



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

2026 Q2

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 metamanomic 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 second 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

A snapshot of recent Q2 + Q1 2026 publications across the iMAPS ecosystem, showcasing iMAPS-Platform-enabled advances in Raman-activated cell sorting, genome-wide functional screening, rapid phage susceptibility testing, probiotic strain identification, mammalian single-cell sorting, microalgal lipid improvement, and single-cell-resolved fermentation monitoring.

Applications of the iMAPS Platform Published during Q2 + Q1, 2026

Title	Journal	Publication Date	Contributing iMAPS Nodes
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
Antifungal Susceptibility Test via single-cell morphology, development, and metabolism	Anal Chem	2026-03-27	CAS-QIBEBT; University of Jinan

Isolation of lactic acid bacteria from Hainan dregs vinegar based on single-cell Raman sorting	J Chin Inst Food Sci Technol	2026-03-25	Hainan University
Rapid classification of <i>Pantoea</i> spp. via Raman flow cytometry	Anal Chem	2026-03-06	Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences
Reconstruction of coral holobionts and elucidation of the causal relationships among symbiodiniaceae, bacteria, and coral through single-cell Raman spectroscopy metabolomics	Microbiome	2026-02-27	Hainan University; South China Sea Institute of Oceanology, Chinese Academy of Sciences; CAS-QIBEBT
Cross-domain transfer of trehalose biosynthesis genes contributes to adaptation in high-altitude environments	Natl Sci Rev	2026-02-25	Ocean University of China; Qingdao Marine Science and Technology Center
RamEx: an R package for high-throughput microbial ramanome analyses with accurate quality assessment	Microbiome	2026-02-10	CAS-QIBEBT; Qingdao Marine Science and Technology Center
Precise probiotic therapy: Advances, bottlenecks, and the road to microbiome-informed nutrition	Gut Microbes	2026-01-30	The University of Hong Kong; Qingdao Stomatological Hospital Affiliated to Qingdao 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

SIMSCA-Soil Project Launched through Lesaffre China Research Fund (June 24, 2026)

CAS-QIBEBT and Lesaffre China officially launched the SIMSCA-Soil project, the one of three projects funded by the Lesaffre China Research Fund. As an important extension of the iMAPS initiative in sustainable agriculture, the project will leverage metaramanomics to discover in-situ functional soil microorganisms and develop next-generation technologies for soil fertility enhancement and agricultural carbon sequestration. The launch also marks a new milestone in Sino-French collaboration on green agricultural biotechnology.

Meet the iMAPS Consortium at CYTO 2026 (June 6–10, 2026)

At CYTO 2026 in West Palm Beach, Florida, the iMAPS Consortium showcased its latest advances in label-free Raman flow cytometry, live-cell sorting, and functional single-cell analysis through oral presentations, posters, and exhibition activities. The meeting further strengthened collaborations on ramanome-based applications in the global cytometry community.

Soil iMAPS Symposium at the 23rd World Congress of Soil Science (June 9, 2026)

The Soil iMAPS Symposium was successfully held during the 23rd World Congress of Soil Science in Nanjing, China. Scientists from CAS-QIBEBT, the Institute of Urban Environment (IUE), Chinese Academy of Sciences, Ulsan National Institute of Science and Technology, the Institute of Soil Science, Chinese Academy of Sciences (ISSCAS), and Nanjing Normal University, presented the latest advances in Raman-based soil microbiome profiling, single-cell sorting, digital cultivation, and functional strain discovery. A three-stage roadmap for Soil iMAPS was also announced, aiming to establish a global network for monitoring and mining soil microbiome metabolism.

Ocean iMAPS Presented at the Marine Biodiversity Symposium (June 8, 2026)

The Ocean iMAPS initiative was introduced at the Symposium on Deep-Sea Biodiversity Conservation and Sustainable Utilization in Xiamen, presenting the vision of applying metaramanomics technologies to marine microbiomes and ocean sustainability. The symposium was hosted by Third Institute of Oceanography, Ministry of Natural Resources, PRC, and Fujian Ocean Innovation Center.

iMAPS Featured at ASM Microbe 2026 (June 4–7, 2026)

The iMAPS Consortium participated in ASM Microbe 2026 in Washington, D.C., where CAS-QIBEBT presented the vision of building a global network of Microbiome Metabolic Observatories (MIMO). Additional presentations highlighted Ramanomics-enabled genome-scale mutant screening and function-first microbiome discovery, introducing iMAPS to the international microbiology community.

iMAPS Presented at IOCAS–CNRS Sino-French Scientific Exchange (April 24, 2026)

The iMAPS Initiative was featured at a high-level Sino-French scientific exchange hosted by Institute of Oceanology, Chinese Academy of Sciences (IOCAS), bringing together representatives from CNRS China, CAS, IOCAS, and CAS-QIBEBT. CAS-QIBEBT presented the vision of the global Microbiome Metabolic Observatory (MIMO) network, while participants explored future collaborations in marine microbiome research and single-cell technologies.

4. iMAPS on the Global Stage

During Q2 2026, the iMAPS Consortium participated in 18 conferences and meetings across 15 cities, delivering 18 invited presentations that highlighted the latest advances in single-cell microbiome technologies across eight application areas.



5. Upcoming Activities

Date	Activity	Location	Focus
Jul 2–5, 2026	iMAPS Talk at the mLife Research Conference	Tianjin, China	Multi-omics technologies and microbial life research
Jul 9–12, 2026	iMAPS Talk at the China Symposium on Public Life Science Platforms	Chongqing, China	Emerging flow cytometry technologies
Jul 11–20, 2026	CAS iMAPS Summer School	Qingdao, Beijing / Xiong'an & Shanghai, China	Hands-on training in single-cell microbiome technologies; https://www.imaps.info/summer
Jul 20–25, 2026	Annual Agri iMAPS Symposium & Soil iMAPS Live Demonstration	Changchun, China	Soil microbiome metabolism and functional strain mining
Aug 6–9, 2026	iMAPS Talk at the International Conference on Engineering Microbiology	Qingdao, China	Industrial microbiology
Aug 27–30, 2026	iMAPS Talk at the National Conference on Environmental Microbiology	Shenyang, China	Environmental microbiome
Aug 28–31, 2026	iMAPS Talk at the First Life Atlas Conference	Kunming, China	Life atlas and single-cell technologies
Sep 17–18, 2026	iMAPS Workshop for Biomanufacturing	Beijing, China	Industrial microbiology
Sep 24–25, 2026	iMAPS Talk at RIKEN–ISM Targeting Microbiota 2026	Tokyo, Japan	Microbiota-targeted technologies
Oct 18–22, 2026	iMAPS Symposium at the Metabolic Engineering Summit 2026	Dalian, China	Single-cell metabolic screening for strain engineering and biomanufacturing
Nov 6–8, 2026	iMAPS Symposium at the 2026 Annual Academic Meeting of the Chinese Association for Microbial Ecology	Wuhan, China	Single-cell microbiome analysis for microbial ecology and environmental function discovery

6. Featured Program — CAS iMAPS Summer School

The CAS iMAPS Summer School is an international training program for graduate students, postdoctoral researchers, and early-career scientists interested in single-cell microbiome technologies.

Sponsored by the Chinese Academy of Sciences President's International Fellowship Initiative (CAS PIFI), the program combines lectures, laboratory demonstrations, and hands-on training in metatranscriptomics, FlowRACS, RAMS, DCP, and RamanAI, with applications spanning biomanufacturing, agriculture, medicine, and environmental science.



The program's focus also resonates with the global agenda of the World Microbiome Partnership (WMP), which brings together academia, government, industry, and funders to advance standardization and responsible translation in microbiome science. Its Working Group F looks at how microbial processes shape climate risk and ecosystem resilience, following a science-to-action pathway of Observe → Understand → Apply → Govern. A key gap remains at the "Understand" step: sequencing reveals who is present, but not which cells are active. iMAPS, built on metaramanomics technology, helps close that gap by linking genotype, phenotype, and ecological function at single-cell resolution.

Program website: <https://www.imaps.info/summer>

7. 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–CSIC Joint Research Exchange Program 2027

Supports collaborative research and researcher exchanges between CAS and the Spanish National Research Council (CSIC) through jointly funded bilateral projects.

- Project duration: 2 years (2027–2028)
- Funding: Up to RMB 200,000 from CAS and €24,000 from CSIC per project
- Priority areas: Green biotechnology, marine science, sustainable use of marine resources, agriculture & food, climate change, biodiversity, and circular economy

NSFC Invitational Visiting Fellowship for European Scholars (IVFES)

Supports Chinese researchers in inviting outstanding European early-career researchers to conduct collaborative research and academic exchanges in China.

- Project duration: 2 years (2027–2028)

- Funding: Up to RMB 300,000 per project
- Highlights: Academic exchanges, joint research, summer schools, access to major national research infrastructures, European researcher stays in China ≥ 30 days/year
- More information: https://www.nsf.gov.cn/english/site_1/international/D6/2026/03-24/510.html

NSFC–JSPS Joint Research Program (China–Japan)

Supports collaborative research and academic exchanges between Chinese and Japanese research teams under the NSFC–JSPS bilateral cooperation framework.

- Project duration: 2–3 years
- Scope: Basic research and interdisciplinary scientific collaboration between China and Japan
- More information: <https://www.nsf.gov.cn/p1/3381/2824/136593.html>

Note: Both programs require a Chinese partner institution to submit the application. For inquiries, please contact: sunmm@qibebt.ac.cn

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.

www.imaps.info | Contact: sunmm@qibebt.ac.cn