Kai Parker

PhD, Coastal Scientist

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https://scholar.google.com/citations?user=fNw9boYAAAAJ&hl=en

Summary

Innovative coastal scientist with over a decade of experience in coastal hazard modeling, climate adaptation, and stakeholder-driven science across the U.S. West Coast. Proven leader in developing and managing multi-million-dollar projects at the USGS, with a strong foundation in numerical modeling, geospatial analysis, and nature-based solutions. Adept at translating complex data into actionable insights for diverse audiences, from policymakers to local communities. Passionate about mentoring, cross-disciplinary collaboration, and advancing coastal resilience through science-based planning and communication.

Work Experience

United States Geological Survey – Physical Scientist (2024 – Present)

- Technical lead for CoSMoS modelling in the Salish Sea, delivering actionable coastal hazard data impacting populations in the millions.
- Managed team and budget (external funding totaling >4 million) with demonstrated success at product delivery and generation of new partners/projects.
- Lead collaboration with multiple partners and sustained engagement with diverse stakeholders including tribes, counties, communities, and federal and academic partners.
- Mentorship of junior staff and postdoctoral researchers, building internal capacity.

United States Geological Survey - Oceanographer (2020 – 2024)

- Designed coastal modelling workflows allowing a small team to develop multi-hazard datasets at regional scales (entire Southeast Atlantic).
- Developed data pipelines to efficiently process 30+ TB of data into stakeholder-ready products
- Work on adaptation solutions to address ecosystem degradation and coastal hazard risk.

Fulbright Scholar (Chile) (2019)

- Application of machine learning techniques for long-term wave and shoreline change hindcasting in resource poor (computational and data) environments.
- Contributed to adaptation planning efforts for a critical Chilean coastal site (Pichilemu).

Graduate Research Assistant (Oregon State University) (2014 - 2018)

Grays Harbor Coastal Futures

- User-centered design, bridging research to stakeholders for community adaptation to risk.
- Design of multiple adaptation scenarios, including various nature-based solutions.
- Large interdisciplinary team including public policy, economics, ecology, and more.

An Emulation Based Approach to Estuarine Flooding

- Developed new hybrid machine learning/physical modeling methodology for robust probabilistic coastal hazard assessments.
- Applied Monte Carlo simulations and non-stationary extreme value analysis to quantify probabilistic hazards, enabling data-driven decision-making under future climate scenarios.

Moffatt & Nichol, San Diego Office – Coastal Engineering Internship (2012 - 2013)

- Comprehensive analysis of various coastal phenomenon such as shoreline erosion, sediment budgets, river/estuary modeling, sea level rise, etc.
- Extensive technical writing explaining coastal processes at multiple audience levels.

Skills

- **Programming Languages**: Python, Matlab, R, Git, bash, Fortran.
- **Physical Modelling:** Delft3d, Adcirc, SFINCS, Xbeach, SWAN, and many others.
- **Geospatial:** ArcGIS Pro, Qgis, GDAL, Python geospatial (geopandas, rasterio, etc.)
- **Engineering (general):** Engineer-in-Training (State of California), CAD.
- **HPC:** SLURM, MPI enabled workflows, linux, Deep-learning,
- **Data Science / ML:** Big data (>30 TB) workflows, Neural networks, ensemble techniques and Monte Carlo Simulations, regression analysis, Bayesian analysis.
- **Communication:** Technical writing, public presentations, stakeholder facilitation.
- **Fieldwork certifications:** Wilderness First Responder, CPR, SCUBA Open Water, Motorboat (MOCC), Jetski, and ATV operator.

Education

Doctor of Philosophy, Coastal and Ocean Engineering (2013 - 2018)

Oregon State University: Corvallis, Oregon
Minor in Statistics

Bachelor of Science, Civil Engineering (2007 - 2012)

California Polytechnic State University: San Luis Obispo, California

Recent Journal Publications (since 2024)

Barnard, P. L., Befus, K. M., Danielson, J. J., Engelstad, A. C., Erikson, L. H., Foxgrover, A. C., Hayden, M. K., Hoover, D. J., Leijnse, T. W. B., Massey, C., McCall, R., Nadal-Caraballo, N. C., Nederhoff, K., O'Neill, A. C., **Parker, K. A.,** Shirzaei, M., Ohenhen, L. O., Swarzenski, P. W., Thomas, J. A., … Jones, J. L. (2025). Projections of multiple climate-related coastal hazards for the US Southeast Atlantic. Nature Climate Change. https://doi.org/10.1038/s41558-024-02180-2

Stevens, A. W., Ruggiero, P.**, Parker, K. A.,** Vitousek, S., Gelfenbaum, G., & Kaminsky, G. M. (2024). Climate controls on longshore sediment transport and coastal morphology adjacent to engineered inlets. Coastal Engineering, 194. https://doi.org/10.1016/j.coastaleng.2024.104617

Vitousek, S., Vos, K., Splinter, K. D., **Parker, K.,** O'Neill, A., Foxgrover, A. C., Hayden, M. K., Thomas, J. A., Erikson, L., & Barnard, P. L. (2024). Scalable, data-assimilated models predict large-scale shoreline response to waves and sea-level rise. Scientific Reports, 14(1). https://doi.org/10.1038/s41598-024-77030-4

Thomas, J. A., Barnard, P. L., Vitousek, S., Erikson, L. H., **Parker, K.,** Nederhoff, K., Befus, K. M., & Shirzaei, M. (2024). The projected exposure and response of a natural barrier island system to climate-driven coastal hazards. Scientific Reports, 14(1), 25814. https://doi.org/10.1038/s41598-024-76749-4