

ELSI 4th international symposium

“Three experiments in biological origins: early Earth, Venus and Mars”

- Program of oral presentations-

Introductory day (Tue 12th)	
14:00 - 14:15	Kei Hirose, George Helffrich (ELSI, Japan) Welcome and Introduction
14:15 - 15:00	Shigeru Ida (ELSI, Japan) Introduction to day 1 topics: Planet formation and volatile delivery to terrestrial planets
15:00 - 15:45	Dave Stevenson (Caltech, USA) Introduction to day 2 topics: The Nature of Planets
15:45 - 16:30	Norm Sleep (Stanford, USA) Introduction to day 3 topics: Disequilibria and the requirements for (successful) pre-biotic chemistry
16:30 - 16:35	Instructions to poster presenters
16:35 - 18:30	<i>Coffee and poster viewing</i>
19:00 – 20:30	Public lecture: “Does water define a planet's habitability?” Victoria Meadows (University of Washington/NASA Astrobiology Institute) Tomohiro Usui (Tokyo Tech)
Day 1 (Wed 13th) - The Formation of Venus, Earth and Mars	
09:00 - 09:40	Colette Salyk (Vassar College, USA) Chemistry in terrestrial planet forming regions of protoplanetary disks
09:40 - 10:20	Hal Levison (SwRI, USA) The Formation of Terrestrial Planets from the Direct Accretion of Pebbles
10:20 - 10:50	<i>Coffee</i>
10:50 - 11:30	Francis Albarede (ENS Lyon, France) Volatility scale, gravitational escape, and abundance of water and volatiles in the Moon and Earth
11:30 - 12:00	Q&A and discussion Discussion leaders: Shigeru Ida
12:00 - 13:30	<i>Lunch</i>
13:30 - 14:10	Bernard Marty (CRPG Nancy, France) Origins and timing of volatile elements on Earth and Mars in view of the results of the Rosetta mission
14:10 - 14:50	Hidenori Genda (ELSI, Japan) Giant impacts and early evolution of terrestrial planets
14:50 - 15:20	<i>Coffee</i>
15:20 - 16:00	Kosuke Kurosawa (Chiba Tech, Japan) An atmospheric response against from impact bombardments on Earth and Venus: The role of impact ejecta
16:00 - 16:40	Patrick McGovern (LPI, USA) The Martian Crustal Dichotomy: an Ancient and Fundamental Feature
16:40 - 17:10	Q&A and discussion Discussion leaders: Steve Mojzsis
17:10 - 18:30	<i>Poster viewing</i>

Day 2 (Thu 14th) - Planets as Integrated Systems

09:00 - 09:40	Victoria Meadows (U Washington, USA) Exoplanets: A New Era of Comparative Planetology
09:40 - 10:20	Yuk Yung (Caltech, USA) Chemistry of the Atmospheres of Planets and Exoplanets
10:20 - 10:50	<i>Coffee</i>
10:50 - 11:30	Caroline Dorn (U Bern, Switzerland) Interiors of low-mass exoplanets: what can we learn from observations?
11:30 - 12:00	Q&A and discussion Discussion leaders: Dave Stevenson
12:00 - 13:30	<i>Lunch</i>
13:30 - 14:10	David Catling (U Washington, USA) Planetary atmospheres, biospheres, and chemical disequilibrium
14:10 - 14:50	Axel Kleidon (MPI Jena, Germany) What can thermodynamics tell us about the functioning of the Earth system, its habitability, and its evolution?
14:50 - 15:20	<i>Coffee</i>
15:20 - 16:00	Roger Buick (U Washington, USA) Evolution of Earth's biogeochemical nitrogen cycle: an example of an integrated system influencing planetary habitability
16:00 - 17:15	Q&A and discussion
17:15 - 18:30	<i>Poster viewing</i>

FROM 19:00 — SYMPOSIUM BANQUET HELD IN ELSI-1 BUILDING, 2ND FLOOR

Day 3 (Fri 15th) - Starting Conditions and Requirements for Prebiotic Chemistry

09:00 - 09:40	Steve Vance (JPL, USA) Atmosphere disequilibrium in different planetary contexts
09:40 - 10:20	Yuichiro Ueno (ELSI, Japan) Disequilibrium of prebiotic atmosphere: C-H-O systems and role of water
10:20 - 10:50	<i>Coffee</i>
10:50 - 11:30	Everett Shock (ASU, USA) Geologic Sources of Chemical Disequilibria on Terrestrial Planets
11:30 - 12:00	Q&A and discussion Discussion leaders: Jim Cleaves
12:00 - 13:30	<i>Lunch</i>
13:30 - 14:10	Wolfgang Nitschke (IMM/BIP, France) From thermodynamic disequilibria in alkaline hydrothermal vents to dissipative structures giving birth to life
14:10 - 14:50	Joseph L. Kirschvink (Caltech-JPL/ELSI, Japan) Are we really from Tharsis? An analysis of the electrochemical environment of early Martian high-altitude glaciers during late Noachian time
14:50 - 15:20	<i>Coffee</i>
15:20 - 18:00	Wrapup discussion "Why?" Discussion leaders: Eric Smith & Steve Mojzsis

- Program of poster presentation -

Session A - Planetary structure and evolution	
A-1	High-Resolution Global N-body Simulation of Planetary Formation: Outward Migration of a Protoplanet Junko Kominami
A-2	Dynamical mixing of the Earth's core by a giant impact Miki Nakajima
A-3	Early inner core formation in terrestrial planets George Helffrich
A-4	Crystallization of SiO₂ in Earth's core: The new core paradox on early geodynamo and its solution Kei Hirose
A-5	Critical Review: Is Earth's Outer Core Liquid or a High Density Plasma? Daniel Helman
A-6	Liquid Iron Alloys with Hydrogen at Outer Core Conditions by First Principles Koichiro Umemoto
A-7	Discovery of new iron oxide Fe₇O₉ and its solid solution, (Mg,Fe²⁺)₃Fe₃+4O₉ Ryosuke Shinmyo
A-8	Core-mantle equilibrium temperature of the Earth Hiroki Ichikawa
A-9	Direct sound velocity measurements of pyrolite across the mantle transition region Steeve Greaux
A-10	The rheological structure and formation of plate boundaries on early Mars Shintaro Azuma
A-11	Geodynamically driven temporal & local formation of hydrogen and complex hydrocarbons Vlada Stamenković
A-12	Water, melt, and surface-interior connections: Implications for Venusian tectonics Vlada Stamenković
A-13	Influence of temperature-dependent tidal dissipation on lunar crust formation Matthieu Laneuville
A-14	True continental growth curve and fate of the continental crust Hikaru Sawada
Session B - Early environments and habitability	
B-1	Constraints on early Mars atmospheric pressure inferred from nitrogen and argon isotopes Hiroyuki Kurokawa
B-2	Possibility of aerobic environments on early Mars Lewis Ward
B-3	Was Venus the first habitable world of our solar system? Michael Way

B-4	Pulling back the veil: The habitability and characterization of hazy worlds Giada Nicole Arney
B-5	In-situ iron isotope analysis of pyrite and organic carbon/nitrogen isotope ratios from the Middle Proterozoic sediments, McArthur Basin, Northern Australia Kazumi Yoshiya
Session C - Prebiotic chemistry	
C-1	Quantifying impactor delivery of amino acids during the timespan relevant to emergence of life Elizabeth Bailey
C-2	Mineral and Organic Compound Interactions at the Emergence of Life: Magnetite's Effect on Carboxylic Acids Kristin Nicole Johnson
C-3	Abiogenic synthesis of hydrocarbons revealed by position-specific isotope analysis Alexis Gilbert
C-4	Electrochemically-driven carbon fixation Norio Kitadai
Session D - Origins of life	
D-1	Signature of Life in isotopic distributions of C, H, N and O Roman Zubarev
D-2	Restoration of an ancestral form of the reductive TCA cycle as a primitive carbon fixation pathway Masafumi Kameya
D-3	Virus exploration in extreme environments provides insights for the RNA world theory, and possible alternative genotypes — the first hyperthermophilic single stranded DNA virus — Tomohiro Mochizuki