



AECOR-5 (2014)

5th Symposium on Academic Exchange and Collaborative Research

Competence Center for Materials & Processes, ETH Zürich (MaP) and
Graduate School of Engineering, Hokkaido University

Organized by ETH Zürich, Competence Center for Materials and Processes (MaP), co-organized
by Hokkaido University “Ambitious Leader’s Program” & Frontier Chemistry Center (FCC),
Hokkaido University

Embedded in the events for

**“150 Years Anniversary of the Establishment of Diplomatic
Relations between Switzerland and Japan”**

27-28th November 2014

at ETH Zurich,

Zurich, Switzerland

Program Overview

Nov 27 (Thu)	Session	Titles	Place
09:15 – 12:00	Plenary Session		ETH Zentrum: Lecture Hall HG E3
09:15 – 09:45	Prof. E. Windhab Prof. I. Uyeda	Opening address	
09:45 – 10:10	Prof. R. Müller	High-Throughput Bone Imaging in Mechanical Systems Biology	
10:10 – 10:40	Prof. Y. Kobayashi	Introduction of Graduate School of Engineering and Research Groups in Mechanical Engineering	
11:00 – 11:30	Prof. Jan Vermant	A Mechanical View on Pulmonary Surfactant Functioning	
11:30 – 12:00	Prof. T. Kakuchi	Recent Progress in Organocatalytic Group Transfer Polymerization	
12:15 – 14:00	Lunch		CAB foodLAB
14:00 – 17:30	Mini Symposia		
	Lab Visit Presentations	Mechanical Systems/ Biomechanics	Zentrum: CLA E 31 HG D 3.2
		Organic/Macromolecular Chemistry	Hönggerberg: HCI J 498
		Fluid Mechanics/Rheology	Zentrum: LFO F 25.1
18:30 – 21:00	Reception		Linde Oberstrass, Gilde Hall
Nov 28 (Fri)	Session	Titles	Place
09:00 – 12:00	Mini Symposia		
		Mechanical Systems/ Biomechanics	Hönggerberg: HIT K 51
		Organic/Macromolecular Chemistry	Hönggerberg: HCI J 498
		Fluid Mechanics/Rheology	Zentrum: LFO F 25.1
12:00 – 14:00	Lunch		Dozentenfoyer
14:30 – 15:45	Plenary Session		ETH Zentrum: Lecture Hall HG E3
14:30 – 15:00	Prof. E. Windhab	Flow Processing of Multi-Component Delivery Systems for Food and Pharma	
15:00 – 15:30	Prof. Y. Takeda	Ultrasonic Velocity Profiler for Fluid Flow - Bridging PSI-ETHZ/CH and HU/JP	
15:30 – 15:45		Closing Remarks	
16:30 – 17:30	Ceremony for JCH150		Haus zum Rüden (Rüdenstübli)
18:00 – 21:00	Dinner		Haus zum Rüden (Gothic Hall)

Detailed Program for Mini-Symposia

1. Mini-Symposium on Mechanical Systems and Biomechanics

Organized by Dr. R. Kress, Prof. R. Müller (both ETH Zürich), Prof. S. Honda, Prof. S. Tadano (both Hokkaido University)

Thursday, 27 November 2014 (ETH Zentrum)

Laboratory Visit (ETH Zentrum, CLA E 31)

14.00-14.45 Laboratory of Composite Materials and Adaptive Structures (3 groups)

Dr. G. Kress, ETH Zürich (CLA D 31)

Structural Optimization of Structures made from Composite Materials with the Ghost-Layer Concept

Dr. A. Arrieta, ETH Zürich (CLA D 23)

Research in Compliant Systems with Applications to Adaptive Structures

Dr. A. Bergamini, ETH Zürich (CLA D 23)

Electromechanically Coupled Systems for Vibration Mitigation and Shape Control

Mechanical Systems (ETH Zentrum, HG D 3.2)

15.00-15.20 Prof. K. Sasaki, Hokkaido University

Measurements of Creep Strain by Indentation Tests Using a Modified Reference Area

15.20-15.40 Prof. I. Kajiwara, Hokkaido University

Non-contact Laser Excitation Vibration Test and Health Monitoring of Membrane Structures

15.40-16.00 Prof. S. Honda (Associate Professor), Hokkaido University

Multi-objective Optimization of Curvilinear Fiber Shapes for Laminated Composite Plates by Using NSGA-II

16.00-16.30 Intermission

16.30-16.50 Prof. M. Meboldt, ETH Zürich

Design for Additive Manufacturing

16.50-17.10 Prof. C. Daraio, ETH Zürich

Programmable Materials with Extreme Mechanical Properties

17.10-17.30 Prof. P. Ermanni, ETH Zürich

Composite Materials and Adaptive Structures

Friday, 28 November 2014 (ETH Zürich, Höggerberg Campus, HIT K 51)

Biomechanics

09.00-09.20 Prof. S. Tadano, Hokkaido University

Mechanical Sensing to Detect Health Performance of Elderly People

09.20-09.40 Prof. E. de Bruin (Associate Professor)

Inertial and Mechanical Sensing for Health Related Physical Activity Monitoring in Older People

- 09.40-10.00 Prof. T. Ohashi, Hokkaido University
Experimental Device for Mechanical Loading to Tenocytes and Its Application to Study of Intercellular Diffusivity
- 10.00-10.20 Prof. J. Snedeker, ETH Zürich
Cytoskeletal Integration of Matrix Mechanics, Topology, and Chemistry - Implications for Tendon to Bone Regeneration
- 10.20-10.40 Intermission
- 10.40-11.00 Prof. M. Todoh (Associate Professor), Hokkaido University
Raman Analysis of Articular Cartilage under Compressive Load
- 11.00-11.20 Prof. M. Zenobi-Wong (Assistant Professor), ETH Zürich
Controlling Cell Fate through Hydrogel Stiffness
- 11.20-11.40 Prof. S. Yamada (Assistant Professor), Hokkaido University
Effects of Growth on Residual Stress Distribution along the Radial Depth of Cortical Cylinders from Bovine Femurs
- 11.40-12.00 P. Christen (Postdoctoral Fellow), ETH Zürich
In Silico Multiscale Simulations of Bone Remodelling in Health, Disease and Treatment
- 12.00-12.30 Transfer to ETH Zentrum

2. Mini-Symposium Materials/Organic/Macromolecular Chemistry

Organized by Prof. A.D. Schlüter (ETH Zürich) and Prof. Habazaki (Hokkaido University)

Thursday, Nov. 27, 2014 (ETH Zürich, Hönggerberg Campus, HCI J 498)

- 14.00-14.20 Prof. H. Ito, Hokkaido University
Mechanical Response of Luminescent Gold (1) Isocyanide Complexes
- 14.20-14.40 Prof. M. Tokeshi, Hokkaido University
Microfluidic Devices for Rapid Detection of Disease Biomarkers and Fabrication of Functional Nanoparticles
- 14.40-15.00 Prof. M. Niederberger, ETH Zürich
From Nano to Macro: Chemical Synthesis of Inorganic Materials Over Several Length Scales
- 15.00-15.20 Dr. E. Benetti, ETH Zürich
Engineering Multi-dimensional Surfaces by Grafting Polymers
- 15.20-15.40 Intermission
- 15.40-15.50 Olof Sterner, ETH Zürich
Spatially Controlled Polymer Adlayers for Biological Applications
- 15.50-16.00 Yu Toguchi, Hokkaido University
Hetero-oligomerization of the Wild-type and Mutant Tumor Suppressor

Protein p53

- 16.00-16.10 Riku Takahashi, Hokkaido University
Control Superstructure of Rigid Polyelectrolytes in Oppositely Charged Hydrogel via Programmed Internal Stress
- 16.10-16.30 Prof. Don Hilvert, ETH Zürich
Design and Evolution of Protein Containers
- 16.30-16.40 Intermission
- 16.40-17.00 Prof. K. Matsumoto, Hokkaido University
Engineering of Bacteria and Pathways Toward Efficient Plastic Production from Renewable Feedstock
- 17.00-17.20 Prof. M. Kovalenko, ETH Zürich
Colloidal Nanocrystals for Li-ion and Na-ion Batteries
- 17.20-17.30 Aroua Safwan, ETH Zürich
Derivatization of $M_3N@C_{80}$ Metallofullerenes via Prato Reaction: a New Route for Preparation of MRI Contrast Agents

Friday, Nov. 28, 2014 (ETH Zürich, Hönggerberg Campus, HCI J 498)

- 09.00-09.20 Prof. P. Dittrich, ETH Zürich
Microchambers and Microdroplets: New Perspectives for Proteomics and Single-cell Analysis
- 09.20-09.40 Prof. A. deMello, ETH Zürich
Droplet-Based Microfluidics for High-Throughput Experimentation
- 09.40-10.00 Prof. K. Tadanaga, Hokkaido University
Preparation of Materials for All-solid-state Electrochemical Devices by Solution Processes
- 10.00-10.20 Prof. H. Habazaki, Hokkaido University
Pt-supported Platelet Carbon Nanofibers for Oxygen Reduction Reaction
- 10.20-10.40 Intermission
- 10.40-10.50 Mingzhe Zhang, Hokkaido University
Unique Optical Properties of Subnanometer-sized Gold Clusters
- 10.50-11.00 Bernd Deffner, ETH Zürich
High Molecular Weight Poly(m,p-phenylene)s by Suzuki-Miyaura Cross-Coupling Polymerization
- 11.00-11.10 Fumihiko Nakamura, Hokkaido University
Development of Micro Mixer Based on Baker's Transformation by Two-Dimensional Mixing
- 11.10-11.20 NN - Hokkaido PhD Polymer Chem., Hokkaido University
- 11.20-11.30 Richard Obexer, ETH Zürich
Droplet-Based Microfluidics for Directed Evolution of Designer Retro-Aldolases
- 11.30-11.50 Prof. Jeff Bode, ETH Zürich
SnAP Reagents for the Synthesis of Chiral, Saturated N-Heterocycles

11.50-12.00 Ryoto Kojima, Hokkaido University
*Copper(I)-Catalyzed Diastereoselective Intramolecular Borylative
exo-Cyclization of Alkenyl Ketones*

12.00-12.30 Transfer to ETH Zentrum

3. Mini-Symposium Materials – Fluid Mechanics / Complex Rheology

Organized by Prof. E. Windhab (ETH Zürich), Prof. Y. Murai & Prof.em. Y. Takeda (both Hokkaido University)

Thursday, Nov. 27, 2014 (ETH Zentrum, LFO F 25.1)

14.00-14.25 Prof. Y. Murai, Hokkaido University
Drag Reduction by Repetitive Bubble Injection

14.25-14.50 T. Shiratori, Hokkaido University
*Characterization and Flow Simulation with Experimental Information of
Viscoelastic Unsteady Flows*

14.50-15.15 H. Kobayashi, Hokkaido University
Visualization of Flow around a Twisted Cylinder

15.15-15.50 Intermission

15.50-16.15 L. Pokorny (PhD student), ETH Zürich
*Mapping of Radial Component Velocity Component in Taylor Couette Flow
with Ultrasound Doppler Velocimetry*

16.15-16.40 V. Lutz Bueno (PhD student), ETH Zürich
Alignment of Wormlike Micelles in the Entry Flow of a Planar Contraction

16.40-17.05 Prof. E. Windhab, ETH Zürich
*Flow Experiments and Coupled CFD Simulations for Peristaltic Human
GI-food Disintegration Models*

17.05-17.30 P. Guillet (PhD student), ETH Zürich
*Spray Processing of Novel Sub-structured Lipid Shell Particles for
Functional Food Applications*

Friday, Nov. 28, 2014 (ETH Zentrum, LFO F 25.1)

09.00-09.25 Prof. I. Kumagai (Associate Prof.), Hokkaido University
Buoyancy-driven Plumes in Heterogeneous Fluid

09.25-09.50 T. Shiratori, Hokkaido University
*Unstable Wake Behind a Permeable Disk in Viscoelastic Flow
Measured by UVP*

09.50-10.15 P. Rühls (Postdoctoral fellow), ETH Zürich
*Interfacial Rheology and Processing of Amyloid Fibrils and Bacterial
Biofilms*

10.15-10.40 Intermission

10.40-11.05 N. Scheuble (PhD student), ETH Zürich

*Dynamics of Complex Fluid-Fluid Interfaces - Controlling Satiety
by Tailored Interfaces*

- 11.05-11.30 D. Dufour (PhD student), ETH Zürich
In-line Monitoring of a High-shear Crystallization by UVP-PD Technique
- 11.30-11.55 A.-K. Mütze (PhD student), ETH Zürich
*Evidence for Simultaneous Appearance of Gradient and Vorticity Shear
Bands using Time-resolved Rheo-SANS and Laser Light Transmittance
Measurements*