

Nicholas C. Davatzes

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Geomechanics
Structural Geology
Borehole Geophysics
Geothermal Systems
Updated: April 26, 2026

ACADEMIC APPOINTMENTS

2017–present **Chair**, Earth and Environmental Science, Temple University, Philadelphia, PA (4 terms)
2014–present **Associate Professor** of Earth and Environmental Science, Temple University, Philadelphia, PA
2008–2014 **Assistant Professor** of Earth and Environmental Science, Temple University, Philadelphia, PA
Summers 2008, **Invited Visiting Professor**, RES School of Renewable Energy Science, Akureyri, Iceland Taught
2009, 2010 GEO605 Geothermal Drilling and Logging (M.Sc. degree program); advised M.Sc. research projects

EDUCATION

2004–2007 **Mendenhall Postdoctoral Fellow**, U.S. Geological Survey, Earthquake Hazards Team, Menlo Park, CA Advisors: Steve Hickman and Colin Williams
2003–2004 **Postdoctoral Fellow**, Stanford University, Rock Fracture Project
1998–2003 **Ph.D.**, Geology, Stanford University, Stanford, CA Advisor: Dr. Atilla Aydin
1994–1998 **B.A.** (Magna Cum Laude, Honors), Geology and Philosophy, Bucknell University, Lewisburg, PA

DISSERTATION

Fault architecture as a function of deformation mechanism in clastic rocks with an emphasis on sandstone (2003). Stanford University. Combined field analysis of structures comprising faults, fault kinematics, and 3-D model construction with mechanical simulations using linear elastic fracture mechanics and boundary element methods. 185 pp.

EXPERTISE SUMMARY

Professor Davatzes's research program addresses the fundamental controls of stress, deformation mechanism, and alteration on the permeability, friction, and seismic behavior of fault zones; these are the properties that govern fluid flow in geothermal reservoirs, petroleum systems, and earthquake-hazard settings. His approach primarily integrates quantitative structural field mapping, fracture and stress analysis from borehole core and geophysical logs, and geomechanical modeling. These approaches have been applied to reservoir-scale impulses from injection, production, and stimulation that provide well-constrained tests of geomechanical predictions. This work has directly supported Enhanced Geothermal Systems projects by producing geomechanical frameworks that guided hydraulic stimulation design at Desert Peak, Nevada, contributed to real-time EGS monitoring at Brady Hot Springs and Raft River, and established seismicity-based methods for discriminating induced from natural earthquakes at Coso, California. These approaches are also applied to assess geothermal resource potential of undeveloped or undiscovered resources in the Cascades or to investigate volcano-tectonic interactions in basin extension. Emerging collaborative work extends systems-based characterization to other parts of the renewable energy landscape where feedback modeling and field instrumentation inform the design, environmental evaluation, and impact of agrivoltaic and multi-use solar facilities.

IMPACT

2,719 Total citations Google Scholar · Apr 2026	30 h-index Google Scholar · Apr 2026	53 i10-index Google Scholar · Apr 2026	969 Citations since 2021 Google Scholar · Apr 2026
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PUBLICATIONS

(Note: * = Student or PostDoc author)

In Preparation

- Davatzes, N.C.,** *Krzystek, C., J. Glen, R.J. *Sawyer, M. (*in prep*) Interaction of faults and dikes to accommodate extension of Surprise Valley, California. *Geosphere (GSA)*.
- Davatzes, N.C.,** *Krzystek, C., J. Glen, R.J. *Ayanwunmi, (*in prep*) Geometry and interaction of dikes with basin extension and fluid flow; Surprise Valley, CA. *Geosphere (GSA)*.
- Davatzes, N.C.,** *R.J. Ayanwunmi, C. *Krzystek, (*in prep*) *Workshop on Geothermal Reservoir Engineering*, Stanford, CA.
- Davatzes, N.C.** and J. Glen (*in prep*) Image Log Analysis of Well WME-E1: Geomechanics of Hot Springs along a Segmented Magnetic Anomaly, Surprise Valley, California. *Geothermics*.
- Davatzes, N.C.** Relationship between slipping fractures and stress state in boreholes: Implications for interpreted induced failure of borehole walls. *Journal of Geophysical Research*.
- Davatzes, N.C.,** S. Hickman (*in prep*) The role of fault properties and stress state on the response to stimulation at Desert Peak, NV. *Geothermal Energy*.

Refereed Articles

- *Merheb, C., J.S. Caplan, P. Phuyal, J. Macknick, **N.C. Davatzes**, & S. Ravi (2026). Urban agrivoltaics enhance crop resilience and food-energy synergies in a changing climate. *npj Urban Sustainability*. <https://doi.org/10.1038/s42949-026-00381-6>
- *Merheb, C., J.S. Caplan, C. Rydzewski, P. Phuyal, J. Macknick, **N.C. Davatzes**, & S. Ravi (2026). Exploring micro-environmental conditions of urban agrivoltaics: Advancing sustainable green spaces and agriculture in temperate cities. *Sustainable Cities and Society*, 136, 107091. <https://doi.org/10.1016/j.scs.2025.107091>
- *Merheb, C., J. Macknick, **N.C. Davatzes**, & S. Ravi (2025). Synergies and trade-offs of multi-use solar landscapes. *Nature Sustainability*, 8, 857–870. <https://doi.org/10.1038/s41893-025-01600-1>
- Sakuma, H., D.A. Lockner, J. Solum, & **N. Davatzes** (2022). Effect of cationic species on the friction of clay-bearing faults. *Communications Earth & Environment*, 3, 116. <https://doi.org/10.1038/s43247-022-00444-3>
- *Choi, C.S., S. Ravi, I.Z. Siregar, F.G. Dwiyantri, J. Macknick, M. Elchinger, & **N. Davatzes** (2021). Combined land use of solar infrastructure and agriculture for socioeconomic and environmental co-benefits in the tropics. *Renewable and Sustainable Energy Reviews*, 151, 111610. <https://doi.org/10.1016/j.rser.2021.111610>
- *Callahan, O.A., P. Eichhubl, J.E. Olson, & **NC Davatzes** (2020). Experimental investigation of chemically aided fracture growth in silicified fault rocks. *Geothermics*, 83, 101724. <https://doi.org/10.1016/j.geothermics.2019.101724>
- *Callahan, O.A., P. Eichhubl, & **NC Davatzes** (2020). Mineral precipitation as a mechanism of fault core growth. *Journal of Structural Geology*, 140, 104156. <https://doi.org/10.1016/j.jsg.2020.104156>
- *Callahan, O.A., P. Eichhubl, J.E. Olson, & **NC Davatzes** (2019). Fracture mechanical properties of damaged and hydrothermally altered rocks, Dixie Valley–Stillwater Fault Zone, Nevada. *Journal of Geophysical Research: Solid Earth*, 124(4), 4069–4090. <https://doi.org/10.1029/2018JB016708>
- *Ali, S.T., E.C. Reinisch, J. Moore, M. Plummer, I. Warren, **N.C. Davatzes**, & K.L. Feigl (2018). Geodetic measurements and numerical models of transient deformation at Raft River geothermal field, Idaho, USA. *Geothermics*, 74, 106–111. <https://doi.org/10.1016/j.geothermics.2018.02.007>
- Cardiff, M., D.D. Lim, J.R. Patterson, J. Akerley, P. Spielman, J. Lopeman, P. Walsh, A. Singh, W. Foxall, H.F. Wang, N.E. Lord, C.H. Thurber, D. Fratta, R.J. Mellors, **N.C. Davatzes**, & K.L. Feigl (2018). Geothermal production and reduced seismicity: Correlation and proposed mechanism. *Earth and Planetary Science Letters*, 482, 470–477. <https://doi.org/10.1016/j.epsl.2017.11.037>
- *Schoenball, M. & **N.C. Davatzes** (2017). Quantifying the heterogeneity of the tectonic stress field using borehole data. *Journal of Geophysical Research: Solid Earth*, 122, 6737–6756. <https://doi.org/10.1002/2017JB014370>
- *Lindsey, N.J., J.O. Kaven, **N.C. Davatzes**, & G.A. Newman (2017). Compartmentalization of the Coso East Flank geothermal field imaged by 3-D full-tensor magnetotelluric inversion. *Geophysical Journal International*, 208(2), 652–662. <https://doi.org/10.1093/gji/ggw408>

- *Ali, S.T., J. Akerley, E.C. Baluyut, M. Cardiff, **N.C. Davatzes**, K.L. Feigl, W. Foxall, D. Fratta, R.J. Mellors, P. Spielman, H.F. Wang, & E. Zemach (2016). Time-series analysis of surface deformation at Brady Hot Springs geothermal field (Nevada) using interferometric synthetic aperture radar. *Geothermics*, 61, 114–120. <https://doi.org/10.1016/j.geothermics.2016.01.008>
- *Benato, S., S. Hickman, **N.C. Davatzes**, J. Taron, P. Spielman, D. Elsworth, E.L. Majer, & K. Boyle (2016). Conceptual model and numerical analysis of the Desert Peak EGS project: Reservoir response to the shallow medium flow-rate hydraulic stimulation phase. *Geothermics*, 63, 139–156. <http://dx.doi.org/10.1016/j.geothermics.2015.06.008>
- *Schoenball, M., **N.C. Davatzes**, & J.M. Glen (2015). Differentiating induced and natural seismicity using space-time-magnitude statistics applied to the Coso Geothermal Field. *Geophysical Research Letters*, 42, 6221–6228. <https://doi.org/10.1002/2015GL064772>
- *Dempsey, D., S. Kelkar, **N.C. Davatzes**, S. Hickman, & D. Moos (2015). Numerical modeling of injection, stress and permeability enhancement during shear stimulation at the Desert Peak Enhanced Geothermal System. *International Journal of Rock Mechanics and Mining Sciences*, 78, 190–206. <https://doi.org/10.1016/j.ijrmms.2015.06.003>
- *Geng, X., **N.C. Davatzes**, D.J. Soeder, J. Torlapati, R.S. Rodriguez, & M.C. Boufadel (2014). Migration of high-pressure air during gas well drilling in the Appalachian Basin. *Journal of Environmental Engineering*, 140(5), B4014002. [https://doi.org/10.1061/\(ASCE\)EE.1943-7870.0000769](https://doi.org/10.1061/(ASCE)EE.1943-7870.0000769)
- *Kaven, J.O., S.H. Hickman, **N.C. Davatzes**, & O. Mutlu (2012). Linear complementarity formulation for 3D frictional sliding problems. *Computational Geosciences*, 16(3), 613–624. <https://doi.org/10.1007/s10596-011-9272-0>
- Solum, J.G., **N.C. Davatzes**, & D.A. Lockner (2010). Fault-related clay authigenesis along the Moab Fault: Implications for calculations of fault rock composition and mechanical and hydrologic fault zone properties. *Journal of Structural Geology*, 32(12), 1899–1911. (invited; special issue) <https://doi.org/10.1016/j.jsg.2010.07.009>
- Eichhubl, P., **N.C. Davatzes**, & S.P. Becker (2009). Structural and diagenetic control of fluid migration and cementation along the Moab Fault, Utah. *AAPG Bulletin*, 93(5), 653–681. <https://doi.org/10.1306/02180908080>
- Davatzes, N.C.**, P. Eichhubl, & A. Aydin (2005). Structural evolution of fault zones in sandstone by multiple deformation mechanisms: Moab fault, SE Utah. *Geological Society of America Bulletin*, 117(1–2), 135–148. <https://doi.org/10.1130/B25473.1>
- Davatzes, N.C.**, A. Aydin, & P. Eichhubl (2003). Overprinting faulting mechanisms during the development of multiple fault sets in sandstone, Chimney Rock fault array, Utah, USA. *Tectonophysics*, 363, 1–18. [https://doi.org/10.1016/S0040-1951\(02\)00647-9](https://doi.org/10.1016/S0040-1951(02)00647-9)
- Davatzes, N.C.** & A. Aydin (2003). The formation of conjugate normal fault systems in folded sandstone by sequential jointing and shearing, Waterpocket monocline, Utah. *Journal of Geophysical Research*, 108(B10), 2478. <https://doi.org/10.1029/2002JB002289>
- Davatzes, N.C.** & A. Aydin (2003). Overprinting faulting mechanisms in high porosity sandstones of SE Utah. *Journal of Structural Geology*, 25(11), 1795–1813. [https://doi.org/10.1016/S0191-8141\(03\)00043-9](https://doi.org/10.1016/S0191-8141(03)00043-9)

Book Chapters

- Davatzes, N.C.** & S.H. Hickman (2010). Stress, fracture, and fluid-flow analysis using acoustic and electrical image logs in hot fractured granites of the Coso geothermal field, California, U.S.A. In Poppelreiter, M., García-Carballido, C., & Kraaijveld, M. (Eds.), *Dipmeter and Borehole Image Log Technology* (AAPG Memoir 92, Ch. 24, pp. 1–35). AAPG. <https://doi.org/10.1306/13181288M923134>
- Davatzes, N.C.**, A. Aydin, R. Sorkhabi, & Y. Tsuji (2005). Distribution and nature of fault architecture in a layered sandstone and shale sequence: An example from the Moab fault, Utah. In Sorkhabi, R. & Tsuji, Y. (Eds.), *Faults, Fluid Flow, and Petroleum Traps* (AAPG Memoir 85, pp. 153–180). AAPG. <https://doi.org/10.1306/M851033>

Peer-Reviewed Proceedings Papers

- *Stowe, B., D. Spake, T.T. Cladouhos, A.N. Steely, & **NC Davatzes** (2021). Combined structural analysis of core and image log of TGH MB76-31 east of Mt. Baker, Washington State. *Geothermal Resources Council Transactions*, 45, 1235–1259.
- *Spake, D., A.N. Steely, T.T. Cladouhos, M.W. Swyer, C. Forson, & **NC Davatzes** (2019). Geothermal exploration north of Mount St. Helens: Washington State play-fairway project. *Workshop on Geothermal Reservoir Engineering*, 44, 19 p.

- Swyer, M.W., T.T. Cladouhos, C. Forson, A.N. Steely, & **NC Davatzes** (2018). Simulating local sources of crustal deformation for Washington State geothermal prospects using geomechanical models. *ARMA 52nd US Rock Mechanics Symposium*, ARMA 18-464, Seattle, WA. 9 p.
- Swyer, M.W., T.T. Cladouhos, C. Forson, A.N. Steely, & **NC Davatzes** (2018). Preliminary geothermal resource assessment of the St. Helens Seismic Zone using geothermal play-fairway analysis of Washington State. *ARMA 18-464*. 9 p.
- Forson, C., A.N. Steely, T. Cladouhos, M. Swyer, **N.C. Davatzes** et al. (2018). Geothermal play-fairway analysis of Washington State prospects: Phase 2. *Geothermal Resources Council Transactions*, 41.
- *Callahan, O.A., P. Eichhubl, J. Olson, & **N.C. Davatzes** (2017). Fracture mechanical properties of damaged and hydrothermally altered rocks, Dixie Valley, NV. *PROCEEDINGS, 41st Workshop on Geothermal Reservoir Engineering*, Stanford University, SGP-TR-212, 8 p.
- Feigl, K.L., The PoroTomo Team, incl. **N.C. Davatzes** (2016). Overview and preliminary results from the PoroTomo project at Brady Hot Springs, Nevada. *PROCEEDINGS, 42nd Workshop on Geothermal Reservoir Engineering*, Stanford, SGP-TR-212. 15 p.
- Forson, C., J.L. Czajkowski, D.K. Norman, M.W. Swyer, T.T. Cladouhos, & **N. Davatzes** (2016). Summary of Phase 1 and plans for Phase 2 of the Washington State Geothermal Play-Fairway Analysis. *Geothermal Resources Council Transactions*, 40.
- Swyer, M.W., T.T. Cladouhos, C. Forson, J.L. Czajkowski, **N.C. Davatzes**, & G.M. Schmalzle (2016). Permeability potential modeling of geothermal prospects combining regional crustal strain rates with geomechanical simulation. *50th Annual Rock Mechanics Symposium*, Houston. ARMA 16-828, 14 p.
- *Schoenball, M., J.M.G. Glen, & **N.C. Davatzes** (2016). Analysis and interpretation of stress indicators in deviated wells of the Coso Geothermal Field. *PROCEEDINGS, 41st Workshop on Geothermal Reservoir Engineering*, Stanford, 12 p.
- *Laboso, R.C. & **N.C. Davatzes** (2016). Fault-controlled damage and permeability at the Brady Geothermal System, Nevada. *PROCEEDINGS, 41st Workshop on Geothermal Reservoir Engineering*, Stanford, 16 p.
- *Ali, S.T., **N.C. Davatzes**, K.L. Feigl, H.F. Wang, W. Foxall, R.J. Mellors, J. Akerley, E. Zemach, & P. Spielman (2016). Geodetic measurements and numerical models of deformation: Examples from geothermal fields in the western United States. *PROCEEDINGS, 41st Workshop on Geothermal Reservoir Engineering*, Stanford, 7 p.
- Allis, R., J. Moore, **N.C. Davatzes** et al. (2016). EGS concept testing and development at the Milford, Utah FORGE site. *PROCEEDINGS, 41st Workshop on Geothermal Reservoir Engineering*, Stanford, 13 p.
- Forson, C., M.W. Swyer, G.M. Schmalzle, J.L. Czajkowski, T.T. Cladouhos, **Davatzes, N.C.** et al. (2015). Geothermal play-fairway analysis of Washington State prospects. *39th Geothermal Resources Council Annual Meeting*, Reno, NV. 16 p.
- *Ali, S.T., **N.C. Davatzes**, K.L. Feigl et al. (2015). Deformation at Brady Hot Springs geothermal field measured by time series analysis of InSAR data. *PROCEEDINGS, 40th Workshop on Geothermal Reservoir Engineering*, Stanford. 5 p.
- *Wells, O.L. & **Davatzes, N.C.** (2015). The history of dilation across natural fractures due to evolving surface roughness. *PROCEEDINGS, 40th Workshop on Geothermal Reservoir Engineering*, Stanford. 12 p.
- *Schoenball, M., J.O. Kaven, J.M.G. Glen, & **Davatzes, N.C.** (2015). Natural or induced: Identifying natural and induced swarms from pre-production and co-production microseismic catalogs at the Coso Geothermal Field. *PROCEEDINGS, 40th Workshop on Geothermal Reservoir Engineering*, Stanford. 11 p.
- *Geng, X., **N.C. Davatzes**, M.C. Boufadel, & D.J. Soeder (2013). A modeling study of air migration from a drilling well to the surrounding aquifer in Appalachia. *Journal of Environmental Engineering, ASCE*.
- *Kaven, J.O., S. Hickman, & **Davatzes, N.C.** (2014). Micro-seismicity and seismic moment release within the Coso Geothermal Field, California. *PROCEEDINGS, 39th Workshop on Geothermal Reservoir Engineering*, Stanford. 10 p.
- *Dempsey, D., S. Kelkar, **Davatzes, N.C.**, S. Hickman, & D. Moos (2014). Evaluating the roles of thermoelastic and poroelastic stress changes in the Desert Peak EGS stimulation. *PROCEEDINGS, 39th Workshop on Geothermal Reservoir Engineering*, Stanford. 14 p.
- Davatzes, N.C.**, K.L. Feigl, R.J. Mellors, W. Foxall, H.F. Wang, & P. Drakos (2013). Preliminary investigation of reservoir dynamics monitored through combined surface deformation and micro-earthquake activity: Brady's

- Geothermal Field, Nevada. *PROCEEDINGS, 38th Workshop on Geothermal Reservoir Engineering*, Stanford, SGP-TR-194. 20 p.
- *Swyer, M.W. & **Davatzes, N.C.** (2013). Evaluating the role of the Rhyolite Ridge fault system in the Desert Peak Geothermal Field. *PROCEEDINGS, 38th Workshop on Geothermal Reservoir Engineering*, Stanford, SGP-TR-194. 16 p.
- *Batir, J., **Davatzes, N.C.**, & R. Asmundsson (2012). Preliminary state of stress of the Hellisheidi Geothermal Field, Hengill Volcanic Zone, Iceland. *PROCEEDINGS, 37th Workshop on Geothermal Reservoir Engineering*, Stanford, SGP-TR-194. 17 p.
- *Blake, K. & **Davatzes, N.C.** (2012). Borehole image log and statistical analysis of FOH-3D, Fallon Naval Air Station, NV. *PROCEEDINGS, 37th Workshop on Geothermal Reservoir Engineering*, Stanford, SGP-TR-194. 14 p.
- Chabora, E., E. Zemach, P. Spielman, P. Drakos, S. Hickman, S. Lutz, K. Boyle, A. Falconer, A. Robertson-Tait, **N.C. Davatzes**, P. Rose, E. Majer, & S. Jarpe (2012). Hydraulic stimulation of well 27-15, Desert Peak Geothermal Field, Nevada. *PROCEEDINGS, 37th Workshop on Geothermal Reservoir Engineering*, Stanford, SGP-TR-194. 12 p.
- *Kaven, J.O., S.H. Hickman, & **N.C. Davatzes** (2012). Using micro-seismicity and seismic velocities to map subsurface structure within the Coso Geothermal Field. *PROCEEDINGS, 37th Workshop on Geothermal Reservoir Engineering*, Stanford, SGP-TR-194. 8 p.
- Kelkar, S., K. Lewis, S. Hickman, **N.C. Davatzes**, D. Moos, & G. Zyvoloski (2012). Modeling coupled thermal-hydrological-mechanical processes during shear stimulation of an EGS well. *PROCEEDINGS, 37th Workshop on Geothermal Reservoir Engineering*, Stanford, SGP-TR-194. 8 p.
- *Swyer, M.W. & **N.C. Davatzes** (2012). Using boundary element modeling of fault slip to predict patterns of stress perturbation in geothermal reservoirs. *PROCEEDINGS, 37th Workshop on Geothermal Reservoir Engineering*, Stanford, SGP-TR-194. 14 p.
- Davatzes, N.C.** & S. Hickman (2011). Preliminary analysis of fractures, strength and stress directions in the Newberry EGS well 55-29. *Geothermal Resources Council Annual Meeting*, San Diego, CA. 12 p.
- *Fetterman, J.D. & **N.C. Davatzes** (2011). Evolution of fracture porosity in the Newberry Volcano Geothermal System, Oregon. *Geothermal Resources Council Annual Meeting*, San Diego, CA. 7 p.
- Davatzes, N.C.** & S. Hickman (2011). Natural fractures, mechanical properties, and *in situ* stress in the planning and execution of the Desert Peak EGS experiment. *AAPG/SPE/SEG Hedberg Conference on Enhanced Geothermal Systems*, Napa, CA. 2 p.
- *Runyon, K., A. Davatzes, & **N.C. Davatzes** (2011). Structural characterization of the Cerberus Fossae at the Athabasca Valles source region, Mars. *Lunar and Planetary Sciences Annual Meeting Extended Abstracts*. 2 p.
- *Blake, K. & **N.C. Davatzes** (2011). Stress heterogeneity in the vicinity of the Coso Geothermal Field. *PROCEEDINGS, 35th Workshop on Geothermal Reservoir Engineering*, Stanford. 11 p.
- *Kaven, J.O., S. Hickman, & **N.C. Davatzes** (2011). Micro-seismicity, fault structure, and hydrologic compartmentalization within the Coso Geothermal Field. *PROCEEDINGS, 35th Workshop on Geothermal Reservoir Engineering*, Stanford. 8 p.
- Cladouhos, T., S. Petty, W. Osborn, S. Hickman, & **N.C. Davatzes** (2011). The role of stress in stimulation planning at the Newberry EGS Demonstration Project. *PROCEEDINGS, 35th Workshop on Geothermal Reservoir Engineering*, Stanford. 8 p.
- Lutz, S.J., S. Hickman, **N.C. Davatzes**, E. Zemach, P. Drakos, & A. Robertson-Tait (2010). Rock mechanical testing in support of well stimulation at the Desert Peak Geothermal Field, Nevada. *Geothermal Resources Council Annual Meeting Proceedings*.
- *Garza-Cruz, T. & **N.C. Davatzes** (2010). Numerical modeling of the nucleation conditions of drilling-induced petal centerline fractures. *Geothermal Resources Council. Best Paper Award!*
- Davatzes, N.C.** & S. Hickman (2010). The feedback between stress, faulting, and fluid flow: Lessons from the Coso Geothermal Field, CA. *World Geothermal Congress*, paper #1267, Bali, Indonesia. 12 p.
- Hickman, S. & **N.C. Davatzes** (2010). In-situ stress and fracture characterization for planning of an EGS stimulation in the Desert Peak Geothermal Field, NV. *PROCEEDINGS, 34th Workshop on Geothermal Reservoir Engineering*, Stanford, SGP-TR-187. 11 p.

- Lutz, S.J., S. Hickman, **N.C. Davatzes**, E. Zemach, P. Drakos, & A. Robertson-Tait (2010). Rock mechanical and petrologic testing in support of well stimulation at the Desert Peak Geothermal Field, Nevada. *PROCEEDINGS, 34th Workshop on Geothermal Reservoir Engineering*, Stanford, SGP-TR-187.
- Davatzes, N.C.** & S. Hickman (2009). Fractures, stress and fluid flow prior to stimulation of well 27-15, Desert Peak, Nevada, EGS project. *Workshop on Geothermal Reservoir Engineering*, 2009, Stanford.
- Davatzes, N.C.** & S. Hickman (2006). Stress and faulting in the Coso Geothermal Field: Update and recent results from the East Flank and Coso Wash. *31st Stanford Workshop on Geothermal Engineering*, SGP-TR-179. 12 p.
- Davatzes, N.C.** & S. Hickman (2005). Controls on fault-hosted fluid flow: Preliminary results from the Coso Geothermal Field, California. *Geothermal Resources Council Transactions*, 19, 343–348.
- Davatzes, N.C.** & S. Hickman (2005). Interpretation and comparison of electrical and acoustic image logs from a well in the Coso Geothermal Field, CA. *30th Stanford Workshop on Geothermal Reservoir Engineering*, SGP-TR-176. 11 p.
- Eichhubl, P., **N.C. Davatzes**, & A. Aydin (2003). Fault architecture fluid flow and cementation: The Moab Fault, Utah, USA. *In Geofluids IV, Extended Abstract*. 13 p.

ABSTRACTS

*Abstracts are listed only where no closely matched peer-reviewed proceedings paper or journal article appears elsewhere in this CV or under Invited Lectures. * = student/postdoc author.*

- *Merheb, C., P. Phuyal, N. Thomas, C.S. Choi, J. Caplan, M. Bonfim, K. Orangers, **NC Davatzes**, J. Macknick, & S. Ravi (2024). A learning community model focused on agrivoltaic research. *American Geophysical Union National Meeting*, December 9–13, 2024, Washington D.C.
- *Sawyer, M., J. Glen, & **NC Davatzes** (2021). Potential role of dikes in damaging rock to support hydrothermal fluid flow, Surprise Valley. *AAPG Eastern Section Meeting*, October 2–5, 2021, Pittsburgh, PA.
- Cladouhos, T., A. Steely, & **NC Davatzes** (2020). Washington State geothermal play-fairway analysis: Preliminary TCH drilling results. *Geothermal Resources Council Transactions*, 44, 1296.
- Cladouhos, T.T., M. Swyer, C. Ulberg, K. Crosby, C. Forson, A.N. Steely, & **NC Davatzes** (2017). Geologic, geophysical, and geothermal characteristics of St. Helens shear zone: Washington State play fairway analysis. *GSA Abstracts with Programs*, 49(6). doi: 10.1130/abs/2017AM-307572.
- Davatzes, N.C.**, R.C. Laboso, C.E. Layland-Bachmann, K.L. Feigl, W. Foxall, A.R. Tabrez, R.J. Mellors, D.C. Templeton, & J. Akerley (2017). Are geothermal systems stressed out? *AGU Fall Meeting*, New Orleans, LA, December.
- Davatzes, N.C.**, M.W. Swyer, T.T. Cladouhos, A. Steely, & C. Forson (2017). Geomechanical play-fairway analysis of geothermal prospects in the Cascades Range of Washington State, USA. *IMAGE Meeting: Novel Approaches for Geothermal Exploration*, Akureyri, Iceland, October 2017. (*invited*)
- Forson, C., A.N. Steely, T.T. Cladouhos, M.W. Swyer, **NC Davatzes** et al. (2017). Geothermal exploration using play-fairway analysis in Washington state. *GSA Abstracts with Programs*, 49(6). doi: 10.1130/abs/2017AM-301774.
- Wang, H.F., K.L. Feigl, J. Patterson et al. (incl. **NC Davatzes**) (2017). Characterization of material properties at Brady Hot Springs, Nevada by inverse modeling of data from seismology, geodesy, and hydrology. *AGU Fall Meeting*, abstract #H41O-01, New Orleans, LA.
- *Schoenball, M. & **NC Davatzes** (2016). Quantifying the heterogeneity of the stress field derived from local and global borehole data. *AGU Fall Meeting*, San Francisco, CA, December.
- Hickman, S., **N.C. Davatzes**, E. Zemach, E. Chabora, S. Lutz, R. Rose, E. Majer, A. Robertson-Tait, C. Barton, R. Benoit, M. Zoback, D. Dempsey, S. Kelkar, & D. Moos (2013). Geomechanical controls on fault reactivation, fluid flow and induced seismicity in natural and engineered geothermal systems. *GEISER Workshop: Geothermal Engineering Integrating Mitigation of Induced Seismicity in Reservoirs*, Convento di San Domenico Maggiore, Napoli, May 30–31, 2013. (*invited*) 3 p.
- Davatzes, N.C.**, *M. Swyer, D. Lockner, J.G. Solum, & *N. Anyamele (2010). Mechanisms of fault gouge evolution and physical properties. *American Geophysical Union National Meeting*, San Francisco, CA.

- Davatzes, A.E.K., **N.C. Davatzes**, & V. Gulick (2010). Evidence for persistent and catastrophic fault-controlled fluid flow on Mars. *Geological Society of America Southeastern Section Meeting*.
- *Lukens, B., P.W. Oliver, & **N.C. Davatzes** (2010). Senior student mentorship in field methods. *GSA Northeastern & Southeastern Sections Joint Meeting*, March 13–16, 2010.
- *Anyamele, N., **N.C. Davatzes**, & J.G. Solum (2009). Sources of clay in fault rock of the Moab Fault, Utah. *AAPG/SEPM Joint Annual Meeting*, Denver, Colorado.
- Davatzes, N.C.** (2008). Controls on vertical variation in fluid flow from borehole analysis of fractures, stress and mineralogy. *AAPG/SPE/SEG Hedberg Conference, Faulting Panel Discussion Leader*, Casper, Wyoming, July 14–18. (invited panel)
- Maerten, F., L. Maerten, & **N.C. Davatzes** (2007). Poly3D boundary element code with inequality constraints: More potential to model natural structures. *European Geophysical Union Annual Meeting*.
- Lockner, D.A., J.G. Solum, & **N.C. Davatzes** (2006). The effect of brine composition and concentration on strength of expandable clays. *American Geophysical Union Joint Assembly*, San Francisco, California.
- Davatzes, A.E.K., **N.C. Davatzes**, & V.C. Gulick (2006). Relationship of fault geometry to catastrophic outflow on Mars. *American Geophysical Union Joint Assembly*.
- Penuel, W., P. Kreikemeier, D. Venezky, A. Davatzes, & **N.C. Davatzes** (2006). Assessing teachers' comprehension of what matters in Earth science. *American Geophysical Union Joint Assembly*.
- Aydin, A., **N.C. Davatzes**, & E. Flodin (2003). Conjugate faults in the brittle realm: Old and new perspectives. *Geological Society of America Abstracts with Programs*, Seattle, Washington.
- Davatzes, N.C.** & M.B. Gray (1998). Strain partitioning and factorization in the Silurian Keefer Sandstone, central Appalachians. *Geological Society of America Annual Meeting*.

SELECTED RESEARCH REPORTS

- Akerley, J., & Robertson-Tait, A. (2025). *Feasibility of Enhanced Geothermal Systems (EGS) Development at Bradys Hot Springs, Nevada* (Report No. 3021439). U.S. Department of Energy Office of Scientific and Technical Information (OSTI). <https://doi.org/10.2172/3021439> (DOE project research contributed by **N.C. Davatzes**)
- Steely, A., T. Cladouhos, **N. Davatzes** et al. (2021). Geothermal Play-Fairway Analysis of Washington State Prospects: Final Report. DOE Contract DE-WGS-6728, Report #: DOE-WGS-6728 Washington Dept. of Natural Resources. <https://doi.org/10.2172/1823116>
- NC Davatzes**, K. Feigl, H. Wang, R. Mellors, W. Foxall, D. Templeton, T. Ali, & P. Drakos (2020). Development of tools for coupled InSAR and seismicity monitoring of EGS reservoir development and management. Final Technical Report, DOE Geothermal Technology Program. <https://www.osti.gov/biblio/1642469>
- Kuscu, L.S., L. Mink, C. Rose, **NC Davatzes**, & R. Holt (2019). Exploratory geothermal drilling, Surprise Valley. California Energy Commission, Contract GEO-16-005. Pub #: CEC-300-2023-007, 88 p.
- Forson, C., A.N. Steely, T. Cladouhos, M. Swyer, **NC Davatzes** et al. (2017). Geothermal Play-Fairway Analysis of Washington State Prospects: Phase 2 Report and Phase 3 Proposal. Report to Geothermal Technologies Program. 52 p.
- Davatzes, N.C.**, K. Feigl, H. Wang, R. Mellors, W. Foxall, & P. Drakos (2015). PHASE 1 Stage Gate Go/No-Go Report: Development of tools for coupled InSAR and seismicity monitoring of EGS reservoir development and management. DOE Geothermal Energy Technology Program. 115 p.
- Drakos, P., E. Zemach, A. Robertson-Tait, E. Chabora, S. Lutz, B. Ayling, P. Rose, D. Moos, S. Hickman, **N.C. Davatzes** et al. (2011). Brady's EGS Project Phase I: Studies and Engineering Report. DOE Award DE-GO-18200. 41 p.
- Davatzes, N.C.** & S. Hickman (2006). Fracture and Stress Analysis. In: Rose, P. (PI), *Creation of an Enhanced Geothermal System through Hydraulic and Thermal Stimulation*. Report to DOE, pp. 11–36; 135–164. 237 pp.

INVITED LECTURES / SPEAKERS

- 2021 **Davatzes, N.C.** Power from Earth's heat: How geothermal energy systems could improve our energy outlook? *Featured Speaker*, Second Anniversary PEP Bandung International Webinar, Bandung, Indonesia, September 8, 2021.
- 2020 **Davatzes, N.C.** Invited participant: ICDP Scientific Drilling Workshop: Deep Geothermal Test Borehole, Cornell Campus, January 8–10.
- 2019 **Davatzes, N.C.** Geothermal Energy Systems. IPB Agricultural University, Bogor, Indonesia, May 13; ITB Technical University, Bandung, Indonesia, May 16.
- 2018 **Davatzes, N.C.** What can heterogeneity of stress in the brittle crust tell us? *Gordon Research Conference on Rock Deformation*, Andover, NH, August 19–24.
- 2018 **Davatzes, N.C.** Are geothermal systems stressed out? Recruiting Seminar, Bucknell University, Lewisburg, PA, October 12.
- 2017 **Davatzes, N.C.** Geomechanical play-fairway analysis. *IMAGE Final Conference: Novel Approaches for Geothermal Exploration*, Akureyri, Iceland, October 4–6.
- 2016 **Davatzes, N.C.** Geomechanics of geothermal systems: Lessons from the Basin and Range. Dept. of Geosciences, Univ. of Massachusetts, Amherst, February 5.
- 2015 **Davatzes, N.C.** Geothermal feedback: Stress, active faulting, and fluid flow. *USC Distinguished Lecture Series*, June 11.
- 2013 **Davatzes, N.C.** et al. Structural and geomechanical constraints in designing an EGS: Desert Peak Geothermal Field, Nevada. Cornell University, December 4; China EGS Workshop, Jilin University, July 9–10.
- 2012 **Keynote: Davatzes, N.C.** Structural and geomechanical constraints in designing an EGS. *International Congress on Enhanced Geothermal Systems*, Freiburg, Germany, May 25.
- 2012 **Invited Lecture Series: Davatzes, N.C.** Three lectures, Geological & Nuclear Sciences of New Zealand, Taupo, August 28–31.
- 2011 **Davatzes, N.C.** Advanced formation evaluation seminar: Applications to geothermal systems. Colorado School of Mines, February 15.
- 2011 **Davatzes, N.C.** Alternative stress observations from boreholes. SCEC Annual Meeting Workshop on Community Stress Model, Palm Springs, CA, September 10.
- 2009 **Davatzes, N.C.** Geothermal energy: Active faulting, stress, and fluid flow at the Coso Geothermal Field, CA. University of Pennsylvania, Dept. of Earth and Environmental Science Seminar.
- 2007 **Davatzes, N.C.** Borehole geophysical methods in the development of geothermal reservoirs. *Geothermal Resources Council*, Reno, Nevada.
- 2007 **Davatzes, N.C.** Stress, faulting, and fluid flow in the Coso Geothermal Field. *Chevron Corporation*.
- 2006 **Davatzes, N.C.** Structural controls of geothermal systems. *Exploration Techniques Short Course, GRC Annual Meeting*.
- 2006 **Davatzes, N.C.** Controls on geothermal system permeability at the Coso Geothermal Field. *UC Davis Lecture Series*.

WORKSHOPS, SHORT COURSES & FIELD TRIPS

- 2014 **Davatzes, N.C.**, J. Ziagos, & N. Lindsey. Invited 5-day Geothermal Training Course (Winter School), Ilya State University, Tbilisi, Georgia, March 3–7. Topics covered: Reservoir Geomechanics; Geophysical Well Characterization; Site Screening; Reservoir Characterization and Management; Geothermal Geology; Case Study: Coso Geothermal System.
- 2007 **Davatzes, N.C.** Invited lecturer on borehole geophysical methods. *Geothermal Resources Council Annual Meeting*.
- 2006 **Davatzes, N.C.** Structural Controls of Geothermal Systems. *Exploration Techniques Short Course, GRC Annual Meeting*.
- 2004 **Davatzes, N.C.** & A. Aydin. Stanford Sedimentology Research Group fieldtrip to Southern Nevada: Buffington Pockets and Valley of Fire State Park.

- 2002 **Davatzes, N.C.** & A. Aydin. Gordon Research Conference: Rock Deformation (Il Ciocco, Italy): Sequence and distribution of deformation mechanisms along a slipping normal fault in sandstone.
- 2001 Aydin, A., **Davatzes, N.C.**, & P. Eichhubl. Rock Fracture Project Field Workshop: Moab Fault & Arches National Park, UT. Field Guide: *Fractures and faults in sandstone — Moab Revisited*. 71 p.
- 1999 Aydin, A., **Davatzes, N.C.** et al. Rock Fracture Project Field Workshop: Capitol Reef, UT. Field Guide: *Fractures and faults in folded rocks: the Waterpocket Monocline and the San Rafael Anticline*. 78 p.

RESEARCH GRANTS

Active Grants

None

Previously Funded Grants

- 2017–2021 PI: C. Forson; Co-I: A.N. Steely, T. Cladouhos, M. Swyer, **N.C. Davatzes** et al. Washington State Play-Fairway Analysis Phase 3. DOE Geothermal Technologies Program.
- 2013–2020 **Davatzes, N.C.** (PI). USGS-Temple cooperative research on tectonic and geothermal systems. USGS Geothermal Energy Program. (\$499,835). Renewed annually.
- 2016–2017 PI: D.K. Norman; Co-I: **Davatzes, N.** et al. Washington State Play-Fairway Analysis Phase 2. (Total: \$715,909; sub-award to Temple: \$19,977).
- 2014–2017 **Davatzes, N.C.** (PI). Lawrence Berkeley National Laboratory collaborative agreement: Geomechanical analysis of geothermal systems. (\$32,000).
- 2014–2017 Feigl, K.L. (PI); **Davatzes, N.C.** (Co-I) et al. PoroTomo: Poroelastic Tomography by Adjoint Inverse Modeling. DOE Geothermal Technologies Program. (Sub-award to Davatzes: \$101,145).
- 2013–2017 Feigl, K.L. (PI); **Davatzes, N.C.** Interferometric analysis of JERS-1, ALOS, and ALOS-2 SAR data over geothermal areas. JAXA.
- 2012–2017 **Davatzes, N.C.** (PI), S. Hickman. Brady's EGS Demonstration Phase II. (\$65,194). ORMAT, Nevada.
- 2011–2017 **Davatzes, N.C.** (PI), K. Feigl, H. Wang, R. Mellors, W. Foxall, & P. Drakos. Development of tools for coupled InSAR and seismicity monitoring. (\$1,552,447). DOE Geothermal Technologies Program. Award DE-EE0005510.
- 2015–2016 FORGE Milford Site, Utah (Phase 1). Co-I (sub-contract from Utah Geological Survey). DOE DE-FOA-0000890. (\$10,000).
- 2014–2015 PI: D.K. Norman; Co-I: **Davatzes, N.** et al. Washington State Play-Fairway Analysis Phase 1. (Total: \$274,810; sub-award: \$22,847).
- 2013–2015 Feigl, K.L. (PI); **Davatzes, N.C.** Interferometric analysis of SAR data over geothermal areas. German Space Agency (DLR), TerraSAR-X.
- 2012–2013 Hutapea, P. (PI); **Davatzes, N.C.** (Co-PI) et al. Acquisition of a Scanning Electron Microscope for Multidisciplinary Research. (\$475,000). DoD DURIP.
- 2012 **Davatzes, N.C.** (PI). Blue Mountain BHTV log analysis. (\$13,400). Nevada Geothermal Power.
- 2011–2014 Feigl, K.L. (PI); **Davatzes, N.C.** (Co-PI). Constraining the rheology of Earth's crust by interferometric radar measurements at geothermal areas. German Aerospace Centre (DLR), TerraSAR-X.
- 2011–2012 **Davatzes, N.C.** & S. Hickman. Development of an EGS at Desert Peak, NV. (\$210,000). Ormat Energy, DOE.
- 2011–2012 **Davatzes, N.C.** Fractures and stress in the Fallon FOH-3D geothermal well. (\$20,846). Epsilon System Solutions.
- 2011–2012 Boufadel, M.C. (PI); **Davatzes, N.C.** (Co-PI). Evaluation of the upwelling of natural gas and liquids during hydrofracking of shale formations. (\$66,000). William Penn Foundation.
- 2011 **Davatzes, N.C.** Evolution of fault zone permeability and strength, Moab Fault, Utah. (\$25,000). Shell Petroleum.

- 2010–2016 Ghassemi, A. & **N.C. Davatzes**, Development of a geological and geomechanical framework for the analysis of MEQ in EGS experiments (Geysers). (\$195,523 to Temple; total \$1,607,442). DOE.
- 2010–2014 **Davatzes, N.C.** & S. Hickman. Newberry Volcano EGS Demonstration. (\$670,000). AltaRock Energy / DOE.
- 2010–2012 **Davatzes, N.C.** & S. Hickman. Brady's Geothermal Field EGS Project mechanical analysis. (\$75,000). Ormat Energy.
- 2010–2012 J.O. Kaven, **N.C. Davatzes**. Fault geometry and mechanics in the Coso Geothermal Field. (\$123,599/year × 4 years = \$494,396). USGS.
- 2009 **Davatzes, N.C.** Use of multiple stimulations to improve economics of EGS in shallow high-temperature intrusives. (\$215,000). AltaRock Energy, DOE.
- 2008–2010 **Davatzes, N.C.** Evolution of hydraulic and mechanical properties of clay-rich fault rocks. (\$145,265). Shell Petroleum Technologies Research Group.
- 2008 **Davatzes, N.C.** Visiting Scientist. (\$6,180). USGS.
- 2008 Faulds, J., M. Coolbaugh, **N.C. Davatzes**, & G. Oppliger. Characterizing structural controls on geothermal systems in the Northern Great Basin. (\$10,690). Great Basin Center for Geothermal Research.
- 2006–2007 **Davatzes, N.C.** (Co-PI). Creation of an Enhanced Geothermal System through hydraulic and thermal stimulation. (\$175,000). DOE, FOA DE-FC07-01ID14186.
- 2004–2006 **Davatzes, N.C.** Investigating host rock mineralogical and petrophysical controls on fracture. (\$160,000). USGS Mendenhall Postdoctoral Fellow program.

MENTORING

Postdoctoral Research Advisor (Temple University)

- 2014–2017 **Martin Schoenball** — Research on tectonic and geothermal systems integrating geomechanics and potential fields geophysics. (Jointly advised by Davatzes and Jonathan Glen, USGS)
- 2013–2016 **Dr. Tabrez Ali** — Poroelastic modeling of impulse and response in geothermal systems. (Jointly advised with Dr. Kurt Feigl)
- 2009–2012 **Dr. J. Ole Kaven** — Fault geometry and mechanics in the Coso geothermal field. (Jointly advised by Davatzes and Steven H. Hickman, USGS)

Ph.D. Dissertation External Reviewer

- 2023 **Sahand Khabiri (Civil & Environmental Engineering, Temple University)** — Uncertainty Quantification of Landslide Susceptibility Mapping Using Bayesian Network. 151 p.
- 2017 **Cecile Massiot (Victoria University of Wellington)** — Fracture system characterization and implications for fluid flow in volcanic and metamorphic rocks. 198 p.
- 2014 **Ing. Branislav Fričovský (Technical University of KOŠICE)** — Composite conceptual model and hydrogeothermal evaluation of the Bešeňová elevation hydrogeothermal structure. 300 p.

Ph.D. Research Committee Member (Temple University)

- 2024–present **Pralad Phuyal** — TBD (in Renewable Energy Food Systems)
- 2023–2026 **Caroline Merheb** — Evaluating Urban Agrivoltaics for Microclimate Regulation and Food-Energy Co-Production in Temperate Climates
- 2019–2024 **Chong Seok Choi** — Environmental impacts of renewable energy development; co-locating solar energy and agriculture in tropical areas.
- 2019–2025 **Louise Borthwick** — Geophysical imaging of subglacial geology beneath Thwaites Glacier
- 2013–2018 **Owen Callahan (University of Texas, Austin)** — Interactions between chemical alteration, fracture mechanics, and fluid flow in hydrothermal systems.

Masters Research Advisor (Temple University)

- 2023–2025 **Rebecca Juliet Ayanwunmi** — *Contact Metamorphism Accompanying Dike Injection in Surprise Valley, CA, USA* (<https://sites.temple.edu/ncdavatzes/files/2025/07/AYANWUNMI-Rebecca-2025.pdf>)
- 2023–2025 **Colin Krzystek** — *Evolution of Dikes in Surprise Valley, California: Relationship Among Dikes and Basin and Range Tectonics* (<https://sites.temple.edu/ncdavatzes/files/2025/07/KRZYTEK-Colin-2025.pdf>)
- 2020–2022 **Brecann Stowe** — *Combined Structural Analysis of Core and Image Log of TGH MB76-31 East of Mt. Baker, Washington State* (graduated) (<http://dx.doi.org/10.34944/dspace/7708>)
- 2019–2022 **Morgan Sawyer** — *Potential Role of Dikes in Damaging Rock to Support Hydrothermal Fluid Flow, Surprise Valley California, USA: Implications for Geothermal Development* (<http://dx.doi.org/10.34944/dspace/7680>)
- 2017–2019 **Phillip Drew Spake** — *Geothermal Exploration North of Mount St. Helens* (<http://dx.doi.org/10.34944/dspace/2424>)
- 2014–2016 **Roselyne Laboso** — *Spatial Heterogeneity of Permeability as Influenced by Stress States and Fault Slip* (<http://dx.doi.org/10.34944/dspace/3137>)
- 2013–2015 **Olivia Wells** — *Investigation of the source and evolution of fracture surface topography and its dependence on slip* (<http://dx.doi.org/10.34944/dspace/4008>)
- 2011–2013 **Justin Roth** — *Quantifying the volume of porosity in fractured and un-fractured rocks from the Newberry Volcano* (Co-Advisor: Alexandra Davatzes) (<http://dx.doi.org/10.34944/dspace/3479>)
- 2010–2012 **Michael Swyer** — *Evaluating the role of the rhyolite ridge fault system in the Desert Peak geothermal field, NV: Boundary element modeling* (<http://dx.doi.org/10.34944/dspace/2479>)
- 2009–2011 **Kelly Blake** — *Quantifying Length-Scale Dependence of Stress Heterogeneities in the Earth's Crust: Coso Geothermal Field, CA* (<http://dx.doi.org/10.34944/dspace/794>)
- 2009–2011 **Kirby Runyon** — *Tectonic pressurization of Athabasca Valles: Mapping and modeling of a graben-sourced outflow system on Mars* (Co-Advisor; Primary: Alexandra Davatzes) (<http://dx.doi.org/10.34944/dspace/2264>)
- 2008–2009 **Nwachukwu Anyamele** — *Characterizing mechanisms of clay gouge formation and implications for permeability, Moab fault, Utah* (graduated) (<http://dx.doi.org/10.34944/dspace/8199>)

Masters Research Advisor (RES School of Renewable Energy Science, Iceland)

Note: Students spent time as visiting researchers in the Davatzes Laboratory, with projects initiated during the summer session of their 1st year. Unless otherwise noted, Davatzes was the primary research advisor.

- 2010–2011 **Joseph Batir (Co-Advisor: R. Asmundsson)** — Stress field characterization of the Hellisheidi Geothermal Field and possibilities to improve injection capabilities. (<https://hdl.handle.net/1946/7758>)
- 2010–2011 **James Drew Fetterman** — Analysis of porosity generation in geothermal systems. (<https://hdl.handle.net/1946/7748>)
- 2010–2011 **Amelia Letvin** — Cuttings and geophysical log analysis at the Newberry Geothermal Field.
- 2009–2010 **Tryana Garza-Cruz** — Numerical modeling of the nucleation conditions and geometry of petal-centerline fractures below a borehole. (top-of-class)

Masters Research Committee Member (Temple University) — Selected

- 2025–present **Emma Holtzman** — Investigating the Antarctic Circumpolar Current in Climate Models: Using observations to evaluate model representation
- 2023–present **Mohammed Moin** — Modeling target rock composition of two impact events
- 2023–2025 **Sean Becker** — Archean spherule size distributions: Implications for the continent Vaalbara and separation of the Pilbara and Kaapvaal cratons.
- 2022–2025 **Natalie Thomas** — Evaluating soil carbon sequestration potential at multifunctional solar energy facilities.
- 2019–2021 **JoAnna Marlow** — Sources of Uncertainty in Remote Stratigraphic Observations
- 2018–2020 **Nolan Barrette** — Geophysical imaging of tunnel channels in central Wisconsin
- 2018–2020 **Alex Rocarro** — Geophysical mapping of sub-ice-shelf bathymetry in Amundsen Sea Embayment
- 2017–2019 **Chong Seok Choi** — Combined land use of solar infrastructure and agriculture for socioeconomic and environmental co-benefits in the tropics
- 2013–2015 **Haley Rodack** — Using fracture flow modeling to understand back matrix diffusion in pump and treat remediation.

- 2013–2014 **Stephen Peterson** — Geologic, geomorphic and geographic controls on lead and other heavy metals in Philadelphia's Fairmount Park soils.
- 2011–2013 **Joseph Frederickson** — Craniofacial ontogeny in *Centrosaurus apertus*.
- 2010–2012 **Alyssa Finlay** — A new method for CO₂ sequestration: Indirect mineral carbonation of bone using a two-step aqueous phase process.
- 2008–2010 **Catherine Jedrzejczyk** — Monitoring the effectiveness of stormwater infiltration trenches at the Pennypack Preserver, Montgomery County, Pennsylvania.

TEACHING

Courses Taught — Temple University

- SCTC 1001** College of Science and Technology 1st Year Seminar
- SCTC 1003** Fragile Future to Sustainable Society (Developer. /Teacher): Seminar introducing EES students to departmental research themes and careers. (Developed 2022)
- EES 0836** Disasters: Geology vs. Hollywood (Teacher): General Education course on natural disasters through the lens of Hollywood film.
- EES 2001** Physical Geology (Teacher): Laboratory course introducing earth materials, processes, and systems.
- SCTC 2001 / EES 2002** Science of Energy Resource Consumption (Developer / Teacher): Introduction to energy resources, systems including their limitations, impacts, and benefits; public science communication of controversial issues. (Created 2015)
- EES 2051** Introduction to Data Visualization and Analysis for Earth and Environmental Science (Developer / Teacher). (Created 2017)
- EES 3051/5051** Natural Hazards (Teacher / Developer): Laboratory course covering earth systems that cause natural hazards and risk assessment (Created 2025)
- EES 4001/5001** Structural Geology (Teacher / Developer): Laboratory course introducing structural geology and methods (Created 2008)
- EES 5801** Quantitative Structural Geology (Teacher / Developer): Laboratory course developing quantitative methods in Matlab for the analysis and modeling of brittle structures (Created 2008)

Short Courses and External Teaching

- 2014 **Davatzes, N.C.**, J. Ziagos, & N. Lindsey. 5-day Geothermal Resource Characterization short course (Winter School), Ilya State University, Georgia. Topics: Reservoir Geomechanics; Geophysical Well Characterization; Site Screening; Reservoir Management; Geothermal Geology; Case Study: Coso Geothermal System.
- 2008, 2009, 2010 GEO605 Geothermal Drilling and Logging, RES School of Renewable Energy Science, Akureyri, Iceland (invited visiting professor, each summer) (Developer / Teacher).
- 1998–2000 Teaching Assistant, Stanford University: GES 1 Introductory Geology; GES 151 Depositional Systems; GES 217 Characterization and Hydraulics of Rock Fractures; GES 254 Diagenesis and Transfer Processes in Sedimentary Basins.

SERVICE

Journal Editor

- 2013–2020 Editorial Board, *Geothermal Energy* (Springer Open). [springer.com/journal/40517](https://www.springer.com/journal/40517)

Reviewer — Articles / Manuscripts

Geofluids, Geology, GSA Bulletin, Geophysical Research Letters, GEOSPHERE, Geothermics, Geothermal Energy, Journal of Geophysical Research, Journal of the Geological Society of London, Journal of Structural Geology, Tectonophysics, USGS internal reviewer, Water Resources Reviews

Committee / Task Force / Workshop Member — Selected

- 2015 **U.S. DOE, SubTER Roundtable Meeting**, Germantown, MD, May 22. Led to DOE white paper: *Controlling Subsurface Fractures and Fluid Flow: A Basic Research Agenda*. Member: N.C. Davatzes, J. Fredrich, B. Gilbert, P. Kelemen, K. Maher, J. Miller, et al. (National)
- 2014 **JASON Advisory Group Briefing**, General Atomics, La Jolla, CA, June 20. Topic: 'Constraining State of Stress from Boreholes. (National)
- 2011 Invited speaker: Borehole televiewer logging and analysis. **Brady's EGS Workshop**, Ormat NV, Reno.
- 2010 Invited participant: **Joint DOE/GEISER Consortium Workshop on Induced Seismicity**, Reykjavik, Iceland, October 4–5. (International)
- 2009 Invited member: **NREL Expert Panel: Enhanced Geothermal Systems Reservoir Risk Analysis**. (National)
- 2008 **Hedberg Conference (AAPG)**, Casper, WY: Faulting Panel discussion leader, July 14–18.
- 2007 Invited member: **DOE Working Group: The Future of Geothermal Energy: EGS Workshop**, Washington, D.C. (National)
- 2007 Invited member: **DOE Expert Working Group: Enhanced Geothermal Systems Reservoir Creation Workshop**, Houston, TX. (National)
- 2006 Invited member: **DOE Exploration Research Planning Meeting**. (National)
- 2005–2007 **USGS Geothermal Resources Assessment**. (National)

Conference Chair / Convener

- 2006 Workshop on Geothermal Reservoir Engineering — Convener, paired special session on the Coso EGS project. (International)
- 2005 American Geophysical Union Joint Assembly — Convener, special session: Geothermal Systems: Fantastic natural laboratories and valuable energy resources. (International)

Temple University Committee Service

2009–present: Middle States Assessment | 2010–present: Open House/Experience Temple University | 2025, 2024, 2023, 2022, 2021, 2018: EES Departmental Newsletter (Chair) | 2024–2025 EES Undergraduate Curriculum Committee | 2021–2022: Classroom Design Committee (Chair) | 2017–2019: Graduate Student Recruiting Committee | 2016–2017: Periodic Program Review Committee (Chair) | 2015–2017: Certificates Development Program Committee; CST Merit Committee | 2015, 2012, 2010: Departmental Seminar Series Chair | 2014–2016: Science Library Committee | 2014–2015: Curriculum Committee Co-Author Ph.D. Handbook; Faculty Search Committee Chair | 2013: Faculty Search Committee | 2008: Ph.D. Proposal Writing Committee

Education and Public Outreach

- 2024, 2025 S. Ravi and N. Davatzes hosted PA State Rep. Chris Rabb at the Agrivoltaic Test Site, Ambler Field Station, January 9, 2025; March 15, 2024.
- 2024 Dr. Davatzes (EES Chair) interviewed by CBS Philadelphia about the M4.8 earthquake, April 5, 2024.
- 2024 S. Ravi and N. Davatzes hosted PA State Rep. Chris Rabb at the Agrivoltaic Test Site, Ambler Field Station, March 15.
- 2022 Dr. Davatzes interviewed by KYW Newsradio about catastrophic earthquakes. Available as podcast.
- 2016, 2017 Abington Friends School Science Night: 'The Earthquake Machine' — Kindergarten through 5th grade.
- 2013–2015 AFS Outside Planning Committee: Phase 2; Design Team; Case Statement Team.
- 2011–2012 Planning Committee Member, Abington Friends School Outdoor Learning Center.
- 2011 Science Enrichment Activity: 'Earthquake Machine' (3rd grade) and 'Tree Ring Dating' (Kindergarten), Abington Friends School.
- 2006 California State Textbook Commission Reviewer ([Science 2006 Primary Adoption Report](#)): Panel member for Earth science teacher training (K-8) reviewed textbooks and experiential learning elements for accuracy and consistency with state science standards.

HONORS / AWARDS

2014	Geothermics 2013 Certificate of Excellence in Reviewing
2013	College of Science and Technology, Temple University — Dean's Mentoring Award
2010	Invited Visiting Professor, RES School of Renewable Energy Science, Iceland
2009	Invited Visiting Professor, RES School of Renewable Energy Science, Iceland
2008	Invited Visiting Professor, RES School of Renewable Energy Science, Iceland
2003	USGS Mendenhall Postdoctoral Research Fellow
2002	Shell Grant, Stanford University
1998	Dr. and Mrs. Thomas Davies Barrow Fellowship, Stanford University
1998	McGee Grant, Stanford University
1998	Phi Beta Kappa / Sigma Xi
1998	Harold W. Miller Prize (best University Honors Thesis), Bucknell University
1998	Richard P. Nickelsen Prize (excellence in geology), Bucknell University
1994–1998	Dean's List, Bucknell University
1993	Norwalk Jazz Festival, CT — Best Soloist
1993	National Merit Scholar Finalist, Wilton High School, CT

PROFESSIONAL EXPERIENCE & CONSULTING

2004	Greystone Pictures — Expert consultant, documentary <i>Countdown to Armageddon</i> : plate tectonics and geology of Earth's evolution.
2004	Personnel Protection Technologies LLC — Developed Matlab scripts to analyze radar for a new suicide-bomber detection device.
2002	ConocoPhillips Petroleum Company — Internship.
1998–2000	Southwest Research Institute , Center for Nuclear Waste Regulatory Assessment — Two internships: (1) Structural analysis of faults in Owens Valley, CA, to assess seismic risk. (2) Magnetic study of dikes in San Rafael volcanic field, UT, as analogue for nuclear waste repository risk at Yucca Mtn., NV.