



iMAPS

In-situ Metabolic Atlas Projects @ Single-cell


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NEWSLETTER

What are new across the global iMAPS network, in the World Microbiome Partnership (WMP)

“Metabolic monitoring and mining of microbiota @ single-cell, anytime & anywhere”



100+

Global nodes and facilities in operation / setup

14

Featured research outputs highlighted in this issue (Q3 + Q2)

2026 Q3

Focus on network expansion, application published, and community events

1. iMAPS Overview

For 3.8 billion years, microbes have flourished on Earth, serving as the invisible architects of the living world. They underpin the health of humans, animals, plants, and the planet. As one of humanity's greatest shared treasures, microbiomes form a vast, interconnected superorganism that stretches across the globe. Yet, we have arguably explored and utilized less than 1% of this incredible natural resource. To more efficiently observe, understand, mine, and harness the metabolic potential of microbiome, the iMAPS (in-situ Metabolic Atlas Projects @ Single-cell) Consortium is establishing a global network of Microbiome Metabolic Observatories (MIMO) at single-cell resolution. Each node acts as a "metabolic sensor, strain miner, and ecological restorer" of microbiome. Powered by metatranscriptomic instrumentation (<https://www.imaps.info/platform>), AI-assisted phenotyping, and downstream workflows for single-cell cultivation or single-cell DNA/RNA sequencing, the iMAPS Consortium empowers scientists to detect, sort, and recover microbial cells of a targeted in-situ metabolic function directly from human or environmental samples.

iMAPS is designed to serve as a collaborative support system. Rooted in a spirit of connectivity, mutual support, and shared growth across the consortium, each node is committed to “symbiosis”, the spirit of the microbiome, by sharing data, experimental protocols, technical expertise, and instrument time, and by hosting training and workshops at no costs to the community whenever possible. Our goal is to foster an ecosystem in which knowledge, resources, and capabilities circulate across institutions, disciplines and countries efficiently, so as to advance microbiome science rapidly and collectively, as microbiome knows no geographic or disciplinary borders.

By the third quarter of 2026, iMAPS has grown into a rapidly expanding global network of more than 100 members, spanning Asia, Europe, and North America. The consortium is moving beyond concept validation to coordinated development of tools and applications, with new nodes being established, demonstration platforms going live, and cross-institutional programs emerging in areas such as biomanufacturing, medicine, nutrition, public health, agriculture, and environmental sustainability.

Vision

To profile, decode and mobilize microbial metabolism globally so that microbiomes can benefit health, agriculture, environmental restoration, climate resilience, and biomanufacturing.

Mission

Build a global network of “metabolic sensors, strain miners, and ecological restorers” for real-time microbiota profiling and strain mining.

Shift from sequence-based functional predictions to rapid and low-cost measuring and mining of single-cell metabolism.

Create biobanks for in-situ-functioning strains.

Approach

Metaramanomics — a high-throughput platform that produces single-cell “6W” data (Who, What, Wealth, Why, When, Where) by profiling single-cell Raman spectra of microbiota and sorting in-situ-functioning cells for downstream cultivation or sequencing.

2. Featured Scientific Outputs by Members of the iMAPS Initiative

Between Q3 and Q2 2026, iMAPS Platform-enabled studies spanned new Raman-activated cell sorting methods, functional screening of microbes, rapid phage susceptibility testing, probiotic strain identification, microalgal lipid improvement, and single-cell monitoring of fermentation, continuing to expand the reach of Metaramanomics technology.

Applications of the iMAPS Platform Published during Q3 + Q2, 2026

Title	Journal	Publication Date	Contributing iMAPS Nodes
High-throughput dual resonance and non-resonance mode Raman-activated cell sorting with low-volume harvesting	Small Methods	2026-09-12	Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences (CAS-QIBEBT); Kweichow Moutai Co., Ltd.; Chishui River Middle Basin Watershed-ecosystem Observation and Research Station of Guizhou Province
Functional screening and single-cell cultivation of marine CO ₂ -fixing bacteria via flow-mode Raman-activated cell sorting	Bioresour Technol	2026-09-09	Ludong University; CAS-QIBEBT; Qingdao University of Science and Technology; Third Institute of Oceanography, Ministry of Natural Resources; University of Cape Town
Quorum sensing-driven metabolic altruism of nitrite-oxidizing bacteria fuels nitrification	Nat Water	2026-07-29	Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences; Institute of Tibetan Plateau Research, Chinese Academy of Sciences; Chinese Research Academy of Environmental Science; Quaid-i-Azam University; CAS-QIBEBT
Unequal costs of community stress responses	Nat Water	2026-07-29	Hokkaido University
Microbial cleavage and mineralization of acesulfame by <i>Shinella</i> sp. strain KJ01	Water Res	2026-07-24	Shandong University of Science and Technology; Rutgers University; CAS-QIBEBT; Shandong Normal University
Metabolism-driven and high-efficiency mining of ethanol-tolerant microorganisms from pit mud microbiota using Raman-activated cell sorting	Bioresour Technol	2026-07-14	CAS-QIBEBT; COFCO Nutrition and Health Research Institute Co. Ltd.; Jiugui Liquor Co. Ltd.; University of Jinan
Single-cell Raman spectroscopy and synthetic microbiology power microbial-driven extraterrestrial domestic wastewater treatment	mSystems	2026-06-23	Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences; China

			Astronaut Research and Training Center; University of Science and Technology of China
High-throughput Raman-activated cell sorting of microalgal genome-wide edited library revealed a regulatory pathway for carotenoid synthesis	Nat Commun	2026-06-12	Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences (CAS-QIBEBT); University of Potsdam; Max Planck Institute of Molecular Plant Physiology; CEA Cadarache
From fragmented workflows to integrated pipelines: Bridging enzymatic DNA synthesis, assembly, and MutS-based error correction	Biotechnol Adv	2026-05-31	CAS-QIBEBT; University of Jinan; Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences; Zhonghe Gene Technology Co., Ltd.
Rapid and quantitative phage susceptibility test by ramanome	mLife	2026-05-21	CAS-QIBEBT; University of Jinan; Shenzhen Third People's Hospital; University of Hong Kong
Improved high-throughput Raman-activated cell sorting yields a high-DHA <i>Aurantiochytrium</i> mutant with enhanced lipid recycling	J Agric Food Chem	2026-05-14	CAS-QIBEBT
An integrated platform for high-throughput analysis and sorting of single mammalian cells	Sensor Actuat B-Chem	2026-05-05	CAS-QIBEBT
Single-cell Raman spectroscopy-machine learning combination: Rapid and accurate strain-level identification of <i>Bifidobacterium animalis</i> subsp. <i>lactis</i> J12	Food Microbiol	2026-04-22	Beijing University of Agriculture; Inner Mongolia Mengniu Dairy (Group) Co., Ltd.; Science and Technology Research Center of China Customs
Label-free, single-cell-precise, and monomeric-unit-resolved monitoring of biopolymer fermentation by ramanomics	Trends Biotechnol	2026-04-11	CAS-QIBEBT; Beijing PhaBuilder Biotechnology Co., Ltd.; Institute of Animal Science, Chinese Academy of Agricultural Sciences; Tsinghua University

For more publications enabled by the iMAPS platform, please visit: <https://www.imaps.info/Solutions>

If you are aware of iMAPS-related publications that are not included in this Featured Scientific Outputs section, please email us (newsletter@imaps.info). We would be pleased to highlight and share them with the global iMAPS Community.

3. Major Events and Network Milestones

iMAPS at Targeting Microbiota 2026 in Tokyo; Ramanomics Receives Innovation Award (September 24-25, 2026)

The iMAPS Consortium participated in the 2nd Conjoint RIKEN-ISM Targeting Microbiota Meeting at The University of Tokyo, showcasing Ramanomics and Metaramanomics technologies to the international microbiota research community. Two scientific talks highlighted how the iMAPS platform is being applied to rapid probiotic quality assessment, strain traceability, and single-cell metabolic phenotyping and sorting across the global iMAPS network. At the meeting, Ramanomics, the core technology platform of iMAPS, was honored with the Innovation Award 2026, co-presented by RIKEN and the International Society of Microbiota (ISM).

Biomanufacturing iMAPS Symposium Co-hosted at 2026 IMic (September 16-18, 2026)

During the 14th Conference on Industrial Microbiology in Beijing, the iMAPS Consortium organized a satellite symposium on high-throughput strain development, process monitoring, and quality control. Six experts presented on Ramanomics principles and its applications in high-producing strain selection, fermentation monitoring, monoclonal seed-bank assurance, and industrial deployment. The Consortium also showcased integrated solutions for strain mining, fermentation monitoring, and microbial quality control at the accompanying exhibition.

iMAPS 2026 Annual Symposium Held in Qingdao (September 9-10, 2026)

The iMAPS Consortium convened its 2026 Annual Symposium in Qingdao, hosted by CAS-QIBEBT and the Green Carbon Resources Utilization Committee, CIESC, with more than 100 experts from universities, research institutes, and industry in attendance. Twelve experts presented across four application sessions: Biomanufacturing/SynBio, Nutrition & Health, Environment, and Agriculture. Topics included fermented-food microbiome regulation, gut microbiome and probiotic development, functional microbe discovery, and black-soil health. A roundtable discussed stage-wise goals, standardization, data sharing, and industry-academia-research collaboration. Hands-on instrument operation and data-analysis sessions on September 11 further extended the reach of the iMAPS global network.

Three New Nodes Join the iMAPS Global Network (August 2026)

The iMAPS Global Network expanded with three new nodes: the Institute of Biotechnology, National Autonomous University of Mexico (IBt-UNAM), focusing on Nutrition & Health; Vietnam National University, focusing on Public Health & Medicine; and Chulalongkorn University, focusing on Biomanufacturing / SynBio. The new nodes extend the network's reach across Latin America and Southeast Asia.

iMAPS at the 17th National Symposium on Microbial Resources (July 20-25, 2026)

The iMAPS Consortium took part in the symposium in Changchun, which brought together more than 900 researchers from over 200 institutions across 31 provinces and municipalities. A hands-on workshop built on the Black Soil iMAPS platform gave participants practice in the full workflow of isolating active functional strains from complex soil microbiomes using FlowRACS and DCP. A Ramanomics-themed session covered in-situ strain bank construction, denitrifying microbe identification, and deep learning-assisted microbial identification, and an AI-enabled soil microecosystem solution was presented at the exhibition.

Inaugural CAS iMAPS Summer School Held Across Qingdao, Beijing/Xiong'an and Shanghai (July 11-20, 2026)

The iMAPS Consortium held its inaugural Summer School, a 10-day program bringing together 27 early-career researchers from 21 institutions across 11 countries and regions to trace Ramanomics from technological innovation to real-world applications. Participants received hands-on training with core iMAPS instruments and RamEx/RamanAI analysis tools in Qingdao, visited iMAPS nodes focused on food safety and agriculture in Beijing/Xiong'an, and explored biomedical applications in Shanghai. Two iMAPS Young Scientists Forums recognized outstanding young researchers with Best Presentation Awards. The summer school will be held annually at iMAPS nodes worldwide.

4. iMAPS on the Global Stage

During Q3 2026, the iMAPS Consortium participated in 16 conferences and meetings across 12 cities, delivering 18 invited presentations that highlighted the latest advances in single-cell microbiome technologies across four application areas.



Environment

Sep 21-24

World Data Center for Microorganisms 2026 International Annual Conference
Beijing, China

Aug 28-31

The 1st Life Atlas Conference 2026
Kunming, China

Aug 27-30

The 27th National Symposium on Environmental Microbiology
Shenyang, China

Jul 20-25

The 17th National Symposium on Microbial Resources
Changchun, China

Jul 2-5

mLife Research Conference 2026
Tianjin, China



Biomanufacturing / SynBio

Sep 28-29

The Second Sino-German International Conference on Zero-Carbon Technologies and Biomanufacturing
Hangzhou, China

Sep 21-23

The 17th International Bio-fermentation Products & Technology Equipment Exhibition 2026
Hangzhou, China

Sep 19

2026 Annual Academic Conference of the Heilongjiang Society of Bioengineering and the Heilongjiang Society for Microbiology
Qiqihar, China

Sep 16-18

The 14th Conference on Industrial Microbiology
Beijing, China

Aug 24-27

The 6th Zymomonas mobilis Symposium and the 1st Sichuan-Chongqing Symposium on Synthetic Biology and Biomanufacturing
Chengdu, China

Aug 6-9

International Conference on Engineering Microbiology
Qingdao, China



Public Health & Medicine

Sep 9

The 6th Jinfeng Stem Cell Academic Seminar
Chongqing, China

Aug 13-15

The 2nd Workshop on Flow Cytometry Technology and Applications 2026
Beijing, China

Aug 4-7

NIBS Science & Technology Forum, Joint with the 2026 NIBS/TIMBR Annual Academic Meeting
Xiong'an, China

Jul 9-12

The 16th China Symposium on Management and Technology Development of Life Science Core Facilities
Chongqing, China



Nutrition & Health

Sep 24-25

The 2nd Conjoint RIKEN-ISM Targeting Microbiota Meeting
Tokyo, Japan



16

Conferences & Meetings



12

Cities



18

Invited Presentations

5. Upcoming Activities

Date	Activity	Location	Focus
Oct 13–15, 2026	iMAPS Talk at the 8th Raman Spectroscopy Network Conference (iCRS 2026)	Online	FlowRACS-Culture and the RamanAI cloud platform supporting the iMAPS program
Oct 13–15, 2026	iMAPS Talk at the Course on Microbial Culture Collections: Innovation and Global Challenges	São Paulo, Brazil	Building a global network of Microbial Metabolic Observatories and strain banks via high-throughput RACS-Culture
Oct 16–18, 2026	iMAPS Talk at the 19 th Symposium on Infectious Diseases of the Chinese Medical Association	Tianjin, China	Advances in rapid phage detection by Raman spectroscopy
Oct 18–22, 2026	iMAPS Symposium at the Metabolic Engineering Summit 2026	Dalian, China	Single-cell metabolic and process engineering enabled by the Ramanomics platform
Oct 21, 2026	iMAPS Talk at the Academic Forum on Frontier Technologies and Applications at the Medicine–Engineering Interface	Beijing, China	High-throughput Raman flow sorting: a new tool for live single-cell metabolic profiling and functional cell bank construction
Oct 23–24, 2026	iMAPS Talk at the Synthetic Microbiome and Human Nutritional Health Symposium	Shenzhen, China	Single-cell Raman phenotyping and sorting for synthetic microbiome construction and human health
Oct 30–Nov 1, 2026	iMAPS Talk at the 2026 Symposium on Interdisciplinary Science and Frontier Technologies in Resources and Environment	Wuhan, China	Single-cell metabolic profiling of resource and environmental microbiomes

Oct 30–Nov 1, 2026	iMAPS Talk at the SMART Symposium Microbiota in Health and Disease	Shenzhen, China	Single-cell Raman phenotyping and sorting for functional microbiota research in health and disease
Oct 30–Nov 2, 2026	iMAPS Talk at the Second National Conference on Analytical Science and Instrumentation (NCASI 2026)	Wuhan, China	Ramanomics platform and its applications across biomedicine and industry
Oct 30–Nov 2, 2026	iMAPS Talk at the 13th National Congress of Members of the Microbiological Society of China & 2026 Annual Academic Conference	Nanchang, China	Ramanomics-based pathogen platform for rapid drug and phage susceptibility testing
Nov 4–6, 2026	iMAPS Talk at the 2026 National Symposium on Marine Microbiology	Nanjing, China	Ramanomics-based single-cell sorting for functional marine microbe discovery
Nov 6–8, 2026	iMAPS Symposium at the 2026 Annual Academic Meeting of the Chinese Association for Microbial Ecology	Wuhan, China	In-situ metabolic atlas at single-cell resolution for environmental sustainability
Nov 16–18, 2026	iMAPS Talk at the 23rd Meeting of the Asian Consortium for the Conservation and Sustainable Use of Microbial Resources	Hanoi, Vietnam	Harnessing microbial resources: from single cells to microbiomes for a sustainable bioeconomy
Nov 20–21, 2026	iMAPS Talk at the 5th China Dermatology Development Conference	Nanjing, China	Fungal iMAPS initiative: new strategies for fungal diagnosis, drug susceptibility, and strain bank development
Nov 29–Dec 2, 2026	iMAPS Talk at the China–Europe Workshop on Green Carbon Science Development and Popularization	Munich, Germany	Ramanomics technology in support of green carbon science

6. Funding Opportunities for iMAPS

CAS International Visiting Student Program

Supports international graduate students to conduct research at CAS-affiliated institutes (1–6 months).

- Monthly stipend: RMB 10,000 (Covers accommodation, domestic transportation, and living expenses)
- Travel allowance: RMB 10,000

CAS President's International Fellowship Initiative (PIFI) – Open year-round. (Non-Chinese nationality)

The CAS PIFI Program is a flagship initiative of the Chinese Academy of Sciences, designed to promote global scientific collaboration and researcher mobility across all career stages.

The program provides a comprehensive support package covering living expenses, international travel, insurance, and research allowance. [More info: <https://pifi.cas.cn/>]

- Distinguished Scientist: For internationally recognized scientists, short-term academic visit (1–2 weeks), RMB 40,000 per week
- Visiting Scientist: For postdoctoral researchers and junior scientists (1–6 months) to conduct collaborative research at CAS institutes, RMB 40,000 / 30,000 / 20,000 per month for professors / associate professors / assistant professors (incl. postdocs), plus one round-trip economy-class international airfare

MOST Intergovernmental International S&T Innovation Cooperation Program: 2027 Joint R&D Projects (Guidelines)

China's Ministry of Science and Technology (MOST) has released draft guidelines for the first batch of 2027 joint R&D projects under the National Key R&D Program "Intergovernmental International S&T Innovation Cooperation". The call plans to support about 117 projects across 10 research directions with 8 countries and international organizations, with total central government funding of RMB 475.6 million. Projects typically run for 2 to 3 years. Several directions align closely with iMAPS themes, including health, agriculture, food, the bioeconomy and environmental sustainability.

Partner	Priority areas	Planned support
EU (Flagship Research and Innovation Program)	Climate change and biodiversity; food, agriculture and biological solutions	4 projects, RMB 159 million in total
Spain	Biomedicine and advanced therapies; modern agriculture and food safety; circular economy; marine biotechnology; climate change and biodiversity	Up to 25 projects, RMB 75 million in total
Finland	Climate change and sustainable development; circular economy; health and aging technologies	Up to 15 projects, RMB 60 million in total
Austria	Climate change and sustainable transport; food, bioeconomy, natural resources, agriculture and environment; biochemistry	Up to 15 projects, RMB 30 million in total
Singapore	Infectious diseases	3 projects, up to RMB 15 million each
Egypt	Advanced manufacturing, artificial intelligence, agriculture, water, information and communications; renewable energy and quantum technology	40 projects, RMB 55 million in total
Malta	Smart manufacturing, renewable energy and storage, resource efficiency and valorization	About 6 projects, RMB 9.6 million in total
Cuba	Artificial intelligence; traditional Chinese medicine	6 projects, RMB 18 million in total

Key requirements:

- Chinese and foreign partners must apply separately to their own national agencies. Applications from one side only are invalid.
- Several programs (Spain, Finland, Austria) require participating companies to provide matching funds at least equal to their government funding.
- The EU program requires at least 3 unaffiliated Chinese institutions per project, and the Chinese lead institution must be an Associated Partner in the corresponding Horizon Europe project.

Note: This is a draft for public comment, and details may change in the final version. Application deadlines and foreign partner contacts have not yet been announced. Members interested in these opportunities are welcome to contact sunmm@qibebt.ac.cn for follow-up.

Stay connected with the iMAPS community

As the network continues to scale, iMAPS is moving from distributed node building toward coordinated scientific delivery. Members are encouraged to share research updates, workshop announcements, node milestones, and collaboration opportunities for inclusion in future issues.

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