

# シンポジウム / Symposium

11月1日(月) (1 Nov.) 8:30 ~ 10:30

A会場  
S1-A1 ~ S1-A4

## シンポジウム 1 / Symposium 1 Major Microbial Transitions: From the origin of life to the origin of the domains

[ コンビナー / Convenor ]

Shawn E. McGlynn (Tokyo Inst. Technol.), Takuro Nunoura (JAMSTEC), Masaru Nobu (AIST)

What is the history of metabolic innovation in relationship to the tree of life? How were major biological transitions facilitated by these biochemical innovations? In this session, we invite presenters who can help address these questions through a variety of techniques including: culturing, field work, theory, and bioinformatics. In addition to welcoming those who have new data to share, we also invite participants who can share new hypotheses that might be tested by others as well as those who can supplement microbial inferences using orthogonal data (e.g. geochemical studies).

We ask presenters to share their newest data - including their unpublished results - and we also ask the audience to come prepared to participate. To facilitate vigorous interactions, our session will begin with an overview of open questions given by the session organizers. Next we will hear from experts who are invited or who have submitted contributions. At the end of the session, participants will hear a summary talk which aims to give further insight and also criticism to the former talks. Audience members are asked to participate at all the stages.

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8:30- **Session introduction by organizers**

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**S1-A1** **Relaxed substrate specificity of polymerase through in vitro evolution may provide a possible scenario for the transition from the RNA world to the DNA world**  
8:47-

○ Norikazu Ichihashi  
Grad. Sch. Arts and Sci, Univ. Tokyo

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**S1-A2** **Unique metabolic strategies in Hadean analogues**  
9:09-

○ Masaru K. Nobu<sup>1</sup>, Ryosuke Nakai<sup>1</sup>, Satoshi Tamazawa<sup>2</sup>, Hiroshi Mori<sup>3</sup>, Atsushi Toyoda<sup>3</sup>, Akira Ijiri<sup>4</sup>, Shino Suzuki<sup>4</sup>, Ken Kurokawa<sup>3</sup>, Yoichi Kamagata<sup>1</sup>, Hideyuki Tamaki<sup>1</sup>  
<sup>1</sup>AIST, <sup>2</sup>H-RISE, <sup>3</sup>NIG, <sup>4</sup>JAMSTEC

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**S1-A3** **Reconstructing the history of the nitrogen cycle using bioinformatics methods**  
9:31-

○ Rika E. Anderson<sup>1</sup>, Eva Stueeken<sup>2</sup>, Christopher Parsons<sup>3</sup>, Katherine Mateos<sup>4</sup>, Caleb Rosen<sup>5</sup>  
<sup>1</sup>Carleton College, <sup>2</sup>University of St. Andrews, <sup>3</sup>Massachusetts Institute of Technology, <sup>4</sup>University of California, Santa Cruz, <sup>5</sup>University of Southern California

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**S1-A4** **Asgard archaea cytoskeleton proteins and the implications for the archaea-to-eukaryote transition**  
9:53-

○ Robert C. Robinson<sup>1</sup>, Caner Akil<sup>1,3</sup>, Samson Ali<sup>1,2</sup>, Linh T. Tran<sup>1</sup>, Jeremie Gaillard<sup>4</sup>, Laurent Blanchoin<sup>4</sup>, Wenfei Li<sup>5</sup>, Kosuke Fujishima<sup>3</sup>, Akihiro Narita<sup>2</sup>  
<sup>1</sup>Research Institute for Interdisciplinary Science, Okayama University, <sup>2</sup>Division of Biological Science, Graduate School of Science, Nagoya University, <sup>3</sup>Tokyo Institute of Technology, Earth-Life Science Institute (ELSI), <sup>4</sup>University of Grenoble-Alpes, <sup>5</sup>Department of Physics, Nanjing University

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10:15- **Session integration**

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11月1日(月) (1 Nov.) 15:00 ~ 17:05

A会場  
S2-A1 ~ S2-A4

シンポジウム 2 / Symposium 2  
The Impact of Interactions

[ コンビナー / Convenor ]

Yoshitomo Kikuchi (AIST), Hideomi Itoh (AIST)

The world is full of diverse organisms, and their complex interactions have impacted biodiversity and organismal evolution. However, we understand only a small fraction of the important interactions among organisms. In this symposium, we will introduce recent progress on interactions between microbes and eukaryotic organisms, as well as the diversity and functions of these interactions, to illustrate how organismal interactions have impacted evolution. This symposium hosts four international speakers, and will cover a wide range of interactions between animals, plants, fungi, protists, archaea and bacteria, from their molecular bases to their ecological impacts.

The first speaker, Dr. Haoyang Shen (Univ. Tokyo), focuses on interactions between fungi and mycophagous mites in agricultural fields. Surprisingly, mycophagous mites feed on N<sub>2</sub>O-producing fungi, reducing N<sub>2</sub>O emissions from agricultural soils. Second, Dr. Yuya Sato (AIST) will discuss a recently discovered host-symbiont reciprocal insecticide detoxification relay, by which insect hosts obtain microbially conferred insecticide resistance. The third speaker, Dr. Filip Husnik (OIST), will present a current knowledge about bacterial and archaeal symbioses in protists. The fourth speaker, Dr. Peter Mergaert (CNRS), will present how a classic yet novel model system, legume-Rhizobium symbiosis, can be stabilized by antimicrobial peptides.

New concepts presented by these four front-runners will open new avenues of organismal interaction studies.

15:00- **Opening remarks**

**S2-A1** **Defending against fungal threats from agricultural soils via intensified belowground fungal grazing**  
15:05-

○ Haoyang Shen<sup>1</sup>, Yutaka Shiratori<sup>2</sup>, Masayuki Maeda<sup>2</sup>, Tadashi Nagamine<sup>3</sup>, Keishi Senoo<sup>1,4</sup>  
<sup>1</sup>Grad. Sch. Agric., Univ. Tokyo, <sup>2</sup>Niigata Agric. Res. Inst., <sup>3</sup>ROM, <sup>4</sup>CRIIM, Univ. Tokyo

**S2-A2** **Insecticide detoxification through mutual cooperation between host and symbiont**  
15:35-

○ Yuya Sato  
AIST, EMRI

**S2-A3** **Bacterial and archaeal symbioses with protists: Similarities and differences with animal symbioses**  
16:05-

○ Filip Husnik  
OIST

**S2-A4** **The BacA and YejABEF peptide uptake transporters of *Sinorhizobium meliloti* mediate interspecies interactions between bacteria and between bacteria and plants**  
16:35-

○ Peter Mergaert<sup>1</sup>, Dmitrii Y. Travin<sup>1,2</sup>, Quentin Nicoud<sup>1</sup>, Konstantin Severinov<sup>2</sup>  
<sup>1</sup>I2BC, Univ. Paris-Saclay, CEA, CNRS, <sup>2</sup>Center of Life Sci., Skoltech

11月1日(月)(1 Nov.) 15:00 ~ 17:50

B会場  
S3-B1 ~ S3-B7

シンポジウム 3 / Symposium 3  
微生物生態学を社会実装する！

[コンビーナ / Convenor]

木村 浩之 (静岡大学), 中村 孝道 (熊谷組)

飽くなき研究者の探求心と解析技術の目覚ましい進化に起因し、微生物生態学はこの10年で大きく発展してきた。その発展過程のなかで環境微生物の多様性や代謝機能の解明が加速化されてきた。地球環境の物質循環や物質生産は、微生物の多様な代謝機能を礎として機能している。

近年、国連サミットにおいて17の目標を有するSDGs(持続可能な開発目標)が採択された。微生物生態学は、SDGsの2. 飢餓をゼロに、3. すべての人に健康と福祉を、6. 安全な水とトイレを世界中に、7. エネルギーをみんなにそしてクリーンに、14. 海の豊かさを守ろう、15. 陸の豊かさを守ろうなど、多くの目標において解決策を導き出す学問となる可能性を秘めている。

また、温暖化対策として脱炭素化が世界的潮流となっており、カーボンニュートラル(CN)やカーボンリサイクル(CR)という言葉が定着しつつある。CNを達成するには、化石資源から再生可能エネルギーへの代替を始めとする精力的なCO<sub>2</sub>排出量削減に加えてカーボンネガティブとなる技術の組み合わせが必須である。2021年6月に経済産業省が示した「2050年カーボンニュートラルに伴うグリーン成長戦略」には、2050年までにCR産業を創出し技術開発からの社会実装を目指すことが、2019年に示された「カーボンリサイクル技術ロードマップ」には、CO<sub>2</sub>の有効利用方法として人工光合成による化学品生産や藻類バイオマスエネルギー生産が記載されている。つまり、CN達成にはホワイトバイオテクノロジーやバイオエネルギーが必要であり、まさに今、微生物の代謝機能を利用したイノベーションが求められている。

本セッションでは、微生物生態学を基盤とし、社会的課題の解決を目指した先進的な研究・開発について紹介する。さらに、環境微生物についての知見や有用微生物を活用した技術の社会実装について議論したい。

15:00- 趣旨説明

S3-B1 遺伝子組み換えホモ酢酸菌を用いた合成ガス発酵による化成品製造

15:05- ○中島 豊  
広島大・院統合生命

S3-B2 微生物培養における攪拌の重要性 - 攪拌について本気で考えたことありますか…-

15:30- ○酒井 祐介<sup>1</sup>, 植田 芳昭<sup>2</sup>  
<sup>1</sup>(株)熊谷組・技術研究所, <sup>2</sup>摂南大学・理工学部

S3-B3 石油の増進回収を目的とした地下環境微生物の利用とその社会実装について

15:55- ○菅井 裕一  
九州大・院工

S3-B4 微生物メタネーションの実用化に向けた検討

16:30- ○川野 誠<sup>1</sup>, 木村 浩之<sup>2</sup>  
<sup>1</sup>横河電機(株), <sup>2</sup>静岡大・理・地球

S3-B5 微生物電気化学を活用したバイオガス生産の効率化

16:55- ○加藤 創一郎  
産総研・生物プロセス

S3-B6 微細藻類ユーグレナ由来バイオジェット燃料生産の可能性

17:20- ○鈴木 健吾<sup>1,2</sup>  
<sup>1</sup>株式会社ユーグレナ, <sup>2</sup>理化学研究所 微細藻類生産制御技術研究チーム

17:45- Wrap up

11月2日(火) (2 Nov.) 10:00 ~ 13:15

A会場  
S4-A1 ~ S4-A12

シンポジウム 4 / Symposium 4  
Multidisciplinary English session :  
Microbial ecology, Fundamentals and Applications

[ コンビナー / Convenor ]

Hiroyuki Kashima (JAMSTEC), Yukihiro Kinjo (OIST),  
JSME Committee for the Promotion of Diversity and Career Development

JSME Committee for the Promotion of Diversity and Career Development is pleased to have the second Multidisciplinary English session at 34<sup>th</sup> JSME annual meeting. This session aims to encourage scientific discussion in English in JSME meetings, and to provide a new forum for a diverse community associated with microbial ecology, including those who did not participate in the JSME activities (especially non Japanese-speaking people). We will invite several keynote speakers and accept a wide range of oral presentations from students and young scientists. The excellent presentation will be awarded by the Committee.

Microbes that are ubiquitous in natural environments and in artificial systems have shaped the biosphere on the Earth, and their activities also play significant roles in grand challenges such as human health, food production, waste management, energy and environmental conservation, and climate change. We seek session contributions across all aspects of microbial ecology which covers such a diverse microbial life with a range of spatial and temporal scopes. By discussing wide research topics, we would like to exchange ideas about fundamental understanding of microbes and their applications. We would like to have fun with exciting discussions as well as to have opportunity to foster communication with people all over the microbial ecology community.

10:00- **Introduction**

**S4-A1 Gut microbial communities in eusocial insects**

10:05- ○ Ryo Miyazaki  
Bioproduction Research Institute, AIST

**S4-A2 Metabarcoding observations on species-characteristic microbiomes of deep-sea benthic foraminifera**

○ Iina Salonen<sup>1</sup>, Panagiota-Myrsini Chronopoulou<sup>1</sup>, Hidetaka Nomaki<sup>3</sup>, Dewi Langlet<sup>4</sup>, Masashi Tsuchiya<sup>3</sup>, Karoliina Koho<sup>2</sup>

<sup>1</sup>Japan Agency of Marine-Earth Science and Technology (JAMSTEC), <sup>2</sup>University of Helsinki,

<sup>3</sup>Japan Agency of Marine-Earth Science and Technology (JAMSTEC),

<sup>4</sup>Okinawa Institute of Science and Technology (OIST)

**S4-A3 The functional evolution of termite gut microbiota**

10:42- ○ Thomas Bourguignon<sup>1</sup>, Jigyasa Arora<sup>1</sup>, Yukihiro Kinjo<sup>1</sup>, Jan Sobotnik<sup>2</sup>, Ales Bucek<sup>1</sup>, Petr Stiblik<sup>2</sup>, Yves Roisin<sup>3</sup>, Lucia Zifcakova<sup>1</sup>, Yung Chul Park<sup>4</sup>, Ki Yoon Kim<sup>4</sup>, David Sillam-Dusses<sup>5,6</sup>, Vincent Herve<sup>7</sup>, Nathan Lo<sup>8</sup>, Gaku Tokuda<sup>9</sup>, Andreas Brune<sup>7</sup>

<sup>1</sup>Okinawa Institute of Science and Technology, <sup>2</sup>Czech University of Life Sciences,

<sup>3</sup>Universite Libre de Bruxelles, <sup>4</sup>Kangwon National University,

<sup>5</sup>Sorbonne Universites, iEES-Paris, U 242, Bondy, <sup>6</sup>Universite Paris 13 - Sorbonne Paris Cite,

<sup>7</sup>Max Planck Institute for Terrestrial Microbiology, <sup>8</sup>University of Sydney, <sup>9</sup>University of the Ryukyus

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**S4-A4**      **Microbial community structures and methanogenic functions in the wetland environments**  
11:05-

○ Wipoo Prasitwuttisak<sup>1</sup>, Yuki Hoshiko<sup>2</sup>, Toshinari Maeda<sup>2</sup>, Akira Haraguchi<sup>1</sup>, Katsunori Yanagawa<sup>1</sup>

<sup>1</sup>Faculty of Environmental Engineering, The University of Kitakyushu,

<sup>2</sup>Graduate School of Life Sciences and Systems Engineering, Kyushu Institute of Technology

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**S4-A5**      **Revisiting the evolution and ecology of photosynthesis with the discovery of "Candidatus Chlorohelix allophototropha", a phototrophic Chloroflexota member that uses a Type I reaction center**  
11:19-

○ Jackson M. Tsuji<sup>1,2</sup>, Nicolette A. Shaw<sup>2</sup>, Sakiko Nagashima<sup>3,4</sup>, Jason J. Venkiteswaran<sup>2,5</sup>, Sherry L. Schiff<sup>2</sup>, Manabu Fukui<sup>1</sup>, Satoshi Hanada<sup>3,6</sup>, Marcus Tank<sup>3,7</sup>, Josh D. Neufeld<sup>2</sup>

<sup>1</sup>Inst. of Low. Temp. Sci., Hokkaido Univ., Sapporo, Japan, <sup>2</sup>Univ. of Waterloo, Waterloo, Canada,

<sup>3</sup>Tokyo Metropolitan Univ., Tokyo, Japan, <sup>4</sup>Kanagawa Univ., Kanagawa, Japan,

<sup>5</sup>Wilfrid Laurier Univ., Waterloo, Canada,

<sup>6</sup>Bioproduction Res. Inst., National Inst. of Adv. Industrial Sci. and Tech. (AIST), Ibaraki, Japan,

<sup>7</sup>Leibniz Inst. DSMZ-German Collection of Microorg. and Cell Cultures GmbH, Braunschweig, Germany

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**S4-A6**      **Development of Genetic Tools for Promising *Halomonas* Using A Novel Isolate**  
11:33-

○ Ayaka Tsuji<sup>1</sup>, Yasuko Takei<sup>2</sup>, Taku Nishimura<sup>3</sup>, Yoshinao Azuma<sup>1,2</sup>

<sup>1</sup>Grad. Sch. of B.O.S.T., Kindai Univ., <sup>2</sup>Fac. of B.O.S.T., Kindai Univ., <sup>3</sup>Energy Tech. Lab., Osaka Gas Co. Ltd.

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**S4-A7**      **Nitrate reductase is a key enzyme for N<sub>2</sub>O production in DNRA process**  
11:47-

○ Zhenxing Xu<sup>1</sup>, Yoko Masuda<sup>1</sup>, Hideomi Itoh<sup>2</sup>, Shohei Hattori<sup>3</sup>, Sakae Toyoda<sup>3</sup>, Naohiro Yoshida<sup>3,4</sup>, Keishi Senoo<sup>1,5</sup>

<sup>1</sup>Grad. Sch. of Agri., Univ. Tokyo, <sup>2</sup>Bioproduction Research Institute, AIST, Hokkaido,

<sup>3</sup>Tokyo Tech., <sup>4</sup>NICT, <sup>5</sup>CRIIM, Univ. Tokyo

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**S4-A8**      **Nitrogen and oxygen isotope effects associated with anaerobic ammonium oxidation (anammox)**  
12:01-

○ Kanae Kobayashi<sup>1,2</sup>, Keitaro Fukushima<sup>3</sup>, Yuji Onishi<sup>3</sup>, Kazuya Nishina<sup>4</sup>, Akiko Makabe<sup>1</sup>, Mamoru Oshiki<sup>2</sup>, Keisuke Koba<sup>3</sup>, Satoshi Okabe<sup>2</sup>

<sup>1</sup>X-star, JAMSTEC, <sup>2</sup>Grad. Sch. of Eng., Hokkaido Univ., <sup>3</sup>CER, Kyoto Univ., <sup>4</sup>Earth System Division, NIES

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**S4-A9**      **Isolation and characterization of microbes which are sensitive to extremely low concentration of hydrogen peroxide**  
12:15-

○ Motoyuki Watanabe<sup>1,2</sup>, Kensuke Igarashi<sup>2</sup>, Souichiro Kato<sup>1,2</sup>, Yoichi Kamagata<sup>1,2</sup>, Wataru Kitagawa<sup>1,2</sup>

<sup>1</sup>Grad. Sch. of Agri., Hokkaido Univ., <sup>2</sup>AIST

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**S4-A10**      **Biotransformation potential of antimony-reducing microbial consortium obtained from stibnite mine tailing soil**  
12:29-

○ Daisuke Yamashita<sup>1</sup>, Satoshi Mitsunobu<sup>2</sup>, Natsuko Hamamura<sup>3</sup>

<sup>1</sup>Grad Sch Syst Life Sci, Kyushu Univ, <sup>2</sup>Grad Sch Agric, Ehime Univ, <sup>3</sup>Dep Biol, Fac Sci, Kyushu Univ

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**S4-A11**      **Co-metabolism of Desulfosporosinus with Dehalococcoides achieved full dechlorination in a bio electrochemical system**  
12:43-

○ Lingyu Meng, Naoko Yoshida

Grad. Sch. Eng., Nagoya Inst. Technol.

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**S4-A12 Long-term bioelectrochemical treatment of livestock wastewater in pilot-scale  
12:57- using electrotrophic bacteria**

○ Anna Prokhorova<sup>1</sup>, Mami Kainuma<sup>1</sup>, Rie Hiyane<sup>1</sup>, Masaki Kazeoka<sup>4</sup>, Keisuke Ninomiya<sup>2</sup>,  
Naoto Suzuki<sup>2</sup>, Igor Goryanin<sup>3</sup>

<sup>1</sup>Okinawa Institute of Science and Technology, <sup>2</sup>Okinawa Livestock Research Center,

<sup>3</sup>University of Edinburgh, <sup>4</sup>Okinawa Environment Science Center

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