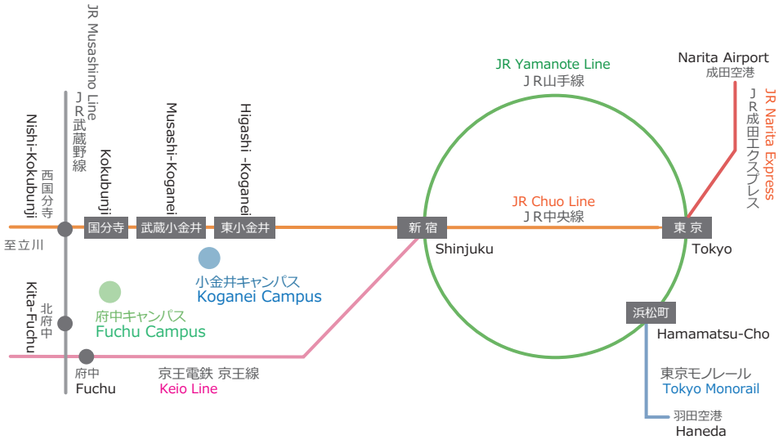
Institute of Global Innovation Research

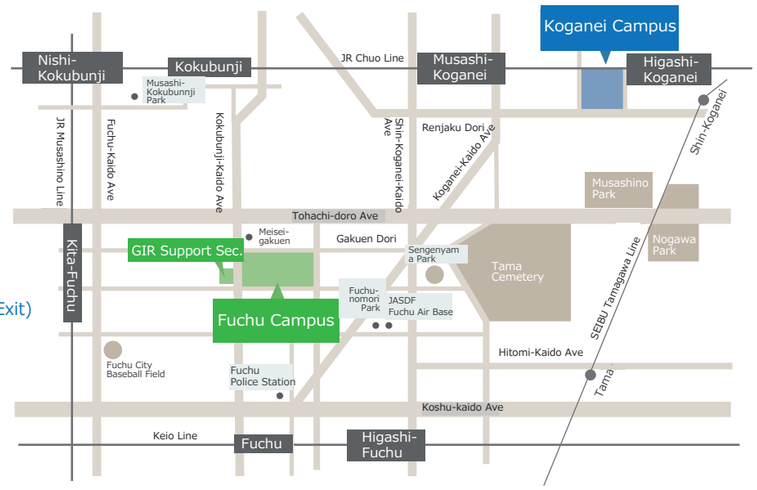
https://en.tuat-global.jp/



Fuchu Campus

3-5-8 Saiwai-cho, Fuchu-shi, Tokyo 183-8509

- JR Chuo Line " Kokubunji Station " (South Exit)
  Keio Bus (Bus Stop #2)
  Bus # 寺 91 bound for "Fuchu Station via Meisei Gakuen,"
  Get off at "Harumi-cho" bus stop
  About 10 minutes
- Keio Line " Fuchu Station " (North Exit)
  Keio Bus (Bus Stop #3)
  Bus # 寺 91 bound for "Kokubunji Station via Meisei Gakuen,"
  Get off at "Harumi-cho" bus stop
  About 7 minutes
- JR Musashino Line "Kita-Fuchu Station"
  About 12 minutes walk



Koganei Campus

2-24-16 Naka-cho, Koganei-shi, Tokyo 184-8588

- JR Chuo Line " Higashi-Koganei Station"
  South Exit : About 8 minutes walk
  nonowa Exit: About 6 minutes walk
- JR Chuo Line " Musashi-Koganei Station" (South Exit)
  About 20 minutes walk

Contact

Institute of Global Innovation Research Support Section
Research Promotion Office, Research Support Office
3-8-1 Harumi-cho, Fuchu-shi, Tokyo 183-8538
TEL: 042-367-5646
https://en.tuat-global.jp/

Jul. 2024.ed.

Institute of Global Innovation Research

Challenge to the global Problems of "food" and "energy"

AY2024

Tokyo University of Agriculture and Technology

Message

GIR Dean
Prof. Masaharu Kameda

TUAT aims to become a world-leading research university through scientific exploration of agriculture, engineering, and related interdisciplinary fields. In 2016, to strengthen our advanced research capabilities, TUAT established the Institute of Global Innovation Research (GIR). At the GIR, we promote international collaborative research in the three key fields of Food, Energy and Life Sciences. We also endeavor to further the careers of promising young researchers and assist them in working on an international scale.

Our strategic research teams welcome the world' s leading researchers as core faculty members in each of our fields of research while encouraging TUAT researchers and students to study abroad to build a network for conducting advanced research through international collaborations.

In 2020, we took our efforts further by establishing the Global Research Hub (GRH), which consists of research units that were formed from our strategic research teams. At the GRH, we strive to realize the establishment of independent research centers that also participate in international collaboration.

We will continue to promote the creation of new initiatives to further enhance our globally competitive research capabilities by building upon a foundation of international collaboration.

学長ビジョン

地球をまわす世界第一線の研究大学へ

Toward a world-leading research university that "Spins the Earth"
— weaving science and society to create a globally sustainable world

人とかがやく *Flourishing Together*

持続発展可能な社会の実現・「地球をまわそう。」を理念に、農学、工学およびその融合領域における科学的探究を通じ、次の時代のあるべき姿を示し努力する全ての人を尊重し、人の価値を知的に社会的に最大に高める世界第一線の研究大学となることを目指す

In its founding 150 years ago, Tokyo University of Agriculture and Technology laid the foundation for agricultural science and technology to sustainably secure food and to export the products obtained from the sericulture industry, or silk spinning, which was the key industry in Japan at that time. Against this background, we would like to present a vision of Spinning the Earth, which encompasses the history of this research institution as well as our current mission to weave together science and society in order to promote the sustainability of our planet.

戦略１　学生の未来価値を拡張
Promote educational reform to increase students' future potential

戦略２　世界を牽引する新分野・新概念を創成
Create new initiatives and novel concepts that lead the world

戦略３　目指すべき社会の姿を提案・先導
Provide and implement a knowledge-based society embodying how it should be

戦略４　ガバナンスの強化と大学経営の自律化
Strengthen university governance and self-empowered management

Approaches

Three Priority Areas : "Food" "Energy" "Life Science"
World-leading Research、Promotion of Young Researchers

a) Invite the world's leading researchers as core members of "Global Research Hub" and "Strategic Research Teams" for research collaboration.

Encourage students to conduct cutting edge research at GIR and to study abroad.

b) Flexible personnel system for promoting and fostering young researchers.

International Collaborative Research Center

Global Research Hub

①Research Center of Informatics for Human-Animal Interaction
②Research Center for Nitrogen and Phosphorus Upcycling

World-leading research
Global brain circulation of researchers

Boost the number of international co-authored papers
Submission to high-impact journals

Priority Field 1 FOOD

Solve the problems in food production and environmental depletion.

- Conservation of Regional Biodiversity
- Environmental Stress Resistance of Plant
- Plastic Pollution
- Green Infrastructure
- Biomass Production

Priority Field 2 ENERGY

Solve energy problems through the development of capacitors/LEDs and application of ionic liquids.

- LED
- Li-Ion Battery
- Green Manufacturing
- Resource/Energy Recovery
- Environmental-friendly Process for the Production of Useful Compounds

Priority Field 3 LIFE SCIENCE

Development in advanced technologies on protein science and biomedical science.

- Disease
- Drug Discovery
- Health
- Microorganism
- Cell Biology

History

2014 Established "Global Innovation Research Organization (GIRO)" launched with 9 Strategic Research Teams

2016 Reorganization of "GIRO" as "Institute of Global Innovation Research (GIR)" integrates all of the following organizations
- Global Innovation Research Organization
- Women's Future Development Organization
- Organization for Promotion of Tenure-track System
- Innovation Advancement Organization

2018 Launched "Field Group" and "Strategic Research Initiative for Interdisciplinary Field" in the GIR

2019 Removed "Innovation Advancement Organization" from the GIR

2022 Launched "Global Research Hub (GRH)" in the GIR
Termination of "Field Group" and "Strategic Research Initiative for Interdisciplinary Field"

2023 Launched two research centers in the GRH
- Research Center of Informatics for Human-Animal Interaction
- Research Center for Nitrogen and Phosphorus Upcycling

Institute of Global Innovation Research

TOKYO UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

FOOD

Food is one of the critical challenges that the international community is currently facing. Particularly, food shortages afflict many people living mainly in the Asia-Pacific region.
Because these problems relate closely with global environmental concerns, "Food" as a priority theme encompasses both food production and environmental science to solve these issues.

Kajita Team

Elucidation of metabolic mechanism of biocomponents and development of various functional molecules

Dr. Shinya Kajita
Division of Sciences for Biological System, Institute of Agriculture

Dr. John Ralph
University of Wisconsin
(U.S.A.)

Ohtsu Team

Study of interactions between organisms that contribute to crop cultivation under environmental stress

Dr. Naoko Ohtsu
Division of Science of Biological Production, Institute of Agriculture

Dr. Gary Stacey
University of Missouri
(U.S.A)

Toyoda Team

Development of soil evaluation systems for environment-friendly sustainable crop productiona

Dr. Koki Toyoda
Division of Sciences for Biological System, Institute of Agriculture

Dr. Karl Ritz
University of Nottingham
(U.K.)

Fukuda Team

Formation of International Research Unit for Prediction Agriculture based on Spatiotemporal Multidimensional Data

Dr. Shinji Fukuda
Institute of Global Innovation Research

Dr. Jirka Šimůnek
University of California, Riverside (U.S.A.)

Fukuhara Team

Study on mechanisms against abiotic and biotic stress responses in plants and its application

Dr. Toshiyuki Fukuhara
Division of Bioregulation and Biointeraction, Institute of Agriculture

Dr. Rowan F. Sage
University of Toronto
(Canada)

Koike Team

Research on biodiversity and ecosystem conservation taking into account synergies and trade-offs of ecosystem services

Dr. Shinsuke Koike
Institute of Global Innovation Research

Dr. Tatsuya Amano
The University of Queensland
(Australia)

Kato Team

Watershed scale ecosystem services assessment through water saving irrigation with Smart Agriculture

Dr. Tasuku Kato
Division of International Environmental and Agricultural Science, Institute of Agriculture

Dr. Claudio Gandolfi
University of Milan
(Italy)

Julien Boulange Team

Determining the role of global agricultural systems in mitigating flood events

Dr. Julien Boulange
Division of International Environmental and Agricultural Science, Institute of Agriculture

Dr. Simon Gosling
University of Nottingham
(U.K.)

Kubo Team

Metasurface Energy Harvesting for powering IoT devices

Dr. Wakana Kubo
Institute of Global Innovation Research

Dr. Xu Fang
University of Southampton
(U.K.)

Energy

The rising energy consumption on a global scale in recent years is expected to continue, and energy issues should therefore be considered to be a great challenge facing humanity.
"Energy" as a priority theme addresses energy problems according to the application of capacitors, LED, and ionic liquids, while adding a new dimension to these research areas.

Tanaka Team

Strategic center for sustainable manufacturing through blue transformation

Dr. Tsuyoshi Tanaka
Division of Biotechnology and Life Science, Institute of Engineering

Dr. Chris Bowler
Institut de Biologie de l 'Ecole Normale Supérieure (IBENS) (France)

Pongsathorn Team

SMART=Strategic Mobility Alliance Research Team

Dr. Pongsathorn Raksincharoensak
Division of Advanced Mechanical Systems Engineering, Institute of Engineering

Dr. Frédéric Barlat
Pohang University of Science and Technology (Korea)

Tominaga Team

Development of Functional Polymeric Materials for Next Generation Energy Devices

Dr. Yoichi Tominaga
Division of Applied Chemistry, Institute of Engineering

Dr. Jusef Hassoun
University of Ferrara
(Italy)

Iwama Team

Next Gen. Batteries for Carbon Neutral Society

Dr. Etsuro Iwama
Division of Applied Chemistry, Institute of Engineering

Dr. Patrice Simon
Paul Sabatier University
(France)

Mizuuchi Team

Towards Three-Dimensional Autonomous Mobile Robot through the International Joint Research on Informatics, Robotics, Cybernetics, and Artificial Intelligence

Dr. Ikuo Mizuuchi
Division of Advanced Mechanical Systems Engineering, Institute of Engineering

Dr. Václav Hlaváč
Czech technical university
(Czech Republic)

Tagawa Team

Deepening of control science for dynamic interfacial dynamics and their process and material applications

Dr. Yoshiyuki Tagawa
Institute of Global Innovation Research

Dr. John W.M. Bush
Massachusetts Institute of Technology (U.S.A.)

Fukutani Team

Elucidation of olfactory mechanism and development

Dr. Yosuke Fukutani
Division of Biotechnology and Life Science, Institute of Engineering

Dr. Hiroaki Matsunami
Duke University School of Medicine (U.S.A.)

Inada Team

Development of disease-therapeutic molecules based on collagen degradation and metabolism through a Japanese-German-British research collaboration

Dr. Masaki Inada
Division of Biotechnology and Life Science, Institute of Engineering

Dr. Yoshifumi Itoh
University of Oxford
(U.K.)

Kuroda Team

Protein Immuno-engineering against infection outbreaks by variant viruses

Dr. Yutaka Kuroda
Division of Biotechnology and Life Science, Institute of Engineering

Dr. Yves L. Janin
Muséum National d'Histoire Naturelle/INSERM/CNRS (France)

Sasaki Team

Research on molecular mechanisms of host manipulation by parasitic microbes

Dr. Nobumitsu Sasaki
Division of Applied Biological Chemistry, Ianstitute of Agriculture

Dr. Richard S. Nelson
Oklahoma State University
(U.S.A.)

Yatabe Team

Mathematical Modeling and Deep Learning for Small-Data AI

Dr. Kohei Yatabe
Division of Advanced Electrical and Electronics Engineering, Institute of Engineering

Dr. Andrzej Cichocki
Polish Academy of Science
(Poland)

Life Science

Life science has a significant impact on our health and well-being and is an important science area that directs us to find a solution for food and energy issues as a fundamental technology.
"Life Science" as a priority theme pushes and precedes the edge of technical possibility, mainly in protein synthesis and life science itself.

Usui Team

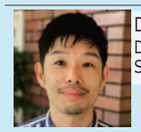
Establishment of a research base using organoids from non-model organisms

Dr. Tatsuya Usui
Division of Animal Life Science, Institute of Agriculture

Dr. Wael Mohamed El-Deeb
King Faisal University
(Saudi Arabia)

Kawano Team

Lipid Modalities: From Lipid Metabolism to Artificial Cell Membrane

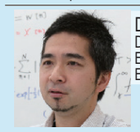


Dr. Ryuji Kawano
Division of Biotechnology and Life Science, Institute of Engineering

Dr. Takanari Inoue
Johns Hopkins University
(U.S.A.)

Umebayashi Team

THz Information communication equipment based on cooperated analog and digital components



Dr.Kenta Umebayashi
Division of Advanced Electrical and Electronics Engineering, Institute of Engineering

Dr. Janne Lehtomäki
University of Oulu
(Finland)

Hamabe Team

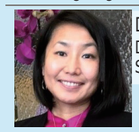
Evaluation of the interplay between oncological and cardiovascular diseases in veterinary medicine

Dr. Lina Hamabe
Division of Animal Life Science, Institute of Agriculture

Dr. Zeki Yilmaz
Bursa Uludag University
(Turkey)

Sakurai Team

Development and target identification of anticancer and antifungal agents for new therapeutic modalities

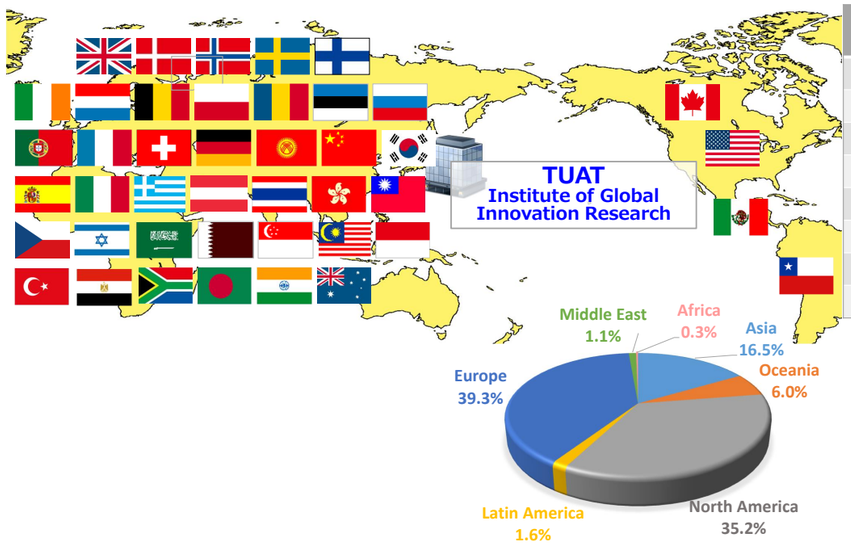


Dr. Kaori Sakurai
Division of Biotechnology and Life Science, Institute of Engineering

Dr. Bengang Xing
Nanyang Technological University
(Singapore)

Research Collaborations

◆43 Countries, 186 Universities



	Cumulative Headcount
Asia	61
Oceania	22
North America	130
Latin America	6
Europe	145
Middle East	4
Africa	1
G.Total	369

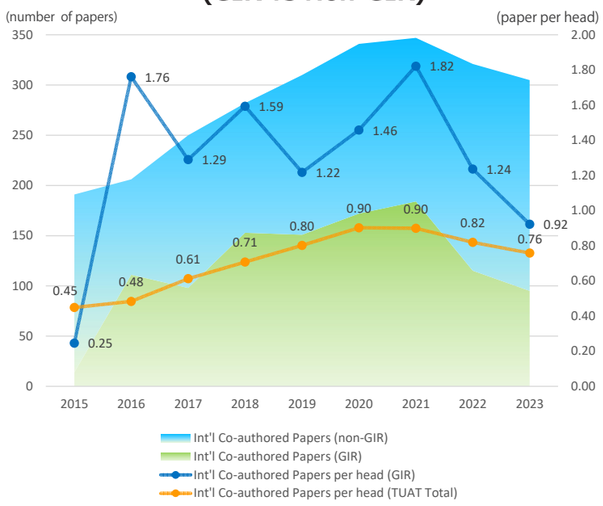
◆GIR Open Seminar

Number of GIR Open Seminar : 481	
2014 (Aug.~)	18
2015	44
2016	41
2017	58
2018	73
2019	88
2020	21
2021	30
2022	49
2023	59

◆Press Release

Number of Press Releasee GIR vs TUAT Total		
2014 (Aug.~)	5 / 15	33.3%
2015	6 / 14	42.8%
2016	9 / 21	42.8%
2017	13 / 25	52.0%
2018	13 / 27	48.1%
2019	32 / 52	61.5%
2020	26 / 47	55.3%
2021	40 / 67	59.7%
2022	35 / 61	57.3%
2023	32 / 61	52.46%

◆Number of WoS International Co-Authored Papers (GIR vs Non-GIR)



◆WoS International Co-authored Papers

	2015	2021	2022	2023
Number of Researchers	426	386	392	402
Number of Researchers (GIR)	57	101	93	103
① Number of Co-authored Papers	191	347	321	305
② Number of Co-authored Papers (GIR)	14	184	115	95

Achievements - Strategic Research Teams

◆2019 - 2021 Arakaki Team

Research Theme : Understanding and application of regulation mechanisms of hardness and toughness of biological hard materials

University of California Irvine (U.S.A.)

Prof. David Kisailus

TUAT

Prof. Atsushi Arakaki

Title : Toughening mechanisms of the elytra of the diabolical ironclad beetle
Nature 586, 543-548 (2020)
DOI10.1038/s41586-020-2813-8

What are the benefits of conducting research at GIR?
- Trusted collaborators
- Opportunity for biweekly free-discussion with overseas collaborators
- Students entering a doctoral program

◆2021 - 2023 Koike Team

Research Theme : Research on biodiversity and ecosystem conservation taking into account synergies and trade-offs of ecosystem services

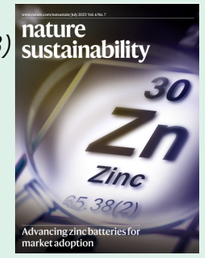
University of Queensland (Australia)

Dr. Tatsuya Amano

TUAT

Prof. Munemitsu Akasaka

Title : The role of non-English-language science in informing national biodiversity assessments
Nature Sustainability 6 (7) , 845-854 (2023)
DOI10.1038/s41893-023-01087-8



What are the benefits of conducting research at GIR?
- Less negative impact in the COVID-19 pandemic
- Positive impact on students by working with world's top researchers

◆2018 - 2021 Terada Team

Research Theme : A new nitrogen management system in water/wastewater treatment

Korea Advanced Institute of Science and Technology (Republic of Korea)

Dr. Sukhwan Yoon

TUAT

Prof. Akihiko Terada

Title : Organic carbon determines nitrous oxide consumption activity of clade I and II nosZ bacteria: Genomic and biokinetic insights
Water Research 209 , 117910 (2022)
DOI10.1016/j.watres.2021.117910

What are the benefits of conducting research at GIR?
- Deeply recognised the importance of submitting to top journals and improving the quality of research through the collaboration with world's top researchers
- New overseas research collaborators through existing team members
- The increasing number of co-authors brings the opportunities to organize sessions at international conference, write opinion papers, and etc.
- Increasing number of co-author invitations