

## TGSW2022 (Sep.26 and 27, online afternoon 13:00-18:40)

### Name of session:

Bio-Flocculation and Smart Sludge for Soil Improvement in the category of joint University of Tsukuba and Kenkyu Gakuen City. This Session is composed of five sub-sessions.

#### Day 1(Sep. 26)

Convener. Yuji Yamashita (University of Tsukuba)

12:50 - 13:00 Opening Remarks Prof. Yasuhisa Adachi (Organizer, University of Tsukuba)

#### 1. Digital summer school in Bio-resources and Environmental Eng. (13:00 - 15:30)

Chair. Dr. Hongtao Wang, Dr. Hideyuki Sugioka

13:00 - 13:30 Hideyuki Sugioka Group (Shinshu University, Complex thermal fluid Lab.)  
Approach from the electric and thermal interface for environment and healthcare  
Professor Hideyuki Sugioka

Water problem:

- 1) "Spiral light-driven BL pump for water problem"  
Hiroki Yoshijima and Hideyuki Sugioka

Healthcare:

- 2) "Fluidic switch using ICEO for healthcare"  
Shunsuke Takahashi and Hideyuki Sugioka
- 3) "Vector separator using ICEO for healthcare"  
Ryo Takeda and Hideyuki Sugioka

Use of waste heat:

- 4) "Bubble water pump using oblique structures for the use of waste heat"  
Atsushi Miyauchi and Hideyuki Sugioka

Micro actuator:

- 5) "Micro rotary engine for microrobot"  
Yuki Arai and Hideyuki Sugioka
- 6) "Side-shooter using discharge"  
Katsuaki Murata and Hideyuki Sugioka
- 7) "Hydrodynamic interaction between thermal cilia"  
Wataru Tomita and Hideyuki Sugioka
- 8) "Weaving technique for ICEO carbon actuators"  
Hiroya Nakamura

13:30 - 14:00 Yasuhisa Adachi Group (University of Tsukuba)

13:30-13:45 "Particle-induced aggregation by adsorption of oppositely charged small particles"  
Lifan Duan

13:45-14:00 "Effects of pH and dosage of polyaluminium chloride on initial-stage kinetics of flocculation of polystyrene latex particles"  
Zheng Ju

- 14:00 - 14:30 Motoyoshi Kobayashi Group (University of Tsukuba)
- 14:00-14:15 "Strength of Flocculation of Leonardite Humic Acid with Cationic Polyelectrolytes"  
Yue Lyu
  - 14:15-14:30 "Effect of lysozyme on the aggregation and charging of oxidized carbon nanohorn (CHNox) in aqueous solution"  
Zhengjian Tian
- 14:30 - 15:00 Hongtao Wang Group (UNEP Tongji University)
- 14:30-14:40 "Introduction to Laboratory of Environmental System Engineering"  
Professor Hongtao Wang
  - 14:40-14:45 "The influence of humic substances on environmental behavior of antibiotic resistance genes"  
Bomin Fu
  - 14:45-14:50 "Enhancement of sludge dewaterability by electrolysis coupled with peroxymonosulfate oxidation process: Performance, mechanisms and implications"  
Junsen Wang
  - 14:50-14:55 "Insight into advanced oxidation processes for the degradation of fluoroquinolone antibiotics: Removal, mechanism, and influencing factors"  
Zonglin Li
  - 14:55-15:00 Discussion (Q&A)
- 15:00 - 15:30 Zhongfang Lei Group (University of Tsukuba)
- "Introduction to Laboratory of Bioresource Process Engineering"  
Zhongfang Lei
  - "A comparative study on simultaneous recovery of phosphorus and alginate-like exopolymers from bacterial and algal-bacterial aerobic granular sludges: Effects of organic loading rate"  
Xingyu Chen
  - "Stable and high-efficacy nitrogen removal from wastewater by algal-bacterial aerobic granular sludge under no mechanical aeration"  
Zejiào Li
  - "Carbon fixation and heavy metal adsorption by soil particles supplemented with microalgal-bacterial granules"  
Xiaochuan Dong
  - "Wastewater treatment by microalgal-bacterial granules under heavy metal inhibition and its sustainable solutions"  
Yankai Zhao

(30 min break)

## 2. Colloids in Civil and Environmental Eng. (16:00 - 18:40)

Chair Dr. Motoyoshi Kobayashi

- 16:00 - 17:00 Plenary lecture  
"Bio-flocculation and applications in Smart Soils"  
Dr. Claire Chassagne, TU Delft
- 17:00 - 17:30 Takashi Matsushima Group (Project & Graduate Study, University of Tsukuba)
- 17:00-17:05 "Role of granular mechanics in civil and environmental engineering"  
Professor Takashi Matsushima
- 17:05-17:15 "3D grain shape evolution during rotating drum abrasion experiment"  
Opu Chandra Debnath
- 17:15-17:25 "DEM-SPH coupling for simulating complex erosion/sedimentation process"  
Haoran Jiang
- 17:25-17:30 Discussion (Q&A)
- 17:30 - 18:30 Key note lectures on Fundamental Colloid
- 17:30-17:50 "Adsorption kinetics of polyelectrolytes onto a silica particle in a unidirectional flow field studied using microfluidics and optical tweezers"  
Lester C. Geonzon, The University of Tokyo
- 17:50-18:10 "Poly(ethylene oxide) (PEO) Adsorption on Polystyrene Sulfate (PS) Latex: An Electrophoretic Analysis"  
Santanu Saha, University of Tsukuba
- 18:10-18:30 "The effect of diverse ion species on the charging and aggregation of natural allophane particles"  
Maolin Li, University of Tsukuba
- 18:30 - 18:40 Closing Remarks Prof. Hiroyuki Ohshima (Tokyo University of Science)  
(This excess time can be managed by the extension)

## Day 2(Sep. 27)

Convener. Yuji Yamashita (University of Tsukuba)

## 3. NARO & Industrial and Agriculture Session (13:00 - 15:15)

Chair Dr. Teruhito Miyamoto

- 13:00 - 13:30 "Biochar: sorption mechanism and its application for agriculture"  
Dr. Koji Kameyama, Institute for Rural Engineering, NARO
- 13:30 - 14:00 "Development of Sensors that Detect the Coagulation State of Flocs for Controlling the Coagulant Dose -Streaming Current Sensor and Image Processing Coagulation Sensor-"  
Mii Fukuda, Toshiba Infrastructure Systems & Solutions Corporation

- 14:00 - 14:45 Chihhao Fan & Shu-Yuan Pan Group (Department of Bioenvironmental Systems Engineering, National Taiwan University, Taiwan)
- 14:00-14:20 "Strategies on source control for fertilizer non-point source pollution mitigation in Agricultural Farmlands"  
Professor Chihhao Fan
- 14:20-14:40 "Green Technology Lab at NTU"  
<https://homepage.ntu.edu.tw/~sypan/Default.html>  
Assistant Professor Shu-Yuan Pan
- 14:40-14:45 Discussion (Q&A)
- 14:45 - 15:15 Shoichiro Hamamoto Group (The University of Tokyo)
- 14:45-14:50 "Lab of Soil Physics and Soil Hydrology at UoT"  
Professor Shoichiro Hamamoto
- 14:50-15:00 "Seasonal variations in methane emissions via plant and ebullition from rice paddies"  
Tatsuya Kobayakawa
- 15:00-15:10 "Effects of cation exchange on colloid transport in saturated porous media"  
Rikutaro Higashi
- 15:10-15:15 Discussion (Q&A)

(15 min break)

#### 4. Asian students and young researcher session (15:30 - 17:00)

Chair Dr. Akiko Nakagawa, Dr. Oviyanti Mulyani, Dr. Toshiharu Enomae

- 15:30 - 17:00 Asian students and Young resercher session
- 15:30-15:45 "Utilization of Adsorbent from Organic Matter in Reducing Heavy Metal Levels"  
Dr. Oviyanti Mulyani, Universitas Padjajaran
- 15:45-16:00 "Lignocellulose Biomass Utilization as Soil Conditioners"  
Dr. Nadia N. Kamaluddin, Universitas Padjajaran
- 16:00-16:15 "Bio-mediated flocculation of cohesive sediment and microalga in different growth phases"  
Que Nguyen Ho, Energy Environment Institute Kyungpook National University, S.Korea
- 16:15-16:30 "Struvite Recovery from Industrial Wastewater via Coagulation and Flocculation using Magnesium Chloride as Coagulant"  
Nurani Ikhlas, Faculty of Engineering, Universitas Diponegoro, Indonesia
- 16:30-16:45 "Performance of Novel Biochar-Clamshell Composite for Real Acid Mine Drainage Treatment"

Yudha Gusti Wibowo, Department of Mining Engineering Institut  
Teknologi Sumatera

16:45-17:00 "Analysis of rate of flocculation of positively charged monodisperse  
spheres induced by the montmorillonite using standardized mixing  
approach"

Meher Sultana, Graduate School of Life and Environmental Sciences,  
University of Tsukuba

(15 min break)

**5. Discussion on the education of fundamental subjects of Bio-resource and environmental  
Engineering (17:15 - 18:10)**

Chair Dr. Tofael Ahamed

17:15 - 18:00 Introduction of lectures (for each 5-10 min)

Dr. Mito Kokawa (Electromagnetics)

Dr. Takuya Sugimoto (Thermodynamics)

Dr. Yohei Asada (Hydraulics)

Dr. Tian Yuan

General Discussion

18:00 - 18:10 Closing Remarks Prof. Chiaki Matsukura (Chair of Degree Program in Agricultural  
Sciences, University of Tsukuba)

Mission of summer school (DSSIBEE2021 (digital summer school interface for bioresources and  
environmental engineering 2021), TGSW2021(Colloid and interface for civil and environmental  
engineering), DSSBEE2022(digital spring school in bioresources and environmental engineering) , and  
NARO(national agricultural organization) and Industrial collaboration are all included.

- Call for abstract (deadline Aug.31) Acceptance will be informed by Sep 5.
- Final program will be announced by Sep. 5.
- Registration for participant of this session will be opened from Sep. 1.

(We will start earlier if there comes more than four requests for speeches in sub-session 4)

In addition to TGSW2022,the session of Bio-Flocculation and Smart Sludge for Soil Improvement is  
carried out by the support of Kyoikusuishinsenryaku Project (University of Tsukuba), JSPS Kakenhi  
22H00387, Auspices Research Unit Bio-resource colloid engineering University of Tsukuba. The  
Electrokinetic Society of Japan, Japanese Society of Soil Physics, Bio-flocculation Seminar, ETC (will be  
updated)

Organizing Chair: Yasuhisa Adachi