## The 24th HU and SNU Joint Symposium

# Joint Symposium in the fields of Mechanical and Aerospace Engineering (On-line)

**Friday, December 17, 2021**

# Program


Department of Mechanical and Intelligent System Engineering, Faculty, Graduate School and School of Engineering, Hokkaido University (HU), Japan

Department of Aerospace Engineering and Department of Mechanical Engineering, Seoul National University (SNU), Korea

**Date:** Friday, December 17, 2021
**Zoom link:** [redacted]

**Co- Chairs:** Toshiro Ohashi, Professor, Hokkaido University
Chongam Kim, Professor, Seoul National University

**08:40 – 09:00** **Opening Remarks**
Toshiro Ohashi, HU
Chongam Kim, SNU
**Welcome address**
Harunori Nagata, Vice Dean of Engineering, HU
Junho Song, Vice Dean of Engineering, SNU

**09:00 – 10:20** **Session 1: Fluid Dynamics, Fuel Cells**
Chair: Yuki Shimizu, HU

1. Modeling for combustion flows under supercritical pressure environments
   *Hiroshi Terashima, HU*
2. Numerical investigation on thermoacoustic instability of laminar premixed flames propagating through a tube
   *Bok Jik Lee, SNU*
3. Frictional drag reduction using bubble injection
   *Hyun Jin Park, HU*
4. Application of sputtering process for low temperature reversible operation of solid oxide cells
   *Suk Won Cha, SNU*

**10:20 – 10:30** **Break**

**10:30 – 11:50** **Session 2: Measurement and Control, Robotics**
Chair: Hyungrok Do, SNU

1. Machine learning aided gas property measurements in scramjet combustors
   *Hyungrok Do, SNU*
2. Evaluation of optical scale gratings for precision positioning
   *Yuki Shimizu, HU*
3. SMA-based actuators and robotics
   *Sung-Hoon Ahn, SNU*
4. Adaptive vibration control of smart structures using simultaneous perturbation stochastic approximation
   *Itsuro Kajiwara, HU*

**11:50 – 12:30** **Open Discussion Towards Future Joint Symposium**
Chair: Toshiro Ohashi, HU
Chongam Kim, SNU

**12:30 – 13:30 Lunch**

**13:30 – 14:30 Graduate Student Poster Session**

**14:30 – 15:50 Session 3: Aircraft Design, Fracture Mechanics**
Chair: Hiroshi Terashima, HU

1. $f^3$ (f-cube) engineering education and research center in collaboration with Hokkaido University and Muroran Institute of Technology
   *Harunori Nagata, HU*
2. Mission-oriented performance assessment and optimization of electric multirotors
   *Kwanjung Yee, SNU*
3. Detection of small internal fatigue cracks in titanium alloys via synchrotron radiation nanocomputed tomography
   *Takashi Nakamura, HU*
4. Multiscale process simulation and fatigue life prediction models for composite materials
   *Gun Jin Yun, SNU*

**15:50 – 16:00 Break**

**16:00 – 17:20 Session 4: Biomechanics**
Chair: Do-Nyun Kim, SNU

1. Programmable ultrasensitive reconfiguration of DNA nanorings through chemomechanical instability
   *Do-Nyun Kim, SNU*
2. Evaluating the stability of the knee joint through finite element analysis and ligament strength
   *Ryo Takeda, HU*
3. Optimization of garment production line using power consumption monitoring system
   *Woo-Kyun Jung, SNU*
4. Mechanical behavior of biomimetically mineralized collagen matrix using the polymer - induced liquid precursor process
   *Masahiro Todoh, HU*

**17:20 – 17:30 Closing Remarks**
Toshiro Ohashi, HU
Chongam Kim, SNU

**Graduate Student Poster Session**

HU-1 Behaviors of sliding bubble inside turbulent boundary layer on a tilted channel
*Dongik Yoon (D3)*

HU-2 Drag reduction by repetitive bubble injection in high-speed and long-distance flows
*Taiji Tanaka (D2)*

HU-3 Sign language translation based on motion capture system
*Yutong Gu (D3)*

HU-4 Finite element analysis for function and role of sacroiliac joint during bipedal walking
*Ryota Toyohara (D1)*

HU-5 Characteristics of biomimetically mineralized collagen membranes from sturgeon swim bladder by PILP process
*Keita Arai (M2)*

HU-6 Aging effect on elastic moduli of single trabeculae in bovine proximal femurs
*Miyu Kobayashi (M1)*

HU-7 Mechanical properties of composites fabricated by electrodeposition resin molding method
*Md Tansirul Isram (M2)*

HU-8 Numerical simulation of Bunsen flame by direct numerical simulation with detailed chemistry
*Ying Lai (M2)*

SNU-1 Comparative study of advanced high-order spatial discretization schemes for aeroacoustic prediction
*Yoonpyo Hong (D3)*

SNU-2 Overlapping finite element analysis for structures under thermal loads with spatially varying gradients
*Namkyu Kim (D4)*

SNU-3 A framework to link process parameters and defects in laser powder bed fusion (L-PBF) additive manufacturing process
*Kang-Hyun Lee (D1)*

SNU-4 Fabrication of glass micro pockets by laser induced backside wet etching
*Kui-Kam Kwon*

SNU-5 Nanosecond laser pulse modulation using optical breakdown plasma
*Youchan Park (D3)*

SNU-6 Development of tantalum sputtered stainless steel bipolar plates for PEM water electrolysis
*Wonyeop Jeong (D4)*

SNU-7 Numerical investigation of transonic flow characteristics over a reentry capsule
*Seoeum Han (D1)*

SNU-8 Polling-based energy management system for off-grid in rural Tanzania: A field demonstration
*Hyucksoon Im (M2)*