

## **Tian-Jian Hsu (Tom), Ph.D.**

Professor

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### **EDUCATION**

Ph.D. Civil & Environmental Engineering, Cornell University, Ithaca, NY, USA. August 2002.

Dissertation: A two-phase approach for sediment Transport.

Advisor: Dr. Philip L.-F. Liu, James T. Jenkins.

M.S. Civil & Environmental Engineering, Cornell University, Ithaca, NY, USA. May 1999.

Thesis: A Numerical Study of Wave-Structure Interaction Using Reynolds Averaged Navier-Stokes Equation with a  $k-\epsilon$  Turbulence Model.

Advisor: Dr. Philip L.-F. Liu

B.S. Naval Architecture & Ocean Engineering, National Taiwan University, Taipei, Taiwan.  
May 1994.

### **EXPERIENCE**

Professor, Civil and Environmental Engineering, University of Delaware. *September 2017 – present.*

Director, Center for Applied Coastal Research, *July 2020 – present.*

Adjunct Scientist, Applied Ocean Physics and Engineering, Woods Hole Oceanographic Institution. *May 2006 – June 2018.*

Associate Professor, Civil and Environmental Engineering, University of Delaware. *September 2010 – August 2017.*

Assistant Professor, Civil and Environmental Engineering, University of Delaware. *September 2008 – August 2010.*

Assistant Professor, Civil and Coastal Engineering, University of Florida. *January 2006 – August 2008.*

Assistant Scientist (tenure-accruing), Applied Ocean Physics and Engineering, Woods Hole Oceanographic Institution. *August 2004 – December 2005.*

Postdoctoral Scholar, Applied Ocean Physics and Engineering, Woods Hole Oceanographic Institution. *September 2003 – August 2004.*

Postdoctoral Fellow, Civil and Environmental Engineering, University of Delaware, *September 2002 – August 2003.*

### **RESEARCH INTERESTS**

Sediment transport, Coastal Engineering, Environmental Fluid Mechanics, Estuarine & Shelf processes.

## **HONORS AND AWARDS**

- Hans Albert Einstein Award (ASCE) 2021.
- Outstanding paper of Journal of Waterway, Port, Coastal and Ocean Engineering in 2014.
- National Science Foundation Faculty Early Career Development (CAREER) Award, 2007.
- Coastal Ocean Postdoctoral Scholarship, Woods Hole Oceanographic Institution, 2003.
- DeFrees Fellowship, Cornell University, 2000 – 2002.

## **PROFESSIONAL MEMBERSHIP**

- American Society of Civil Engineers
- American Geophysical Union
- International Association of Hydraulic Research
- American Physical Society

## **PROFESSIONAL SERVICE**

- Guest Editor, Special Issue on Two-phase modeling for sediment dynamics, European Journal of Mechanics - B/Fluid, 2020.
- Associate Editor, Journal of Geophysical Research-Ocean, January 2011 – July 2019.
- Chair of the Organizing Committee and Member of Scientific Committee for the 4<sup>th</sup> Symposium on Two-phase Modeling for Sediment Dynamics in Geophysical Flows (THESIS 2019) took place on Sept 17~19, 2019 in Newark, Delaware, USA.
- Elected as Member of the Executive Committee, Community Surface Dynamics Modeling System (CSDMS) and Chair of the Cyberinformatics & Numerics Working Group, September 2015 – June 2019.
- Scientific Committee member, 8<sup>th</sup> Symposium of Environmental Hydraulics (ISEH 2018), Notre Dame, IN, USA, June 4~7, 2018. Also, serve as convener to organize the Mini-symposium on Sediment Transport and Coastal Processes.
- Local Organizing Committee member of the 36<sup>th</sup> International Conference on Coastal Engineering (ICCE 2018), Baltimore, MD, USA, July 30~ Aug 3, 2018.
- Convener for the 2017 AGU Fall Meeting Session: EP028: Modeling earth surface processes using computational fluid dynamics across scales, New Orleans, LA, USA. December 11~15, 2017.
- National Science Foundation (NSF) proposal review panel: May 2009, November 2010, January 2012, March 2013, December 2015.
- Scientific Committee member (founding member), Symposium on Two-phase Modelling for Sediment Dynamics in Geophysical Flows, IAHR-AIRH, 2011, 2013, 2016.
- Convener for the 2016 AGU Fall Meeting Session EP028: Moving down the chain — studying earth surface processes using computational fluid dynamics approaches across scales, San Francisco, CA, USA. December 12~16, 2016.
- Convener: 2016 Ocean Science Meeting Session in “Physical and Biogeochemical Processes at the Sediment-Water Interface in Estuaries, Coastal Oceans, and Shelf Seas”, New Orleans, MS, USA. Feb 21-26, 2016.

- Convener: 2012 Ocean Science Meeting Session in “Biogeochemical and Sedimentological factors that influence physical, geotechnical and mechanical properties of cohesive sediments in riverine and littoral zones”, Salt Lake City, Utah, USA. Feb 20-24, 2012.
- Scientific Committee member, International Conference on Multiphase flow 2010 (ICMF-2010), May 30 – June 4, 2010, Tampa, FL.
- Convener for 2010 Ocean Science Meeting Special Session on Advances in Coupled Models of Coastal Sedimentary Dynamics and Morphology. Feb 22-26, Portland, Oregon, USA.
- Scientific committee member, International Symposium on Sediment Transport and Sedimentation on Asian Continental Margins. March 23-29, 2009, National Sun Yat-sen University, Kaohsiung, Taiwan.
- Organizing committee member, International Workshop on Sediment Transport in Taiwanese Rivers-Coastal Seas and Other Coastal Systems, Nov 3-5, 2008. National Central University, Jungli, Taiwan.
- Convener: 2006 AGU Fall Meeting Special Session on New Algorithms and Models for Fluvial and Coastal Sediment Transport and Surface Dynamics, San Francisco, December, 2006.
- Convener for the Nearshore Processes session in 2006 Ocean Science Meeting, American Geophysical Union, Honolulu, Hawaii, February, 2006
- Proposal reviewer for National Science Foundation; DoD/SERDP; Delaware, Louisiana, Puerto Rico Sea Grant; U.S. Geological Survey (NIWR); American Society for Engineering Education; University of Wisconsin Water Resource Institute; Chilean National Research Council; Netherlands Organization for Scientific Research; Research Council of Norway; Agence Nationale La Recherche (France), Government of Greece. KU Leuven (Belgium). Evaluator for faculty tenure and promotion of National Taiwan University and National Central University (Taiwan).

## **DEPARTMENT AND UNIVERSITY SERVICE**

- Chair, Promotion and Tenure Committee, Civil and Environmental Engineering, University of Delaware, Sept 2022 – present.
- Director, Center for Applied Coastal Research, University of Delaware, July – present.
- University of Delaware Faculty Senate COCAN Committee, Sep 2021 – present.
- Chair of Faculty Mentoring Committee, Civil and Environmental Engineering, University of Delaware, Sep 2020 – present.
- Civil and Environmental Engineering Graduate Education Committee, University of Delaware, Sep 2008 – Aug 2020.
- College CT Promotion Guidelines Committee, Fall 2019 – Spring 2021.
- Ad Hoc committee on Department Graduate Student Funding Policy committee. Fall 2019.
- Civil and Environmental Engineering Department Chair Search Committee, June 2019 – December 2019.
- College of Engineering Tenure and Promotion Committee, University of Delaware, Sep 2017 – 2019.
- Faculty Senate, September 2012 – 2016.

- Environmental Engineering Search Committee, Fall 2015 – Spring 2016.
- College eCalc Committee, September 2011 – 2014.
- College Election’s Committee, September 2010 – 2014.
- Geotechnical Engineering Faculty Search Committee, Fall 2012 – Spring 2013.
- College Graduate Tuition Policy Committee, May – June 2011.
- Civil and Coastal Engineering Faculty Workload Committee, University of Florida, 2006 – 2007.

## PUBLICATIONS

(\*: Hsu’s graduate student; &: Hsu’s postdoc or research associate)

### Chapters in Books

1. Hsu, T.-J. (2016) Sediment Resuspension, in “*Encyclopedia of Estuaries*”, Editor: M. Kennish, in *Encyclopedia of Earth Sciences Series*, Springer Netherlands.
2. Hetland, R. D., and Hsu, T.-J. (2013) Freshwater and sediment dispersal of large river plumes, in “*Biogeochemical Dynamics at Major River-Coastal Interfaces: Linkages with Global Climate Change*”, Editors: Thomas S. Bianchi, Mead A. Allison, and W.-J. Cai, Cambridge University Press.
3. Hsu T.-J., and Yu\*, X., (2009) Sand transport under nearshore wave and current and its implication to sandbar migration, *Nonlinear Wave Dynamics, Selected paper of the symposium hold in honor of Philip L.-F. Liu’s 60<sup>th</sup> birthday*, Editor: Patrick Lynett, World Scientific, 247-266.

### Journal Articles

(H-index 34, i10-index 73 according to Google Scholar)

1. Rafati, Y., T.-J Hsu, J. Calantoni, and J.A. Puleo. (2022) Entrainment and transport of well-sorted and mixed sediment under wave motion, *Journal of Geophysical Research – Oceans*, 127, 8, <https://doi.org/10.1029/2022JC018686>
2. Mathieu&, A., Cheng, Z., Chauchat, J., Bonamy C., Hsu, T.-J. (2022). Numerical investigation of unsteady effects in oscillatory sheet flows, *J. Fluid Mech.*, 943, A7. doi:10.1017/jfm.2022.405
3. Simpson, A. J., Shi, F., Jurisa, J. T., Honegger, D. A., Hsu, T.-J., & Haller, M. C. (2022). Observations and modeling of a buoyant plume exiting into a tidal cross-flow and exhibiting along-front instabilities. *Journal of Geophysical Research: Oceans*, 127, e2021JC017799.
4. Hsu, T.-J. (2022). Causality between fluid motions and bathymetric features, *Journal of Fluid Mechanics*, 936, F1, doi:10.1017/jfm.2022.29.
5. Chauchat, J., Hurther, D., Revil-Baudard, T., Cheng, Z., Hsu, T.-J. (2022) Controversial turbulent Schmidt number value in particle-laden boundary layer flows, *Phys. Rev. Fluid*, 7, 014307.

6. Tsai\*, B., Mathieu, A., Montella, E. P., Hsu, T.-J., Chauchat, J. (2022) An Eulerian two-phase flow model investigation on scour onset and backfill of a 2D pipeline, *European J. of Mech. B/Fluids*, 91, 10-26.
7. Innocenti, R. A., Feagin, R., Charbonneau, B. R., Figlus, J., Lomonaco, P., Wengrove, W., Puleo, J., Huff, T. P., Rafati\*, R., Hsu, T.-J., Moragues, M. V., Tsai\*, B., Boutton, T., Pontiki, M., Smith, J., (2021) The effects of plant structure and flow properties on the physical response of coastal dune plants to wind and wave run-up, *Estuarine, Coastal and Shelf Science*, 261, 107556.
8. Montella, E. P., Chauchat, J., Chareyre, B., Bonamy, C., Hsu, T.-J. (2021) A two-fluid model for immersed granular avalanches with dilatancy effects, *J. Fluid Mech.*, 925, A13.
9. Sherwood C. R., van Dongeren A., Doyle, J., Hegermiller, C. A., Hsu, T.-J., Kalra, T. S., Olabarrieta, M., Penko, A. M., Rafati\*, Y., Roelvink, D., van der Lugt, M., Veeramony, J., Warner, J. C. (2022) Modeling morphodynamics of coastal response to extreme events – What shape are we in?, *Annual review of Marine Science*, Vol. 14. <https://doi.org/10.1146/annurev-marine-032221-090215>
10. Salimi-Tarazouj\*, A., Hsu, T.-J., Traykovski, P., & Chauchat, J. (2021). Eulerian two-phase model reveals the importance of wave period in ripple evolution and equilibrium geometry. *Journal of Geophysical Research: Earth Surface*, 126, e2021JF006132.
11. Kim\*, Y., Kalligeris, N., Hsu, T.-J., Lynett, P. J., (2021) Large eddy simulation study of a wave-induced shallow-water monopolar vortex, *Ocean Modelling*, 162, 101796.
12. Mathieu, A., Chauchat, J., Bonamy, C., Balarac, G., Hsu, T.-J. (2021) A finite-size correction model for two-fluid Large-Eddy Simulation of particle-laden boundary layer flow, *Journal of Fluid Mechanics*, 913, A26. DOI: <https://doi.org/10.1017/jfm.2021.4>
13. Dukhovskoy, D. S., Morey, S. L., Chassignet, E. P., Chen, X., Coles, V. J., Cui, L., Harris, C. K., Hetland, R., Hsu, T.-J., Manning, A. J., Stukel, M., Thyng, K. and Wang, J. (2021) Development of the CSOMIO coupled ocean-oil-sediment- biology model. *Front. Mar. Sci.* 8:629299. doi: 10.3389/fmars.2021.629299
14. Ye\*, L., Manning A. J., Holyoke\*, J., Penaloza-Giraldo\*, J. A. and Hsu, T.-J. (2021) The role of biophysical stickiness on oil-mineral flocculation and settling in seawater. *Front. Mar. Sci.*, 8:628827. doi: 10.3389/fmars.2021.628827
15. Han, Z., Horner-Devine, A. R., Ogston, A., Hsu, T.-J. (2021) The role of sand in wave boundary layers over primarily muddy seabeds, implications for wave-supported gravity flows, *J. Geophys. Res.*, 126(5), e2020JC016621.
16. Rafati\*, Y., Hsu, T.-J., Elgar, S., Raubenheimer, R., Quataert, E., van Dongeren, A., (2021) Modeling the hydrodynamics and morphodynamics of sandbar migration events, *Coastal Engineering*, 166, 103885. `
17. Zhao, K., Pomes, F., Vowinckel, B., Hsu, T.-J., Bai, B., Meiburg, E. (2021) Flocculation of suspended cohesive particles in homogeneous isotropic turbulence, *J. Fluid Mech.*, 921, A17.

18. Salimi-Tarazouj\*, A., Hsu, T.-J., Traykovski, P., Cheng, Z., Chauchat, J. (2021) A numerical study of onshore ripple migration using a Eulerian two-phase model, *J. Geophys. Res. Oceans*, 126(2), e2020JC016773. doi: 10.1029/2020JC016773
19. Rafati\*, Y., Hsu, T.-J., Cheng, Z., Yu, X., Calantoni, J., (2020) Armoring and exposure effects on the wave-driven sediment transport, *Continental Shelf Research*, 211, 104291.
20. Nagel, T., Chauchat, J., Bonamy, C., Liu, X., Cheng\* Z., Hsu T.-J. (2020) Three-dimensional scour simulations with a two-phase flow model, *Advances in Water Resources*, 138, 103544.
21. Zhao K., Vowinckel B., Hsu T.-J., Köllner, T., Bai B., Meiburg E. (2020) An efficient cellular flow model for cohesive particle flocculation in turbulence, *J. Fluid Mech.*, 889. 10.1017/jfm.2020.79.
22. Yue\* L., Cheng\* Z., Hsu T.-J. (2020) A turbulence-resolving numerical investigation of wave-supported gravity flows, *J. Geophys. Res. Oceans*, 125 (2). 10.1029/2019JC015220
23. Ye\* L., Manning A. J., Hsu, T.-J. (2020) Oil-Mineral Flocculation and Settling Velocity in Saline Water, *Water Research*, 173(15). 10.1016/j.watres.2020.115569
24. Kim\*, Y., Mieras, R. S., Cheng, Z., Anderson, D., Hsu, T.-J., Puleo, J. A., Cox, D. (2019) A numerical study of sheet flow driven by velocity and acceleration skewed near-breaking waves on a sandbar using SedWaveFoam, *Coastal Engineering*, 152, 103526.
25. Mieras, R. S., J. A. Puleo, D. Anderson, Hsu, T.-J., D. T. Cox, J. Calantoni (2019), Relative contributions of bed load and suspended load to sediment transport under skewed-asymmetric waves on a sandbar crest, *J. Geophys. Res. Oceans*, doi: 10.1029/2018JC014564
26. Kim\*, Y., Cheng, Z., Hsu, T.-J., & Chauchat, J. (2018). A numerical study of sheet flow under monochromatic nonbreaking waves using a free surface resolving Eulerian two-phase flow model. *Journal of Geophysical Research: Oceans*, 123, 4693–4719.
27. Ye\* L., Manning, A. J., Hsu, T.-J., Morey, S., Chassignet, E., P., Ippolito, T. A. (2018) Novel Application of Laboratory Instrumentation Characterizes Mass Settling Dynamics of Oil-Mineral Aggregates (OMAs) and Oil-Mineral-Microbial Interactions, *Marine Tech. Soc. J.*, 56(6), 1-4.
28. Cheng\*, Z., Chauchat, J., Hsu, T.-J., Calantoni, J. (2018) Eddy interaction model for turbulent suspension in Reynolds-averaged Euler–Lagrange simulations of steady sheet flow, *Advances in Water Resources*, 111, 435-451, doi:10.1016/j.advwatres.2017.11.019.
29. Cheng\*, Z., Hsu, T.-J., Chauchat, J. (2018) An Eulerian two-phase model for steady sheet flow using large-eddy simulation methodology, *Advances in Water Resources*, 111, 205-223, doi:10.1016/j.advwatres.2017.11.016.
30. Anderson, D., D. Cox, R. Mieras, J. A. Puleo, and T.-J. Hsu (2017), Observations of wave-induced pore pressure gradients and bed level response on a surf zone sandbar, *J. Geophys. Res. Oceans*, 122, 5169–5193, doi:10.1002/2016JC012557.

31. Mieras, R. S., J. A. Puleo, D. Anderson, D. T. Cox, and T.-J. Hsu (2017), Large-scale experimental observations of sheet flow on a sandbar under skewed-asymmetric waves, *J. Geophys. Res. Oceans*, 122, 5022–5045, doi:10.1002/2016JC012438.
32. Chauchat, J., Cheng\*, Z., Nagel, T., Bonamy, C., Hsu, T.-J. (2017) SedFoam-2.0: a 3-D two-phase flow numerical model for sediment transport, *Geoscientific Model Development*, 10, 4367-4392, doi:10.5194/gmd-10-4367-2017.
33. Zhou\*, Z., X. Yu<sup>&</sup>, T.-J. Hsu, F. Shi, W. R. Geyer, and J. T. Kirby (2017), On nonhydrostatic coastal model simulations of shear instabilities in a stratified shear flow at high Reynolds number, *J. Geophys. Res. Oceans*, 122, doi:10.1002/2016JC012334.
34. Kim\*, Y., Zhou\*, Z., Hsu, T.-J., Puleo, J. A., (2017) Large eddy simulation of dam-break driven swash on a rough-planar beach, *Journal of Geophysical Research: Ocean*, 122. doi: 10.1002/2016JC012366.
35. Zhou\*, Z., Hsu, T.-J., Cox, D., Liu, X., (2017) Large-eddy simulation of wave-breaking induced turbulent coherent structures and suspended sediment transport on a barred beach, *Journal of Geophysical Research: Oceans*, 122, 207-235, doi: 10.1002/2016JC011884
36. Cheng\*, Z., Hsu, T.-J., Calantoni, J. C., (2017) SedFoam: A multi-dimensional Eulerian two-phase model for sediment transport and its application to momentary bed failure, *Coastal Engineering*, 119, 32-50, doi:10.1016/j.coastaleng.2016.08.007
37. Shi, F., Chickadel, C., Hsu, T.-J., Kirby, J. T., Farquharson, G., Ma, G. (2017) High-Resolution Non-Hydrostatic Modeling of Frontal Features in the Mouth of the Columbia River, *Estuaries and Coasts*, 40(1), 296-309, doi:10.1007/s12237-016-0132-y.
38. Briganti, R., Torres-Freyermuth, A., Baldock, T. E., Brocchini, M., Dodd, N., Hsu, T.-J., Jiang, Z., Kim\*, Y., Pintado-Patino, J. C., Postacchini, M., (2016) Advances in numerical modelling of swash zone dynamics, *Coastal Engineering*, 115, 26-41.
39. Ma, G., Kirby, J. T., Hsu, T.-J., Shi, F., (2015) A two-layer granular landslide model for tsunami wave generation: Theory and computation, *Ocean Modelling*, 93, 40-55, doi:10.1016/j.ocemod.2015.07.012.
40. Chen\*, J.-L., Hsu, T.-J., Shi, F., Raubenheimer, B., Elgar, S. (2015) Hydrodynamic and sediment transport modeling of New River Inlet (NC) under the interaction of tides and waves, *J. Geophys. Res.*, 120(6), 4028-4047.
41. Cheng\* Z., Yu<sup>&</sup>, X., Hsu, T.-J., Balachandar, S., (2015) A numerical investigation of fine sediment resuspension in the wave boundary layer - uncertainties in particle inertia and hindered settling, *Computers & Geosciences*, 83, 176-192, doi:10.1016/j.cageo.2015.07.009.
42. Cheng\* Z., Yu<sup>&</sup>, X., Hsu, T.-J., Ozdemir, C. E., Balachandar, S., (2015) On the transport mode of fine sediment in the wave boundary layer due to resuspension/deposition – A turbulence-resolving numerical investigation, *J. Geophys. Res.*, 120, 1918–1936, doi:10.1002/2014JC010623.

43. Hsu, W.-Y., Yang, R.-Y., Hsu, T.-J., Torres-Freyermuth, A., Hwung, H.-H, (2014) Boundary layer structure under wave-mud interactions, *International Journal of Offshore and Polar Engineering*, 24(4), 247-252.
44. Yu<sup>&</sup>, X., Hsu, T.-J., Balachandar, S., (2014) Convective instability in sedimentation – 3D numerical study. *J. Geophys. Res.*, 119(11), 8141-8161, doi: 10.1002/2014JC010123.
45. Zhou\*, Z., Sangermano\*, J., Hsu, T.-J., Ting, F. C. K., (2014) A numerical investigation of wave-breaking-induced turbulent coherent structure under a solitary wave, *J. Geophys. Res.*, 119 (10), 6952-6973, doi:10.1002/2014JC009854.
46. Kranenburg, W. M., Hsu, T.-J., Ribberink, J. S., (2014) Two-phase modeling of sheet-flow beneath waves and its dependence on grain size and streaming, *Advances in Water Resources*, 72, 57-70.
47. Chen\*, J.-L., Shi, F., Hsu, T.-J., Kirby, J. T., (2014) NearCoM-TVD — A quasi-3D nearshore circulation and sediment transport model, *Coastal Eng.*, 91, 200-212.
48. Torres-Freyermuth<sup>&</sup>, A., Hsu, T.-J., (2014) On the mechanism of low-frequency wave attenuation by muddy seabeds, *Geophys. Res. Lett.*, 41(8), 2870-2875.
49. Ozdemir<sup>&</sup>, C. E., Hsu, T.-J., Balachandar, S., (2014) Direct numerical simulations of transition and turbulence in Stokes boundary layer, *Phys. Fluids*, 26, 045108.
50. Hsu, H.-C., A. Torres-Freyermuth, H.-H., Hwung, T.-J., Hsu, P.-C. Kao, (2014) On dam-break flood propagation and its implication to sediment erosion, *Journal of Hydraulic Research*, 52(2), 205-218. DOI:10.1080/00221686.2013.857365.
51. Yu<sup>&</sup>, X., C. E. Ozdemir<sup>&</sup>, Hsu, T.-J., Balachandar, S., (2014) Numerical investigation of turbulence modulation by sediment-induced stratification and enhanced viscosity in oscillatory flows, *Journal of Waterway, Port, Coastal, and Ocean Engineering*, 140(2), 160-172.
52. Yu<sup>&</sup>, X., Hsu, T.-J., Balachandar, S., (2013) A spectral-like turbulence-resolving scheme for fine sediment transport in the bottom boundary layer, *Computers and Geosciences*, 61, 11-22.
53. Ozdemir<sup>&</sup>, C. E., Hsu, T.-J., Balachandar, S., (2013) A Direct numerical simulation of instability and boundary layer turbulence under a solitary wave, *J. Fluid Mech.*, 731, 545-578.
54. Chen, S. C., Geyer, R. W., Hsu, T.-J., (2013) A numerical investigation of the dynamics and structure of hyperpycnal river plumes on sloping continental shelves, *J. Geophys. Res.*, 118(5), 2702-2718.
55. Hsu\*, W. Y., Hwung, H. H., T.-J. Hsu, Torres-Freyermuth, A., Yang, R. Y., (2013) An experimental and numerical study on wave-mud interaction, *J. Geophys. Res.*, 118(3), 1126-1141.
56. Yu\*, X., Hsu, T.-J., Balachandar, S., (2013) Convective instability in sedimentation – a linear stability analysis. *J. Geophys. Res.*, 118(1), 256-272.
57. Sahin, C., I. Safak , T.-J. Hsu, A. Sheremet, (2013) Observations of Sediment Stratification on the Muddy Atchafalaya Shelf, Louisiana, USA, *Marine Geology*, 336, 24-32.



58. Yu\*, X., Hsu, T.-J., Jenkins, J. T., Liu, P. L.-F., (2012) Predictions of vertical sediment flux in oscillatory flows using a two-Phase, sheet-flow model, *Advances in Water Resources*, 48, 2-17.
59. Hsu, T.-J., Chen S.-C., and Ogston A. S., (2012) A numerical investigation of fine sediment transport across intertidal flats, *Cont. Shelf Res.*, 60, S85-S98, doi:10.1016/j.csr.2012.02.003.
60. Ozdemir\*, C. E., T.-J. Hsu, and S. Balachandar, (2011) A numerical investigation of lutocline dynamics and saturation of fine sediment in the oscillatory boundary layer, *J. Geophys. Res.*, 116, C09012, doi:10.1029/2011JC007185.
61. Snyder\*, P. J., and T.-J. Hsu, (2011) A numerical investigation of convective sedimentation, *J. Geophys. Res.*, 116, C09024, doi:10.1029/2010JC006792.
62. Son\*, M., and T.-J. Hsu, (2011) Idealized study on cohesive sediment flux by tidal asymmetry, *Environmental Fluid Mechanics*, 11(2), 183-202, DOI 10.1007/s10652-010-9193-9.
63. Son\*, M., and Hsu, T.-J., (2011) Effects of flocculation on modeling cohesive sediment transport, *J. Geophys. Res.*, 116, C03021, doi:10.1029/2010JC006352.
64. Ozdemir\*, C. E., Hsu, T.-J., Balachandar, S., (2010) A numerical investigation of fine particle laden flow in oscillatory channel: the role of particle-induced density stratification, *J. Fluid Mech.*, 665, 1-45.
65. Safak, I., A. Sheremet, M.A. Allison, and T.-J. Hsu, (2010) Bottom turbulence on the muddy Atchafalaya Shelf, Louisiana, USA, *J. Geophys. Res.*, 115, C12019, doi:10.1029/2010JC006157.
66. Torres-Freyermuth\*, A., and Hsu, T.-J., (2010) On the dynamics of wave-mud interaction: a numerical study, *J. Geophys. Res.*, 115, C07014, doi:10.1029/2009JC005552.
67. Ozdemir\*, C. E., T.-J. Hsu, S. (2010) Balachandar, Simulation of fine sediment transport in oscillatory boundary layer, *Journal of Hydro-environment Research*, 3, 247-259.
68. Yu\*, X., and Hsu, T.-J., and Hanes, D. M. (2010) Sediment transport under wave groups- the relative importance between wave shape and boundary layer streaming, *J. Geophys. Res.*, 115, C02013, doi:10.1029/2009JC005348.
69. Pedrozo-Acuña, A., Torres-Freyermuth\*, A., Zou, Q., Hsu, T.-J., Reeve, D. E., (2009) Diagnostic investigation of impulsive pressures induced by plunging breakers impinging on gravel beaches, *Coastal Eng.*, 57, 252-266.
70. Scott\* N. V., Hsu, T.-J., Cox, D., (2009) Steep wave, turbulence, and sediment concentration statistics and their implications to sediment transport, *Cont. Shelf Res.*, 29, 2303-2317.
71. Son\*, M., and Hsu, T.-J., (2009) The effect of variable yield strength and variable fractal dimensional on flocculation of cohesive sediment, *Water Res.*, 43, 3582-3592.
72. Hsu, T.-J., Ozdemir\* C. E., Traykovski P. A., (2009) High resolution numerical modeling of wave-supported gravity-driven fluid mud transport, *J. Geophysical Res.*, 114, C05014, doi:10.1029/2008JC005006.

73. Bhaganagar, K., and Hsu, T.-J., (2009) Direct numerical simulation of flow over 2D and 3D ripples and implication to sediment transport: steady flow, *Coastal Eng.*, 56(3), 320-331.
74. Kennedy, A. B., Slatton K. C., Hsu, T.-J., Starek, M., and Kampa, K, (2008) Hurricane-induced sandwave in the nearshore ocean, *Marine Geology*, 250, 276-280.
75. Amoudry, L., Hsu, T.-J., and Liu, P. L.-F., (2008) Two-phase model for sand transport in sheet flow regime, *J. Geophys. Res.*, 113, C03011, doi:10.1029/2007JC004179.
76. Son\*, M., and Hsu, T.-J. (2008) Flocculation model of cohesive sediment using variable fractal dimension, *Environmental Fluid Mech.*, 8, 55-71.
77. Hsu, T.-J., Traykovski P. A., and Kineke, G. C., (2007). On modeling boundary layer and gravity driven fluid mud transport, *J. Geophys. Res.*, 112, C04011, doi:10.1029/2006JC003719.
78. Hsu, T.-J., Elgar, S. and Guza, R. T., (2006). Wave-induced sediment transport and onshore sandbar migration, *Coastal Engineering*, 53, 817-824.
79. Hsu, T.-J., Raubenheimer, B. (2006). A numerical and field study on inner-surf and swash sediment transport, *Continental Shelf Research*, 26, 589-598.
80. Amoudry, L., Hsu, T.-J., and Liu, P. L.-F. (2005) Schmidt number and near-bed boundary condition effects on a two-phase dilute sediment transport model, *J. Geophys. Res.*, 110(C9), C09003, doi:10.1029/2004JC002798.
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87. Chang, K-A, Hsu, T.-J., and Liu, P. L.-F. (2001) Vortex generation and evolution in water waves propagating over a submerged rectangular obstacle. Part I: Solitary waves, *Coast. Eng.*, 44(1), 13-36.

### **Refereed Conference Proceedings**

1. Scott, N. V., R. A. Handler, Z. Cheng, T.-J. Hsu, (2020) Spatiotemporal multicomponent optimal learning state estimation of numerically simulated turbulent features: A smart sensing approach. Proc. SPIE 11420, Ocean Sensing and Monitoring XII, 114200T; doi:10.1117/12.2559818.

2. Kalra, T. S., Sherwood, C. R., Warner, J. C., Rafati\*, Y., Hsu, T.-J. (2019) Investigating bedload transport under asymmetrical waves using a coupled ocean-wave model, *Coastal Sediment* 2019, 591-604. [https://doi.org/10.1142/9789811204487\\_0052](https://doi.org/10.1142/9789811204487_0052)
3. Scott, N. V. and Hsu, T.-J. (2018) Bayesian belief network modeling of direct numerically simulated imagery variables for sub-surface structure diagnostics, *Proc. SPIE 10649, Pattern Recognition and Tracking XXIX*, 1064912. doi: 10.1117/12.2301255
4. Kim\*, Y., Cheng, Z., Hsu, T.-J., Mieras, R. S., Puleo, J. A., (2017) A numerical investigation of sheet flow under non-breaking and breaking waves, *Proceedings of Coastal Dynamics 2017*, 1779-1788.
5. Nagel, T., Chauchat, J., Cheng\*, Z., Bonamy, C., Liu, X., Hsu, T.-J., Bertrand, O. (2017) Two-phase flow simulation of scour around a cylindrical pile, *Proceedings of Coastal Dynamics 2017*, 1758-1766.
6. Mieras, R. S., Puleo, J. A., Anderson, D., Cox, D. T., Hsu, T.-J. (2017) Large-scale experimental observations of wave-induced sediment transport over a surf zone sandbar, *Proceedings of Coastal Dynamics 2017*, 618-629.
7. Hsu, T.-J., Cheng\*, Z., Chauchat, J., Yu\*, X., Bateman, S., Calantoni, J. (2016) A multi-dimensional multiphase sediment transport modeling framework – an open-source community modeling effort, 3rd Symposium on Two-phase Modeling on Sediment Dynamics in Geophysical Flows, September 12-14, 2016, Tokyo, Japan.
8. Cheng\*, Z., Hsu, T.-J., Revil-Baudard, T., Chauchat, J., Hurther, D., (2016) A large-eddy simulation Eulerian two-phase model for sheet flow sediment transport, 3rd Symposium on Two-phase Modeling on Sediment Dynamics in Geophysical Flows, September 12-14, 2016.
9. Cheng\*, Z., Hsu, T.-J. (2014) A turbulence-resolving Eulerian two-phase model for sediment transport, *Proceedings of 34th Conference on Coastal Engineering*, Seoul, Korea, 34, DOI: <http://dx.doi.org/10.9753/icce.v34.sediment.74>.
10. Chen\*, J.-L., Hsu, T.-J., Shi, F., Raubenheimer, B., Elgar, S., (2014) Hydrodynamic modeling of New River Inlet, North Carolina using NearCoM-TVD, *Proceedings of 34th Conference on Coastal Engineering*, Seoul, Korea, 34, DOI: <http://dx.doi.org/10.9753/icce.v34.currents.41>.
11. Zhou\*, Z., Sangermano\*, J., Hsu, T.-J., Ting, F. C. K., Liu, X., (2014) The effect of wave-breaking induced turbulent coherent structures on bottom stress and suspended sediment transport – A 3D numerical study, *Proceedings of 34th Conference on Coastal Engineering*, Seoul, Korea, 34, DOI: <http://dx.doi.org/10.9753/icce.v34.sediment.35>.
12. Shi, F., Ma, G., Kirby, J., & Hsu, T.-J. (2012). Applications of a TVD solver in a suite of coastal engineering model. *Coastal Engineering Proceedings*, 1(33), currents.31. doi:10.9753/icce.v33.currents.31
13. Hsu, T.-J., Yu\* & X., Ozdemir\*, C., & Balachandar, S. (2012). A 3D numerical investigate of fine sediment transport in an oscillatory channel. *Coastal Engineering Proceedings*, 1(33), sediment.9. doi:10.9753/icce.v33.sediment. (Selected as Outstanding Contribution).
14. Hsu, H.\*, Torres-Freyermuth, A., Hsu, T.-J., & Hwung, H. (2012). Numerical and experimental study of dam-break flood propagation and its implication to sediment

erosion. *Coastal Engineering Proceedings*, 1(33), sediment.7.  
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15. Chen\*, J.-L., T.-J. Hsu, and F. Shi, (2011) A numerical investigation on hyperpycnal flow, *in* Rosati, J.D., Wang, P., and Roberts, T.M., eds., *Proceedings of the Coastal Sediments 2011*, v. 3: pp1472-1484. Hackensack, N.J., World Scientific Publishing.
16. Ozdemir\*&, C. E., T.-J. Hsu, and S. Balachandar, (2011) Numerical simulation of fine sediment transport in wave boundary layer, *in* Rosati, J.D., Wang, P., and Roberts, T.M., eds., *Proceedings of the Coastal Sediments 2011*, v. 3: pp1514-1527. Hackensack, N.J., World Scientific Publishing.
17. Yu\*, X., Hsu, T.-J. and S. Balachandar (2010) Enhanced settling due to particle-laden convective instability, *7th International Conference on Multiphase Flow*, ICMF 2010, Tampa, FL, May 30 – June 4, 2010.
18. Yu\*, X., Hsu, T.-J. and S. Balachandar, (2010) Enhanced settling due to particle-laden convective instability, *7th International Conference on Multiphase Flow*, ICMF 2010, Tampa, FL, May 30 – June 4, 2010.
19. Ozdemir\*, C. E., Hsu, T.-J., S. Balachandar, (2010) Fine Particle Laden Flow Simulations with Simplified Eulerian-Eulerian Approach, *7th International Conference on Multiphase Flow*, ICMF 2010, Tampa, FL, May 30 – June 4, 2010.
20. van Wachem, B., Yu\*, Xiao, Hsu, T.-J., (2010) A 3D Eulerian-Lagrangian Numerical Model for Sediment Transport, *7th International Conference on Multiphase Flow*, ICMF 2010, Tampa, FL, May 30 – June 4, 2010.
21. Torres-Freyermuth&, A., Lara, J. L., Losada, I. J., Hsu, T.-J. (2009) Modeling low-frequency waves transformation using COBRAS-UC, *Proceedings 30<sup>th</sup> International Conference on Coastal Engineering*, p281-292, World Scientific, 2009.
22. Hsu, T.-J. and Son\*, M. (2007) A fine sediment transport modeling framework and its application to fluid mud processes, *Proceedings of Coastal Sediment '07*, ASCE, p1669-1677.
23. Long, W., Kirby, J. T. and Hsu, T.-J., (2007) Cross-shore sandbar migration predicted by a time-domain Boussinesq model incorporating undertow, *Proceedings 30<sup>th</sup> International Conference on Coastal Engineering*, p2655-2667, World Scientific.
24. Hsu, T.-J., (2007) Modeling boundary layer and gravity driven fine sediment transport, *Proceedings 30<sup>th</sup> International Conference on Coastal Engineering*, p2220-2232, World Scientific.
25. Long, W., Hsu, T.-J., and Kirby, J. T., (2005) Modeling cross-shore sediment transport processes with a time domain Boussinesq model, *29<sup>th</sup> International Conference on Coastal Engineering*, ASCE. Vol. 2, p1874-1886.
26. Hsu, T.-J., Jenkins, J.T., Liu, P. L.-F. (2003) Modeling sheet flow using two-phase flow approach, *Coastal Sediments '03*, ASCE, Clearwater beach, FL.
27. Hsu, T.-J., Jenkins, J.T., Liu, P. L.-F., (2001) Simulation of sediment suspension using two-phase approach, *Proceedings of 4<sup>th</sup> International Symposium on Ocean Wave Measurement and Analysis*, ASCE, p1386-1396.
28. Hsu, T.-J., Jenkins, J.T., Liu, P. L.-F. (2001) Modeling of Sediment Transport--A Two-Phase Flow Approach, *Proceedings of Coastal Dynamics '01*, ASCE, p578-587.

29. Liu, P. L.-F., Hsu, T.-J., Lin, P., Losada, I. J., Vidal, C. and Sakakiyama, T., (1999) "The Cornell breaking wave and structure (COBRAS) model", *Proceedings of the International Conference Coastal Structures'99*, Santander, Spain, p169-174.

### **Research and Technical Reports**

1. Yue, L., Cheng, Z., and Hsu, T.-J. (2019). Turbid: A turbulence-resolving numerical model for simulating bottom boundary layer and fine sediment transport. Technical report CACR-19-02, Center for Applied Coastal Research, Department of Civil and Environmental Engineering. University of Delaware, Newark, USA. Open source model available at <https://github.com/yueliangyi/TURBID>
2. Cheng\*, Z., Yu\*, X., Ozdemir, C. E., Hsu, T.-J., Balachandar, S., (2015) A turbulence-resolving numerical model for fine sediment transport in the bottom boundary layer – FineSed3D (Version 1.0), technical report CACR-15-01, Center for Applied Coastal Research, University of Delaware, Newark, DE, USA. Open source model available at <https://github.com/csdms-contrib/finesed3d>
3. Cheng\*, Z., Hsu, T.-J. (2014) A multi-dimensional two-phase Eulerian model for sediment transport – TwoPhaseEulerSedFoam (Version 1.0), technical report CACR-14-08, Center for Applied Coastal Research, University of Delaware, Newark, DE, USA. Open source model available at <https://github.com/csdms-contrib/twophaseeulersedfoam>
4. Yu\*, X., T.-J. Hsu and S. Balachandar (2012) A hybrid spectral-compact scheme for turbulence resolving simulation of fine sediment transport in the bottom boundary layer, research report CACR-12-07, Center for Applied Coastal Research, University of Delaware, Newark, DE, USA.
5. C. E. Ozdemir\*, Hsu, T.-J., (2009) CFD evaluation of extreme flow characteristics through SFWMD spillways. Water Resource Research Center Report WRRC:2006FL146B, University of Florida, Gainesville, FL, USA.
6. Hsu, T.-J., Newman, M. A., and C. E. Ozdemir\*, (2006) Erosion at hydraulic structure – A literature survey, Water Resource Research Center Report WRRC:2006FL145B.
7. Hsu, T.-J. (2002) "A two-phase approach for sediment Transport". PhD Thesis, Cornell University.
8. Hsu, T.-J. (1999) "A Numerical Study of Wave-Structure Interaction Using Reynolds Averaged Navier-Stokes Equation with a k- $\epsilon$  Turbulence Model", M.S. Thesis, Cornell University.

### **OTHER PRESENTATIONS AND INVITED LECTURES**

1. "A Novel Eulerian Two-phase Numerical Simulation Tool for Scour Burial of Munitions" Recent Developments in Burial and Mobility Modeling of Munitions in the Underwater Environment Side Meeting SERDP/ESTCP Symposium, Dec 2, 2021.
2. "On the instabilities at the buoyant plume front", 2021 ONR USRS annual project meeting, November 11, 2021.
3. "Novel Eulerian two-phase simulations for burial dynamics", 2020 SERDP and ESTCP Symposium. November 30, 2020.

4. "Novel Eulerian two-phase simulations for burial dynamics of munitions", 2020 MR Spring In Progress Review, SERDP/ESTCP. June 4, 2020.
5. "Oil-Mineral Flocculation and Settling Dynamics in Saline Water" in session: Cohesive Sediment Transport Processes I, 2020 Ocean Science Meeting, San Diego, California, USA. February 16 – 21, 2020.
6. "Cohesive sediment processes – flocculation, oil-mineral aggregates and mixed sediments", weekly seminar on December, 26, 2019 in the Department of Marine Environment and Engineering, National Sun Yet-sen University, Kaohsiung, Taiwan.
7. "Cohesive sediment processes – flocculation, oil-mineral aggregates and mixed sediments". Invited lecture (fifth of the five lectures) on November 29, 2019 to graduate students at the University of Science and Technology at Korean Institute of Ocean Science and Technology (KIOST), Busan, South Korea.
8. "Sediment source to sink – insights into wave-driven resuspension of fine sediments", Invited lecture (fourth of the five lectures) on November 28, 2019 to graduate students at the University of Science and Technology at Korean Institute of Ocean Science and Technology (KIOST), Busan, South Korea.
9. "New challenges in two-phase modeling of coastal sediment transport", Invited lecture (third of the five lectures) on November 27, 2019 to graduate students at the University of Science and Technology at Korean Institute of Ocean Science and Technology (KIOST), Busan, South Korea.
10. "A Eulerian two-phase modeling framework to study wave-driven sediment transport and its application to event scale coastal processes", weekly seminar on November 26, 2019 to KIOST scientists/researchers in the Coastal Engineering Division, Korean Institute of Ocean Science and Technology, Busan, South Korea.
11. "SedWaveFoam – sheet flow driven by surface waves", Invited lecture (second of the five lectures) on November 26, 2019 to graduate students at the University of Science and Technology at Korean Institute of Ocean Science and Technology (KIOST), Busan, South Korea.
12. "SedFoam - An open-source two-phase numerical modeling framework for sediment transport applications", Invited lecture (first of the five lectures) on November 25, 2019 to graduate students at the University of Science and Technology at Korean Institute of Ocean Science and Technology (KIOST), Busan, South Korea.
13. "Wave-driven sediment transport and their applications to event-scale coastal processes". Invited Keynote Talk in 41st Ocean Engineering Conference of Taiwan, November 21-22, 2019. National Cheng-Kung University, Tainan, Taiwan.
14. "Nonhydrostatic modeling of Connecticut River plume – on the along-front instabilities", Office of Naval Research, USRS DRI meeting, Sept. 24~26, 2019, Arlington, VA.
15. "An open-source numerical modeling tool for wave-scale and turbulence/grain-scale coastal processes", in Session: Coastal Response to Extreme Events: Fidelity of Model Predictions of Surge, Inundation, and Morphodynamics, 2018 AGU Fall Meeting, Washington, D.C., December 10~14, 2018.

16. "On uncertainties in sediment transport process", in Office of Naval Research IFMSIP (Increasing the Fidelity of Morphological Storm Impact Predictions) Project Progress Meeting, October 9~11, University of Delaware, Newark, DE, USA.
17. "Insights into several issues in sediment dynamics investigated by turbulence-scale and wave-scale models", National Science Foundation Workshop on Coastal and Estuarine Modeling, June 19, 2018, North Carolina State University, Raleigh, NC, USA.
18. "Turbulence-resolving simulation of fine sediment transport in wave bottom boundary layer", 8<sup>th</sup> International Symposium on Environmental Hydraulics (ISEH 2018), June 5, 2018, Notre Dame, IN, USA.
19. "Modeling wave-driven sediment transport with heterogeneous sediment properties", Naval Postgraduate School, ONR Littoral Geosciences and Optics Program Review, May 15, 2018, Monterey, CA, USA.
20. "Frontal Structures and Surface Signatures in a River Plume – A non-hydrostatic eddy-resolving model study", Naval Postgraduate School, ONR Littoral Geosciences and Optics Program Review, May 14, 2018, Monterey, CA, USA.
21. "On wave-driven sediment transport: some insights revealed by a two-phase flow modeling approach", LEGI, Université Grenoble-Alpes, Grenoble, France, April 24, 2018.
22. "The physics of Oil-Mineral Aggregates (OMA) and Marine Oil Snow (MOS) and their parameterizations into regional scale modeling systems", Consortium for Simulation of Oil-Microbial Interaction in the Ocean, Center for Ocean-Atmospheric Prediction Studies, Florida State University, January 11, 2018.
23. "Understanding sediment transport using an Eulerian two-phase model with large-eddy simulation methodology" IUTAM/AMERIMECH SYMPOSIUM: Dynamics of Gravity Currents, Sept. 25~27, 2017, University of California – Santa Barbara.
24. "Frontal Structures and Surface Signatures in a River Plume – A non-hydrostatic eddy-resolving numerical simulation study", Office of Naval Research, USRS Project Meeting, Sept. 12, 2017, Arlington, VA.
25. "Numerical Modeling for Poly-dispersed Sediment Transport under Waves", Office of Naval Research IFMSIP (Increasing the Fidelity of Morphological Storm Impact Predictions) Project Progress Meeting, August 30, 2017.
26. "Studying various aspects of turbulent mixing and sediment transport processes in the aquatic environment through open-source numerical modeling/simulation", University of Delaware Water Workshop, Feb. 3<sup>rd</sup>, Newark, Delaware, USA..
27. "Wave-mud interaction – on fine sediment transport mode and its implication to wave attenuation", invited talk in the International Symposium on Nonlinear Wave Dynamics in Taiwan – Review and Outlook, Nov. 5<sup>th</sup>, 2016, Tainan, Taiwan.
28. "A multi-dimensional multiphase sediment transport modeling framework - an open-source community modeling effort", invited keynote in 3<sup>rd</sup> Symposium on Two-phase Modelling for Sediment Dynamics in Geophysical Flows, Sept. 13, 2016, Tokyo, Japan.

29. "Modeling Coastal Processes Using OpenFOAM", invited Clinic Session talk for Community Surface Dynamics and Systems (CSDMS) 2016 Annual Meeting, May 18, 2015. University of Colorado, Boulder, CO, USA.
30. "A multi-dimensional Eulerian two-phase model for coastal sediment transport applications", Department of Civil Engineering, Stony Brook University, May 2, 2016.
31. "A turbulence-resolving Eulerian two-phase model for coastal sediment transport applications", Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, March 31, 2016.
32. "Fine-sediment transport and the depositional record in wave-supported mud flows", invited talk in session *Sources, Transport Processes, and Deposition/Storage of Fine-Grained and Cohesive Sediment: From Hillslopes to Oceans*, 2015 AGU Fall Meeting, December 15, 2015, San Francisco, CA, USA.
33. "On mechanisms driving large sediment transport under breaking waves in shallow water", Coastal/Oceanographic Engineering Seminar, December 1, 2015. University of Delaware.
34. "Sediment transport driven by wave-breaking-induced turbulent coherent structures – A numerical investigation", Fluid Dynamics Reviews Seminar Series, University of Maryland, October 30, 2015. College Park, MA, USA.
35. "Large-eddy simulation of wave-breaking induced turbulent coherent structures in the nearshore zone", invited talk at Harbor & Marine Technology Center of Taiwan, July 27, 2015. Taichung, Taiwan.
36. "Large-eddy simulation of wave-breaking induced turbulent coherent structures in the nearshore zone", invited talk at Tainan Hydraulic Laboratory, National Cheng-Kung University, July 24, 2015. Tainan, Taiwan.
37. "On Large-eddy simulation of river plumes and their surface signatures", a talk presented at International Conference on Model Integration across Desperate Scales in Complex Turbulent Flow Simulations (ICMIDS), June 16, 2015. Penn State University, State College, PA, USA.
38. "SedFOAM: Modeling Coastal Sediment Transport Using OpenFOAM", invited Clinic Session talk for Community Surface Dynamics and Systems (CSDMS) 2015 Annual Meeting, May 26, 2015. University of Colorado, Boulder, CO, USA.
39. "Understanding Coastal Sediment Transport Through Turbulence-Resolving Numerical Simulations", Levich Institute Spring 2015 Seminar Series, City University of New York, April 28, 2015.
40. "Unveiling coherent structures in river plumes through surface signatures – nonhydrostatic numerical simulations using NHWAVE", Littoral Geosciences and Optics Program Review, Office of Naval Research, Monterey, CA, April 21~23, 2015.
41. "Understanding critical fine sediment transport mechanisms in sediment source to sink – A turbulence-resolving numerical study", 2015 Spring Special Program in Applied Mathematics and Applied Mechanics, National Taiwan University, March 31st, 2015.



42. "Non-hydrostatic simulation of river plumes", COFDL seminar series, Applied Ocean Physics and Engineering, Woods Hole Oceanographic Institution, March 13, 2015.
43. "Using Computational fluid dynamic (CFD) to study coastal processes - Our HPC experience (MILLS)", HPC Symposium, University of Delaware, Feb 24, 2015.
44. "Understanding fine sediment transport through 3D turbulence resolving simulations", Environmental Fluid Mechanics Seminar, University of Washington, January 29, 2015.
45. "Understanding fine sediment transport through 3D turbulence resolving simulations – Implications to offshore delivery of fine sediment", COAS Seminar, Oregon State University, January 15, 2015.
46. "A multi-dimensional Eulerian two-phase model for sediment transport – plug flow and sediment burst events" 34th International Conference on Coastal Engineering, June 15~20, Seoul, Korea, 2014.
47. "Understanding wave-driven fine sediment transport through 3D turbulence resolving simulations – Implications to offshore delivery of fine sediment", invited as Keynote talk in the 2014 Community Surface Dynamics and Systems (CSDMS) annual meeting, Boulder, CO, May 22~24, 2014,
48. "A numerical investigation of wave-current interaction in New River Inlet using NearCoM-TVD – residual flow and sediment transport", ONR RIVET review, Arlington, VA. April 22~25, 2014.
49. "On the dynamics of plug flow and sediment bursts - A multi-dimensional Eulerian two-phase model investigation", 2014 Ocean Science Meeting, Nearshore Processes session. Honolulu, HI, Fabury22~24, 2014.
50. "Beach Erosion after Hurricane Sandy", Constable Elementary School, South Brunswick, NJ. November 15, 2013 (public outreach to elementary school students in Center NJ).
51. "Selected topics on fine (cohesive) sediment transport and sand (non-cohesive) transport in the coastal environment", Kavli Institute for Theoretical Physics, University of California, Santa Barbara, October 21, 2013.
52. "Wave-breaking-induced turbulent coherent structures and their interaction with the bed – A 3D numerical investigation", Johns Hopkins University, Center for Environmental and Applied Fluid Mechanics Seminar, October 4, 2013.
53. "Wave-breaking-induced turbulent coherent structures and their interaction with the bed – A 3D numerical investigation", Woods Hole Oceanographic Institution, COFDL seminar series, August 9, 2013.
54. "On turbulence modulation due to the presence of fine sediment in the bottom wave boundary layer – a numerical investigation" Invited talk in AGU Meeting of the Americas, Session on Progress in Turbidity Current Research, May 14, 2013, Cancun, Mexico.
55. "A numerical investigation on fine sediment transport in the oscillatory bottom boundary layer and its implication to muddy seabed states", invited talk in the spring departmental seminar series, Civil and Environmental Engineering, University of Texas at San Antonio, January 18, 2013.

56. "Understanding the state of the muddy seabed - a numerical study utilizing multiphase flow approach", invited talk in Session: Modeling developments for sediment transport and other multiphase flow, 2012 AGU Fall Meeting, San Francisco, CA, USA, December 3~7, 2012.
57. "Interactions of Waves, Tidal Currents and Riverine Outflow and their Effects on Sediment Transport" Office of Naval Research Littoral Geosciences and Optics RIVET II project meeting on the Mouth of Columbia River, Denver, CO, September 13-14, 2012.
58. "A 3D Numerical Investigation of Fine Sediment Transport in an Oscillatory Channel and its Field Implications" Office of Naval Research Littoral Geosciences and Optics Peer Review, Denver, CO, September 11-12, 2012.
59. "A 3D Numerical Investigation of Fine Sediment Transport in an Oscillatory Channel and its Field Implications", invited to weekly seminar of Institute of Oceanography, National Taiwan University, Taipei, Taiwan, August 24<sup>th</sup>, 2012.
60. "On the Formation of Hyperpycnal Flow from Riverine Outflow with Low Sediment Concentration", invited to weekly seminar of Tainan Hydraulic Laboratory, National Cheng-Kung University, Tainan, Taiwan, August 22<sup>nd</sup>, 2012.
61. "On the Formation of Hyperpycnal Flow from Riverine Outflow with Low Sediment Concentration", invited to COFDL seminar, Applied Ocean Physics and Engineering, Woods Hole Oceanographic Institution, August 10, 2012.
62. "A 3D investigation on fine sediment transport in an oscillatory channel", presented as 33<sup>rd</sup> International Conference on Coastal Engineering, Santander, Spain, July 1<sup>st</sup>~6<sup>th</sup>, 2012.
63. "Turbulence-resolved numerical investigation on fine sediment transport in wave bottom boundary layer - Physics of lutocline and laminarization" invited talk in Workshop on Environmental and Extreme Multiphase Flows (NSF-funded), University of Florida, Gainesville, FL, March 14~16, 2012.
64. "On the occurrence of low concentration hyperpycnal flow ", 2012 Ocean Science Meeting, Session: Sediment Transport and Deposition in Lakes, Estuaries, and Shallow Shelves, Feb. 21<sup>st</sup>, Salt Lake City, Utah, USA.
65. "Initial deposition and wave resuspension of fine sediment in the coastal environment – a numerical study". Invited to POSE seminar, College of Earth, Ocean and Environment, University of Delaware, Feb 10, 2012.
66. "On wave-driven fine sediment transport and its implication to fluid mud processes on the continental shelves", International Workshop on Coastal Observations and Sediment Transport in Coastal Zones, National Central University, Taiwan, June 27~28, 2011.
67. "Fine sediment transport driven by oscillatory channel flow", Taiwan Hydraulic Laboratory, National Cheng-Kung University, Taiwan, June 24, 2011.
68. "On wave-driven fluid mud and its applications", Coastal Engineering and Processes Laboratory (LIPC) of the Engineering Institute Campus Yucatán, National Autonomous University of Mexico, Merida, Mexico, June 8, 2011.

69. "A two-phase sheet flow model and its application to wave-induced sediment transport", Symposium on Two-phase Modelling for Sediment Dynamics in Geophysical Flows, Chatou, France, April 26-28, 2011.
70. "On wave-driven fluid mud and its applications", Coastal/Oceanographic Engineering Seminar, University of Delaware, March 1, 2011.
71. "Effects of wave-current interaction on vertical mixing and implication to sediment transport", ONR Inlet DRI Meeting, December 16, 2010. San Francisco, CA.
72. "The trapping and delivery of fine sediment in the coastal environment", Summer Seminar Series, Naval Research Laboratory, Stennis Space Center, MS, July 14, 2010.
73. "Enhanced settling in hypopycnal river plume" Western Pacific Geophysics Meeting, June 25, 2010, Taipei, Taiwan.
74. "Sediment trap – the role of buoyancy driven flow in trapping and delivering of fine sediment in the coastal environment", Mini Source to Sink Workshop, National Taiwan University.
75. "High resolution numerical modeling of cohesive sediment transport in tide-dominated estuaries", invited talk in special session on Tidal Flats: Hydrodynamics and Morphodynamics of Macrotidal Estuarine and Beach Environments, 2010 Ocean Science Meeting, Portland, Oregon, Feb 22-26, 2010.
76. "The trapping and delivery of fine sediment in coastal environment", Environmental Engineering Seminar, Cornell University, Feb 4, 2010.
77. "The role of turbulence modulation in wave-induced fine sediment transport", Coastal Ocean Fluid Dynamics Laboratory Seminar, Woods Hole Oceanographic Institution, Jan 15, 2010.
78. "Effects of Flocculation on modeling cohesive sediment transport", ONR Tidal Flat Symposium, Boston, MA, Oct 28-30, 2009.
79. "The trapping and delivering of fine sediment in coastal environment", Research Center of Ocean Environment and Technology, National Cheng-Kung University, Tainan, Taiwan, Aug 14<sup>th</sup>, 2009.
80. "Sediment trap - the role of buoyancy-driven flow in trapping and delivering sediment in the coastal environment", invited lecture in Gordon Research Conference, Coastal Ocean Circulation, Colby-Sawyer College, New London, NH, June 7-12, 2009.
81. "Facts about Taiwan's coastal ocean that you need to know", Taiwan Study Association, Rutgers University, Piscataway, New Jersey, April 24, 2009. (invited presentation to general public).
82. "A numerical study on wave-mud interaction", National Cheng-Kung University, Tainan Hydraulics Laboratory, Tainan, Taiwan, March 27<sup>th</sup>, 2009.
83. "Understanding sediment source to sink – on modeling several critical processes in the nearshore", 2009 International Sediment Transport and Sedimentation Symposium, Kaohsiung, Taiwan, March 24, 2009.

84. "On several critical processes in understanding sediment source to sink", National Central University, Jungli, Taiwan, March 20, 2009.
85. "Understanding the fate of river-borne sediment in the coastal ocean", RISE Program Workshop, University of Delaware, Feb 21, 2009. (invited presentation to undergraduate students from underrepresented groups).
86. "Critical processes in understanding the fate of terrestrial sediment in the coastal ocean", Johns Hopkins University, Environmental Fluid Mechanics Seminar, Feb 20, 2009.
87. "High resolution numerical modeling of cohesive sediment transport and evolution of bed properties at mudflats", Office of Naval Research Tidal Flat DRI annual meeting, December 17, 2008, San Francisco.
88. "A numerical modeling framework for fine sediment transport in estuary and continental shelf", presented at the International Workshop on Sediment Transport in Taiwanese Rivers-Coastal Seas and Other Coastal Systems, Nov 3-5, 2008. National Central University, Jungli, Taiwan.
89. "Numerical modeling of cohesive sediment transport processes in estuary and continental shelf", Woods Hole Oceanographic Institution, Coastal Ocean Fluid Dynamic Laboratory (COFDL) seminar, Aug 2008.
90. "Numerical modeling of cohesive sediment transport processes in estuary and continental shelf". Massachusetts Institute of Technology, Environmental Fluid Mechanics Seminar Series, Civil and Environmental Engineering, Apr 10, 2008.
91. "Numerical modeling of cohesive sediment transport processes in estuary and continental shelf". University of Delaware, Civil and Environmental Engineering, March 2008.
92. "High resolution numerical modeling of cohesive sediment transport in estuary and continental shelf", National Central University, Institute of Hydrological and Ocean Sciences, Jhongli, Taiwan, Feb 22<sup>nd</sup> 2008.
93. "High resolution numerical modeling of cohesive sediment transport in estuary and continental shelf", Taiwan-US Source to Sink Resource Workshop, Kaohsiung, Taiwan, Feb. 2008.
94. "High resolution numerical modeling of cohesive sediment transport in estuary and continental shelf", National Taiwan University, Department of Engineering Science and Ocean Engineering, Taipei, Taiwan, Dec 28<sup>th</sup> 2007.
95. "High resolution numerical modeling of cohesive sediment transport in estuary and continental shelf", National Cheng-Kung University, Tainan Hydraulics Laboratory, Tainan, Taiwan, Dec 27<sup>th</sup> 2007.
96. "High resolution numerical modeling of cohesive sediment transport in estuary and continental shelf", National Sun Yat-sen University, Institute of Applied Ocean Physics and Undersea Technology, Kaohsiung, Taiwan, Dec 21<sup>st</sup>, 2007.

97. "Sediment transport mechanics investigated by a multiphase flow approach - current status and challenges", invited lecture in Gordon Research Conference, Coastal Ocean Modeling, Colby-Sawyer College, New London, NH, June 17-22, 2007.
98. "CROSSTEX – Wave breaking, boundary layer processes, the resulting sediment transport and beach profile evolution", Florida State University, Office of Naval Research Progress Review Southeast Region, May 2007.
99. "Coastal sediment transport using multiphase and granular flow approach", Thermal-Fluid Seminar Series, University of Florida, Feb. 2007.
100. "A fluid mud transport model in multi-dimensions", Office of Naval Research workshop on wave-mud interaction, Johns Hopkins University, Jan. 2007.
101. "Modeling Sediment Transport in Heterogeneous Coastal Environment", 50<sup>th</sup> Florida Shore & Beach Preservation Association Annual Meeting, September 2006.
102. "Modeling sediment transport in heterogeneous coastal environment", presented at Prof. Philip L.-F. Liu Symposium, Cornell University, Ithaca, NY. September 2006.
103. "Coastal Sediment Transport in Different Scales", U.S. Army Corp of Engineers, ERDC-CHL, Vicksburg, MS, June 2006.
104. "On Multiphase Modeling for Sediment Transport", Workshop on Discrete Element Method, U.S. Army Corp of Engineers, ERDC-GSL, May 2006.
105. "Critical Processes in the wave-current bottom boundary layer", NOPP – Community Sediment Transport Model Meeting, Woods Hole, MA, May 2006.
106. "Understanding Coastal Sediment Transport Using Small-scale Fluid Mechanics", University of Miami, RSMAS, Office of Naval Research Progress Review Southeast Region, March 2006.
107. "Toward Modeling Sediment Transport in Heterogeneous Environment", Texas A&M University, Civil Engineering, College Station, TX, Oct. 2005.
108. "Toward Modeling Sediment Transport in Heterogeneous Environment", Universidad de Cantabria, Ocean and Coastal Research, Santander, Spain, April 2005.
109. "Toward Modeling Sediment Transport in Heterogeneous Environment", University of California, Berkeley, Civil and Environmental Engineering, Feb. 2004.
110. "Toward Modeling Sediment Transport in Heterogeneous Environment", University of Florida, Civil and Coastal Engineering, Nov. 2004.
111. "Sediment transport on beaches", Summer Lecture Series for Undergraduate Student Research Fellows, Woods Hole Oceanographic Institution, 2004.
112. "Nearshore sub-tidal processes", Coastal Ocean Forum - A Short Course and Workshop on Coastal Change, Woods Hole Oceanographic Institution, April 2004.
113. "Toward nearshore sediment transport modeling using two-phase flow approach", Naval Research Laboratory, Stennis Space Center, MS, Aug. 2003.

114. "Sediment transport and beach morphology – an integrated modeling framework", Woods Hole Oceanographic Institution, Applied Ocean Physics & Engineering Seminar, March 2003.
115. "Toward nearshore sediment transport – a theory, the models, and what next?" Johns Hopkins University, Department of Civil Engineering, March 2003.
116. "Toward nearshore sediment transport – a theory, the models, and what next?", University of Delaware, Civil & Environmental Engineering, Feb. 2003.
117. "Toward nearshore sediment transport – a theory, the models, and what next?", Cornell University, Environmental Fluid Mechanics Seminar, Civil & Environmental Eng., Feb. 2003.
118. "A two-phase flow model for sheet flow", National Taiwan University, Engineering Science & Ocean Engineering, Jan. 2003.
119. "A two-phase flow model for sediment transport: sheet flow", NOPP- Nearshore Community Model project meeting, University of Delaware, Aug. 2002.
120. "A two-phase flow model for sediment transport: sheet flow", Oregon State University, College of Oceanic & Atmospheric Science, Jun. 2002.

## **RESEARCH AND CONTRACTS AND GRANTS**

1. A Novel Eulerian Two-phase Numerical Simulation Tool for Scour Burial of Munitions  
PI: Tian-Jian Hsu (with Julien Chauchat, LEGI, Univ. Grenoble – Alps)  
Sponsor: SERDP  
Amount: \$617,993  
Duration: 9/2011~1/2025
2. Nonhydrostatic numerical modeling of wave dynamics interacting with estuarine fronts  
PI: Tian-Jian Hsu  
Sponsor: Office of Naval Research  
Amount: \$200,308  
Duration: 6/1/2021~5/31/2023
3. Collaborative Research: Hybrid flow-sediment-structure interaction analysis of extreme scour due to coastal flooding  
PI: Tian-Jian Hsu  
Sponsor: National Science Foundation  
Amount: \$249,888  
Duration: 1/1/2022~12/31/2024
4. Vertical sorting of olivine particles in sands driven by waves - a numerical model investigation  
PI: Tian-Jian Hsu  
Sponsor: Project Vesta  
Amount: \$2,9996  
Duration: 6/2021~1/2022

5. Collaborative Research: Understanding the physics of flocculation processes and cohesive sediment transport in bottom boundary layers through multi-scale modeling  
PI: Tian-Jian Hsu  
Sponsor: National Science Foundation  
Amount: \$409,851  
Duration: 9/1/2019~8/31/2022
6. Novel Eulerian two-phase simulations for burial dynamics of munitions  
PI: Tian-Jian Hsu (with Julien Chauchat, LEGI, Univ. Grenoble – Alps)  
Sponsor: SERDP  
Amount: \$169,717  
Duration: 9/19/2019~9/18/2021
7. A symposium on sediment dynamics in geophysical flows using two-phase flow methodology  
PI: Tian-Jian Hsu (with Co-PIs, Jack Puleo and James Kirby)  
Sponsor: National Science Foundation  
Amount: \$15,000  
Duration: 12/1/2018~11/30/2019
8. Grain/turbulence-scale numerical simulation of heterogeneous sediment transport and their parameterization in coastal models  
PI: Tian-Jian Hsu  
Sponsor: Office of Naval Research  
Amount: \$205,091  
Duration: 7/15/2018 ~7/14/2021
9. Collaborative Research: Physics of Dune Erosion during Extreme Surge and Wave Events  
PI: Jack Puleo, Hsu serve as co-PI.  
Sponsor: National Science Foundation  
Amount: \$599,584 (Hsu's component is about \$220k)  
Duration: March 2018 ~ Feb 2021
10. Consortium for Simulation of Oil-Microbial Interactions in the Ocean  
PI: Tian-Jian Hsu  
Sponsor: Gulf of Mexico Research Initiative (subcontract from Florida State University)  
Amount: \$317,190  
Duration: Jan 2018 ~ June 2019
11. Frontal structures and surface signatures revealed by non-hydrostatic eddy resolving numerical simulations  
PI: Tian-Jian Hsu (with co-PI: Fengyan Shi, James Kirby)  
Sponsor: Office of Naval Research  
Amount: \$332,527  
Duration: Aug 2017~ July 2021
12. Evolution of Small Scale Seafloor Topography and Sediment Transport under Energetic Waves: From ripples to sheet flow  
PI: Tian-Jian Hsu (with co-PI: P. Traykovski, Woods Hole Oceanographic Institution)  
Sponsor: National Science Foundation

Amount: \$499,241  
Duration: Sep 2016 ~ Aug 2020

13. An Euler-Lagrangian Numerical Modeling for Poly-dispersed Sediment Transport under Waves  
PI: Tian-Jian Hsu  
Sponsor: Office of Naval Research  
Amount: \$179,890  
Duration: July 2016 ~ June 2018
14. Collaborative Research: The effect of sand fraction and event evolution on fine-sediment transport and the depositional record in wave-supported mud flows  
PI: Tian-Jian Hsu (with A. Horner-Devine and A. Ogston, U. Washington)  
Sponsor: National Science Foundation  
Amount: \$259,648  
Duration: Sep 2015~Aug 2018
15. Frontal Structure in the Columbia River Plume Nearfield – A Non-hydrostatic Coastal Modeling Study  
PI: Tian-Jian Hsu (with co-PI: J. Kirby, F. Shi)  
Sponsor: Office of Naval Research  
Amount: \$199,377  
Duration: June 2015~May 2017
16. A 3D Coupled Euler-Lagrangian Numerical Modeling Framework for Poly-dispersed Sediment Transport Simulations  
PI: Tian-Jian Hsu  
Sponsor: Office of Naval Research  
Amount: \$171,356  
Duration: June 2014~May 2016
17. Collaborative Research: Large-scale laboratory investigation and numerical modeling of sheet flow sediment transport dynamics across a surf zone sand bar<sup>&</sup>  
PI: Jack Puleo; Tian-Jian Hsu serve as co-PI  
Sponsor: National Science Foundation  
Amount: \$452,130 (Hsu's component is about \$200,000)  
Duration: Feb 2014~Jan 2017
18. Collaborative Research: The interaction of waves, tidal currents and river outflows and their effects on the delivery and resuspension of sediments in the near field  
PI: Jim Kirby; Tian-Jian Hsu serves as co-PI.  
Sponsor: National Science Foundation  
Amount: \$483,437 (Hsu's component is about \$145,000)  
Duration: Sep 2013~ Aug 2017
19. The Trapping, Storage, and Resuspension of Sediments in the Columbia River Estuary and Near Field Plume (RIVET II)  
PI: Tian-Jian Hsu (with co-PI F. Shi and J. Kirby)  
Sponsor: Office of Naval Research  
Amount: \$156,247



Duration: Dec 2012~ Nov 2014

20. Interactions of Waves, tidal currents and riverine outflow and their effects on sediment transport (RIVET I -data analysis)  
PI: Tian-Jian Hsu (with Co-PI F. Shi)  
Sponsor: Office of Naval Research  
Amount: \$75,424  
Duration: Oct 2012~Sep 2013
21. NEESR: Tsunami Induced Coherent Structures and their Impact on our Coastal Infrastructure  
PI: Tian-Jian Hsu (with Diane Foster (UNH), Patrick Lynett (USC))  
Sponsor: National Science Foundation (subcontract from UNH)  
Amount: \$351,643  
Duration: Oct 2011~ Sep 2015
22. Collaborative Research: Physics of lutoclines and laminarization extracted from turbulence-resolved numerical investigations on sediment transport in wave-current bottom boundary layer  
PI: Tian-Jian Hsu  
Sponsor: National Science Foundation  
Amount: \$235,949  
Duration: Sep 2011~Aug 2014
23. A Numerical Modeling Framework for Cohesive Sediment Transport Driven by Waves and Tidal Currents  
PI: Tian-Jian Hsu  
Sponsor: Office of Naval Research  
Amount: \$124,273  
Duration: Oct 2010- Sep 2012
24. Interactions of Waves and River Plume and their Effects on Sediment Transport at River Mouth (Inlet and River Mouth DRI, Phase II)  
PI: Tian-Jian Hsu  
Sponsor: Office of Naval Research  
Amount: \$146,245  
Duration: Nov 2010- Oct 2012
25. Using wave-current observation to predict bottom sediment processes on muddy beaches  
PI: Tian-Jian Hsu (Collaborative project with U. Florida PI: Alex Sheremet)  
Sponsor: Office of Naval Research  
Amount: \$39,442  
Duration: Oct 2010- Sep 2012
26. Interactions of Waves and River Plume and their Effects on Sediment Transport at River Mouth  
PI: Tian-Jian Hsu  
Sponsor: Office of Naval Research (Inlet and River Mouth DRI, Phase I)  
Amount: \$29,539

Duration: Nov 2009- Sep 2009

27. Collaborative Research: The dynamics of sediment-laden river plume and initial deposition off small mountainous rivers  
PI: Tian-Jian Hsu, Co-PI: James Kirby  
Sponsor: National Science Foundation  
Amount: \$450,361  
Duration: Sep 2009 – Aug 2012
28. CAREER: 3D Multiphase Sediment Transport Modeling Framework  
PI: Tian-Jian Hsu  
Sponsor: National Science Foundation  
Amount: \$400,208  
Duration: March 2007 – Feb 2012
29. High Resolution Numerical Modeling of Cohesive Sediment Transport and Evolution of Bed Properties at Mudflats  
PI: Tian-Jian Hsu  
Sponsor: Office of Naval Research (Tidal Flat DRI – Phase 2)  
Amount: \$212,719  
Duration: Oct 2008 – Sep 2010
30. NOPP - Community Sediment Transport Model  
PI: Tian-Jian Hsu  
Sponsor: NOPP (subcontract from WHOI)  
Amount: \$60,000  
Duration: June 2006 – Oct 2009
31. Complex Flow Through Culvert Structure by CFD Modeling  
PI: Tian-Jian Hsu, Kirk Hatfield (UF)  
Sponsor: South Florida Water Management District (SFWMD); USGS (NIWR)  
Amount: \$50,000 (SFWMD); \$10,000 (USGS-NIWR)  
Duration: March 2006- Feb 2009
32. CROSSTEX – Wave breaking, boundary layer processes, the resulting sediment transport and beach profile evolution  
PI: Tian-Jian Hsu (UF), Co-PI: J. Trowbridge (WHOI).  
Sponsor: Office of Naval Research  
Amount: \$375,000  
Duration: Oct 2005 – Sep 2009
33. A Fluid Mud Transport Model in Multi-dimensions  
PI: Tian-Jian Hsu, Co-PI: P. Traykovski (WHOI)  
Sponsor: Office of Naval Research  
Amount: \$139,888  
Duration: Oct 2006 – Sep 2008
34. Collaborative Research: Coastal Modeling Management and Integration (NSF-ITR)  
PI: P. Lynett (Texas A&M), B. Raubenheimer (WHOI), Tian-Jian Hsu (UF), P. Liu (Cornell).

Sponsor: National Science Foundation  
Amount: \$245,166 (WHOI-UF component)  
Duration: Sep 2004 – Aug 2008

35. Scouring Around District's Hydraulic Structures

PI: Tian-Jian Hsu  
Sponsor: South Florida Water Management District (SFWMD); USGS (NIWR)  
Amount: \$62,000 (SFWMD); \$10,000 (USGS-NIWR)  
Duration: March 2006 – Sep 2007

36. Effect of Fluid Mud on Bottom Boundary Layer Dynamics Sediment Fluxes at Mud Flats

PI: Tian-Jian Hsu, Co-PIs: A. Valle-Levinson, A. Sheremet, A. Mehta  
Sponsor: Office of Naval Research (Tidal Flat DRI – Phase 1)  
Amount: \$50,552  
Duration: Feb 2007- Dec 2007.

37. Parameterization of a Two-phase Model and Application to Nearshore Morphology

PI: S. Elgar (WHOI), Co-PIs: Tian-Jian Hsu (WHOI), D. Hanes (USGS); Collaborate with J. Kirby (U. Delaware).  
Sponsor: Office of Naval Research  
Amount: \$60,000  
Duration: Sep 2003- Sep 2005

## **RESEARCH ADVISING**

### **Doctoral Students**

Sadegh Nouri (Advisor)

Jorge Penaloza Giraldo (Advisor)

Benjamin Tsai PhD Candidate (Advisor)

Ali Salimi Tarazouj PhD Candidate (Advisor)

Yashar Rafati PhD Candidate (Advisor; graduated 6/2021, now at Environmental Science Associates)

Liangyi Yue PhD Candidate (Advisor; graduated 8/2020, now postdoc at Stanford)

Yeulwoo Kim, PhD (Advisor; graduated 12/2018, now Assistant Professor at Pukyong National University, South Korea)

Zhen Cheng, PhD (Advisor; graduated 8/2016, now at Convergent Science)

Zheyu Zhou, PhD (Advisor; graduated 8/2016, now at AECOM)

Jia-Lin Chen, PhD (Advisor; graduated 12/2014, now Assistant Professor, National Cheng-Kung University, Taiwan)

Xiao Yu, PhD (Advisor; graduated 1/2012. Now Assistant Professor, University of Florida)

Celalettin Emre Ozdemir, PHD (Advisor; graduated 8/2010, now Assistant Professor, Louisiana State University)

Minwoo Son, PhD (Advisor; graduated 12/2009, now Associate Professor, Chungnam National University, South Korea)

Hsu, W.-Y., PhD (Advisor during his one-year visit to UD; graduated 12/2012 National Cheng-Kung University, Taiwan; Now scientist at Tainan Hydraulic Laboratory)

W. M. Kranenburg (hosted and advised his two one-month long visits to UD on two-phase modeling of sediment transport; graduated in 2012, University of Twente, Netherlands; Now at Deltares)

Jinshi Chen (committee member, MIT-WHOI joint program)

Jirat Laksanalamai (committee member, UD)

Maria Pontiki (committee member, UD)

Wang Xingchi (committee member, UD-CEOE)

Zhu Tingting (committee member, UD, graduated July 2021)

Sicheng (Winston) Wu (committee member, UD-CEOE, graduated July 2021)

Mithun Deb (committee member, UD, graduated Aug 2020)

Cheng Zhang (committee member, UD, Aug 2020 graduated)

Saeideh Banihashemi (committee member, UD, graduated 1/2020)

Ryan Mieras (committee member, UD, graduated 5/2017)

Julia Hopkins (WHOI/MIT joint program, committee member, graduated 5/2017)

Anna Wargula (WHOI/MIT joint program, committee member, 5/2016)

Patricia Chardon-Maldonado (committee member, UD, graduated 1/2016)

Zhefei Dong (committee member, UD, graduated 1/2016)

Morteza Derkhti (committee member, UD, graduated 12/2015)

Mohammad Keshtpoor (committee member, UD, graduated 5/2014)

Thijs Lanckriet (committee member, UD, graduated 5/2014)

Gangfang Ma (committee member, UD, graduated 5/2012)

Jain Mamta (UF, graduated 5/2007, committee member)

Jun Lee (UF, graduated 12/2007, committee member)

Jaramillo Sergio (UF, graduated 8/2008, committee member)

### **Master Students**

Daniel Sharar-Salgado (Advisor)

Jiaye Zhang (Advisor, graduate 5/2021, now PhD student at UD)

Marina Reilly-Collette (Advisor, now at USACE, NH)

Taisuk Kim (MS graduated 5/2014, now at Haerfest)

Jacob Sangermano, (MS graduated 5/2012; Now at EQT)

Tom Boland (MS graduated 5/2011; Now at NYC-DEP)

Patrick Snyder (MS graduated 5/2009; Now at AECOM)

Gowtham Krishna (UF) (Advisor, 1/2008-12/2008)

Kwangmin Kang (UF) (Advisor, graduated 5/2007)

Allison Penko (UF, graduated 5/2007, committee member)

Shirshant Sharma (UF, graduated 5/2007, committee member)

Tyler Hesser (UF, graduate 1/2008, committee member)

### **Undergraduate Students**

Alyssa Wintzel (UD, CEOE)

James Holyoke (UD, Civil Engineering, 5/2018~8/2020)

Simon d'Albignac (University of Toulouse, France, 5/2012~8/2012)

Selasie Buatsi (UD, Civil Engineering, 6/2010~8/2010)

Michael Honeychuck (UD, Mechanical Engineering 6/2009-8/2009)

Tom Boland (UD, Civil and Environmental Engineering, 2/2009-8/2009)

Benjamin Boss (UF, Civil Engineering, 5/2007-12/2007)

Jennifer Apell (UF, Environmental Science and Engineering, 5/2007-12/2007)  
Jahrue Mullings (UF, Civil Engineering, 5/2007-8/2007)

### **High School Students**

Kathrynn Steward (6/2014~8/2014; now at University of Delaware)

### **Postdoctoral Research Associate**

Antoine Mathieu, Feb 2022 – present

Zhendong Cao, Oct 2021 – present

Leiping Ye, March 2018~February 2021. Now Assistant Professor, Sun Yat-sen University, China.

X. Yu, Feb 2012~July 2015. now Assistant Professor, University of Florida, USA.

C. E. Ozdemir, September 2010~Jan 2012. Now Assistant Professor, Louisiana State University, USA.

Son Minwoo, Jan 2010~July 2010. Now Assistant Professor, Chungnam University, South Korea.

Alec Torres-Freyermuth (Ph.D. Universidad de Cantabria, Spain, Coastal Engineering), Jan 2008- Sep 2009. Now Associate Professor and Head of the Coastal Processes and Engineering Laboratory at the Instituto de Ingeniería-Sisal, Universidad Nacional Autónoma de México

Nicholas V. Scott (Ph.D. University of Rhode Island, Physical Oceanography), Dec 2007 – Dec 2008. Now research scientist, Riverside Research, OH, USA.

### **COURSE TOUGHT**

2022 Spring	CIGE161	Freshman Design
	CIEG405	Advanced Fluid Mechanics
	CIEG678	Transport and Mixing Process
2021 Fall	CIEG670	Physics of Cohesive Sediment
	CIEG865	Coastal/Oceanographic Seminar
2021 Spring	CIGE161	Freshman Design
	CIEG678	Transport and Mixing Process
2020 Fall	CIEG639	Ocean Fluid Dynamics
	CIEG865	Coastal/Oceanographic Seminar
2020 Spring	CIGE161	Freshman Design
	CIEG678	Transport and Mixing Process
2019 Fall	CIEG670	Physics of Cohesive Sediment
2019 Spring	CIGE161	Freshman Design
	CIEG678	Transport and Mixing Process
2018 Fall	CIEG639	Ocean Fluid Dynamics
2018 Spring	CIEG161	Freshman Design
2017 Fall	CIEG678	Transport and Mixing Process
2017 Spring	CIGE 161	Freshman Design

2016 Fall	CIEG 670	Physics of Cohesive Sediment
	CIEG 639	Ocean Fluid Dynamics
2016 Spring	CIEG167	Freshman Design
	CIEG678	Transport and Mixing Process
2016 Winter	CIEG467	Environmental Fluid Systems and Applications
2015 Fall	CIEG667	Physics of Cohesive Sediment
2014 Fall	CIEG 639	Ocean Fluid Dynamics
2014 Spring	CIEG 678	Transport and Mixing Process
	CIEG 161	Freshman Design
2013 Fall	CIEG 678	Transport and Mixing Process
2013 Spring	CIEG 670	Physics of Cohesive Sediment
	CIEG 161	Freshman Design
2012 Fall	CIEG678	Transport and Mixing Process
2012 Spring	CIEG 161	Freshman Design
	CIEG 306	Fluid Mechanics Laboratory
	CIEG 865	Coastal/Oceanographic Seminar
2011 Fall	CIEG 678	Transport and Mixing Process
2011 Spring	CIEG 306	Fluid Mechanics Laboratory
	CIEG 865	Coastal/Oceanographic Seminar
2010 Fall	CIEG 667	Physics of Cohesive Sediment
2010 Spring	CIEG 306	Fluid Mechanics Laboratory
	CIEG 678	Transport and Mixing Process
2009 Fall	CIEG 667	Physics of Cohesive Sediment
2009 Spring	CIEG 306	Fluid Mechanics Laboratory
	CIEG 678	Transport and Mixing Process
2008 Fall	CIEG 865	Coastal/Oceanographic Seminar
2008 Spring (UF)	OCP 6655	Coastal Sediment Transport
2007 Fall (UF)	EOC 6934	Mixing and Transport in Turbulent Flow
2007 Spring (UF)	OCP 6655	Coastal Sediment Transport
	EOC 6939	Coastal/Oceanographic Seminar
2006 Fall (UF)	EOC 6934	Mixing and Transport in Turbulent Flow