Stanford



Christine M Baker

Assistant Professor of Civil and Environmental Engineering and, by courtesy, of Oceans

Bio

BIO

Baker's research advances understanding of environmental fluid mechanics in coastal regions through laboratory experimentation, numerical modeling, and field observations. Her work spans shallow-water wave breaking dynamics over smooth and rough bathymetry, surf-zone vorticity dynamics and its effects on material dispersal and exchange, wave boundary layers and sediment transport, and extreme-event-driven coupled hydro- and morphodynamics. Baker's research informs predictions of coastal water quality, shoreline evolution, and coastal hazards, supporting resilience as coastal environments face growing pressure from storms, sea-level rise, and human development.

Baker completed a bachelors degrees in Civil Engineering from Oregon State University and a Masters and PhD in Civil & Environmental Engineering from the University of Washington.

ACADEMIC APPOINTMENTS

- Assistant Professor, Civil and Environmental Engineering
- Assistant Professor (By courtesy), Oceans

LINKS

- Lab Website: https://nearshore.stanford.edu/
- Bob & Norma Street Environmental Fluid Mechanics Lab: https://cee.stanford.edu/bob-and-norma-street-environmental-fluid-mechanics-laboratory-efml

Teaching

COURSES

2026-27

- Coastal Processes: CEE 162F (Aut)
- Ocean Waves: CEE 262F, OCEANS 262F (Spr)

2025-26

- Coastal Processes: CEE 162F (Aut)
- Ocean Waves: CEE 262F, OCEANS 262F (Spr)

2024-25

- Coastal Processes: CEE 162F (Aut)
- Ocean Waves: CEE 262F, OCEANS 262F (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Sophie Bodek, Jayde Meng, Yun Ni

Postdoctoral Faculty Sponsor

Simon Treillou

Master's Program Advisor

Madeline Hodge, Erin Hovendon, Eliana Olson, Yichen Wang

Doctoral (Program)

Jessica Fairlie, Ashton Pihl, AJ Villaruel, Alex Washburn

Publications

PUBLICATIONS

- **The Role of Sea-Swell, Infragravity Waves, and Dune Geometry on Runup Excursion During Dune Collision**
  Baker, C. M., Anarde, K., Tissier, M., Rutten, J., van Wiechen, P., Mieras, R., De Vries, S.
  edited by Coelho, C., Hallin, C., Sancho, F., Silva, P. A.
  SPRINGER INTERNATIONAL PUBLISHING AG.2026: 37-42
- **Tracer Dispersion by Surfzone Eddies: Assessing the Impact of Undertow Vertical Shear** *JOURNAL OF PHYSICAL OCEANOGRAPHY*
  Treillou, S., Marchesiello, P., Baker, C. M., McWilliams, J., Dumas, F.
  2025; 55 (8): 1211-1234
- **Modeled Surf-Zone Eddies on a Laboratory Scale Barred Beach With Varying Wave Conditions** *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*
  Nuss, E. S., Moulton, M., Suanda, S. H., Baker, C. M.
  2025; 130 (1)
- **Assessing NOAA Rip-Current Hazard Likelihood Predictions: Comparison with Lifeguard Observations and Parameterizations of Bathymetric and Transient Rip-Current Types** *WEATHER AND FORECASTING*
  Casper, A., Nuss, E. S., Baker, C. M., Moulton, M., Dusek, G.
  2024; 39 (7): 1045-1063
- **Correction of coherent interference in wave-resolving nearshore models and validation with experimental data** *OCEAN MODELLING*
  Treillou, S., Marchesiello, P., Baker, C. M.
  2024; 189
- **Measurements of dune erosion processes during the RealDune/REFLEX experiments.** *Scientific data*
  van Wiechen, P., Rutten, J., de Vries, S., Tissier, M., Mieras, R., Anarde, K., Baker, C., Reniers, A., Mol, J. W.
  2024; 11 (1): 421
- **Two-dimensional inverse energy cascade in a laboratory surf zone for varying wave directional spread** *PHYSICS OF FLUIDS*
  Baker, C. M., Moulton, M., Chickadel, C. C., Nuss, E. S., Palmsten, M. L., Brodie, K. L.
  2023; 35 (12)
- **Remotely sensed short-crested breaking waves in a laboratory directional wave basin** *COASTAL ENGINEERING*
  Baker, C. M., Moulton, M., Palmsten, M. L., Brodie, K., Nuss, E., Chickadel, C.
  2023; 183
- **Modeled Three-Dimensional Currents and Eddies on an Alongshore-Variable Barred Beach** *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*
  Baker, C. M., Moulton, M., Raubenheimer, B., Elgar, S., Kumar, N.
  2021; 126 (7)

- **Response of Metal Building Cladding to Tsunami Wave Impact Loads** *JOURNAL OF STRUCTURAL ENGINEERING*
  Baker, C., Higgins, C., Liu, J., Yeh, H.
  2020; 146 (11)