

LLUÍS SALÓ-SALGADO, PHD

✉ salo@utk.edu



RESEARCH INTERESTS

I conduct research at the intersection of geology, flow in porous media, and geomechanics to mitigate geohazards and address outstanding scientific challenges related to energy development in complex subsurface systems.

In particular, my work focuses on developing physics-based and data-driven computational tools—anchored with field and experimental observations—to elucidate the interplay between geologic discontinuities, fluid migration, and seismicity. I seek to enable sustainable development of engineered geosystems for the energy transition.

Keywords: Geosystems engineering, geoenergy, fault hydrogeology, multiphysics reservoir simulation

EDUCATION

- 2024 **Massachusetts Institute of Technology**, Cambridge, MA, USA
PhD in Geotechnical and Geoenvironmental Engineering
Faculty advisor: Ruben Juanes
Thesis: *Numerical Modeling of Geologic Carbon Dioxide Storage in Faulted Siliciclastic Settings*
- 2016 **Universitat Politècnica de Catalunya**, Barcelona, Spain
MS in Geotechnical and Earthquake Engineering
- 2014 **Universitat de Barcelona**, Barcelona, Spain
BS in Geology

PROFESSIONAL APPOINTMENTS

- 01/2026– **Assistant Professor**
Barbara McDonald Endowed Professorship in Energy Transition
Dept. of Earth, Environmental, and Planetary Sciences • The University of Tennessee, Knoxville
- 2023–2025 **Postdoctoral Fellow** • Dept. of Earth and Planetary Sciences • Harvard University
Postdoctoral Associate • Dept. of Civil and Environmental Engineering • MIT
Faculty mentors: John Shaw (Harvard) and Ruben Juanes (MIT)

FELLOWSHIPS AND HONORS

- 2021 “la Caixa” Foundation Postgraduate Fellowship • “la Caixa” Foundation
- 2020 MathWorks Engineering Fellowship • The MathWorks & SoE at MIT
- 2017 Eni-MIT Energy Fellowship • MIT Energy Initiative
- 2017 Michael F. Parlamis (1962) and Goldberg-Zoino (1954) Combined Fellowship • MIT CEE
- 2016 Highest GPA in the MS cohort in Geotechnical and Earthquake Engineering (9.7/10) • UPC

RESEARCH

INVITED TALKS

2026-06	IMEDEA, Esporles, Spain	Workshop on the Limits and Promise of Geo-Energies
2026-05	Universitetet i Bergen	Porous Media Group, seminar
2026-04	The University of Tennessee, Knoxville	Civil and Environmental Engineering, seminar
2026-03	The University of Tennessee, Knoxville	Bredesen Center, seminar
2026-02	The University of Texas at Austin	Petroleum and Geosystems Engineering, graduate seminar
2025-11	Harvard University	Earth and Planetary Sciences, colloquium
2024-12	GCS-SEPM, Houston, TX	Perkins-Rosen Conference
2024-07	The University of Texas at Austin (virtual)	Gulf Coast Carbon Center, PREDICT workshop
2024-06	The University of Texas at Austin (virtual)	Gulf Coast Carbon Center, PREDICT workshop
2024-01	Massachusetts Institute of Technology (virtual)	MIT Energy Initiative, guest lecture
2023-11	Harvard University	Earth and Planetary Sciences, BiSEPPS seminar
2023-04	Massachusetts Institute of Technology	Earth Resources Laboratory, FISH seminar
2022-09	Universitat Politècnica de Catalunya	Civil and Environmental Engineering, GHS seminar
2022-09	ICGC, Barcelona, Spain	Energy Transition & Geohazards colloquium
2022-05	SINTEF Digital, Oslo, Norway	Computational Geosciences, seminar
2021-10	Universitetet i Bergen	Porous Media Group, seminar

GRANTS

2026–2027 “CO₂ Migration along Faults in CCS Projects” (PI: R. Juanes and Ll. Saló-Salgado). Funded by ExxonMobil Technology and Engineering Company (\$111,711 to PI Saló-Salgado)

SUPERVISION

Color indicates the supervisee’s primary institution: **UTK**, **Harvard**, **MIT**.

Postdoctoral Researchers

- 2026– **RUBÉN VIDAL MONTES** Supervised research: Computational modeling of fault hydraulic properties for CO₂ storage
- 2026– **L. T. OZGUR YILDIRIM** Supervised research: Experimental modeling and characterization of clay-smearred fault–fluid interactions

Undergraduate Students

- 2025– **ANGELA LIU** (co-advised with Hannah Lu and Ruben Juanes). MIT Undergraduate Research Opportunities Program: Enhancing Modeling of Subsurface Fluid Flow in Fractured Rocks through Machine Learning
- 2025 **PENELOPE SALMON** (co-advised with John H. Shaw). Supervised research: Pore pressure evolution during hydrogen storage in a depleted hydrocarbon field
- 2024–2025 **CHLOE FAIR** (co-advised with Natasha Toghramadjian and John H. Shaw). B.S. Thesis: “Utilizing Abandoned Oil and Natural Gas Wells in the LA Basin for Carbon Sequestration and Hydrogen Storage”
- 2024–2025 **BEN LITTLEJOHN** (co-advised with Andreas Plesch and John H. Shaw). Harvard Program for Research in Science and Engineering: Evaluation of Potential Underground Hydrogen Storage Sites in the Los Angeles Basin
- Ben published an article in *IJHE* based on this work

- 2024–2025 **JULIA MANSFIELD** (co-advised with Andreas Plesch and John H. Shaw). B.S. Thesis: “A Comparative Assessment of the Capacity for CO₂ Storage in Depleted Hydrocarbon Reservoirs of the Los Angeles Basin, California, Using Multiphase Flow Simulations”
- Julia was awarded Harvard FAS’s *Hoopes Prize* for her honors thesis
- 2024 **RIDDHI BHAGWAT** (co-advised with Hannah Lu and Ruben Juanes). MIT Undergraduate Research Opportunities Program: Enhancing Subsurface Fluid Flow and Solute Transport Modeling through Machine Learning: A Study of Fractured Rocks Using FracNet
- 2023–2024 **JOYCE QU** (co-advised with Hannah Lu and Ruben Juanes). MIT Undergraduate Research Opportunities Program: Sensitivity Analysis of Lithological Controls and Surrogate Modeling for Fault Permeability in Siliciclastic Sediments
- 2022–2024 **RUNAKO GENTLES** (co-advised with Hannah Lu and Ruben Juanes). MIT Undergraduate Research Opportunities Program: Clustering of carbon dioxide injection-induced earthquakes using feature-based representation of time series data

MEMBERSHIPS

- 2026– International Society for Porous Media
- 2026– Society of Petroleum Engineers
- 2025– Society for Industrial and Applied Mathematics
- 2018– American Geophysical Union

TEACHING

INSTRUCTOR

- UTK** EEPS 590: Modeling and Simulation of Subsurface Energy Systems (graduate)
Fall 2026
- EEPS 690: Seminar in Earth & Environmental Sciences (graduate)
Spring 2026
- Harvard** (Guest Instructor) EPS 272: Topics in Structural Geology & Earthquake Science (graduate)
I gave lectures and led discussion sessions (Fall 2025)
- MIT** (Lab Instructor) 1.000: Introduction to Computer Programming and Numerical Methods for Engineering Applications (undergraduate)
Language: Python. I gave lectures, hosted weekly office hours, and graded assignments (Fall 2024)

TEACHING ASSISTANT

- MIT** TA in 1.723: Computational Methods for Flow in Porous Media (graduate)
Hosted weekly office hours and graded all assignments (Fall 2020, Fall 2022)
- UPC** TA in Geology (undergraduate)
Supervised petrology and geological mapping labs (Spring 2016)

PEDAGOGICAL TRAINING

- 2026 Adult Mental Health First Aid Certificate, UTK

2024 Research Mentoring Certificate, MIT
2023 Kaufman Teaching Certificate Program, MIT

SERVICE

CONFERENCES

2026 (Scheduled) Primary session convener, “*Coupled Fault Processes in Carbon Sequestration, Hydrogen Storage, and Geothermal Energy*”, AGU Fall Meeting, San Francisco, CA
(Scheduled) Co-organizer, “*Fault Zones and Fluid Flow, from Outcrops to Algorithms*”, GSA Connects, Denver, CO
(Scheduled) Co-organizer, “*Graph Neural Networks and Digital Twins for Geological Storage of CO₂*”, SIAM Conference on Mathematics of Planet Earth, Cleveland, OH
Member of the Technical Committee, *HydroML Symposium*, hosted by UT Austin, TX
Co-organizer, “*MS03: Flow, Transport and Mechanics in Fractured Porous Media*”, InterPore, Nantes, France

2025 Primary session convener, “*Interplay between Fault Architecture and Coupled Processes in Carbon Sequestration, Hydrogen Storage, and Geothermal Energy*”, AGU Fall Meeting, New Orleans, LA

2024 Primary session convener, “*Predictive modeling and risk assessment in subsurface geoenery technologies*”, AGU Fall Meeting, Washington, DC
Discussion leader, “*Communicating your research to support solutions to the climate and energy transition*”, Gordon Research Seminar in Flow and Transport in Permeable Media, Newry, ME

2023 Primary session convener, “*Fault zone fluid migration and induced seismicity potential in geoenery technologies*”, AGU Fall Meeting, San Francisco, CA

COMMITTEES

2026– Member of the Energy Science and Engineering Admissions Committee, Bredesen Center, UTK
2026– Member of the Graduate Admissions Program Committee, EEPS, UTK
2020–2022 Treasurer, Spain@MIT
2018–2020 Graduate student committee member, MIT Civil and Environmental Engineering

OUTREACH/CAREER MENTORING

2026 Speaker, Knox Climate Watch: “Managing Fault Hazards in Subsurface Energy Systems”
2024 Graduate Application Assistance Program mentor, MIT Civil and Environmental Engineering
2023 K-12 student mentor, MIT Museum: “Computer science applications in the 21st century”
2023 Speaker, Harvard Museum of Natural History: “Earthquakes and their impacts in society”
2021 Panelist, MIT Civil and Environmental Engineering: “Communication in graduate school”

REVIEWER

Journals Energy & Fuels, Water Resources Research, Geophysical Research Letters, Journal of Hydrology, SPE Journal, iScience, Journal of Geophysical Research: Solid Earth, Earth and Space Science, International Journal of Greenhouse Gas Control, Transport in Porous Media, Engineering Geology, Scientific Reports, Environmental Science: Processes & Impacts, Natural Hazards & Earth System Sciences

Conferences HydroML (2026), American Rock Mechanics Association (2023, 2024), American Geophysical Union OSPA program (2023)

Books EGS the Future Energy Road Ahead (CRC Press, 2023)

PUBLICATIONS

* indicates students I advised.

IN REVIEW

3. H. Lu, **Lluís Saló-Salgado**, Y.-T. Chou, E. Haghghat, and R. Juanes. Learning and inferring multiphase flow dynamics in porous media using scientific machine learning: Application to the “FluidFlower” CO₂ injection experiment, 2026a. Submitted for publication. Preprint available at 10.48550/arXiv.2606.05448
2. **Lluís Saló-Salgado**, J. A. Silva, A. Plesch, F. D. Wolfe, J. H. Shaw, and R. Juanes. Stress state, subsidence, and faulting in the Wilmington Oil Field, California: a multiphase flow–geomechanics modeling assessment (1936–2020), 2026. Submitted for publication. Preprint available at 10.48550/arXiv.2605.16711
1. H. Lu, **Lluís Saló-Salgado**, and R. Juanes. Sensitivity analysis and surrogate modeling for lithological controls on fault permeability, 2025a. Submitted for publication. Preprint available at 10.48550/arXiv.2511.09674

PUBLISHED

11. B. Littlejohn*, **Lluís Saló-Salgado**, A. Plesch, and J. H. Shaw. Integrated geologic and socio-economic evaluation of potential underground hydrogen storage sites in the Los Angeles Basin. *International Journal of Hydrogen Energy*, 202:152964, 2026. 10.1016/j.ijhydene.2025.152964
10. H. Lu, **Lluís Saló-Salgado**, Y. M. Marzouk, and R. Juanes. Uncertainty quantification of fluid leakage and fault instability in geologic CO₂ storage. *Water Resources Research*, 61(10):e2024WR039275, 2025b. 10.1029/2024WR039275
9. **Lluís Saló-Salgado**, J. A. Silva, L. Lun, C. M. Rogers, J. S. Davis, and R. Juanes. Assessing CO₂ migration within faults during megatonne-scale geologic carbon dioxide storage in offshore Texas. *Water Resources Research*, 61(5):e2024WR037059, 2025a. 10.1029/2024WR037059
8. **Lluís Saló-Salgado**, O. Møyner, K.-A. Lie, and R. Juanes. Three-dimensional simulation of geologic carbon dioxide storage using MRST. *Advances in Geo-Energy Research*, 14(1):34–48, 2024b. 10.46690/ager.2024.10.06. [SI: MRST]
7. M. Haugen, **Lluís Saló-Salgado**, K. Eikehaug, B. Benali, J. W. Both, E. Storvik, O. Folkvord, R. Juanes, J. M. Nordbotten, and M. Fernø. Physical variability in meter-scale laboratory CO₂ injections in faulted geometries. *Transport in Porous Media*, 151:1169–1197, 2024. 10.1007/s11242-023-02047-8. [SI: FluidFlower]
6. **Lluís Saló-Salgado**, M. Haugen, K. Eikehaug, M. Fernø, J. M. Nordbotten, and R. Juanes. Direct comparison of numerical simulations and experiments of CO₂ injection and migration in geologic media: Value of local data and forecasting capability. *Transport in Porous Media*, 151:1199–1240, 2024a. 10.1007/s11242-023-01972-y. [SI: FluidFlower]
5. J. A. Silva, **Lluís Saló-Salgado**, J. Patterson, G. R. Dasari, and R. Juanes. Assessing the viability of CO₂ storage in offshore formations of the Gulf of Mexico at a scale relevant for climate-change mitigation. *International Journal of Greenhouse Gas Control*, 126(6):103884, 2023. 10.1016/j.ijggc.2023.103884
4. **Lluís Saló-Salgado**, J. S. Davis, and R. Juanes. Fault permeability from stochastic modeling of clay smears. *Geology*, 51(1):91–95, 2023. 10.1130/G50739.1
3. J. A. Gili, R. Ruiz-Carulla, G. Matas, J. Moya, A. Prades, J. Corominas, N. Lantada, M.-A. Núñez Andrés, F. Buill, C. Puig, J. Martínez-Bofill, **Lluís Saló**, and O. Mavrouli. Rockfalls: analysis of the block fragmentation through field experiments. *Landslides*, 2022. 10.1007/s10346-021-01837-9
2. **Lluís Saló**, J. Corominas, N. Lantada, G. Matas, A. Prades, and R. Ruiz-Carulla. Seismic energy analysis as generated by impact and fragmentation of single-block experimental rockfalls. *Journal of Geophysical Research: Earth Surface*, 123(6):1450–1478, 2018. 10.1029/2017JF004374.

† Featured in journal cover

1. **Lluís Saló**, T. Frontera, X. Goula, L. G. Pujades, and A. Ledesma. Earthquake static stress transfer in the 2013 Gulf of Valencia (Spain) seismic sequence. *Solid Earth*, 8:857–857, 2017. 10.5194/se-8-857-2017

OTHER WRITING

- **Lluís Saló-Salgado**, A. Acocella, I. Arzuaga García, S. El Mousadik, and A. Zvinavashe. Managing up: how to communicate effectively with your PhD adviser. *Nature*, 2021. 10.1038/d41586-021-03703-z

RECENT CONFERENCE TALKS

- H. Lu, **Lluís Saló-Salgado**, Y. M. Marzouk, and R. Juanes. Uncertainty quantification of fluid leakage and fault instability in geologic CO₂ storage. In *InterPore 18th Annual Meeting, May 19–22, Nantes, FRA*. International Society for Porous Media, 2026b
- **Lluís Saló-Salgado**, J. A. Silva, A. Plesch, J. H. Shaw, and R. Juanes. Coupled flow and geomechanics modeling of ground deformation and fault stability at the Wilmington field, CA, 1936-2020. In *AGU Fall Meeting, December 15–19, New Orleans, LA*. American Geophysical Union, 2025b
- **Lluís Saló-Salgado**, J. A. Silva, A. Plesch, J. H. Shaw, and R. Juanes. Coupled flow and geomechanics modeling of ground deformation and fault stability at the Wilmington field, CA, 1936-2020. In *SIAM Geosciences, October 14–17, Baton Rouge, LA*. Society for Industrial and Applied Mathematics, 2025c