

Exponent®
Engineering & Scientific Consulting

Hala El Fil, Ph.D., P.E.

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Professional Profile

Dr. Hala El Fil is a geotechnical engineer at Exponent. She specializes in soil and rock mechanics, foundations, landslides and slope failures, settlement and ground movement, earth and retaining structures, and geotechnical instrumentation and monitoring. Her consulting experience includes domestic and international matters involving buildings and developments, mining, and civil infrastructure, including expert testimony. Dr. El Fil has been designated as a geotechnical engineering expert in U.S. domestic litigation.

Dr. El Fil has evaluated foundation performance and ground movement using subsurface and geologic data, laboratory testing, construction records, field observations, analytical methods, and numerical modeling. Her work has included assessment of shallow foundations and slabs-on-grade supported on ground improvement systems, review of drilled-shaft and compaction records, settlement and consolidation analyses, and interpretation of InSAR and LiDAR data.

Dr. El Fil has investigated landslides and other geohazards by evaluating rainfall, watershed, geologic, permitting, and site information; performing slope-stability analyses; and developing mitigation strategies. She has also conducted site reconnaissance for properties in landslide- and wildfire-affected areas and evaluated groundwater availability for a residential well using geologic, rainfall, water-consumption, and watershed data.

Dr. El Fil's experience also includes interpreting passive seismic interferometry data to characterize potential mine geohazards, evaluating runoff at solar farms, assessing wind-farm access-road geometry, and preparing engineering plans for remediation and repair.

At Purdue University, Dr. El Fil's doctoral research combined rock mechanics and geophysics. She used direct shear testing, ultrasonic wave transmission, digital imaging, CT scanning, SEM/EDX, and nano-indentation to investigate rock-discontinuity behavior and seismic precursors to shear failure.

Academic Credentials & Professional Honors

Ph.D., Civil Engineering, Purdue University, 2021

M.Sc., Civil Engineering, American University of Beirut, Lebanon, 2017

B.E., Civil Engineering, American University of Beirut, Lebanon, 2016

Gerald and Beryl Leonards Fellowship Award, Purdue University, 2017-2019

Honor Student, Civil Engineering, American University of Beirut, 2012-2016

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Licenses and Certifications

Professional Engineer Civil and Structural, Colorado, #PE.0063236

Professional Engineer Civil, Connecticut, ##PEN.0040063

Professional Engineer Civil and Structural, New Jersey, ##24GE06265900

Academic Appointments

Teaching Assistant, Purdue University, 2021

Research Assistant, Purdue University, 2017-2021

Prior Experience

Geocomp, Inc., 2024-2026

Exponent, Inc., 2021-2024

Professional Affiliations

American Society of Civil Engineers (ASCE)

American Rock Mechanics Association (ARMA)

Languages

Arabic

French (France)

Publications

El Fil H, Epstein A, Hawkes M, Gokyer Ebris S, Pena-Iguaran A. Risk-mitigation-driven geotechnical design of an excavation system in permeable piedmont residual soils for a mixed-use building. ASCE Met Section Seminar 2025.

El Fil H, Pyrak-Nolte LJ, Bobet A. The role of a rock discontinuity's micro-structure and aperture on the detection of seismic precursors to shear failure. Rock Mechanics and Rock Engineering 2023; 57:1–14.

Moro C, El Fil H, Francioso V, Velay-Lizancos M. Influence of water-to-binder ratio on the optimum percentage of nano-TiO2 addition in terms of compressive strength of mortars: a laboratory and virtual experimental study based on ANN model. Construction and Building Materials 2021; 267:120960.

Presentations

El Fil H, Pyrak-Nolte LJ, Bobet A. Transmitted, reflected, and converted modes of seismic precursors to shear failure of rock discontinuities. 55th US Rock Mechanics/Geomechanics Symposium, 2021.

El Fil H, Bobet A, Pyrak-Nolte LJ. Mechanical and geophysical monitoring of slip along frictional discontinuities. 53rd US Rock Mechanics Symposium, New York, NY, 2019.

Project Experience

Forensic Geotechnical Investigations & Disputes

- Evaluated alleged misinterpretation of subsurface conditions for a development by interpreting subsurface and geologic data, reviewing compaction and drilled-shaft construction records, comparing work with contract specifications, standards, and code requirements, and integrating technical documentation and project communications to formulate expert opinions.
- Investigated a landslide failure by analyzing rainfall data, watershed characteristics, geologic conditions, and permitting documentation to identify contributing factors and determine the root cause; provided deposition testimony.
- Investigated the performance of a reportedly nonfunctional residential well by assessing site geology and subsurface data, historical rainfall trends, water-consumption records, and watershed conditions to evaluate regional recharge and groundwater availability.

Foundation Settlement & Ground Movement

- Evaluated excessive settlement of warehouse foundations involving shallow foundations and slab-on-grade supported by a stone-column ground-improvement system. Performed subsurface characterization, analytical estimates of vertical and differential settlement, and PLAXIS 2D stress-deformation modeling.
- Analyzed ground movement on an international project using consolidation laboratory data to estimate movement magnitude and remaining duration, and reviewed InSAR data in conjunction with ceiling and floor elevation surveys to evaluate historical movement.

Landslides and Slope Stability:

- Performed independent landslide investigations for multiple projects, identified contributing causes, modeled slope failures using SLOPE/W, and developed mitigation strategies.
- Conducted field investigations, site reconnaissance, and permit reviews for properties located on or near landslide- and wildfire-affected areas.
- Interpreted passive seismic interferometry data for an iron ore mine in South Africa to characterize potential subsurface geohazards, including voids and cavities, and developed estimates of rock hardness and blastability index to support optimization of mining operations.

Renewable Energy & Civil Infrastructure

- Evaluated hydrologic impacts at solar farms, including analysis of increased runoff associated with unmaintained vegetation.
- Evaluated access-road geometric design for wind farms and prepared engineering plans supporting remediation and repair of slope failures and solar-farm infrastructure.

Additional Education & Training

Occupational Safety and Health Administration (OSHA) 10 hours training

Peer Reviews

Reviewer for Rock Mechanics and Rock Engineering, reviewer, 2021-2026