ASHLEY NICOLE ELLENSON

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SUMMARY

As a versatile scientist with a PhD in Machine Learning applications within Coastal Science, I have strong technical proficiency and understanding of how to creatively apply machine learning and data mining techniques to gain insights and answer relevant questions. As an environmental consultant, I have learned how to communicate within teams and collaborate across different perspectives to get projects finished. At Integral, I work cross-functionally between the data analytics, data management and marine science and engineering groups. I engineer data pipelines to ingest for dashboards, implement numerical models, and develop tools to increase work efficiency. My technical prowess, eagerness to collaborate, and cross-discipline perspective results in creative and complementary contributions within teams. I am currently looking for roles where I am challenged with creative technical problems, and can simultaneously grow my career within product development by learning from effective leaders and collaborative workflows.

SKILLS

Analytical	Critical thinking, model development and implementation, problem solving
Collaboration	Interpersonal skills, teamwork, teaching and learning
Numerical Models	Wavewatch III, SWAN, X-Beach
Data Science	Data visualization (matplotlib, seaborn), machine learning (sci-kit learn, pytorch), data manipulation and analysis (dask, pandas, x-array), cloud computing (digital ocean, s3 buckets, docker), documentation (sphinx), GitHub
Computer Languages	Python, MATLAB, R, PostgreSQL
Languages	English, Hebrew, Spanish, German, Indonesian

EDUCATION

Oregon State University

PhD, Civil Engineering, *Coastal and Ocean Engineering*	2021
Minor, Risk and Uncertainty Quantification	
MS, Civil Engineering, *Coastal and Ocean Engineering*	2017

Columbia University

BS, Environmental Engineering, *Water Quality*	2011

PROFESSIONAL EXPERIENCE

Project Scientist	2022-Current
Integral Consulting Corporation	*Santa Cruz, CA*

- Quantified coastal risk hazard due to cliff erosion or coastal flooding using physical and empirical models to determine erosion and flooding distances and depths.
- Determine decadal shoreline change using satellite imagery and CoastSat tool.
- Prepared reports and presentations to communicate findings to external clients.
- Developed internal tools for data processing, analysis and plotting for subsequent re-use to increase efficiency and task standardization.
- Developed data pipeline to process 30 years of hourly time series data over 15 grids of 8 different wave parameters as input to wave data dashboard from raw wave output to PostGRES database.
- Developed interactive plots in R for data visualization in dashboard.

Founder of Coastal Conditions	2017-2018
Oregon State Advantage Accelerator	*Corvallis, OR*

- Founded an LLC to develop a wave forecast service for local surfers
- Developed wireframes, data pipeline, and beginning prototypes for iterative product development
- Marketed product and company through news outlets (Surfer Online Magazine, NPR)

RESEARCH EXPERIENCE

Graduate Fellow   September 2018 - August 2021
US Army Corps Engineering Research and Development Center   *Oregon State University*

- Applied Convolutional Neural Networks at two different sites to identify sandbars in 5000+ coastal images
- Determined most relevant environmental forcing for sandbar evolution via correlations between time series of sandbar shape and environmental factors
- Generated ensembles of sandbar forecasts using XBeach to quantify state dependent uncertainy for use in data assimilation scheme
- Sought international collaboration from University of New South Wales-Sydney and led research between four researchers and three institutions.

National Research Trainee   September 2017 - September 2018
National Science Foundation   *Oregon State University*

- Quantified uncertainty metrics of wave forecast error predictions using bagged regression tree
- Collaborated with social scientist and data imaging specialist to develop forecast uncertainty metric
- Used decision tree as an explanatory technique to determine relationships between environmental conditions that coincided with wave model error
- Determined geospatial relationships between 5 different buoy locations of wave height error over 5 years of wave height time series through inspection of bagged regression tree architecture

PUBLICATIONS, GITHUB AND PRESENTATIONS

DEEP LEARNING AND MACHINE LEARNING

Ellenson, A.N., Simmons, J., Wilson, G. W., Hesser, T. J., and Splinter, K. D. (2020). Beach state recognition using argus imagery and convolutional neural networks. *Remote Sensing*, 12(23):3953

Ellenson, A., Pei, Y., Wilson, G., Özkan-Haller, H. T., and Fern, X. (2020). An application of a machine learning algorithm to determine and describe error patterns within wave model output. *Coastal Engineering*, 157:103595 https://github.com/anellenson/DecisionTree_WaveForecasts

Ellenson, A., Pei, Y., Wilson, G., and Fern, X. (Feburary 2018). A machine learning method to correct wave model gridded output. American Geophysical Union - Ocean Sciences

PHYSICAL MODELING

Ellenson, A. and Özkan-Haller, H. T. (2018). Predicting large ocean wave events characterized by bimodal energy spectra in the presence of a low-level southerly wind feature. *Weather and Forecasting*, 33(2):479–499

Ellenson, A., Özkan-Haller, H. T., Haller, M., Brown, A., Thomson, J., and García-Medina, G. (January 2017). Accurate observations of extreme wave conditions with swift buoys in the Eastern North Pacific. American Meteorological Society Annual Meeting

Ellenson, A., Wilson, G., Hesser, T., and Farthing, M. (November 2019). Quantifying state dependent uncertainty of nearshore morphodynamic modelling. Young Coastal Scientists and Engineers - Americas, *best presentation award*