

RESEARCH AND EXCHANGE PROGRAM FOR:
**HARNESSING THE POWER OF BIOTECHNOLOGY
FOR HUMAN AND PLANETARY HEALTH**



**RESEARCH CONFERENCE
NOVEMBER 14-15, 2019**

OSAKA UNIVERSITY, SUITA CAMPUS
UNIVERSITY OF CALIFORNIA, DAVIS
KIRIN HOLDING COMPANY

Sponsors & Participants:





HARNESSING THE POWER OF BIOTECHNOLOGY FOR HUMAN AND PLANETARY HEALTH

In the 40+ years since organisms were first transformed with foreign DNA, biotechnology (“biotech”) has made dramatic advances in the areas of food, feed, fiber, fuel and human health. More recently, plant biotech has showed great potential in the area of human health with the expression, production and commercialization of human protein therapeutics called “plant-made-pharmaceuticals (PMPs). Today, however, we must rethink all forms of biotech in the larger context of global climate change, rising sea levels and a human population that is growing exponentially. For example, plant biotech is more than merely an inexpensive source of food and medicine. Rather, it is an integral part of the global food production system, human/animal health system and local/global ecosystems. Scientists are describing the interplay between these systems as the food – health – ecosystem trilemma; a troubling situation where we can choose any two of these systems, but not all three. If humans want to continue enjoying the products of modern agriculture and medicine, we must find new ways of producing these products in sustainable and environmentally friendly ways.

This conference is the first to be sponsored by the Osaka University/UC Davis Graduate Student Exchange Program (“OU/UCD Exchange Program”). The OU/UCD Exchange Program is a research, education and training program designed to give graduate students (and their faculty mentors) an opportunity to experience cutting-edge research in different cultures and languages. To highlight the interdisciplinary, team science nature of the program, we have chosen to discuss biotechnology through a wider lens that includes:

- Medicinal plant compounds for human health
- Techno-economics: Do PMPs make economic sense?
- Stem cells research for regenerative cures
- Human augmentation and remediation of global ecosystems
- Plants for food and medicine grown for interplanetary travel

Conference sponsors: Osaka University, ICBiotech, Osaka University Office of Global Engagement, Kirin Company Limited, UC Davis College of Biological Science, UC Davis Institute for Regenerative Cures, UC Davis College of Engineering, UC Davis Global HealthShare Initiative.

**Kick-off Conference for
Osaka University University of California, Davis
Collaboration Project**



**14th, NOVEMBER 2019
ICHO HALL, OSAKA UNIVERSITY**





HARNESSING THE POWER OF BIOTECHNOLOGY FOR HUMAN AND PLANETARY HEALTH

Kick-OFF Symposium Launching of UC Davis-Osaka U Collaborative Projects

@Icho Kaikan (Suita Campus)

14- Nov

8:50

K. FUJIYAMA and R. L. RODRIGUEZ
Opening Remarks

9:00

Prof. KAWAHARA Genta, Vice-President, OU
"Opening Address"

9:05

Prof. Ken KAPLAN, Chair of the Steering Committee for the UC Davis, graduate student exchange program
"Cell Stress, Autophagy and Disease States"

UC-Davis Osaka U Collaborative Projects (1)

9:30

Prof. MURANAKA Toshiya, Division of Science and Biotechnology, Graduate School of Engineering, OU
"Redesign of Terpenoid Biosynthetic Pathway in Plant by Genome Editing"

10:00

Dr. Philipp ZERBE, Department of Plant Biology, UC Davis
"Investigating Plant Terpene Diversity for Improving Human Health"

Special Lecture

10:35

Dr. FUNABASHI Masatoshi, SONY Computer Science Laboratories, Inc. Tokyo, Japan

11:10

Photosession

11:30

Lunch

UC-Davis Osaka U Collaborative Projects (2)

12:45

Prof. FUKUSAKI Eiichiro, Division of Science and Biotechnology, Graduate School of Engineering, OU
"Application of Metabolomics for High Resolution Phenotype Analysis"

13:15

Mr. OKAWA Hiroshi, Leader, Plant Biotechnology Project, KIRIN Holdings Company, Limited
"Challenges of the Plant Biotechnology Project in Kirin"

13:45

Prof. KURISU Genji, Institute for Protein Research, OU
"Structural Basis for Ferredoxin-dependency of Photosynthetic Electron Transport Chain"

14:15

Coffee Break

UC-Davis Osaka U Collaborative Projects (3)

14:30

Prof. UMAKOSHI Hiroshi
Department of Materials Engineering Science, Graduate School of Engineering Science, OU

15:00

Prof. Tonya KUHLE, UC-Davis

UC-Davis Osaka U Collaborative Projects (4)

15:35

Osaka University URA

15:40

Closing Remarks

16:30

Party hosted by Osaka University



HARNESSING THE POWER OF BIOTECHNOLOGY FOR HUMAN AND PLANETARY HEALTH

Harnessing Biotechnology for Human and Planet Health

@Suntory Hall, Department of Biotechnology (Suita Campus)

15- Nov

9:25

K. FUJIYAMA and R. L. RODRIGUEZ
Opening Remarks

Plant Biotechnology

9:30

Prof. MATOBA Nobuyuki, James Graham Brown Cancer Center, Center for Predictive Medicine, Department of Pharmacology and Toxicology, University of Louisville School of Medicine
"Development of Unique Biopharmaceuticals Using a Plant-Based Transient Overexpression System"

10:05

Dr. Somen NANDI, Dept. of Chem. Engineering and Global HealthShare, UC Davis
Econo-Science & PMP in Space, UC Davis

10:40

Dr. TASAKA Yasushi, National Institute of Advanced Industrial Science and Technology
"Hydroponic Cultivation in Space"

11:40

Dr. MATSUDA Ryo, Graduate School of Agricultural and Life Sciences, The University of Tokyo
"Environmental Control for Plant-made Pharmaceutical Protein Production with Transient Gene Expression Technology"

11:50

Lunch

13:00

Dr. MATSUO Kouki
Bioproduction Research Institute, National Institute of Advanced Industrial Science and Technology (AIST)
"Repression of RNA Silencing for Efficient Recombinant Protein Expression in Plants"

Cell Imaging

13:35

Prof. John ALBECK, Department of Molecular and Cellular Biology, UC-Davis
"Live-cell Imaging of Kinase Activity: A Biotechnology Platform to Investigate Growth Factor and Metabolic Regulation"

14:10

Prof. UEDA Masahiro, Graduate School of Frontier Biosciences, OU
RIKEN Center for Biosystems Dynamics Research (BDR)
"Automated Single-molecule Imaging in Living Cells"

14:45

Coffee Break

Regenerative Medicine

15:00

Whitney CARY, Institute for Regenerative Cures, UC-Davis
"Clinically Relevant Culture of Induced Pluripotent Stem Cells"

15:35

Prof. Jong-Kook LEE, Graduate School of Medicine, OU
"Engineering of Physiologically- and Anatomically-relevant iPS Cell-derived Cardiac tissues: Implication for Disease Modeling/ Drug Discovery and Regeneration therapy"

16:45

Total Discussion

17:10

Closing Remarks

18:00

Cooking competition by overseas students (Participation fee: ¥ 500)