# Zhengtong Yang

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## PRESENT POSITION

October 2024 – present Postdoctoral Scholar
Center for Coastal Climate Resilience
University of California, Santa Cruz, CA 95064, United States

## RESEARCH INTERESTS

Coastal processes; Climate resilience; Nearshore wave modelling; Wave-current interactions; Wave evolution from generation to the shoreline; Coastal hazard prevention and mitigation.

## EDUCATIONAL BACKGROUND

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|---|---|---|---|
| Ph.D. | Coastal Engineering | National University of Singapore, Singapore<br>Thesis: *"Depth-integrated wave—current models"*<br>Supervisor: Prof. Philip L.-F. Liu<br>(Member, US National Academy of Engineering) | 2021 |
| M.Eng. | Coastal Engineering | Ocean University of China, China<br>Thesis: *"Numerical and experimental study of beach profile evolution under varying wave conditions"*<br>Supervisor: Prof. Hua-Jun Li<br>(Academician, Chinese Academy of Engineering) | 2016 |
| B.Eng. | Coastal Engineering | Ocean University of China, China | 2013 |

## PROFESSIONAL EXPERIENCE

- August 2023 – October 2024: Research Fellow, Department of Civil and Environmental Engineering,
  **National University of Singapore (NUS)**
- July 2021– July 2023: Scientist, Technology Centre for Offshore and Marine, Singapore (TCOMS),
  **Agency for Science, Technology and Research (A*STAR)**
- Sep 2020 – July 2021: Research Engineer, Department of Civil and Environmental Engineering,
  **National University of Singapore (NUS)**

## PUBLICATIONS

1. **Yang, Z.** and Liu, P. L.-F. (2024). A new depth-integrated free surface flow model with higher-order elements. (to be submitted).
2. **Yang, Z.** and Xu, H. H. (2024). A coupled CFD—depth-integrated model method for wave-current-structure interactions. (to be submitted).
3. **Yang, Z.** and Liu, P. L.-F. (2024). New 2D horizontal free surface flow models with applications for water waves. *Journal of Fluid Mechanics*, 999, A32. https://doi.org/10.1017/jfm.2024.604
4. Zhang Y., Zhu Y., Zhang L. **Yang, Z.** *, and Li Y. (2024). CFD study of propeller tip vortex cavitation. *International Journal of Multiphase Flow*, 105020. https://doi.org/10.1016/j.ijmultiphaseflow.2024.105020
5. **Yang, Z.** and Wang J. (2022). Linear analysis on the non-hydrostatic pressure field of depth-integrated models. *Ocean Engineering*, 262, 112228. https://doi.org/10.1016/j.oceaneng.2022.112228
6. Wang, J., Ma, Q., **Yang, Z.** *, Gao, J., and Wu, G. (2022). Two types of wave-current interactions and their effects on extreme waves in directional seas. *Ocean Engineering*, 266, 112637. https://doi.org/10.1016/j.oceaneng.2022.112637
7. **Yang, Z.** and Liu, P. L.-F. (2022). Depth-integrated wave-current models. Part 2. Current with an arbitrary profile. *Journal of Fluid Mechanics*, 936, A31. https://doi.org/10.1017/jfm.2022.42
8. **Yang, Z.** and Liu, P. L.-F. (2020). Depth-integrated wave-current models. Part 1. Two-dimensional formulation and applications. *Journal of Fluid Mechanics,* 883, A4. https://doi.org/10.1017/jfm.2019.831
9. Yang, J., Li, L., Zhao, K., Wang, P., Wang, D., Sou, I.M., **Yang, Z.**, Hu, J., Tang, X., Mok, K.M. and Liu, P. L.-F. (2019). A comparative study of Typhoon Hato (2017) and Typhoon Mangkhut (2018)—Their impacts on coastal inundation in Macau. *Journal of Geophysical Research*: *Oceans*, 124(12):9590-619. https://doi.org/10.1029/2019JC015249
10. **Yang, Z.**, Li, H., Liang, B., Lee, D., Pan, X., & Xu, Y. (2016). Laboratory experiment on the bed load sediment transport over a rippled bed. *Journal of Coastal Research*, 75 (10075), 497-501. https://doi.org/10.2112/SI75-100.1

## CHAPTERS IN BOOKS

1. Higuera P., Wang J., Hu J., and **Yang Z.** (2023) Numerical Modeling of Water Waves in Coastal and Ocean Engineering, in *Advances in Coastal and Ocean Engineering* (ed. by Liu, P. L.-F.), World Scientific Publishing.

## CONFERENCE PRESENTATIONS

1. "Experimental studies on sandy beach profile evolution in 2D wave flume". *The 25th International Offshore and Polar Engineering Conference*, Kona, Hawaii, USA. June, 2015.
2. "Laboratory experiment on the bed load sediment transport of the rippled bed". *International Coastal Symposium 2016*, Sydney, Australia. March, 2016.

3. "Quantitative study on beach-face slope based on field and laboratory experiments". *The 26th International Ocean and Polar Engineering Conference*, Rhodes, Greece. June, 2016.
4. "Depth-integrated wave-current models". *South-China-Sea Tsunami Workshop*, Zhejiang University, Hangzhou, China. October, 2019.
5. "Depth-integrated wave-current models". *Singapore International Water Week (SIWW) 2022*, Singapore. April, 2022.
6. "Multi-linear-element depth-integrated models for flows with a free surface". *The 37th International Conference on Coastal Engineering*, Sydney, Australia. December, 2022.
7. "New 2D horizontal free surface flow models with applications for water waves". *The 43rd International Conference on Ocean, Offshore and Arctic Engineering (OMAE 2024)*, Singapore, 2024.

## RESEARCH PROJECTS

1. "The dynamic evolution of sandy beach profiles under the impacts of storm surge". *Natural Science Foundation of China*. Jan 2017 – Dec 2020. (Conducted laboratory experiments of beach erosion under time-varying wave conditions)
2. "The impact of climate changes on coastal flooding hazard in South & East China Seas". *Ng Teng Fong Charitable Foundation, National University of Singapore*, January 1, 2017 - December 31,2019. (Conducted field survey of coastal flooding after Typhoon Mangkhut 2018 in Macau SAR)
3. "Enhancing offshore system productivity, integrity and survivability in extreme environments". *Industry Alignment Funding in TCOMS*, July 2021 – Aug 2023. (Developed digital twin for simulating waves and currents for the deep-water ocean basin facility)
4. "Modelling nearshore sediment transport". *Public Utilities Board, Singapore*, August 2023 – March 2025. (Investigated coastal erosion at Changi Beach in Singapore with XBeach)
5. "Evaluation of cost-effectiveness and equitable distribution of adaptation benefits through CoSMoS ADAPT". California State Budget. (Focused on coastal modeling techniques and assessment to quantify adaptation benefits of nature-based solutions, and other coastal protection measures in adaptation strategies for California's coastal areas)

## TEACHING EXPERIENCE

Finite amplitude wave theories applications (teaching assistant at NUS)
Water resources engineering (teaching assistant at NUS)
Computer applications in civil engineering (teaching assistant at NUS)

## SKILLS

- *Programming*:

MATLAB, Python, Fortran, Mathematica, QGIS

- *Numerical models*:

XBeach, Simulating WAves till SHore (SWASH), Simulating Waves Nearshore (SWAN), FUNWAVE-TVD

- *Laboratory skills:*

Wave gauges, Acoustic Doppler Velocimetry (ADV), paddle wavemaker, total station