

Thursday, December 1, 2011
University, Old Lecture Hall / Bei Étage

10:00 Excursion to MPI for Astrophysics and EMBL

15:00 **Opening Ceremony**
 Music

Welcome and Greetings
Rector of Heidelberg University
 Bernhard Eitel
Vice President of the German Science Foundation (DFG)
 Elisabeth Knust

15:30 **Keynote Lectures**
 Birth of the Universe and Multiverse
 Katsuhiko Sato
 How metabolism and genes may act together
 Matthias Henzke
 Stem cells, cell-material integration, and mesoscopic sciences
 Norio Nakatsuji
 Natural science and ethics
 Klaus Tanner
 Natural science in the past, present and future
 Yoichiro Murakami

17:30 - 18:15 Reception

19:30 Dinner

Friday, December 2, 2011
Klaus Tschira Stiftung / Studio Bosch

Session 1
Chairs
 08:00 - 08:25 **The Earth in the Universe**
 Thomas Henning and Masanori Iye

From the early universe to the formation of galaxies
 Masanori Iye

08:25 - 08:50 The formation of the first stars
 Ralf Klessen

08:50 - 09:15 The first steps towards planet formation
 Cornelia Dullemond
 09:15 - 09:40 From planetesimals to planets: implications for diversity of extrasolar planetary systems and ubiquity of super-Earths
 Shigeru Ida

09:40 - 10:05 Direct imaging of exoplanets and their formation sites with Subaru
 Motohide Tamura

10:05 - 10:30 Coffee

10:30 - 10:55 The 4.6-billion-year history of the Sun and its influence on Earth's climate
 Saku Tsuneta

10:55 - 11:20 The search for super-Earths
 Didier Queloz

11:20 - 11:45 Chemistry in the formation of stars and planetary systems
 Yuri Alkawa

11:45 - 12:10 The atmospheres of habitable planets
 Lisa Kaltenegger

12:15 - 13:15 Lunch

13:15 - 14:15 **Short talks.** Tobias Albertsson
Deuterium Chemistry in Protoplanetary Disks / Beth Biller *A Survey of close young stars with SDI* / Aya Higuchi
Triggered cluster formation by the dynamical interaction of dense molecular gas / Masayuki Yokoyama
Status and prospect of nuclear fusion science for future energy sources /

Saturday, December 3, 2011
Klaus Tschira Stiftung / Studio Bosch

Session 2
Chairs
 08:45 - 09:10 **Atomic and Molecular Evolution (cont)**
 Kenji Ohmori and Motomu Tanaka
 High precision spectroscopy with optical lattice clock
 Hidetoshi Katori
 09:10 - 09:35 Quantitative regulation of cells and tissues on soft interfaces
 Motomu Tanaka
 09:35 - 10:35 **Short talks.** Ilka Bischofs *Quantitative analysis of biofilms and systems biology of bacteria* / Lazaro Centanni *Fate restriction and multipotency in retinal stem cells* / Thorsten Erdmann *Robustness of morphogen gradients* / Yuki Hamamura *Mechanism of fertilization in plants: Live-imaging of sperm-egg cell interactions* / Alexis Maizel *Developmental plasticity: lessons from plants* / Hideki Mochizuki *Perception mechanism of itch* / Masae Naruse *Development of glial cells - Regulation of oligodendrocyte development in the forebrain* / Hidehiko Okamoto *Auditory processing in the brain* / [REDACTED] / Ildiko Somorjai *Evolution of stem cells* / Hiroshi Koyama *How can we know mechanical states in living cells? Theoretical prediction of cellular stiffness during cell division* / Sayuri Tsukahara *Centromere specific integrations of copia-type retrotransposons in Arabidopsis lyrata*

Session 2
Chairs
 14:30 - 14:55 **Atomic and Molecular Evolution**
 Kenji Ohmori and Motomu Tanaka
 Chemistry of the early Earth
 Peter Schuster

14:55 - 15:20 Low-temperature chemistry in the laboratory
 Andreas Wolf

15:20 - 15:40 Coffee

15:40 - 16:05 Attosecond quantum engineering
 Kenji Ohmori

16:05 - 16:30 Advanced design of heterogeneous catalyst surfaces
 Mizuki Tada

16:30 - 16:55 Evolutionary transition from ancient RNA to the modern protein world
 Irmi Sinnig

19:00 **Conference Dinner**

Greeting on the 150th anniversary of German-Japanese relationship
 Minister of the Embassy of Japan in Germany, Kenji Okada
 Mayor of the City of Heidelberg
 Buddhism and Natural Sciences
 Shoken Miyama

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10:35 - 11:00 Coffee

Session 3
Chairs
 11:00 - 11:25 **The Evolution of Life and Intelligence**
 Kiyotaka Okada and Thomas Holstein
 Functional metagenomics of extremophiles
 Christa Schlieper

Challenges to identify novel hormones in plants
 Yoshikatsu Matsubayashi
 Signaling and synthetic biology
 Roland Ellis
 The painful and itchy brain
 Ryusuke Kakigi
 Lunch
 Stem cells and the evolution of the nervous system
 Jochen Wittbrodt
 Synaptic plasticity in the brain
 Hannah Morner
 Retrotransposon-derived genes in mammalian development and evolution
 Fumitoshi Ishino
 Coffee
Session 4
Chairs
Thomas Holstein and Kiyotaka Okada
 From biodiversity to designer bugs: Bio-inspired engineering of producer microorganisms
 Juergen Eck
 Synthetic biology: New chances for biotechnology?
 Alfred Pühler
 Energy science and civilization
 Kimetaka Itoh
 Road map of large research projects in science and small science
 Hiroshi Yamada
 Short break
 Discussion for the future
 Closing remarks
 Kiyotaka Okada
 Dinner

11:25 - 11:50

11:50 - 12:15

12:15 - 12:40

12:45 - 13:45

13:45 - 14:10

14:10 - 14:35

14:35 - 15:00

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19:00