

Scientific Program

Monday, September 12

13:30- Registration

15:30-16:00 Opening Ceremony Room A

16:00-18:00 Opening Session Room A

Chairs: Michael W.W. Adams, Yoshizumi Ishino

16:00- OL1 **Karl O. Stetter**, University of Regensburg, Germany
Cultivation of Unexpected and "Unculturable" Extremophiles - Facts and Ideas

16:30- OL2 **Tadayuki Imanaka**, Ritsumeikan University, Japan
Analysis and Application of Hyperthermophiles

17:00- OL3 **Patrick Forterre**, Institut Pasteur/Institut de Biologie Intégrative de la cellule, France
Hyperthermophiles and the Universal Tree of Life

17:30- OL4 **Dieter Söll**, Yale University, USA
Universal Concepts learned from Archaeal Translation

18:00-19:30 Welcome Reception Room B

Tuesday, September 13

9:00- Registration

9:20-10:35 **Keynote Lectures** Room A

Chairs: Elizaveta A. Bonch-Osmolovskaya, Takuro Nunoura

9:20- KL1 **Gerhard J. Herndl**, University of Vienna, Austria
Deep Sea Microbes: Living in a Heterogeneous World

9:45- KL2 **David Prangishvili**, Institut Pasteur, France
How to Survive in Hell: Lessons from Viruses

10:10- KL3 **Michael Terns**, University of Georgia, USA
Bipartite Recognition of Target RNAs Activates DNA Cleavage by the Type III-B Cmr CRISPR-Cas System of *Pyrococcus furiosus*

10:35-11:05 Coffee break

11:05-12:17 **Oral Session 1A** Room A

Chairs: Don A. Cowan, Satoshi Nakagawa

11:05- O1 **Kenneth M. Stedman**, Portland State University, USA
Genetic Analysis of the Japanese Fusellovirus SSV1

11:23- O2 **Mart Krupovic**, Institut Pasteur, France
Eukaryotic-like Virus Budding in Archaea

11:41- O3 **Takuro Nunoura**, Japan Agency for Marine-Earth Science & Technology (JAMSTEC), Japan
Comparison of the Hadal Planktonic Biosphere in the Northwest Pacific Trenches

11:59- O4 **Mohamed Jebbar**, Université de Brest, France
Insights into Piezophily and Adaptation to High Hydrostatic Pressure from Thermococcales Dwelling in Deep Biosphere

11:05-12:17 **Oral Session 1B** Room B

Chairs: Francine Perler, Saori Kosono

11:05- O5 **Makoto Kimura**, Kyushu University, Japan
Structural Biology of the Ribonuclease P in the Hyperthermophilic Archaeon *Pyrococcus horikoshii* OT3

11:23- O6 **Akira Hirata**, Ehime University, Japan
X-ray Structure of the Archaeal tRNA m²G/m²G10 Methyltransferase (aTrm11) Provides Insight into the Site Specificity of tRNA Modification Enzymes that Contain the Common RNA Binding Modules

11:41- O7 **Thomas Fouqueau**, University College London, UK
Mechanism of Transcriptional Repression by TFS4

11:59- O8 **Satoshi Watanabe**, Tohoku University, Japan
Structural Study of Hyp Protein Complexes for the Maturation of [NiFe] Hydrogenase from *Thermococcus kodakarensis*

12:17-12:40 Group Photo

12:40-14:00 Lunch

14:00-15:15 Keynote Lectures **Room A**

Chairs: Jennifer A. Littlechild, Shinsuke Fujiwara

- 14:00- KL4 **Robert M. Kelly**, North Carolina State University, USA
The Biology and Biotechnology of Extremely Thermoacidophilic Archaea: Recent Progress
- 14:25- KL5 **Julie A. Maupin-Furlow**, University of Florida, USA
Archaeal Ubiquitin Proteasome System (UPS) and its Function in Extreme Environments
- 14:50- KL6 **Li Huang**, Institute of Microbiology, Chinese Academy of Sciences, China
An Archaeal Methyltransferase Catalyzes Extensive Protein Methylation But Is Dispensable for the Growth of the Cell

15:15-17:15 Poster Session 1 (with coffee) **Poster Rooms 1, 2 & 3**

Poster presentation: Odd Numbers

17:15- 18:45 Memorial Session for Prof. Koki Horikoshi **Room A**

Chairs: Satoshi Nakamura, Chiaki Kato, Akira Inoue

- 17:15- **Garabed Antranikian**, Hamburg University of Technology, Germany
In Memoriam Koki Horikoshi
- 17:30- ML1 **Antonio Ventosa**, University of Sevilla, Spain
Hypersaline Environments: Metagenomics, Culture and Features of *Spiribacter*
- 17:55- ML2 **Frank Robb**, Institute of Marine and Environmental Technology, USA
A Hyperthermophile Model for Structural and Functional Analysis of a Pathogenic Mutation in a Human Protein Chaperone
- 18:20- ML3 **Masahiro Ito**, Toyo University, Japan
The Elucidation of the Mechanisms of Coupling Ion Selectivity of Alkaliphilic Bacterial Flagellar Motors

Wednesday, September 14

9:20-10:10 **Keynote Lectures** Room A

Chairs: Mosè Rossi, Masahiro Ito

9:20- KL7 **Sonja-Verena Albers**, University of Freiburg, Germany
Protein *N*-glycosylation in the Thermoacidophilic Archaeon *Sulfolobus acidocaldarius* is Essential for Cell Motility, Cell Interaction, and Cell Defence

9:45- KL8 **Terry A. Krulwich**, Icahn School of Medicine at Mount Sinai, USA
Multiple Adaptations Support Proton-Coupled ATP Synthesis by Alkaliphilic *Bacillus pseudofirmus* OF4 at pH ≥ 10

10:10-10:40 Coffee break

10:40-11:30 **Keynote Lectures** Room A

Chairs: Masahiro Ito, Biswarup Mukhopadhyay

10:40- KL9 **Blanca Barquera**, Rensselaer Polytechnic Institute, USA
NQR, A Unique Prokaryotic Na⁺ Pump: Energy and Adaptation from the Deep Sea to Human Hosts

11:05- KL10 **Arnold Driessen**, University of Groningen, The Netherlands
Life with Hybrid Heterochiral Membranes

10:40-11:30 **Keynote Lectures** Room B

Chairs: Li Huang, Issay Narumi

10:40- KL11 **Finn Werner**, University College London, UK
A Global Analysis of Transcription in the Archaea – The Connection between Promoter Sequence, RNAP Occupancy, and the Transcriptome of *M. jannaschii*

11:05- KL12 **John N. Reeve**, Ohio State University, USA
Structure of Histone-based Chromatin in Hyperthermophilic Archaea

11:30-12:24 **Oral Session 2A** Room A

Chairs: Blanca Barquera, Tamotsu Kanai

11:30- O9 **Maria M. Corsaro**, University of Naples Federico II, Italy
Carbohydrates from *Colwellia psychrerythraea* 34H: A Strategy for Cold-Adaptation in Sea-Ice

11:48- O10 **Yosuke Toyotake**, Kyoto University, Japan
Substrate Specificity and Subcellular Localization of Multiple Lysophosphatidic Acid Acyltransferases from a Psychrotrophic Bacterium, *Shewanella livingstonensis* Ac10

12:06- O11 **Duncan G.G. McMillan**, The University of Tokyo, Japan
Biophysical Characterization of a Thermoalkaliphilic Molecular Motor Gives Insight into Evolutionary ATP Synthase Adaptation

11:30-12:24 **Oral Session 2B** Room B

Chairs: Thomas J. Santangelo, Akira Hirata

11:30- O12 **Beatrice Clouet-d'Orval**, Université de Toulouse-CNRS, France
A Novel RNA Degradation Multiprotein Complex Conserved Among Euryarchaeota

11:48- O13 **Stefan Dextl**, University of Regensburg, Germany
The Transcription Factor B and its Role in Archaeal Transcription Initiation

12:06- O14 **Xu Peng**, Copenhagen University, Denmark
CRISPR/Cas Type I-A Cascade Complex Couples Viral Infection Surveillance to Transcription Regulation

Thursday, September 15

- 9:20-10:35 Keynote Lectures** Room A
Chairs: Isaac Cann, Norio Kurosawa
- 9:20- KL13 **Thorsten Allers**, University of Nottingham, UK
Regulatory Circuits Formed by Archaeal Origin Recognition (ORC) Proteins
- 9:45- KL14 **Brett J. Baker**, University of Texas Austin, USA
Resolving the Ecological Roles of Novel and Uncultured Deep Sediment Archaea
- 10:10- KL15 **Michael W.W. Adams**, University of Georgia, USA
Structure and Function of Hydrogen-Evolving Hyperthermophilic Hydrogenases
- 10:35-11:05 Coffee break (Poster Room 3 & Room C)
- 11:05-11:55 Keynote Lectures** Room A
Chairs: John N. Reeve, Hiroki Higashibata
- 11:05- KL16 **Thomas J. Santangelo**, Colorado State University, USA
Genome Replication in *Thermococcus kodakarensis* is not Dependent on Cdc6 and does not Initiate from a Defined Origin: Evidence for Life that Defies the Replicon Hypothesis
- 11:30- KL17 **Yoshizumi Ishino**, Kyushu University, Japan
Divergent Functions of RecJ/Cdc45-like Proteins, the Candidate Component of the Replicative Helicase Complex, in Thermophilic Archaea
- 11:05-11:55 Keynote Lectures** Room C
Chairs: Helena Santos, Isao Yumoto
- 11:05- KL18 **Bettina Siebers**, University of Duisburg-Essen, Germany
Metabolic Complexity and Challenges of Life at High Temperature
- 11:30- KL19 **Makoto Nishiyama**, The University of Tokyo, Japan
AmCP-mediated Lysine Biosynthesis and its Regulation in Thermophile
- 12:10-12:55 Luncheon Seminar** Room B
Chair: Koichi Inoue (Takara Bio Inc.)
Yasunobu Terabayashi, Takara Bio Inc., Japan
Highly Accurate Microbial Genome Finishing Service towards Comparative Genomics
Sponsored by Takara Bio Inc.
- 13:10-14:00 Keynote Lectures** Room A
Chair: Kenneth M. Stedman, Ken Takai
- 13:10- KL20 **Akihiko Yamagishi**, Tokyo University of Pharmacy and Life Sciences, Japan
The Japanese Activities in Astrobiology and the Tanpopo Project: Micrometeorite and Microbe Capture and Exposure Experiment on International Space Station
- 13:35- KL21 **Peter R. Girguis**, Harvard University, USA
The Shocking, and Not-So-Shocking, News about Iron-Oxidizing Bacteria

13:10-14:00 Keynote Lectures **Room C**

Chairs: Helena Santos, Isao Yumoto

- 13:10- KL22 **Biswarup Mukhopadhyay**, Virginia Tech, USA
Thioredoxin-based Redox Regulation in *Methanocaldococcus jannaschii*, a
Hyperthermophilic Methanogenic Archaeon: Evolutionary and Ecological Implications
- 13:35- KL23 **Peter Schönheit**, Christian-Albrechts-University Kiel, Germany
ADP-forming Acetyl (Acyl)-CoA Synthetases in Hyperthermophilic Archaea: Function,
Mechanism and Structure

14:00-16:00 Poster Session 2 (with coffee) **Poster Rooms 1, 2 & 3**

Poster presentation: Even Numbers

16:00-17:30 Oral Session 3A **Room A**

Chairs: Zvi Kelman, Sonoko Ishino

- 16:00- O15 **Hannu Myllykallio**, Ecole Polytechnique, France
RNA-Seq Reveals an Archaeal RNA ligase with Circularization Activity
- 16:18- O16 **Yuki Fujii**, Osaka University, Japan
NurA and HerA of the Extremely Thermophilic Eubacterium *Thermus thermophilus* HB8
Suppress the Repair of DNA Crosslinks
- 16:36- O17 **Giuseppe Perugino**, National Research Council of Italy (CNR), Italy
Structure-function Relationships Governing Activity and Stability of a DNA Alkylation
Damage Repair Thermostable Protein
- 16:54- O18 **Yulong Shen**, Shandong University, China
Functional and Structural Characterization of an Archaeal PIN-domain P-loop-ATPase
Protein Putatively Functioning in Processing Holliday Junction
- 17:12- O19 **Shinsuke Fujiwara**, Kwansai-Gakuin University, Japan
Noise Reduction in PCR by Euryarchaeota Specific Helicase from *Thermococcus*
kodakarensis

16:00-17:30 Oral Session 3B **Room B**

Chairs: Mohamed Jebbar, Takashi Itoh

- 16:00- O20 **Johanne Aubé**, Université de Pau et des Pays de l'Adour, France
Metagenomic Characterization of the Saline Alkaline Lake of Parangueo
- 16:18- O21 **Shino Suzuki**, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan
Comparative Genomics Identifies Serpentinomonas Adaptation to the Calcium-rich
Highly-alkaline Serpentinizing Ecosystem
- 16:36- O22 **Michail M. Yakimov**, IAMC-CNR, Italy
Microbial Life under Multiple Extremes: Recovery of Biological Signatures from the
Extremely Chaotropic Anoxic Deep-Sea Lake Kryos
- 16:54- O23 **David S. Holmes**, Universidad Andres Bello, Chile
Genomic Insights into the Evolutionary Mechanisms and Dynamics of Extreme Acidophiles
- 17:12- O24 **Tetyana Milojevic**, University of Vienna, Austria
Extreme Thermoacidophile *Metallosphaera sedula*: A Link between Extraterrestrial and
Terrestrial Biomineralization

16:00-17:30 **Oral Session 3C** Room C

Chairs: Jaeho Cha, Takaaki Sato

- 16:00- O25 **Ennio Cocca**, National Research Council (CNR), IBBR, Italy
From Volcanic Archaea to Antarctic Fish: The Protective Antioxidant Function of Acylpeptide Hydrolase (APEH) in Extreme Environments
- 16:18- O26 **Ryota Hidese**, Kwansai-Gakuin University, Japan
A Novel Aminopropyltransferase Responsible for the Production of Branched-chain Polyamine: Catalytic Mechanism and Distribution
- 16:36- O27 **Roderick I. Mackie**, University of Illinois, USA
Assembly of Biocatalysts from *Caldicellulosiruptor bescii* to Unlock the Energy Stored in Bioenergy Feedstock
- 16:54- O28 **Bradley G. Lusk**, Arizona State University, USA
pH Shifts in the Anode Potential Response from *Thermincola ferriacetica* Suggest the Presence of a Rate Limiting Proton-Coupled Electron Transfer Protein
- 17:12- O29 **Chiaki Kato**, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan
Pressure Adaptation of the Deep-sea Enzyme Is Attributed to a Single Amino Acid Substitution

19:00- **Banquet** Mizuho-no-ma, Westin Miyako Hotel Kyoto

Friday, September 16

9:20-10:35 **Keynote Lectures** Room A

Chairs: Nils-Kåre Birkeland, Dong-Woo Lee

9:20- KL24 **Ken Takai**, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan
Dark Energy Ecosystem in the Modern and Ancient Deep Ocean and Even in the Extraterrestrial Ocean

9:45- KL25 **Elizaveta A. Bonch-Osmolovskaya**, Federal Research Center of Biotechnology RAS, Russia
Inorganic Carbon Assimilation in Chemotrophic Communities of Kamchatka Hot Springs

10:10- KL26 **Garabed Antranikian**, Hamburg University of Technology, Germany
Extremophiles for a Sustainable Biobased Industry,

10:35-11:05 Coffee break (Poster Room 3 & Room C)

11:05-11:55 **Keynote Lectures** Room A

Chairs: John N. Reeve, Hiroki Higashibata

11:05- KL27 **Zvi Kelman**, National Institute of Standards and Technology, USA
A Small Protein Inhibits Proliferating Cell Nuclear Antigen by Breaking the DNA Clamp

11:30- KL28 **Didier Flament**, Ifremer, France
Insights into Physical and Functional Interplay between PCNA and Mre11/Rad50 Complex from *Pyrococcus furiosus*

11:05-11:55 **Keynote Lectures** Room C

Chairs: Frank Robb, Noriyuki Doukyu

11:05- KL29 **Marco Moracci**, National Research Council of Italy, Italy
Exploiting the Biodiversity of Extreme Environments for Application of Novel Carbohydrate Active Enzymes in Biocatalysis and Biotransformations

11:30- KL30 **Janet Westpheling**, University of Georgia, USA
Direct Conversion of Plant Biomass to Fuels and Chemicals by the Hyperthermophilic Anaerobe *Caldicellulosiruptor bescii*

11:55-13:10 Lunch

13:10-14:00 **Keynote Lectures** Room A

Chairs: Kenneth M. Stedman, Ken Takai

13:10- KL31 **Don A. Cowan**, University of Pretoria, South Africa
The Microbial Ecology of a Hot Desert Ecosystem

13:35- KL32 **Takahiro Kikawada**, National Institute of Agriculture and Food Research Organization, Japan
Molecular Mechanisms underlying the Extreme Desiccation Tolerance in the Anhydrobiotic Insect *Polypedilum vanderplanki*

13:10-14:00 **Keynote Lectures** Room C

Chairs: Frank Robb, Noriyuki Doukyu

13:10- KL33 **Francine Perler**, Perls of Wisdom Biotech Consulting/Yale University, USA
Inteins and Extremophiles - Forever Linked

13:35- KL34 **Sung Gyun Kang**, Korea Institute of Ocean Science and Technology/Korea Univ. of Science and Technology, Korea
One-Carbon Substrate-Based Biohydrogen Production Using a Hyperthermophilic Archaeon, *Thermococcus onnurineus* NA1

14:00-14:10 Break

14:10-15:22 **Oral Session 4A** Room A

Chairs: Brett J. Baker, Akira Nakamura

14:10- O30 **Takekazu Kunieda**, The University of Tokyo, Japan
Correct Decoding of Genomic Strategy in Extremotolerant Tardigrade, *Ramazzottius varieornatus*

14:28- O31 **Dominique Madern**, Institute of Structural Biology (IBS), France
Resurrection of Ancestral Malate Dehydrogenases Reveals the Evolutionary History of Haloarchaeal Proteins

14:46- O32 **Alexander Slobodkin**, Research Center of Biotechnology of the Russian Academy of Sciences, Russia
Spore-Forming Thermophilic Bacterium *Thermoanaerobacter siderophilus* within Artificial Meteorite Survives Entry into the Earth's Atmosphere on FOTON-M4 Satellite Landing Module

15:04- O33 **Xiang Xiao**, Shanghai Jiao Tong University, China
Is Depth at Origin Really Essential for Hydrostatic Pressure Preference? Piezophilic Characteristics of Bacteria Isolated from Ambient Environments

14:10-15:22 **Oral Session 4B** Room B

Chairs: Marco Moracci, Tairo Oshima

14:10- O34 **Tamotsu Kanai**, Kyoto University, Japan
In vitro Reconstitution of the Ubiquitin System found in an Unculturable Thermophilic Archaeon, '*Candidatus* Caldiarchaeum subterraneum'

14:28- O35 **Cristina Coscolín**, Institute of Catalysis/National Spanish Research Council (CSIC), Spain
A New Wave of Enzymes from Extreme Marine Ecosystems

14:46- O36 **Masafumi Yohda**, Tokyo University of Agriculture and Technology, Japan
Protein Folding Mechanism of Prefoldin - Group II Chaperonin System Revealed by the Study on That from Hyperthermophilic Archaea

15:04- O37 **Toshiaki Fukui**, Tokyo Institute of Technology, Japan
Development of Random Insertional Mutagenesis and Isolation of Temperature-sensitive Mutants of *Thermococcus kodakarensis*

14:10-15:22 **Oral Session 4C** Room C

Chairs: Janet Westpheling, Yuichi Koga

14:10- O38 **Kohsuke Honda**, Osaka University, Japan
In Vitro Salvage Synthesis of NAD⁺ with Thermophilic Enzymes

14:28- O39 **Anwar Sunna**, Macquarie University, Australia
Biocatalytic Modules for Cell-Free Synthetic Biology
(For the abstract of this oral presentation, see P186)

14:46- O40 **Jan K. Vester**, Novozymes A/S /University of Copenhagen, Denmark
Extremozymes with Industrial Relevance: the Importance of Combining Multiple Bioprospecting Approaches for Novelty and Expedited Discovery

- 15:04- O41 **Eric Madore**, CO₂ Solutions Inc., Canada
Performance of Carbonic Anhydrase in an Industrial CO₂ Capture Process
- 15:22-15:45 Coffee Break
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- 15:45-16:10 **Keynote Lecture** Room A
- 15:45- KL35 **Helena Santos**, Universidade Nova de Lisboa, ITQB-NOVA, Portugal
Small Biomolecules in Stress Adaptation of Hyperthermophiles: from Physiology to Hints for New Anti-Tuberculosis Drugs
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- 16:10-17:10 **Closing Session** Room A
Chairs: Masaharu Ishii, Tatsuo Kurihara
- 16:10- CL1 **Tairo Oshima**, Kyowa-kako Co., Japan
Polyamines in Extreme Thermophiles and Hyperthermophiles and Their Roles in Life at High Temperatures
- 16:40- CL2 **Eugene V. Koonin**, National Institutes of Health, USA
Evolutionary Genomics of Archaea and a General Theory of Microbial Evolution
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- 17:10-17:25 **Poster Awards Ceremony** Room A
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- 17:25-17:40 **Closing Ceremony** Room A