# Nir Badt, PhD

Applied Geophysicist | Geomechanics | R&D

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## Profile

Applied geophysicist and geologist specializing in experimental mechanics, resrevoir geomechanics, rock fracture development and sealing, friction, induced seismicity, and high-pressure/high-temperature rock physics. Strong background in laboratory testing and experimental design, data-driven modeling, and thermo-hydraulic-mechanical coupling, with relevance to subsurface engineering, energy systems, and geotechnical R&D.

## Core Skills

- Reservoir geomechanics and coupled fluid flow in porous and fractured media
- Laboratory testing and custom experimental design
- Rheology, friction, poromechanics, rock-fluid interaction, failure analysis
- Data analysis, modeling, and workflow automation (Python, MATLAB; AI-assisted)
- Instrumentation: high pressure/temperature, nanoindentation, rotary-shear, triaxial, direct shear

## Professional Experience

**Postdoctoral Researcher** 2025–Present
*Hebrew University of Jerusalem (IL) / GFZ Helmholtz Centre for Geosciences (DE)*
High-pressure, high-temperature rock mechanics experiments on fracture behavior and chemical sealing in fractured systems. Developed models and designed carbonate sealing experiments relevant to subsurface integrity and energy applications.

**Postdoctoral Researcher** 2022–2025
*University of Pennsylvania, Philadelphia (US)*
Developed new methods to measure energy dissipation in rocks and minerals via nanoindentation, designed high-precision rock healing and adhesion tests, and created mechanical protocols to quantify micromechanical behavior of teeth. Conducted simulations of thermo-hydraulic-mechanical coupling in earthquake rupture and discovered a new frictional recovery mechanism in clay-sand suspensions.

**Engineering Geologist** 2015–2016
*Geo-Log Ltd., IL*
Managed and logged exploratory drilling operations for the NTA Green and Red Line projects, ensuring accurate data collection and compliance with engineering standards. Oversaw geotechnical drilling and pile casting for foundation construction across multiple infrastructure projects, supporting safe and efficient site development.

## Selected Applied Projects

- Developed adhesion testing methods for silicate rocks, investigating friction and fracture sealing
- Adapted experimental friction protocols for colloidal and granular physics in saturated clay-sand mixtures
- Developed computational models of fault and fracture healing and sealing for realistic fault mechanics
- Designed experimental approaches to quantify cyclic energy dissipation in rocks, minerals, and analog materials
- Provided first experimental evidence of dynamic rock friction weakening in coupled thermal-hydraulic environments
- Expanded thermo-hydraulic-mechanical models for fluid flow during earthquakes under realistic subsurface conditions
- Authored multiple peer-reviewed publications on rock mechanics, fault healing, and fault-related material processes

## Education

**PhD, Geophysics** | Brown University 2022
Focus on thermo-hydraulic-mechanical coupling in faults and hydrofracturing

**MSc, Geology** | Ben-Gurion University 2015
Studied rock damage and fracturing in carbonate rocks

**BSc, Engineering Geology** | Ben-Gurion University 2013

## Teaching & Leadership

- Lecturer | University of Pennsylvania (2024–2025)
- Scientific meeting session organizer | American Geophysical Union (2024)
- Supervised undergraduate on research projects in rock mechanics and geophysics
- Mentored graduate students in experimental design and data analysis
- Laboratory Instructor in *Structural Geology* | Brown University
- Teaching Assistant | Ben-Gurion University & Shamoon College