and reliable immunodiagnostics for detecting biological hazards (infectious germs and virus) and genetic diseases. We are also advancing integrated monitoring systems such as electronic sensor and signal transducer technology to implement simple and accurate diagnostics. Until now, we have secured the original technology for rapid diagnostic kits for solving emerging issues on various infectious diseases based on bioelectronics, bionanosensor, and optic-based platform, In addition, we are developing innovative nanomaterials that can be used for drug delivery, health monitoring, and imaging to upgrade biomedical technology. This presentation introduces the direction and the purpose of our research center to provide new opportunities on sharing manpower and technical resources.

Research Talk

Targeting mTORC1 signaling for autophagy regulation

Hijai Regina Shin, Ph.D
University of California, Berkeley

Autophagy is a lysosomal degradation pathway that eliminates aggregated proteins and damaged organelles to maintain cellular homeostasis. A major route for activating autophagy involves inhibition of the mTORC1 kinase, but selective and complete mTORC1 inhibition remains beyond the reach of current mTORC1-targeting compounds. Here, we have coupled screening of a covalent ligand library with activity-based protein profiling to discover EN6, a small-molecule in vivo activator of autophagy that covalently and selectively targets a cysteine residue in the ATP6V1A subunit of the lysosomal v-ATPase, which mediates mTORC1 activation at the lysosome. EN6-mediated ATP6V1A modification impairs mTORC1 lysosomal recruitment via the Rag guanosine triphosphatases, activates autophagy and increases lysosomal acidification. Consistently, EN6 clears TDP-43 aggregates, a causative agent in frontotemporal dementia, in an autophagy-dependent manner. Our results provide insight into how the v-ATPase regulates mTORC1, and reveal a unique approach for enhancing cellular clearance based on covalent inhibition of lysosomal mTORC1 signaling.

Research Talk

TBD

Prof. Jin Hyung Lee
Stanford University

TBD

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Conference Organizers

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Planning Manager: Myounghwan Oh, UC Berkeley

Account Manager: Jinse Kim, UC Berkeley

PR Manager: Kyueui Lee, UC Berkeley

KOLIS Campus Representatives 2019

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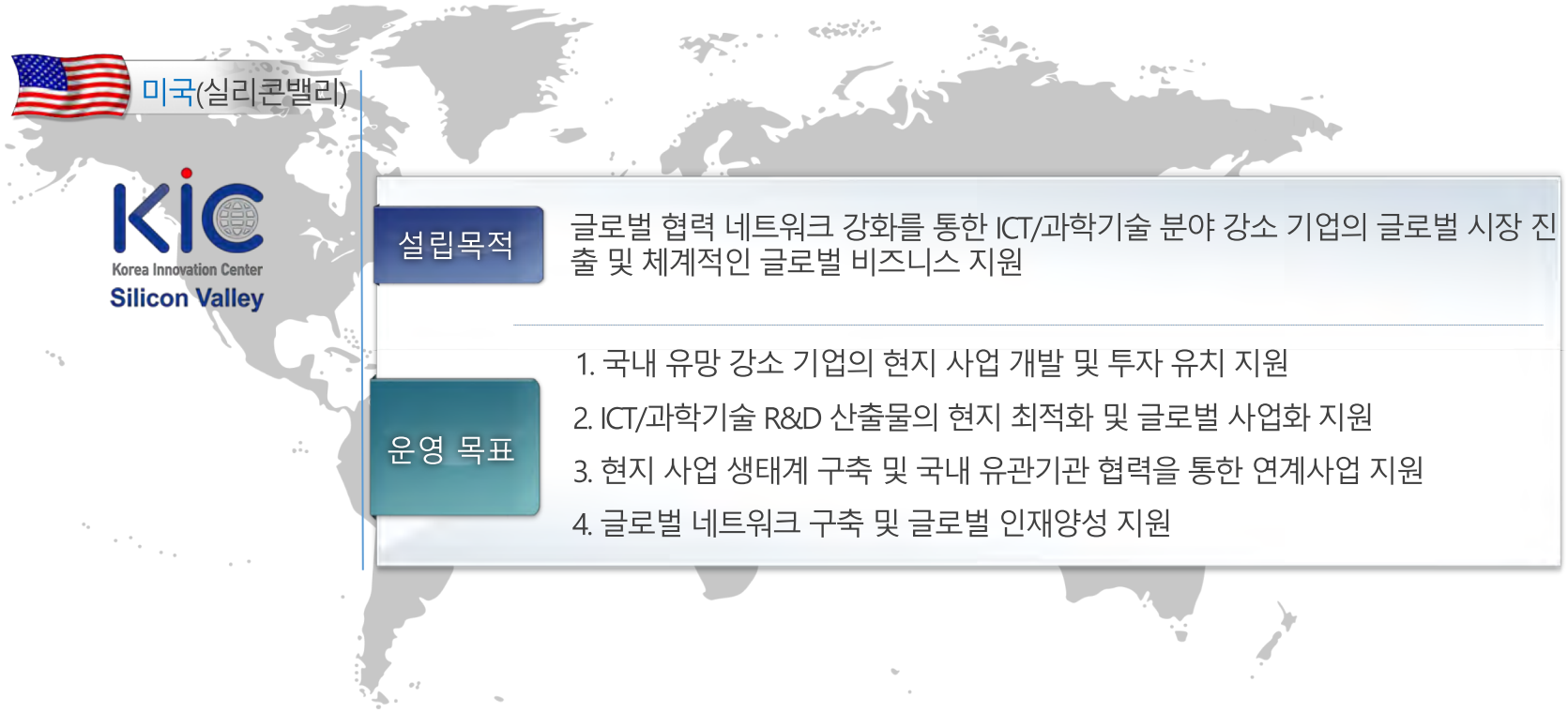

미국(실리콘밸리)

KIC Korea Innovation Center Silicon Valley

설립목적

글로벌 협력 네트워크 강화를 통한 ICT/과학기술 분야 강소 기업의 글로벌 시장 진출 및 체계적인 글로벌 비즈니스 지원

운영 목표

1. 국내 유망 강소 기업의 현지 사업 개발 및 투자 유치 지원
2. ICT/과학기술 R&D 산출물의 현지 최적화 및 글로벌 사업화 지원
3. 현지 사업 생태계 구축 및 국내 유관기관 협력을 통한 연계사업 지원
4. 글로벌 네트워크 구축 및 글로벌 인재양성 지원

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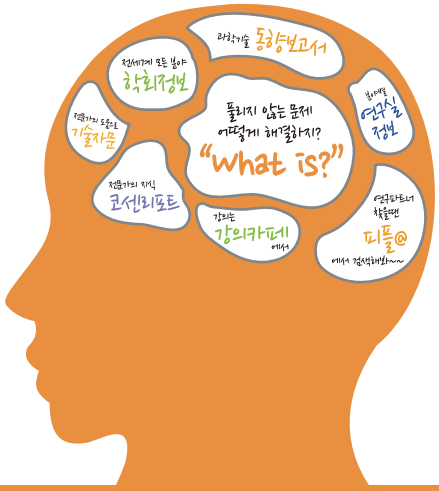
지식을 얻는 기쁨



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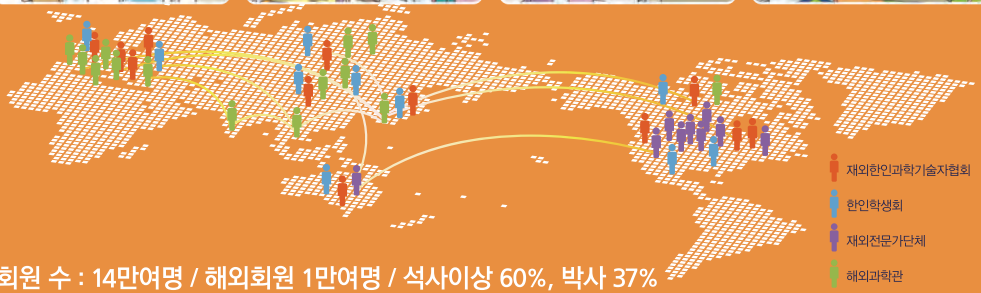

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3D/4D live cell imaging

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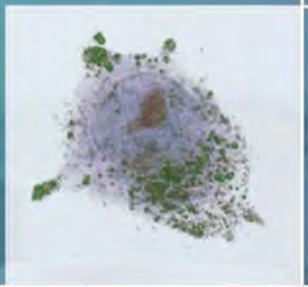
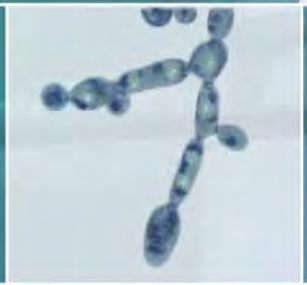
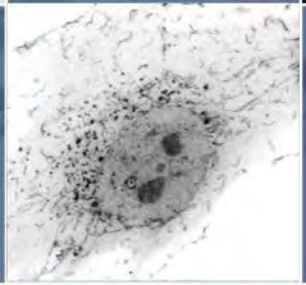


Quantification

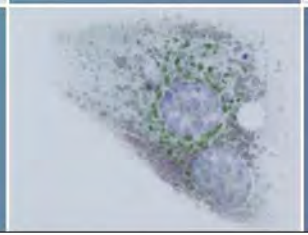
Fast imaging



No labeling



Real 3D



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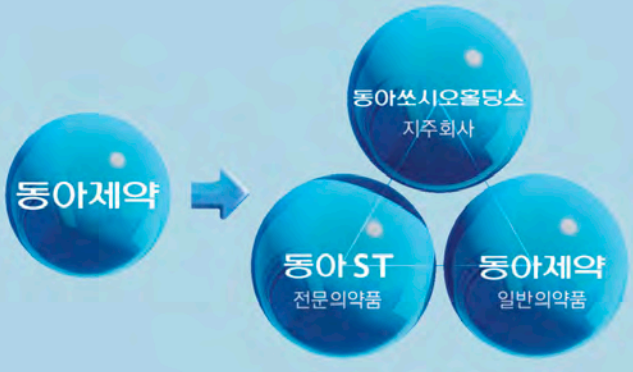

전문화된 글로벌 경영 체제 전환

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