Birendra Jha

Assistant Professor
Department of Chemical Engineering and Materials Science
Department of Civil and Environmental Engineering (courtesy appointment)
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Education

01/2014	Ph.D., Civil and Environmental Engineering, Massachusetts Institute of Technology, Dissertation: "Flow Through Porous Media: From Mixing of Fluids to Triggering of Earthquakes"
06/2010	M.S., Civil and Environmental Engineering, Massachusetts Institute of Technology
06/2005	M.S., Petroleum Engineering, Stanford University
06/2001	B.Tech., Petroleum Engineering, Indian Institute of Technology Dhanbad, India

Professional Appointments

01/2016-	Assistant Professor of Chemical Engineering and Materials Science, University of Southern California, Los Angeles, CA.
01/2022-	Assistant Professor of Civil and Environmental Engineering (courtesy), University of Southern California, Los Angeles, CA.
01/2014–12/2015	Postdoctoral Research Associate, Civil and Environmental Engineering Massachusetts Institute of Technology, Supervisor: Ruben Juanes
09/2006-01/2009	Reservoir Engineer, Occidental Oil and Gas, Long Beach, CA. Waterflood and subsidence management in the Wilmington oilfield through surveillance, production optimization and numerical modeling. Reserves and performance forecasting for waterflood assets and shale gas reservoirs.
06/2005-09/2006	Reservoir Engineer, iReservoir, Denver, CO. Geomodeling and numerical simulation of oil and gas fields. Petrophysical evaluation, production forecasting, drill pattern optimization, and reserves estimation.
06/2001-09/2003	Reservoir Engineer, Schlumberger Asia Services Ltd., Mumbai, India. Design and interpretation of wireline tests to evaluate and monitor reservoir pressure and saturation, well productivity/injectivity, and wellbore mechanical integrity.
06/2004-09/2004	Reservoir Engineer Intern, ConocoPhillips, Houston, TX. Quantification of uncertainty in rock and fluid properties using Experimental Design and Bayesian inversion methods.

Research Interests

Theory and computation of coupled multiphase flow, transport, and rock deformation processes in natural and engineered geosystems

Honors and Awards

01/2023	NSF CAREER Award, Hydrologic Sciences Program
04/2023	Chevron Research Innovation Award, University of Southern California

05/2021	Regional Formation Evaluation Award, Society of Petroleum Engineers
03/2021	American Chemical Society Petroleum Research Fund Certificate of Recognition
05/2020	Distinguished Achievement Award for Petroleum Engineering Faculty, Society of Petroleum Engineers
12/2020	Orange County Engineering Council's Outstanding Educator Award
05/2014	Best Doctoral Thesis Award, Civil and Environmental Engineering, MIT
12/2010	Outstanding Student Paper Award, Hydrology American Geophysical Union Fall Meeting
12/2009	Outstanding Student Paper Award, Hydrology, American Geophysical Union Fall Meeting
02/2009	Schoettler PhD Fellowship, Civil and Environmental Engineering, MIT
06/2008	Performance award for leading with an original development strategy, Occidental Petroleum
05/2003	Top Contributor award, Knowledge-In-Action, Schlumberger
08/2002	Oil India Medal from the Mining, Geological and Metallurgical Institute of India
06/2001	Gold Medal in Petroleum Engineering, Srinivasan Gold Medal, and SBM Gold Medal in Offshore Drilling Design and Production, Indian School of Mines

Peer-reviewed Journal

Citations = 1852, h-index = 21. Web of Science ResearcherID: X-4248-2019.
Below, my name is highlighted in bold, my students' names have * after them, and corresponding authors are underlined. Journal name in blue hyperlinks to the paper, where available.

At USC:

[1] A. Bonazzi, **B. Jha**, F. P. J. de Barros, Influence of initial plume shape on miscible porous media flows under density and viscosity contrasts, *Journal of Fluid Mechanics*, doi: 10.1017/jfm.2023.710, (2023)
Impact Factor: 3.7 *Contribution*: Directed the research, designed the simulator and the simulations, and co-wrote the paper.

[2] D. K. Tiwari, M. Hari, B. Kundu, **B. Jha**, B. Tyagi and K. Malik, Delhi urbanization footprint and its effect on the earth's subsurface state-of-stress through decadal seismicity modulation, *Scientific Reports*, doi: 10.1038/s41598-023-38348-7, (2023)
Impact Factor: 4.6 *Contribution*: Directed the research, designed the simulations, and co-wrote the paper.

[3] G. L. Manjunath*, Z. Liu*, **B. Jha**, Multi-stage hydraulic fracture monitoring at the lab scale, *Engineering Fracture Mechanics*, 109448, (2023)
Impact Factor: 5.4 *Contribution*: Directed the research, designed the experiments, conducted analysis, and co-wrote the paper.

[4] S. Meguerdijian*, R. J. Pawar, B. Chen, C. W. Gable, T. A. Miller, **B. Jha**, Physics-Informed Machine Learning for Fault-Leakage Reduced-Order Modeling, *International Journal of Greenhouse Gas Control*, 125, (2023)
Impact Factor: 4.4 *Contribution*: Directed the research, designed the simulations, conducted analysis, and co-wrote the paper.

[5] R. Dabloul*, B. Jin, **B. Jha**, Failure analysis of the edge-notched beam test on fluid-exposed Berea Sandstone, *Acta Geotechnica*, (2023)
Impact Factor: 5.74 *Contribution*: Directed the research, designed the experiments, conducted analysis, and co-wrote the paper.

[6] G. L. Manjunath*, A. T. Akono, I. Haljasmaa, **B. Jha**, Role of CO2 in geomechanical alteration of Morrow Sandstone across micro-meso scales, *International Journal of Rock Mechanics and Mining Sciences*, 163 (2022)
Impact Factor: 6.85 *Contribution*: Directed the research, designed the experiments, conducted analysis, and co-wrote the paper.

[7] S. Dana*, X. Zhao*, **B. Jha**, A two-grid simulation framework for fast monitoring of fault stability and ground deformation in multiphase geomechanics, *Journal of Computational Physics*, 466 (2022)
Impact Factor: 4.65 *Contribution*: Directed the research, designed the simulations, conducted analysis, and co-wrote the paper.

[8] S. Dana*, **B. Jha**, Towards A Poroelastodynamics Framework For Induced Earthquakes: Effect Of Pore Pressure On Fault Slip, *International Journal for Multiscale Computational Engineering*, 20 (2022)
Impact Factor: 1.59 *Contribution*: Directed the research, designed the simulations, conducted analysis, and co-wrote the paper.

[9] A. Bubshait*, **B. Jha**, Revisiting 2013-2014 Azle seismicity to understand the role of Barnett production on stress propagation and fault stability, *Geophysics*, 87 (2022)
Impact Factor: 3.29 *Contribution*: Directed the research, designed the simulations, conducted analysis, and co-wrote the paper.

[10] S. Meguerdijian*, R. J. Pawar, D. R.Harp, **B. Jha**, Thermal and solubility effects on fault leakage during geologic carbon storage, *International Journal of Greenhouse Gas Control*, 116, 103633, doi: 10.1029/2021WR029584 (2022)
Impact Factor: 4.40 *Contribution*: Directed the research, designed the simulations, conducted analysis, and co-wrote the paper.

[11] M. Tran*, **B. Jha**, Effect of poroelastic coupling and fracture dynamics on solute transport and geomechanical stability, *Water Resources Research*, 57, doi: 10.1029/2021WR029584 (2021)
Impact Factor: 6.16 *Contribution*: Directed the research, designed the simulations, conducted analysis, and co-wrote the paper.

[12] X. Zhao*, **B. Jha**, Diagnostic and predictive analysis of production and injection-induced fault activation, *International Journal for Numerical and Analytical Methods in Geomechanics*, doi: 10.1002/nag.3304 (2021)
Impact Factor: 4.23 *Contribution*: Directed the research, designed the simulations, conducted analysis, and co-wrote the paper.

[13] S. Meguerdijian*, **B. Jha**, Quantification of fault leakage dynamics based on leakage magnitude and dip angle, *International Journal for Numerical and Analytical Methods in Geomechanics*, doi: 10.1002/nag.3267 (2021)
Impact Factor: 4.23 *Contribution*: Directed the research, designed the simulations, conducted analysis, and co-wrote the paper.

[14] F. Zheng, A. Jahandideh, **B. Jha**, B. Jafarpour, Geologic CO2 Storage Optimization under Geomechanical Risk Using Coupled-Physics Models, *International Journal of Greenhouse Gas Control*, doi: 10.1016/j.ijggc.2021.103385 (2021)
Impact Factor: 4.40 *Contribution*: Co-directed the research, designed the geomechanical part, and co-wrote the paper.

[15] C. Ashayeri, **B. Jha**, Evaluation of transfer learning in data-driven methods in the assessment of unconventional resources, *Journal of Petroleum Science and Engineering*, 109178, doi: 10.1016/j.petrol.2021.109178 (2021)
Impact Factor: 4.97 *Contribution*: Directed the research, conducted analysis, and co-wrote the paper.

[16] A. Bonazzi, M. Morvillo, J. Im, **B. Jha**, F. P. J. de Barros, Relative impacts of permeability heterogeneity and viscosity contrast on solute mixing, *Physical Review Fluids* 6, doi: 10.1103/PhysRevFluids.6.064501 (2021)
Impact Factor: 2.89 *Contribution*: Co-directed the research, wrote the simulator, conducted analysis, and co-wrote the paper.

[17] D. K. Tiwari, **B. Jha**, B. Kundu, V. K Gahalaut, N. K. Vissa, Groundwater extraction–induced seismicity around Delhi region, India, *Nature Scientific Reports*, 10.1038/s41598-021-89527-3 (2021)
Impact Factor: 5.51 *Contribution*: Directed the modeling research, designed the model, conducted analysis, and co-wrote the paper.

[18] X. Zhao*, **B. Jha**, A new coupled multiphase flow–finite strain deformation–fault slip framework for induced seismicity, *Journal of Computational Physics*, 10.1016/j.jcp.2021.110178 (2021)
Impact Factor: 4.65 *Contribution*: Directed the research, designed the simulations, and co-wrote the paper.

[19] A. Bonazzi, **B. Jha**, F. P. J. de Barros, Transport analysis in deformable porous media through integral transforms, *International Journal for Numerical and Analytical Methods in Geomechanics*, 10.1002/nag.3150 (2020)
Impact Factor: 4.23 *Contribution*: Co-directed the research, designed the simulations, and co-wrote the paper.

[20] D. Panda, B. Kundu, V.K. Gahalaut, R. Burgmann, **B. Jha**, R. Asaithambi*, R. K. Yadav, N. K. Vissa, A. K. Bansal, Reply to "A warning against over-interpretation of seasonal signals measured by the Global Navigation Satellite System", *Nature Communications*, 11 (2020)
Impact Factor: 14.92 *Contribution*: Directed the modeling part, designed the simulations, and co-wrote the paper.

[21] M. Tran* and **B. Jha**, Coupling between transport and geomechanics affects solute spreading and mixing during viscous fingering in deformable aquifers, *Advances in Water Resources*, doi: 10.1016/j.advwatres.2019.103485 (2019)
Impact Factor: 5.22 *Contribution*: Directed the research, co-wrote the simulator, and co-wrote the paper.

[22] A. Bubshait* and **B. Jha**, Coupled Poromechanics–Damage Mechanics Modeling of Fracturing During Injection in Brittle Rocks, *International Journal of Numerical Methods in Engineering*, doi: 10.1002/nme.6208 (2019)
Impact Factor: 3.10 *Contribution*: Directed the research, designed the simulations, and co-wrote the paper.

[23] X. Zhao* and **B. Jha**, Role of Well Operations and Multiphase Geomechanics in Controlling Fault Stability During CO2 Storage and Enhanced Oil Recovery, *Journal of Geophysical Research: Solid Earth*, 124, doi: 10.1029/2019JB017298 (2019)
Impact Factor: 4.30 *Contribution*: Directed the research, designed the simulations, and co-wrote the paper.

[24] G. L. Manjunath* and **B. Jha**, Geomechanical Characterization of Gondwana Shale across Nano-micro-meso Scales, *International Journal of Rock Mechanics and Mining Sciences*, 119, doi: 10.1016/j.ijrmms.2019.04.003 (2019)

Impact Factor: 6.85 *Contribution*: Directed the research, designed the experiments, and co-wrote the paper.

[25] G. L. Manjunath* and **B. Jha**, Nanoscale Fracture Mechanics of Gondwana Coal, *International Journal of Coal Geology*, doi: 10.1016/j.coal.2019.02.007 (2019)
Impact Factor: 6.30 *Contribution*: Directed the research, designed the experiments, and co-wrote the paper.

[26] D. Panda, B. Kundu, V. K. Gahalaut, R. Burgmann, **B. Jha**, R. Asaithambi*, R. K. Yadav, N. K. Vissa, A. K. Bansal, Seasonal modulation of deep slow-slip and earthquakes on the Main Himalayan Thrust, *Nature Communications*, 9, doi: 10.1038/s41467-018-06371-2 (2018)
Impact Factor: 14.92 *Contribution*: Directed the modeling part, designed the simulations, and co-wrote the paper.

[27] S. M. Hosseini, T. H. W. Goebel, **B. Jha**, and F. Aminzadeh, A probabilistic approach to injection-induced seismicity assessment in the presence and absence of flow boundaries, *Geophysical Research Letters*, 45, doi: 10.1029/2018GL077552 (2018)
Impact Factor: 5.58 *Contribution*: Co-directed the research, conducted analysis, and co-wrote the paper.

[28] J. Jagalur-Mohan, **B. Jha**, Z. Wang, R. Juanes, Y. M. Marzouk, Inferring fault frictional and reservoir hydraulic properties from injection-induced seismicity, *Geophysical Research Letters*, 45, doi: 10.1002/2017GL075925 (2018)
Impact Factor: 5.58 *Contribution*: Wrote the simulator, designed and performed the simulations, and co-wrote the paper.

[29] B. Kundu, N. K. Vissa, D. Panda, **B. Jha**, R. Asaithambi*, B. Tyagi, and S. Mukherjee, Influence of meteorological cycle in mid-crustal seismicity of the Nepal Himalaya, *Journal of Asian Earth Sciences* (2017)
Impact Factor: 3.37 *Contribution*: Directed the modeling part, designed the simulations, and co-wrote the paper.

[30] R. Juanes, **B. Jha**, B. H. Hager, J. H. Shaw, A. Plesch, L. Astiz, J. H. Dieterich, C. Frohlich. Were the May 2012 Emilia-Romagna earthquakes induced? A coupled flow-geomechanics modeling assessment. *Geophysical Research Letters*, 43, doi: 10.1002/2016GL069284 (2016)
Impact Factor: 5.58 *Contribution*: Wrote the simulator, designed and performed the simulations, and co-wrote the paper.

Pre-USC:

[31] **B. Jha**, F. Bottazzi, R. Wojcik, M. Coccia, N. Bechor, D. Mc Laughlin, T. A. Herring, B. H. Hager, S. Mantica, and R. Juanes. Reservoir characterization in an underground gas storage field using joint inversion of flow and geodetic data. *International Journal for Numerical and Analytical Methods in Geomechanics*, 39, doi: 10.1002/nag.2427 (2015)
Impact Factor: 4.23 *Contribution*: Wrote the simulator, designed and performed the simulations, and wrote the paper.

[32] C. Nicolaides, **B. Jha**, L. Cueto-Felgueroso, and R. Juanes. Impact of viscous fingering and permeability heterogeneity on fluid mixing in porous media. *Water Resources Research*, 51, doi:10.1002/2014WR015811 (2015)
Impact Factor: 6.16 *Contribution*: Co-wrote the simulator with Nicolaides and co-wrote the paper.

[33] **B. Jha** and R. Juanes. Coupled modeling of multiphase flow and fault poromechanics during geologic CO_2 storage. *Energy Procedia*, 63, doi:10.1016/j.egypro.2014.11.360 (2014)
Impact Factor: 2.63 *Contribution*: Wrote the simulator, performed the simulations, conducted analysis, and wrote the paper.

[34] **B. Jha** and R. Juanes. Coupled multiphase flow and poromechanics: A computational model of pore-pressure effects on fault slip and earthquake triggering. *Water Resources Research*, 50, doi:10.1002/2013WR015175 (2014)
Impact Factor: 6.16 *Contribution*: Wrote the simulator, performed the simulations, conducted analysis, and wrote the paper.

[35] **B. Jha**, L. Cueto-Felgueroso and R. Juanes. Synergetic fluid mixing from viscous fingering and alternating injection. *Physical Review Letters*, 111, 144501 (2013)
Impact Factor: 9.18 *Contribution*: Directed the research, designed the simulations, conducted analysis, and co-wrote the paper.

[36] **B. Jha**, L. Cueto-Felgueroso and R. Juanes. Quantifying mixing in viscously unstable porous media flows. *Physical Review E*, 84 (2011)
Impact Factor: 2.71 *Contribution*: Wrote the simulator, performed the simulations, conducted analysis, and co-wrote the paper.

[37] **B. Jha**, L. Cueto-Felgueroso and R. Juanes. Fluid mixing from viscous fingering. *Physical Review Letters*, 106 (2011) [Featured in popular science media, e.g., the APS flagship magazine Physics Today, Science Daily, Phys.org, Softpedia]
Impact Factor: 9.18 *Contribution*: Wrote the simulator, performed the simulations, conducted analysis, and co-wrote the paper.

[38] **B. Jha** and R. Juanes. A locally conservative finite element framework for the simulation of coupled flow and reservoir geomechanics. *Acta Geotechnica*, 2 (2007)
Impact Factor: 5.57 *Contribution*: Performed the simulations, conducted analysis, and co-wrote the paper.

Conference Papers (not peer-reviewed)

My name is highlighted in bold and my students' names have * after them.

[1] A. Bubshait*, **B. Jha**, Resolving ambiguity in 2008-2015 Irving-Dallas seismicity by coupling geomechanical models at Fort Worth basin and Barnett reservoir scales, Reservoir Simulation Conference, SPE-212170-MS (2023)

[2] X. Zhao*, **B. Jha**, Role of Inelasticity In Production-induced Subsidence And Fault Reactivation in the Groningen Field, Reservoir Simulation Conference, SPE-212234-MS (2023)

[3] F. Zheng, **B. Jha**, B. Jafarpour, Optimization of CO2 Storage and Leakage through Caprock Fracturing using Coupled Flow-Geomechanics-Fracturing Simulation, European Conference on the Mathematics of Oil Recovery (ECMOR) (2022)

[4] A. Krishna, R. Shenoy, **B. Jha**, Z. Liu*, D. Paul, I. Ershaghi, Repurposing Idle Oil and Gas Wells for Large-Scale Subsurface Energy Storage in Saline Aquifers, Society of Petroleum Engineers, Western Regional Meeting, SPE-209260-MS (2022)

[5] M. Tran*, **B. Jha**, Fracture Permeability and Geomechanical Stability During Viscously Unstable Transport Through Deformable Rocks, 55th U.S. Rock Mechanics/Geomechanics Symposium, ARMA-2021-1315 (2021)

[6] C. Ashayeri*, **B. Jha**, Assessment of Unconventional Resources Opportunities in the Middle East Tethyan Petroleum System in a Transfer Learning Context, Abu Dhabi International Petroleum Exhibition & Conference, SPE-207723-MS, doi: 10.2118/207723-MS (2021)

[7] F. Zheng, A. Jahandideh, **B. Jha**, B. Jafarpour, Optimization of CO2 Storage under Geomechanical Risk with Coupled-Physics Models, European Conference on the Mathematics of Oil Recovery (ECMOR) XVII (2020)

[8] F. Zheng, A. Jahandideh, **B. Jha**, B. Jafarpour, Quantification and Incorporation of Geomechanical Risks in Optimization of Geologic CO2 Storage Using Coupled-Physics Models, SPE Annual Technical Conference and Exhibition (ATCE) (2020)

[9] A. Bubshait* and **B. Jha**, A Coupled Multiphase Poromechanics–Damage Mechanics Framework for Fracture Modeling during Injection, International Petroleum Technology Conference, Paper 19675-MS, doi: 10.2523/IPTC-19675-MS (2020)

[10] A. A. Bubshait* and **B. Jha**, A Novel Meshing Routine for Modeling Reservoirs with Multiple Curved and Intersecting Faults In Coupled Flow-Geomechanical Dual 3D Grids, Western Regional Meeting SPE-195256-MS (2019)

[11] X. Zhao* and **B. Jha**, Effect of Well Location and Fault Conductivity on Geomechanical Stability in a Faulted Oil Field, Society of Petroleum Engineers, Western Regional Meeting, SPE-195299-MS (2019)

[12] M. A. Ante*, G. L. Manjunath*, F. Aminzadeh, and **B. Jha**, Microscale Laboratory Studies for Determining Fracture Directionality in Tight Sandstone and Shale during Hydraulic Fracturing, SPE/AAPG/SEG Unconventional Resources Technology Conference, URTEC-2903021-MS, doi:10.15530/URTEC-2018-2903021 (2018)

[13] M. Tran*, F. Aminzadeh and **B. Jha**, Effect of Coupled Flow and Geomechanics on Transport of a Fluid Slug in a Stress-sensitive Reservoir, 52nd U.S. Rock Mechanics/Geomechanics Symposium, ARMA-2018-143 (2018)

[14] M. Samnejad, F. Aminzadeh and **B. Jha**, A Novel Approach for Studying Hydraulic Fracturing Success Factors beyond Brittleness Indices, 52nd U.S. Rock Mechanics/Geomechanics Symposium, ARMA-2018-0187 (2018)

[15] M. A. Ante*, G. L. Manjunath*, F. Aminzadeh, and **B. Jha**, Nano- and Micro-Scale Deformation Behavior of Sandstone and Shale, 52nd U.S. Rock Mechanics/Geomechanics Symposium, ARMA-2018-055 (2018)

[16] S. Meguerdijian* and **B. Jha**, Towards a Discontinuous Galerkin Thermohydromechanical Simulator for Heavy Oil Recovery, Society of Petroleum Engineers, Western Regional Meeting SPE-190073-MS (2018)

[17] A. A. Bubshait*, F. Aminzadeh, and **B. Jha**, An Integrated Framework of Stress Inversion and Coupled Flow and Geomechanical Simulation For 4D Stress Mapping, Society of Petroleum Engineers, Western Regional Meeting, SPE-190048-MS (2018)

[18] R. Asaithambi* and **B. Jha**, Effect of Well Configuration and Flow Rate on Geomechanical Stability of a Fault during Recovery of Fault-Banked Oil, Society of Petroleum Engineers, Western Regional Meeting SPE-190032-MS (2018)

[19] A. Bubshait*, F. Aminzadeh, **B. Jha**, Fracture Modeling in Naturally Fractured Reservoir Using Damage Mechanics Coupled With Poromechanics, Abu Dhabi International Petroleum Exhibition & Conference, SPE-188744-MS (2017)

[20] M. Samnejad, F. Aminzadeh, **B. Jha**, Simulation of Hydraulic Fracturing-Induced Permeability Stimulation using Coupled Flow and Continuum Damage Mechanics, Western Regional Meeting, SPE-187250-MS (2017)

[21] S. Meguerdijian*, **B. Jha**. Development of a Fully Coupled Thermo-Hydro-Mechanics Simulator Using Automated Solution Framework, SPE-185733-MS, Society of Petroleum Engineers Western Regional Meeting (2017)

[22] Q. Qi*, **B. Jha**. A New Method for Geomechanical Modeling of Subsidence Induced Deformation in Fractured Rocks Subjected to Hydraulic Fracturing, Society of Petroleum Engineers Western Regional Meeting, SPE-185708-MS (2017)

[23] R. Asaithambi*, **B. Jha**. Coupled Flow and Geomechanical Modeling of Reservoir Seismicity: Effects of Hydraulic Communication and Well Type, Society of Petroleum Engineers SPE-185641-MS (2017)

[24] D. Castineira, **B. Jha**, R. Juanes. Uncertainty Quantification and Inverse Modeling of Fault Poromechanics and Induced Seismicity: Application to a Synthetic Carbon Capture and Storage (CCS) Problem. American Rock Mechanics Association ARMA-16-151 (2016).

[25] R. Juanes, B. H. Hager, **B. Jha**, J. H. Shaw, A. Plesch, L. Astiz, J. H. Dieterich, C. Frohlich, D. Susanni, F. Colombo, L. Magagnini, Assessment of the Potential for Induced Seismicity at the Cavone Oilfield: Analysis of Structural and Geophysical Data, and Geomechanical Modeling, Offshore Mediterranean Conference and Exhibition, OMC-2015-481 (2015)

[26] **B. Jha**, F. Bottazzi, R. Wojcik, M. Coccia, N. Bechor, D. McLaughlin, T. Herring, B. H. Hager, and R. Juanes. Reservoir characterization in an underground gas storage field using joint inversion of flow and geodetic data. 14th European Conference on the Mathematics of Oil Recovery (2014)

[27] R. Juanes and **B. Jha** A locally conservative finite element framework for the simulation of coupled flow and reservoir geomechanics, Society of Petroleum Engineers Annual Technical Conference and Exhibition, SPE-102812 (2006)

Invited Talks and Seminars

[1] COMPLAS in Geomechanics, XVII International Conference on Computational Plasticity: Fundamentals and Applications, July 2023

[2] Petroleum Technology Luncheon Seminar, Society of Petroleum Engineers Los Angeles Basin Section, November 2021

[3] Society for Industrial and Applied Mathematics, Conference on Mathematical & Computational Issues in the Geosciences, June 2021

[4] NSF Workshop on Bringing Land, Ocean, Atmosphere and Ionosphere Data to the Community for Hazard Alerts, May 2021

[5] GeoScience & GeoEnergy Webinar, TU Delft and Heriot-Watt University, March 2021

[6] Subsurface CO_2 sequestration, SPE North America Student Symposium, February 2020

[7] Machine Learning for Unconventional Resources, University of Houston, November 2019

[8] Department seminar, University of North Dakota, August 2019

[9] Department seminar, Department of Petroleum Engineering, Texas A&M University, April 2018

[10] Lectures at the Whole Value Chain CCUS, Colorado School of Mines, October 2018

[11] Department seminar, Aerospace and Mechanical Engineering, USC, September 2017

[12] 2017 Crustal Deformation Modeling Workshop, Colorado School of Mines, June 2017

[13] Industry short course on geomechanics of induced seismicity, USC, June 2017

[14] UK InterPore Joint Annual Meeting, Edinburgh, January 2016

[15] Earth Sciences Division Seminar, Lawrence Berkeley National Lab, April 2016

[16] American Geophysical Union Fall Meeting, Hydrology Section, San Francisco, December 2015

[17] Department seminar, University of Memphis, April 2015

[18] Gordon research seminar, Bates College, July 2014

[19] Seminar, Petroleum and Geosystems Engineering, University of Texas at Austin, May 2014

[20] Workshop on Computational Geomechanics, University of Pittsburgh, May 2014

[21] Solid Earth Seminar, Boston University, May 2014

Conference Presentations

My name is highlighted in bold and my students' names have * after them.

[1] A. Bonazzi, **B. Jha**, F. de Barros, Influence of initial conditions under density and viscosity contrast in porous media flows, InterPore, Edinburgh, Scotland (2023)

[2] S. Meguerdijian*, R. Pawar, B. Chen, **B. Jha**, C. W. Gable, T. A. Miller, Physics-Informed Machine Learning for Fault-Leakage Reduced-Order Model Development, American Geophysical Union Fall Meeting, Chicago (2022)

[3] S. Meguerdijian*, **B. Jha**, Quantification of Fault Leakage Dynamics in the Presence of fault rupture based on Leakage Magnitude and dip angle, American Geophysical Union Fall Meeting, New Orleans (2021)

[4] X. Zhao*, **B. Jha**, Production-induced subsidence and seismicity with plastic failure: A Groningen field study, American Geophysical Union Fall Meeting, New Orleans (2021)

[5] S. Dana*, **B. Jha**, Modeling the interplay between deep subsurface pressure perturbation, fault stability, surface deformation and earthquake cycles, US National Congress Computational Mechanics (2021)

[6] S. Dana*, **B. Jha**, Two-grid coupled multiphase flow and geomechanics: A computational framework to monitor surface deformation along with fault slip due to pore pressure perturbations, InterPore (2021)

[7] A. Bonazzi, M. Morvillo, J. Im, **B. Jha**, F. P. J. de Barros, Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media, Interpore (2021)

[8] A. Bonazzi, **B. Jha**, F. P. J. de Barros, Transport analysis in deformable porous media through integral transforms, Interpore (2021)

[9] M. Tran*, **B. Jha**, Fracture permeability and geomechanical stability during viscously unstable transport through deformable rocks, 55th American Rock Mechanics Association (2021)

[10] **B. Jha**, Two-Way Coupling Between Solute Transport and Geomechanical Stability in Fractured Deformable Aquifers, Society for Industrial and Applied Mathematics Geosciences (2021)

[11] S. Meguerdijian*, **B. Jha**, Multiphysics Proxy Modeling for Risk Assessment during CCS, American Geophysical Union Fall Meeting (2020)

[12] A. A. Bubshait*, **B. Jha**, Role of Barnett production and flow-geomechanical coupling on stress migration and fault stability in the 2013-2014 Azle earthquake sequence, American Geophysical Union Fall Meeting (2020)

[13] S. Meguerdijian*, J. White, **B. Jha**, Thermoporomechanical Effects of CO2 Injection on Caprock Sealing Integrity in Geologic Storage, Computational Methods for Water Resources, Stanford (2020)

[14] A. Bonazzi, M. Morvillo, J. Im, F. de Barros, **B. Jha**, Impact of the Coupled Effect of Viscous Fingering and Subsurface Heterogeneity on Solute Transport, AGU Fall Meeting, H51R-1734 (2019)

[15] X. Zhao* and **B. Jha**, Effect of poroplasticity on geomechanical stability of a faulted reservoir under production, American Geophysical Union Fall Meeting, S22B-03 (2019)

[16] S. Mehran Hosseini, T. Goebel, **B. Jha**, F. Aminzadeh. A Probabilistic Approach to Injection--Induced Seismicity Assessment for Different Reservoir Types and PressureDiffusion Models, American Geophysical Union Fall Meeting, San Francisco (2016)

[17] R. Asaithambi*, **B. Jha**, E. Choi. Coupled Flow and Geomechanical Study of Intraplate Seismicity in the New Madrid Seismic Zone, American Geophysical Union Fall Meeting, San Francisco (2016)

[18] **B. Jha**, F. Bottazzi, R. Wojcik, M. Coccia, N. Bechor, D. McLaughlin, T. Herring, B. H. Hager, S. Mantica, R. Juanes. Reservoir characterization in an underground gas storage field using joint inversion of flow and geodetic data. American Geophysical Union Fall Meeting, San Francisco (2015)

[19] **B. Jha**. Coupled multiphase flow and geomechanics analysis of the 2011 Lorca earthquake. Engineering Mechanics Institute, Stanford (2015)

[20] **B. Jha**, A. Plesch, J. H. Shaw, B. H. Hager, and R. Juanes. Coupled flow and geomechanical modeling of fluid production and injection in the Cavone Oil Field, Northern Italy: an assessment of the potential for induced seismicity, American Geophysical Union Fall Meeting, San Francisco (2014)

[21] **B. Jha** and R. Juanes. Coupled modeling of multiphase flow and fault poromechanics during geologic CO_2 storage. International Conference on Greenhouse Gas Technologies, Austin, (2014)

[22] **B. Jha**, L. Cueto-Felgueroso, and R. Juanes. Synergetic fluid mixing from viscous fingering and alternating injection. American Geophysical Union, San Francisco (2013)

[23] **B. Jha**, N. Bechor, B. H. Hager, and R. Juanes. Coupled multiphase flow and geomechanics: The 2011 Lorca earthquake study. American Geophysical Union Fall Meeting, San Francisco (2013)

[24] **B. Jha**, L. Cueto-Felgueroso, and R. Juanes. Synergetic fluid mixing from viscous fingering and alternating injection. American Physical Society Division of Fluid Dynamics, Pittsburgh (2013)

[25] **B. Jha**, B. H. Hager, and R. Juanes. Coupled modeling of fault poromechanics during geologic CO_2 storage. American Geophysical Union Fall Meeting, San Francisco (2012)

[26] **B. Jha**, L. Cueto-Felgueroso and R. Juanes. A reduced-order model of fluid mixing in strongly heterogeneous porous media. Computational Methods in Water Resources, Univ. of Illinois at Urbana-Champaign, (2012)

[27] J. Chui, **B. Jha**, M. Szulczewski, and R. Juanes. Interface evolution during miscible viscous fingering. American Geophysical Union, San Francisco (2012)

[28] A. A. Pahlavan, **B. Jha**, L. Cueto-Felgueroso, G. McKinley, R. Juanes. Effect of viscosity contrast on mixing and dispersion in a capillary tube. American Geophysical Union, San Francisco (2012)

[29] **B. Jha**, L. Cueto-Felgueroso, and R. Juanes. Mixing in heterogeneous formations. American Geophysical Union, San Francisco (2011)

[30] **B. Jha**, L. Cueto-Felgueroso, and R. Juanes. Fluid mixing from viscous fingering. American Geophysical Union, San Francisco (2010)

[31] **B. Jha**, L. Cueto-Felgueroso, and R. Juanes. Fluid mixing from viscous fingering. American Physical Society Division of Fluid Dynamics, Long Beach (2010)

[32] **B. Jha**, L. Cueto-Felgueroso and R. Juanes. Numerical simulation of mixing in viscous-fingering displacements. Gordon Research Conference on Flow and Transport through Permeable Media, Bates College (2010)

[33] **B. Jha**, L. Cueto-Felgueroso, and R. Juanes. Numerical simulation of mixing in viscous-fingering displacements. American Geophysical Union, San Francisco (2009)

[34] **B. Jha** and R. Juanes. A locally conservative finite element method for coupled flow and geomechanics. Ninth US National Congress on Computational Mechanics, San Francisco (2007)

[35] **B. Jha** and R. Juanes. Modeling of coupled fluid flow and reservoir geomechanics. Symposium on Current Research in Engineering & Applied Mathematics, Society for Industrial and Applied Mathematics, Stanford (2005)

Teaching

Instructor Rating below is the median value and out of 5.0.

Fall 2023	PTE 461 Formation Data Sensing, 4 units. Enrollment: 10. Instructor Rating: 5.0
Fall 2022	PTE 461 Formation Data Sensing, 4 units. Enrollment: 5. Instructor Rating: 5.0
Spring 2022	PTE 412/464 Petroleum Reservoir Engineering, 4 units. Enrollment: 10. Instructor Rating: 5.0
Fall 2021	PTE 461 Formation Data Sensing, 4 units. Enrollment: 12. Instructor Rating: 5.0
Fall 2020	PTE 461 Formation Data Sensing, 4 units. Enrollment: 9. Instructor Rating: 5.0
Fall 2020	PTE 586 Artificial Intelligence and Machine Learning for Subsurface Problems, 3 units. Enrollment: 10. Instructor Rating: 5.0
Fall 2019	PTE 461 Formation Data Sensing, 4 units. Enrollment: 10. Instructor Rating: 5.0
Fall 2019	PTE 592 Computational Geomechanics, 4 units. Enrollment: 9. Instructor Rating: 5.0
Spring 2019	PTE 509 High-Resolution Simulations of Porous Media flows, 3 units. Enrollment: 8. Instructor Rating: 5.0
Spring 2019	PTE 592 Computational Geomechanics, 4 units. Enrollment: 6. Instructor Rating: 5.0
Fall 2018	PTE 461 Formation Data Sensing enrollment: 4 units. Enrollment: 19. Instructor Rating: 4.0
Spring 2017	PTE 592 Computational Geomechanics, 3 units. Enrollment: 9. Instructor Rating: 4.5
Spring 2016	PTE 592 Computational Geomechanics, 3 units. Enrollment: 13. Instructor Rating: 5.0

Curriculum Development Created three new courses: PTE 509 High-Resolution Simulations of Porous Media Flows, PTE 592 Computational Geomechanics, and PTE 586 Artificial Intelligence and Machine Learning in Oilfield Operations. Refurbished two courses: PTE 461 Formation Data Sensing with Well Logs and PTE 464 Reservoir Engineering

Student Mentoring and Advising

Current Students:

PhD Students

[1] Zhongqi Liu, PTE. Since Fall 2021

[2] Mohammed Alasker, PTE. Since Spring 2023

[3] Abdullah Alqadran, PTE. Since Spring 2023

[4] Faeze Ghazvini, CHE. Since Spring 2023

[5] Lifeng Wang, PTE. Since Fall 2023

MS Students

[1] Ramdhan Wibawa, PTE. Since Fall 2023

Undergraduate Students

[1] Alia Harris, MechE. Since Summer 2023

Graduated Students:

PhD Students

[1] Minh Tran, PTE. PhD 2023. Dissertation: *A novel multiphysics coupled framework to model fluid flow, solute transport, and reservoir geomechanics in fractured porous media.* Joined SLB Geothermal as an engineer

[2] Saro Meguerdijian, PTE. PhD 2022. Dissertation: *Dynamics of CO_2 Leakage Through Faults.* Joined Beyond Limits AI as a Data Scientist

[3] Abdulrahman Bubshait, PTE. PhD 2022. Dissertation: *Reactivation of Multiple Faults in Oilfields with Injection and Production.* Joined Saudi Aramco as Reservoir Engineer

[4] Rayan Dabloul, PTE. PhD 2022. Dissertation: *Characterization of Failure processes in Fluid-saturated Rocks.* Joined Saudi Aramco as Reservoir Engineer

[5] Xiaoxi Zhao, PTE. PhD 2020. Dissertation: *A Coupled Multiphase Flow-Geomechanics Framework For Modeling Material, Kinematic And Contact Nonlinearities In Faulted Reservoirs.* Joined LinkedIn as Machine Learning Engineer

[6] Ahmed Bubshait, PTE. PhD 2019. Dissertation: *A Coupled Multiphase Flow-Poromechanics-Damage Mechanics Approach To Model Fracture Propagation.* Joined Saudi Aramco as Reservoir Engineer

MS Students

[1] Renuhaa Asaithambi, PTE. Joined Chevron as Data Scientist

[2] Qianru Qi, PTE

[3] Chenyu Wu, PTE

[4] Zhongqi Liu, PTE. Joined my group as PhD student

[5] Farrukh Sohail, PTE. Joined Amazon as Product Manager

[6] Juan Li, PTE

[7] Patrick Ostoyich, PTE. Joined National Grid as Pipeline Integrity Engineer

Undergraduate Students

[1] Maddy Lee, CHE.

[2] Chumeng Cheng, CHE

[3] You Sun, CHE

[4] Mohammed Idriss, CHE. Joined Saudi Aramco as Engineer

[5] Dylan Chennault, CHE. Joined Aera Energy LLC as Production Engineer

[6] Maya Kota, CHE

[7] Brayden Lantz, CHE

Past Postdoctoral Associates

[1] Saumik Dana. Joined Sapient AI as Principal Computational Lead

[2] Manjunath Lingareddy. Joined Rajiv Gandhi Institute of Technology India as Faculty

Service

Internal:

[1] MFD Graduate Admissions Committee (2019, 2020)

[2] MFD Student Research Symposium Organization Committee (2016 – 2023)

[3] MFD Faculty Seminar Series Organization Committee (2016, 2017)

[4] MFD Student Seminar Series Organizer (2018, 2019)

[5] USC Office of Research, Internal Proposal Reviewer (Rose Hills Fellowship 2019, USC Presidential Working Group on Sustainability 2023)

[6] Chevron–USC Colloquium for High School Science Teachers, Spring 2019 – 2022: Lectures on the topic of geothermal energy practices, issues, and solutions. Attended by 8-15 teachers from different states.

[7] Educational Outreach Programs:

1. **John Adams Middle School**, Los Angeles, Spring 2018 – 2022: Organize annual visits of students and teachers between JAMS and USC. Approximately 80 students and three teachers of JAMS visited USC for a half-day tour of the campus with presentations by USC faculty (MFD and AME) on topics related to energy and the environment, careers in STEM fields, and Viterbi graduate student life. JAMS is a Magnet and Charter School in Los Angeles with approximately 96% of the students from the Hispanic community and approx. 51% female students in the eighth grade
2. **Mira Costa High School**, Manhattan Beach, Summer 2019: Lectures on topics related to petroleum energy, groundwater resource, and human-induced earthquakes. Six lectures with approx. 150 students per lecture
3. **Manhattan Beach Community Church**, Manhattan Beach, Fall 2018: Lecture on a topic related to hydraulic fracturing practices, issues, and solutions. Attended by members from the local community

External:

[1] Technical Committee, Society of Petroleum Engineers Western Regional Meeting, 2024

[2] Technical Committee, Society of Petroleum Engineers Western Regional Meeting, 2022

[3] Technical Committee, Society of Petroleum Engineers Western Regional Meeting, 2021

[4] Technical Committee Society of Petroleum Engineers Western Regional Meeting, 2020

[5] Technical Committee, Society of Petroleum Engineers Western Regional Meeting, 2019

[6] Conference Session Chair, Engineering Mechanics Institute, American Society of Civil Engineers, 2015

[7] Reviewing activities for grant agencies:

1. National Science Foundation (NSF) Hydrologic Sciences (2019, 2020, 2022)
2. NSF Geophysics (2015)
3. Department of Energy (DOE) National Energy Technology Lab (2018)
4. United States Geological Survey (USGS) External Grants Program (2019)
5. American Chemical Society PRF (2017, 2019, 2020, 2021, 2023)

[8] Reviewing activities for journals: Acta Geotechnica, Advances in Water Resources, Computational Geosciences, Computer Methods in Applied Mechanics and Engineering, Geophysics, Geophysical Research Letter, Geothermics, Geosciences, Hydrogeology, International Journal for Numerical and Analytical Methods in Geomechanics, International Journal for Numerical Methods in Engineering, International Journal of Greenhouse Gas Control, Journal of Chemical Physics, Langmuir, Journal of Fluid Mechanics, Journal of Geophysical Research, Journal of Fluid Mechanics, Journal of Mechanics and Physics of Solids, Journal of Natural Gas and Engineering, Journal of Rock Mechanics and Geotechnical Engineering, Physical Review Letters, Physical Review E, Physica A, Physics of Fluids, PLoS One, Society of Petroleum Engineering Journal, Transport in Porous Media, Water Resources Research

January 4, 2024