

# THESIS-2019: The 4th symposium on two-phase modeling for sediment dynamics in geophysical flows

September 17-19, 2019 | Newark, Delaware, USA

## Draft schedule

### Tuesday 9/17 (day 1)

9:00~9:05 Welcome. *T.-J. Hsu & Fabrice Veron*

9:05~10:50: Session 1A **Two-phase flow modeling I**

Moderator: *James Jenkins*

1. **Keynote:** Next generation two-phase flow models that capture fully resolved physics and what they can do for sediment-laden geophysical flows. S. Balachandar
2. Analysis of turbulent channel flows laden with finite-size solid particles, Lian-Ping Wang and Cheng Peng
3. Eulerian-Eulerian two-phase flow Large Eddy Simulation of dilute suspended load: development of sub-grid models, Antoine Mathieu, Julien Chauchat, Cyrille Bonamy, Guillaume Balarac, Tian-Jian Hsu
4. Development of a two-equation turbulence model for non-dilute suspension transport Erik A. Toorman, Mohamed Ouda
5. Numerical experiments of turbulent flow over a permeable rough bed with the one-fluid model of solid-liquid multiphase. Yuya Takakuwa, Shoji Fukuoka

Coffee Break (15 min)

11:05~12:45: Session 1B **Two-phase flow modeling II**

Moderator: *James Kirby*

1. **Young investigator spotlights:** A discrete approach to the evaluation of sediment transport in an oscillatory boundary layer. Marco Mazzuoli
2. A new multiphase model for modeling sediment transport in free surface flows. Mohamed Ouda & Erik A. Toorman
3. Multi-phase simulations of submarine landslides. Cheng-Hsien Lee
4. SPH study of sediment gravity flows in free surface water with a rheology-based constitutive law. Huabin Shi, Ping Dong, Yan Zhou.
5. Two-phase modeling of high speed erosion. G. H. Keetels

Buffet Lunch 12:45~1:50

1:50~3:30: Session 1C **Sediment-laden density-driven flows**

Moderator: *Xiaofeng Liu*

1. A settling-driven instability in two-component, stably stratified fluids. Ahmad Alsinan, Eckart Meiburg, Pascale Garaud
2. Three-dimensional two-phase model for dredged sediment releases into homogeneous water. M. Uh Zapata, W. Zhang, D. Pham Van Bang, K.D. Nguyen
3. Numerical study of convective sedimentation through a sharp density interface. Yi-Ju Chou, Yun-Chuan Shao, and Chen-Yen Hung
4. Turbulent Erosion of a Sharp Density Interface, Joel A. Lagade Jr. and Blair A. Johnson
5. Two-phase experiment of sediment dumping. D. Pham Van Bang, M. Uh Zapata, W. Zhang, K.D. Nguyen

Coffee Break (15 min)

3:45~5:25: Session 1D **Scour**

Moderator: *Allison Penko*

1. Toe scour at vertical seawalls subject to wave action: PIV-XRCT experiment for velocity-density field. L. Marois, W. Zhang, M. Uh Zapata, K.D. Nguyen, D. Pham Van Bang
2. 3D two-phase numerical simulation of scour erosion at the toe of a vertical seawall. W. Zhang, D. Pham Van Bang, M. Uh Zapata, X. Bai, K.D. Nguyen
3. Sediment transport and erosion process around coastal structures using SPH method. Dong Wang and Philip L.-F. Liu
4. Modeling scour processes in the Eulerian-Eulerian two-phase flow framework, J. Chauchat, C. Bonamy, T. Nagel, A. Mathieu, Z. Cheng, X. Liu, T.-J. Hsu
5. Modelling the local impact of hydrokinetic turbine on mobile sandy bed by two-phase Euler-Euler CFD approach. F. Khaled, S. Guillou, Y. Mear, F. Hadri

5:45~8:45pm: Cocktail and dinner at STAR atrium, University of Delaware STAR Campus, Health Sciences Complex is 540 South College Avenue, Newark, DE, 19713 (10 min walk from conference hotel)

## Wednesday 9/18 (day 2)

9:00~10:45: Session 2A **Coastal sediment transport**

Moderator: *Joseph Calantoni*

1. **Keynote:** Current Challenges in Coastal Sediment Transport, Peter Nielsen
2. Large-scale laboratory observations of sheet flow under breaking transient waves. Ryan S. Mieras, Takayuki Suzuki, and Daniel T. Cox
3. A free-surface resolving Eulerian two-phase model and its application to sheet flow driven by surface waves. Yeulwoo Kim, Ryan S. Mieras, Zhen Cheng, Dylan Anderson, Tian-Jian Hsu, Julien Chauchat, Jack A. Puleo, Daniel Cox
4. Wave-induced hydrodynamics, morphodynamics and sediment transport around a slender vertical cylinder. Massimo Miozzi, Sara Corvaro, Francisco Alves Pereira, Maurizio Brocchini

5. Phase-resolved Parameterization for Incipient Motion of Coarse Sand Grains. Thaxton, C., T. Frank, Calantoni, J.

Coffee Break (15 min)

11:00~12:40: Session 2B **Breaking waves and upper ocean processes.**

Moderator: *Meg Palmsten*

1. **Young investigator spotlights:** Wave breaking turbulence: significance of bubbles. Morteza Derakhti, James T. Kirby, and Jim Thomson
2. Intermittent bubble transport in surf zone breaking waves, James T. Kirby and Morteza Derakhti
3. Spume droplet measurements during breaking wave events using shadowgraph/PTV and LIF. Robert Jaquette, Fabrice Veron
4. Wave effects on particle dispersion in the turbulent ocean surface boundary layer. Tobias Kukulka, Kathleen Gamble, Fabrice Veron, Todd Thoman
5. Surfacing of gyrotactic micro-swimmers in thermally-stratified free-surface turbulence. C. Marchioli, S. Lovecchio, F. Zonta and A. Soldati

Buffet Lunch 12:40~1:45

1:45~3:25: Session 2C **Emerging topic and technique**

Moderator: *C. Emre Ozdemir*

1. Toward Eulerian-Eulerian two-phase flow modeling of grain size segregation in bedload transport H. Rousseau, J. Chauchat and P. Frey
2. Empirical evidence of the importance of grain shape and angularity in sediment transport parameterizations, Sylvia Rodríguez-Abudo, Juan Vargas-Martínez, Edwin Aponte-Cruz
3. Numerical modeling of the tsunami generated by the collapse of Anak Krakatau volcano in the Sunda Straits of Indonesia on Dec. 22, 2018, with a two-layer non-hydrostatic wave-slide model, Cheng Zhang, James Kirby, Stephen Grilli
4. SPH simulation of coupled flow-object-sediment system. Zilong Li, Tong Qiu, and Xiaofeng Liu
5. Coupling a non-hydrostatic wave model and a discrete element model for simulations of wave-ice interaction. Fengyan Shi, Mark D. Orzech, Jay Veeramony, Samuel Bateman, James Kirby, Joseph Calantoni

Coffee Break (15 min)

3:40~5:00: Session 2D **Bedforms**

Moderator: *Lian-Ping Wang*

1. Dynamics of wave orbital ripples and reversing tidal megaripples. Traykovski, P.

2. In situ Particle Image Velocimetry Measurements over a Rippled Sand Bed. Blake Landry, Carlo Zuniga Zamalloa, Joseph Calantoni, Callum Gray, Ryan Mieras, Edward Braithwaite, Charles Key, Sean Griffin.
3. Numerical Simulation of Sand Ripple Evolution in Oscillatory Boundary Layers. Ming Li, Justin R. Finn, Sourabh V. Apte, Ping Dong, and Yong Peng.
4. Seafloor spectra predictions with a coupled wave-seafloor modeling system. Penko, A., Roger, Calantoni, J.

Break (15 min) Snack/drink

5:15~7:00: Session 2E **Fast talk (7 min) + poster** (with snack/drink)

Moderator: *Sylvia Rodriguez-Abudo*

1. Euler-Lagrange Modeling of Graded Sand Transport Driven by Nearshore Waves, Rafati Y., Cheng Z., Yu X., Hsu, T.-J., Calantoni, J.
2. Exploring the role of bed fluidization on ripple formation in highly turbulent flows, Hannah Knaup and Blair A. Johnson
3. Two phase modeling of sand ripple bed under oscillatory flow using SedFoam, Ali Salimi Tarazouj, Zheng Cheng, Tian Jian Hsu, Peter Traykovski
4. A Numerical and experimental investigation of fine sand transport from an immobile substrate, Mahdi Khademishamami, William Nardin
5. Probabilistic Prediction of Sediment Resuspension Using a Bayesian Network Samuel Bateman, Margaret Palmsten, Allison Penko, Ryan Mieras.
6. Toward linking fluid mechanics with soil mechanics - Extension of SedFoam model for simulating slumping process. Benjamin Tsai, Y. Kim, T.-J. Hsu, J. Chauchat, J. Calantoni
7. Oil-mineral flocculation and settling dynamics in saline water. Leiping Ye, James Holyoke, Andrew Manning, Tian-Jian Hsu

Dinner on your own (suggestion: Main Street at Newark downtown)

## **Thursday 9/19 (day 3)**

9:00~1040: Session 3A **Fine sediment processes**

Moderator: *Blair Johnson*

1. Flocculation Characteristics and Settling Dynamics of Suspended Cohesive Sediments: “Floccin’ Across the USA!”, Andrew Manning, Leiping Ye
2. **Young investigator spotlight:** Settling of cohesive sediment: particle-resolved simulations. Bernhard Vowinkel
3. Two-phase flow modeling of alongshore current-supported turbidity currents over erodible bed: role of sediment settling velocity, C. Emre Ozdemir, Sahar Haddadian, Xiao Yu.
4. Sand fraction effects on wave-supported gravity flows, Zhuochen Han, Alexander Horner-Devine, Andrea Ogston, Tian-Jian Hsu

5. On the role of wave direction in wave supported gravity flow through turbulence resolving numerical investigation, Liangyi Yue, Zhen Cheng, Tian-Jian Hsu.

Coffee Break (15 min)

10:55~12:05: Session 3B **Special session on model-model model-data integration**

Moderator: *Eckart Meiburg*

1. Near Bed Sediment Transport in the Surf and Swash Zones. Jack A. Puleo
2. The Community Surface Dynamics Modeling System (CSDMS) Python Modeling Tool (PyMT), Hutton E., Piper M., Tucker G.
3. Open discussion.

Lunch 12:05~1:10pm

1:10~2:30: Session 3C **Two-phase flow modeling III**

Moderator: *Tobias Kukulka*

1. A simple model for a dense mixture of particles and water over an inclined, erodible bed. James Jenkins, M. Larcher
2. Rheology of dense granular suspensions mobilized by oscillatory bottom boundary layer flow, Julian A. Simeonov, Mazzuoli, M., Calantoni, J.
3. Interface-resolved large eddy simulation of a field debris flow including large stones and woods. Tomoo Fukuda, Shoji Fukuoka
4. Evolution of the transport layer under uniform-unsteady flow conditions, Luigi Fraccarollo, Jose M. Gonzalez-Ondina and Philip L.-F. Liu.

Coffee Break (15 min)

2:45~5:45 **SedFoam Workshop**

Cyrille Bonamy and Julien Chauchat