

Exponent®
Engineering & Scientific Consulting

Jaewon Saw, Ph.D.

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Professional Profile

Dr. Saw is a systems engineer specializing in infrastructure monitoring, performance-based engineering, and data science. Her expertise includes distributed fiber optic sensing technologies -- particularly distributed acoustic sensing (DAS) -- for continuous, real-time monitoring of civil and energy infrastructure systems. She has led projects applying these tools to monitor hydraulic fracturing operations, roadway vibration and activity, and whale vocalizations in Monterey Bay. She has also contributed to efforts detecting leaks and pressure surges in water pipelines, as well as assessing the structural health of wind turbines. Dr. Saw brings experience in earthquake source characterization, ground motion modeling and selection, and fragility and vulnerability modeling, contributing to probabilistic risk analyses spanning individual components to system-wide vulnerabilities. Her work integrates field sensor deployments with machine learning and deep learning approaches for feature extraction and signal classification, emphasizing reproducible, adaptive data workflows to inform infrastructure design, performance assessment, and operational decision-making.

Dr. Saw's doctoral research at the University of California, Berkeley culminated in the dissertation "Listening with Light: Distributed Acoustic Sensing for Event Detection, Characterization, and Classification." This research investigated how decisions made throughout the DAS data science lifecycle – ranging from study conceptualization and sensor deployment to domain-specific data analysis and signal characterization – impact the effectiveness of DAS-based monitoring systems. Through case studies on whale vocalizations, roadway activity, and hydraulic fracturing, Dr. Saw addressed challenges such as environmental noise, infrastructure heterogeneity, and labeling uncertainty, offering grounded guidance for applying DAS in complex, real-world environments.

As a Data Science Fellow at UC Berkeley's D-Lab, Dr. Saw supported the campus-wide research community by teaching workshops on data manipulation, cleaning, visualization, machine learning, and deep learning. This experience reflects her commitment to making advanced data science methods accessible and actionable across disciplines. In addition to her D-Lab role during her graduate studies, she also taught undergraduate and graduate students in a course on infrastructure sensing and modeling.

Academic Credentials & Professional Honors

Ph.D., Civil and Environmental Engineering, University of California, Berkeley, 2025

M.S., Structural Engineering, Stanford University, 2021

B.S., Civil Engineering, University of California, Berkeley, 2019

Bakar Innovation Fellowship

Stanford School of Engineering Graduate Fellowship

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John A. Blume Earthquake Engineering Research Assistantship

Tau Beta Pi Engineering Society

Prior Experience

Graduate Student Researcher, University of California, Berkeley, 2021-2025

D-Lab Data Science Fellow, University of California, Berkeley, 2024-2025

Graduate Student Instructor, University of California, Berkeley, 2022 (CIVENG 170A Infrastructure Sensing and Modeling)

Graduate Student Researcher, Stanford University, 2020-2021

Intern, Forell-Elsesser, 2019

Intern, Pacific Earthquake Engineering Research Center, 2018-2019

Professional Affiliations

American Society of Civil Engineers (ASCE) Member

Utility Engineering & Surveying Institute (UESI) Member

American Geophysical Union

Publications

Saw J, Apoji D, Wang C, Soga K. Exploring distributed acoustic sensing for pedestrian monitoring: signal characteristics and identification using fiber optic cables embedded in roadways. Transportation Research Record: Journal of the Transportation Research Board 2025; 2680(2).

Saw J, Zhu X, Luo L, Correa J, Soga K, Ajo-Franklin J. Distributed fiber optic sensing for in-well hydraulic fracture monitoring. Geoenergy Science and Engineering (formerly Journal of Petroleum Science and Engineering) 2025; 250:213792.

Saw J, Luo L, Chu K, Ryan J, Soga K, Wu Y. Distributed acoustic sensing for whale vocalization monitoring: a vertical deployment field test. Seismological Research Letters 2025;96(2A):801–815. DOI: 10.1785/0220240389.

Xu J, Luo L, Saw J, Wang C, Sinha S, Wolfe R, Soga K, Wu Y, DeJong M. Structural health monitoring of offshore wind turbines using distributed acoustic sensing. Journal of Civil Structural Health Monitoring 2024; 15:445–463.

Saw J, Luo L, Correa J, Soga K, Zhu X, Ajo-Franklin J, Kerr E, Bohn R. Hydraulic fracture stage identification and size estimation using distributed strain and temperature sensing. SEG International Exposition and Annual Meeting 2023.

Zhu X, Ajo-Franklin J, Correa J, Ma Y, Saw J, Luo L, Soga K. Hydraulic fracture aperture estimation using low frequency DAS and DSS in Austin Chalk and Eagle Ford Shale. SEG International Exposition and Annual Meeting 2023.

Xu J, Luo L, Saw J, Wang C, Sinha S, Wolfe R, Soga K, Wu Y, DeJong M. A shake-table test to evaluate fiber optic vibration monitoring of offshore wind turbines. International Conference on Experimental

Vibration Analysis for Civil Engineering Structures 2023.

Bassman T, Zsarnóczay A, Saw J, Wang S, Deierlein G. High-fidelity testbed development for regional risk assessment in Alameda, California. National Conference on Earthquake Engineering 2022.

Presentations

Saw J, Jasiak M, Chiu S, Soga K. Multi-purpose urban monitoring with embedded distributed acoustic sensing: traffic visualization and water pipeline assessment. Invited oral presentation, International Meeting for Applied Geoscience & Energy, Houston, TX, 2025.

Saw J, Jasiak M, Soga K. Innovations in monitoring civil infrastructure systems using distributed fiber optic sensing. Oral presentation, Utilities Technology Council Telecom & Technology Conference, Long Beach, CA, 2025.

Saw J. Making sense of distributed acoustic sensing data: overcoming challenges in an emerging technology. Oral presentation. D-Lab Fellows Talk, Berkeley, CA, 2025.

Saw J, Apoji D, Wang C, Soga K. Exploring distributed acoustic sensing for pedestrian monitoring: signal characteristics and identification using fiber optic cables embedded in roadways. Oral presentation, Transportation Research Record Annual Meeting, Washington D.C., 2025.

Saw J, Luo L, Chu K, Soga K, Wu Y. Shallow water deployment of distributed acoustic sensing for whale vocalization monitoring in Monterey Bay, California. Oral presentation, American Geophysical Union Fall Meeting, Washington D.C., 2024.

Saw J, Jasiak M, Soga K. Revolutionizing urban infrastructure monitoring with embedded distributed acoustic sensing: real-time traffic visualization and pipeline integrity assessment. Oral presentation, Society of Exploration Geophysicists / European Association of Geoscientists and Engineers Workshop on Geophysical Aspects of Smart Cities, Seoul, South Korea, 2024.

Saw J, Luo L, Chu K, Soga K, Wu Y. Listening with light: applications of distributed acoustic sensing in environmental and infrastructure monitoring. Invited seminar, Korea Advanced Institute of Science and Technology (KAIST) Civil Engineering Department, Daejeon, South Korea, 2024.

Saw K, Luo L, Chu K, Soga K, Wu Y. Listening to whales with light: application of distributed acoustic sensing in Monterey Bay, California. Oral presentation. D-Lab Fellows Talk, Berkeley, CA, 2024.

Saw J, Luo L, Soga K. Monitoring capabilities of distributed fiber optic sensing for hydraulic fracturing. Keynote oral presentation, UC Berkeley Annual GeoSymposium, Berkeley, CA, 2023.

Saw J, Luo L, Correa J, Soga K, Zhu X, Ajo-Franklin J, Kerr E, Bohn R. Hydraulic fracture stage identification and size estimation using distributed strain and temperature sensing. Poster presentation, International Meeting for Applied Geoscience & Energy, Houston, TX, 2023.

Project Experience

Provided analytical support for a probabilistic, structure-level model estimating the average annual contamination-induced insulator flashover rates across a large electric utility’s service territory, integrating environmental exposure and asset characteristics. Conducted research and synthesis of environmental data sources, structure specifications, and relevant peer-reviewed and industry literature to inform model assumptions and inputs.

Supported reactive case evaluations through detailed analysis of building codes, utility standards, historical inspection and incident records, and event timelines, supplemented by review of government agency reports, technical literature, and public reporting to support regulatory context, compliance assessments, and evaluation of potential failure mechanisms.

Identified and characterized humpback whale vocalizations using a novel vertical deployment of distributed acoustic sensing (DAS) aboard a research vessel in Monterey Bay, California. Assessed signal and noise characteristics in comparison with co-deployed hydrophone datasets. Ongoing work focuses on automating whale call detection in noisy DAS data using deep learning techniques.

Developed a near real-time heatmap visualization to track road user activity on a DAS-instrumented experimental roadway. Achieved low-latency performance through vectorized signal processing workflows and ring buffer management. Quantified system responsiveness using metrics such as update frequency, processing latency, data throughput, and memory footprint.

Characterized pedestrian movement patterns using DAS on both controlled and opportunistic roadway deployments. Applied random forest and k-nearest neighbors algorithms to evaluate the effectiveness of simple, interpretable machine learning techniques for classifying DAS signals. Data included pedestrian jumps near the fiber at regular intervals and locations.

Characterized strain signatures from distributed fiber optic sensors deployed at the Austin Chalk/Eagle Ford Field Laboratory. Evaluated relationships between strain magnitude, spatial extent, and duration with fracture width, closure, and connectivity. Estimated maximum fracture widths to support operational monitoring and improve understanding of subsurface fracture behavior.

Contributed to the evaluation of DAS performance for detecting events in water pipelines and vibrations in wind turbine towers. Supported analysis of signal quality, sensitivity, and detection reliability across infrastructure types.

Peer Reviews

Nature Communications

Scientific Reports

Geoenergy Science and Engineering