Stanford

Hamdi Tchelepi

Max Steineke Professor and Senior Fellow at the Precourt Institute for Energy

Energy Science & Engineering

Curriculum Vitae available Online

Bio

ACADEMIC APPOINTMENTS

- Professor, Energy Science & Engineering
- Affiliate, Precourt Institute for Energy
- Member, Institute for Computational and Mathematical Engineering (ICME)

ADMINISTRATIVE APPOINTMENTS

- Chair, Department of Energy Science and Engineering (ESE), Stanford University, (2022- present)
- Chair, Department of Energy Resources Engineering (ERE), Stanford University, (2018-2022)
- Professor, Energy Resources Engineering, Stanford University, (2013- present)
- Co-Director, CEES (Center for Computational Earth & Environmental Sciences), Stanford University, (2010-2018)
- Associate Professor, Energy Resources Engineering, Stanford University, (2003-2013)
- Research Positions, including Staff Research Scientist, Chevron Energy Technology Company, (1994-2003)

HONORS AND AWARDS

- Distinguished Member, SPE (2020)
- Robert Earll McConnell Award, Joint SPE and AIME Societies (2020)
- President's Individual Achievement Award, Successful Completion of Phase 1 of the Intersect Project, ChevronTexaco & Schlumberger (2003)
- Nominee for the Council of Graduate Schools Distinguished Dissertation Award, Stanford University (1994)
- Edmund W. Littlefield Fellow, Edmund W. Littlefield Fellowship (1993-1994)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Co-Director: Center for Computational Earth & Environmental Science (CEES), Stanford University (2010 - 2018)
- Co-Director, SUETRI-B Stanford University Energy Transition Research Institute - ReservoirSimulation, Stanford University (2006 - present)
- Advisory Editor, Journal of Computational Science (2010 - present)
- Chair, Gordon Conference on "Flow and Transport in Permeable Media", Bates College, Maryland, Gordon Research Conferences (2014 - 2014)
- Editorial Board, SIAM Multiscale Modeling & Simulation, SIAM (2014 - 2022)
- Vice-Chair, Gordon Research Conference on Flow in Permeable Media, Switzerland, Gordon Research Conference, Switzerland (2012 - 2012)
- Chair, SPE Reservoir Simulation Symposium, The Woodlands, Texas (2011 - 2011)
- Invited Speaker, Stanford/Aramco/KFUPM Meeting on Research Collaboration, Dhahran, Saudi Arabia (2011 - 2011)
- Lecturer, Short Course on Reservoir Simulation, ENI, Milan, Ente Nazionale Idrocarburi (ENI) (2011 - 2011)

- Co-Director: Stanford Earth Sciences Algorithms & Architecture Initiative (SESAAI), Stanford University (2010 - present)
- Invited Speaker, Computational Geoscience Seminar Series, MIT, MA (2010 - 2010)
- Invited Speaker, Earth Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA (2010 - 2010)
- Instructor, Short Course on Reservoir Simulation, ENI (2010 - 2010)
- Invited Speaker, Flow and Transport in Permeable Media, Bates College, Maine, Gordon Research Conference (2010 - 2010)
- Board Member, SPE Digital Energy Technical Section (2009 - 2011)
- Keynote Speaker, Monte Verita, Switzerland, (March), International Conference on Preferential and Unstable Flow in Porous Media (2009 - 2009)
- Keynote Speaker, Svalbard, Norway (August), Workshop on Modeling and Risk Assessment of Geological Storage of CO2 (2009 - 2009)
- Invited Speaker, Petroleum Institute, Abu-Dhabi, UAE, Petroleum Institute (2008 - 2008)
- Guest Co-Editor, Special Issue on \Multiscale, Computational Geosciences (2008 - 2008)
- Keynote Speaker, Computational Methods in Water Resources (CMWR) (2008 - 2008)
- Instructor, Short Course on Reservoir Simulation, ENI, Milan, Italy (2008 - 2008)
- Invited Speaker, Civil & Environmental Engineering,, USC, Los Angeles, CA (2008 - 2008)
- Invited Speaker, SPE Section & Aramco Advanced Research Center, Dhahran, Saudi Arabia, Society of Petroleum Engineers (2008 - 2008)
- Associate Director, Center for Computational Earth & Environmental Science (CEES), Stanford University (2007 - 2010)
- Invited Speaker, ENI, Milan, Italy (2007 - 2007)
- Invited Speaker, Workshop on Discretization and Scale-up Methods, Princeton University, Princeton, NJ (2007 - 2007)
- Invited Speaker, ExxonMobil Research Lab, Houston, TX., ExxonMobil Research Lab (2007 - 2007)
- Invited Speake, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia (2007 - 2007)
- Invited Speaker, Lecture Series, Aramco Advanced Research Center, Dhahran, Saudi Arabia, Aramco Advanced Research Center (2007 - 2007)
- Invited Speaker, Inaugural Conference on Computational Methods in Energy and Environmental Research (CMEER), July, Beijing, China, Computational Methods in Energy and Environmental Research (CMEER) (2007 - 2007)
- Invited Participant: DOE Basic Energy Sciences (BES): Basic Research Needs for Geosciences: Facilitating 21st Century Energy Systems, Feb., DOE Basic Energy Sciences (BES) (2007 - 2007)
- Lecturer, Short Course on Reservoir Simulation, Milan, Italy, ENI (2007 - 2007)
- Invited Panel Member, SIAM Conf., Computational Sci. & Engineering, CS & E Education, Costa Mesa, Society for Industrial and Applied Mathematics (2007 - 2007)
- Invited Speaker, Structural Engineering and Geomechanics Seminar, Stanford University (2007 - 2007)
- Invited Panelist, Meeting on Technology Impact on EOR, November, National Petroleum Council (NPC) (2006 - 2006)
- Organizing Committee Member, Modeling Flow in Permeable Media, Gordon Research Conference (2006 - 2006)
- Member, SPE Continuing Education Committee (2006 - 2010)
- Guest editor, Special issue, ìMultiscale methods for heterogeneous porous media, Computational Geosciences Journal (2006 - 2006)
- Organizing Committee, SPE Reservoir Simulation Symposium (2006 - 2006)
- Advisory Panel, Center for Computational Earth & Environmental Sciences (CEES), Stanford University (2005 - 2010)
- Co-Chair, Heriot-Watt Forum, Stanford University (2005 - 2005)
- Editorial Board, Transport in Porous Media (2005 - present)
- Organizing Committee, SPE Reservoir Simulation Symposium (2005 - 2005)
- Invited Speaker, Fluid Mechanics Seminar, Mechanical Engineering Department, UC Santa Barbara (2005 - 2005)
- Invited Speaker, CIMMS/IPAM Workshop on Multiscale Modeling and Computation, Caltech, Pasadena, CA, CIMMS/IPAM (2005 - 2005)
- Instructor, Short Course on Reservoir Simulation, Milan, Italy, ENI (2005 - 2005)
- Co-taught Short Course on Reservoir Simulation, Stanford University (2005 - 2005)

- Invited Speaker, International Forum on Reservoir Simulation Stresa, Italy (2005 - 2005)
- Invited Presenter, Institute for Computational and Mathematical Engineering, Stanford University (2005 - 2005)
- Invited Presenter, School of Petroleum Engineering and Geological Engineering, University of Oklahoma (2004 - 2004)
- Graduate Admissions Committee, Energy Resources Engineering Department, Stanford University (2004 - present)
- Co-taught Short Course on reservoir simulation, Stanford University (2004 - 2004)
- Editorial board, Vadose Zone Journal (2003 - 2006)
- Organizing Committee, SPE Reservoir Simulation Symposium (2003 - 2003)
- Invited speaker, SPE Forum on Reservoir Simulation, Park City, Utah (July), Society of Petroleum Engineers (2003 - 2003)
- Invited Speaker, Earth Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA (November), Lawrence Berkeley National Laboratory (2003 - 2003)
- Co-taught Short Course on Reservoir Simulation (August), Stanford University (2003 - 2003)
- Invited speaker, Fundamental Problems in Reservoir Simulation & Optimization, Oxford (April), Schlumberger & Oxford University (2002 - 2002)
- Organizing Committee Member, Modeling Flow in Permeable Media, Gordon Research Conference (2002 - 2002)
- Invited plenary speaker, SIAM Conference on Mathematical & Computational Issues in the Geosciences, Colorado (June), Society for Industrial and Applied Mathematics (2001 - 2001)
- Editorial Board, SPE Journal (2000 - present)
- Invited speaker, Gordon Research Conference on Flow in Permeable Media, New Hampshire (August), Gordon Research Conference (2000 - 2000)
- Invited speaker, Institute of Mathematics & its Applications, Minnesota (February), Institute of Mathematics (IMA) (2000 - 2000)
- Member, SPE, AGU, APS, SIAM (1999 - present)
- Program Committee Member of the Fifth SIAM Conference on Mathematical and Computational Isues in the Geosciences, Society for Industrial and Applied Mathematics (1999 - 1999)

PROFESSIONAL EDUCATION

- Ph.D., Stanford University , Petroleum Engineering (1994)
- M.S., King Fahd University , Petroleum Engineering (1988)
- B.S., University of Petroleum and Minerals , Petroleum Engineering (1985)

PATENTS

- Seong Lee, Yalchin Efendiev, Hamdi Tchelepi. "United States Patent 11,280, 935 B2 Multiphase Flow in Porous Media", Chevron, Schlumberger, Mar 22, 2022
- Moncorge, A. and Tchelepi, H.A.. "United States Patent 8,412,502 B2 System and Method for Performing Oilfield Simulation Operations", Schlumberger-Total, Apr 2, 2013
- Lee, S.H., Zhou, H., and Tchelepi, H.A.. "United States Patent 8,346,523 B2 Indirect-Error-Based Dynamic Upscaling of Multi-Phase Flow in Porous Media", Chevron-Schlumberger, Jan 1, 2013
- Lee, S. H., Zhou, H., and Tchelepi, H. A.. "United States Patent 8,204,726 Multi-Scale Method for Multi-Phase Flow in Porous Media", Schlumberger-Chevron, Jun 19, 2012
- Moncorge, A. and Tchelepi, H.A.. "United States Patent 7,877,246 B2 System and Method for Performing Oilfield Simulation Operations", Schlumberger-Total, Jan 25, 2011
- J. R. Wallis, Hamdi Tchelepi. "United States Patent 7,684,967 Apparatus, Method and System for Improved Reservoir Simulation Using an Algebraic Cascading Class Linear Solver", Mar 23, 2010
- J. R. Wallis, H. A. Tchelepi, and H. Cao. "United States Patent 7,516,056 B2 Apparatus, Method and System for Improved Reservoir Simulation using a Multiplicative Overlapping Schwarz Preconditioning for Adaptive Implicit Linear Systems", Schlumberger Technology Corporation, Apr 7, 2009
- P. Jenny, Hamdi Tchelepi, S.H. Lee. "United States Patent 7,505,882 B2 Stable Method and Apparatus for Solving S-Shaped Non-Linear Functions Utilizing Modified Newton-Raphson Algorithms", Mar 1, 2009
- Jenny, P., Lee, S.H., and Tchelepi, H.A.. "United States Patent 6,823,297 B2 Multi-Scale Finite-Volume Method for use in Subsurface Flow Simulation", Chevron-Schlumberger, Nov 23, 2004
- P. Jenny, S.H. Lee, Hamdi Tchelepi. "United States Patent 2004/0176937A1 Multiscale Finite Volume Method for Use in Subsurface Flow Simulation", Sep 5, 2004

LINKS

- SUPRI-B: Reservoir Simulation: https://supri-b.stanford.edu/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Research

Numerical simulation of flow, transport, and fluid-structure interactions in multiscale porous media.

Areas of ongoing activity: (1) modeling and simulation of unstable miscible and immiscible fluid flow in heterogeneous porous media, (2) development of multiscale numerical solution algorithms for coupled mechanics and multiphase fluid flow in large-scale subsurface formations, and (3) development of stochastic numerical methods that quantify the uncertainty associated with predictions of nonlinear fluid-structure dynamics in heterogeneous porous media.

The application areas include reservoir simulation and subsurface CO2 sequestration at scale. An area of growing interest is modeling and high-fidelity numerical simulation of species transport and fluid-structure interactions in the next-generation of Lithium-ion batteries.

Teaching

I teach courses on multiphase flow in porous media and numerical reservoir simulation.

Professional Activities

President's Individual Achievement Award, sponsored by Chevron and Schlumberger, for successful completion of the Intersect Project (next generation reservoir simulator), 2003; Co-Director, Stanford Reservoir Simulation Affiliates Program (SUPRI-B), 2006-present; Editorial board, Transport in Porous Media, 2005-2010; advisory panel, Center for Computational Earth and Environmental Science, 2005-present; graduate admissions committee, Department of Energy Resources Engineering, 2004-2017; Editorial board, SPE Journal, 2000-present; member, SPE, AGU, APS, SIAM, 1999-present; Edmund W. Littlefield Fellow, 1993-94

Teaching

COURSES

2025-26

- Advanced Subsurface Flow Simulation: ENERGY 224 (Aut)
- Subsurface Flow Simulation: ENERGY 223 (Spr)

2024-25

- ESE Master's Graduate Seminar: ENERGY 351 (Spr)
- ESE PhD Graduate Seminar: ENERGY 352 (Spr)
- Fundamentals of Multiphase Flow: ENERGY 121, ENERGY 221 (Win)
- Subsurface Flow Simulation: ENERGY 223 (Spr)

2023-24

- Advanced Subsurface Flow Simulation: ENERGY 224 (Aut)
- Fundamentals of Multiphase Flow: ENERGY 121, ENERGY 221 (Win)

- Subsurface Flow Simulation: ENERGY 223 (Spr)

2022-23

- ERE Master's Graduate Seminar: ENERGY 351 (Spr)
- ERE PhD Graduate Seminar: ENERGY 352 (Spr)
- Fundamentals of Multiphase Flow: ENERGY 121, ENERGY 221 (Win)
- Subsurface Flow Simulation: ENERGY 223 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Halldora Gudmundsdottir, Zixin Ping, Dang Ton, Jimin Zhou

Postdoctoral Faculty Sponsor

Sidian Chen, Taeho Kim, Yu Qiu

Doctoral Dissertation Advisor (AC)

Yoo Jin Cha, Nik Leuenberger, RALPH PIAZZA, Changgyun Son, Brea Swartwood, Teja Tripuraneni, Sohail Waziri

Doctoral (Program)

Zhibo Dai, Richard Larson, Dimitri Trifunac

Publications

PUBLICATIONS

- **Mathematical Modeling and Experimental Investigations of the Charge-Discharge Mechanisms in Aqueous Batteries** *JOURNAL OF THE ELECTROCHEMICAL SOCIETY*
  Chen, S., Catalina, S. K., Chueh, W. C., Tchelepi, H. A.
  2026; 173 (8)
- **Sensitivity of multiphase flow behaviour to experimental methodology in laboratory core flooding** *INTERNATIONAL JOURNAL OF GREENHOUSE GAS CONTROL*
  Spurin, C., Callas, C., Kurotori, T., Tchelepi, H. A., Benson, S. M.
  2026; 151
- **Method of distributions for transient flow in porous media with uncertain properties** *ADVANCES IN WATER RESOURCES*
  Tripuraneni, S., Tartakovsky, D. M., Tchelepi, H. A.
  2026; 209
- **Optimized Particle Porosity to Alleviate Diffusion-Induced Stresses in High-Capacity Electrodes** *JOURNAL OF THE ELECTROCHEMICAL SOCIETY*
  Joshi, S. A., Tchelepi, H. A., Tartakovsky, D. M.
  2025; 172 (12)
- **Dynamic Mode Decomposition of 4D imaging data to explore intermittent fluid connectivity in subsurface flows** *ADVANCES IN WATER RESOURCES*
  Raizada, A., Berg, S., Benson, S. M., Tchelepi, H. A., Spurin, C.
  2025; 203
- **SEI-Electrolyte Dyads for Dendrite Suppression in Li-Metal Batteries** *JOURNAL OF THE ELECTROCHEMICAL SOCIETY*
  Li, W., Korbitz, W., Tchelepi, H. A., Tran, A.
  2025; 172 (7)
- **The role of injection method on residual trapping: Insights into bridging scales and heterogeneity** *ADVANCES IN WATER RESOURCES*
  Spurin, C., Ellman, S., Bultreys, T., Kurotori, T., Benson, S., Tchelepi, H. A.
  2025; 197

- **Pressure stability in explicitly coupled simulations of poromechanics with application to CO₂ sequestration** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
  Aronson, R. M., Tomin, P., Castelletto, N., Hamon, F. P., White, J. A., Tchelepi, H. A.
  2025; 435
- **Compositional reservoir simulation with a high-resolution compact stencil adaptive implicit method** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Deucher, R. H., Franc, J., Moyner, Tchelepi, H. A.
  2025; 521
- **New algorithm of three-phase equilibrium calculations for CO2-hydrocarbon-water systems** *GEOENERGY SCIENCE AND ENGINEERING*
  Sun, R., Pan, H., Tchelepi, H.
  2025; 244
- **Fully implicit scheme for coupled flow and geomechanics with embedded discrete fracture intersection** *GEOENERGY SCIENCE AND ENGINEERING*
  An, J., Shovkun, I., Tchelepi, H.
  2024; 242
- **Learning CO₂ plume migration in faulted reservoirs with Graph Neural Networks** *COMPUTERS & GEOSCIENCES*
  Ju, X., Hamon, F. P., Wen, G., Kanfar, R., Araya-Polo, M., Tchelepi, H. A.
  2024; 193
- **Python Workflow for Segmenting Multiphase Flow in Porous Rocks** *TRANSPORT IN POROUS MEDIA*
  Spurin, C., Ellman, S., Sherburn, D., Bultreys, T., Tchelepi, H. A.
  2024
- **Design of Stable Hollow Particles for Silicon Anodes** *ACS ENERGY LETTERS*
  Joshi, S. A., Tchelepi, H. A., Tartakovsky, D. M.
  2024
- **Pressure-stabilized fixed-stress iterative solutions of compositional poromechanics** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
  Aronson, R. M., Castelletto, N., Hamon, F. P., White, J. A., Tchelepi, H. A.
  2024; 427
- **Probabilistic Forecast of Multiphase Transport Under Viscous and Buoyancy Forces in Heterogeneous Porous Media** *WATER RESOURCES RESEARCH*
  Rajabi, F., Tchelepi, H. A.
  2024; 60 (3)
- **The role of injection method on residual trapping at the pore-scale in continuum-scale samples** *INTERNATIONAL JOURNAL OF GREENHOUSE GAS CONTROL*
  Spurin, C., Ellman, S., Bultreys, T., Tchelepi, H. A.
  2024; 131
- **Physical-informed deep learning framework for CO2-injected EOR compositional simulation** *ENGINEERING APPLICATIONS OF ARTIFICIAL INTELLIGENCE*
  Sun, R., Pan, H., Xiong, H., Tchelepi, H.
  2023; 126
- **Coupling-strength criteria for sequential implicit formulations** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Franc, J., Moyner, O., Tchelepi, H. A.
  2023; 492
- **Accelerated nonlinear domain decomposition solver for multi-phase flow and transport in porous media** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Jiang, J., Tomin, P., Tchelepi, H.
  2023; 490

- **Core-scale numerical simulation and comparison of breakdown of shale and resulting fractures using sc-CO2 and water as injectants** *GAS SCIENCE AND ENGINEERING*
  Yang, J., Tchelepi, H. A., Kovscek, A. R.
  2023; 118
- **Pore-Scale Fluid Dynamics Resolved in Pressure Fluctuations at the Darcy Scale** *GEOPHYSICAL RESEARCH LETTERS*
  Spurin, C., Roberts, G. G., O'Malley, C. P. B., Kurotori, T., Krevor, S., Blunt, M. J., Tchelepi, H.
  2023; 50 (18)
- **The FluidFlower Validation Benchmark Study for the Storage of CO2** *TRANSPORT IN POROUS MEDIA*
  Flemisch, B., Nordbotten, J. M., Ferno, M., Juanes, R., Both, J. W., Class, H., Delshad, M., Doster, F., Ennis-King, J., Franc, J., Geiger, S., Glaeser, D., Green, et al
  2023
- **Tightly coupled hyperbolic treatment of buoyant two-phase flow and transport in porous media** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Jenny, P., Hasanzade, R., Tchelepi, H.
  2023; 489
- **Screening of Electrolyte-Anode Buffers to Suppress Lithium Dendrite Growth in All-Solid-State Batteries** *JOURNAL OF THE ELECTROCHEMICAL SOCIETY*
  Li, W., Tchelepi, H. A., Tartakovsky, D. M.
  2023; 170 (5)
- **Sequential fully implicit newton method for flow and transport with natural black-oil formulation (MAR, 10.1007/s10596-022-10186-y, 2023)** *COMPUTATIONAL GEOSCIENCES*
  Li, J., Tomin, P., Tchelepi, H.
  2023
- **Comparison of nonlinear field-split preconditioners for two-phase flow in heterogeneous porous media** *COMPUTATIONAL GEOSCIENCES*
  N'diaye, M., Hamon, F. P., Tchelepi, H. A.
  2023
- **Sequential fully implicit newton method for flow and transport with natural black-oil formulation** *COMPUTATIONAL GEOSCIENCES*
  Li, J., Tomin, P., Tchelepi, H.
  2023
- **Method of Distributions for Two-Phase Flow in Heterogeneous Porous Media** *WATER RESOURCES RESEARCH*
  Yang, H., Tchelepi, H. A. A., Tartakovsky, D. M. M.
  2022; 58 (12)
- **High resolution adaptive implicit method for reactive transport in heterogeneous porous media** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Deucher, R. H., Tchelepi, H. A.
  2022; 466
- **Second-order accurate hierarchical approximate factorizations for solving sparse linear systems** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN ENGINEERING*
  Klockiewicz, B., Cambier, L., Humble, R., Tchelepi, H., Darve, E.
  2022
- **Scalable preconditioning for the stabilized contact mechanics problem** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Franceschini, A., Castelletto, N., White, J. A., Tchelepi, H. A.
  2022; 459
- **Stability-Guided Strategies to Mitigate Dendritic Growth in Lithium-Metal Batteries** *JOURNAL OF THE ELECTROCHEMICAL SOCIETY*
  Li, W., Tchelepi, H. A., Ju, Y., Tartakovsky, D. M.
  2022; 169 (6)
- **A Cut-Cell Polyhedral Finite Element Model for Coupled Fluid Flow and Mechanics in Fractured Reservoirs** *SPE JOURNAL*
  Shovkun, Tchelepi, H. A.
  2022; 27 (2): 1221-1243

- **Smooth implicit hybrid upwinding for compositional multiphase flow in porous media** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
  Bosma, S. B. M., Hamon, F. P., Mallison, B. T., Tchelepi, H. A.
  2022; 388
- **QuantImPy: Minkowski functionals and functions with Python** *SOFTWAREX*
  Boelens, A. M. P., Tchelepi, H. A.
  2021; 16
- **Striving to translate shale physics across ten orders of magnitude: What have we learned?** *EARTH-SCIENCE REVIEWS*
  Mehmani, Y., Anderson, T., Wang, Y., Aryana, S. A., Battiato, I., Tchelepi, H. A., Kovscek, A. R.
  2021; 223
- **Nonlinear convergence in contact mechanics: Immersed boundary finite volume** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
  Mehmani, Y., Castelletto, N., Tchelepi, H. A.
  2021; 383
- **Adaptive formulation for two-phase reactive transport in heterogeneous porous media** *ADVANCES IN WATER RESOURCES*
  Deucher, R. H., Tchelepi, H. A.
  2021; 155
- **The Effect of Topology on Phase Behavior under Confinement** *PROCESSES*
  Boelens, A. M. P., Tchelepi, H. A.
  2021; 9 (7)
- **Solution of multiphase Rachford-Rice equations by trust region method in compositional and thermal simulations** *JOURNAL OF PETROLEUM SCIENCE AND ENGINEERING*
  Pan, H., Imai, M., Connolly, M., Tchelepi, H.
  2021; 200
- **Physics-informed machine learning: case studies for weather and climate modelling.** *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences*
  Kashinath, K., Mustafa, M., Albert, A., Wu, J., Jiang, C., Esmaeilzadeh, S., Azizzadenesheli, K., Wang, R., Chattopadhyay, A., Singh, A., Manepalli, A., Chirila, D., Yu, et al
  2021; 379 (2194): 20200093
- **A Nonlinear Solver with Phase Boundary Detection for Compositional Reservoir Simulation** *TRANSPORT IN POROUS MEDIA*
  Khebzegga, O., Iranshahr, A., Tchelepi, H.
  2021
- **Multiscale formulation of frictional contact mechanics at the pore scale** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Mehmani, Y., Castelletto, N., Tchelepi, H. A.
  2021; 430
- **Reduced method for rapid multiphase isenthalpic flash in thermal simulation** *CHEMICAL ENGINEERING SCIENCE*
  Connolly, M., Pan, H., Imai, M., Tchelepi, H. A.
  2021; 231
- **Phase-field modeling of rate-dependent fluid-driven fracture initiation and propagation** *INTERNATIONAL JOURNAL FOR NUMERICAL AND ANALYTICAL METHODS IN GEOMECHANICS*
  Yang, J., Tchelepi, H. A., Kovscek, A. R.
  2021
- **Uncertainty Space Expansion: A Consistent Integration of Measurement Errors in Linear Inversion** *SPE JOURNAL*
  Likanapaisal, P., Tchelepi, H. A.
  2020; 25 (6): 3317–31
- **Algebraically stabilized Lagrange multiplier method for frictional contact mechanics with hydraulically active fractures** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
  Franceschini, A., Castelletto, N., White, J. A., Tchelepi, H. A.

2020; 368

- **Wettability and capillary effects: Dynamics of pinch-off in unconstricted straight capillary tubes** *PHYSICAL REVIEW E*
  Esmaeilzadeh, S., Qin, Z., Riaz, A., Tchelepi, H. A.
  2020; 102 (2)
- **Wettability and capillary effects: Dynamics of pinch-off in unconstricted straight capillary tubes.** *Physical review. E*
  Esmaeilzadeh, S., Qin, Z., Riaz, A., Tchelepi, H. A.
  2020; 102 (2-1): 023109
- **Finite-volume simulation of capillary-dominated flow in matrix-fracture systems using interface conditions** *COMPUTATIONAL GEOSCIENCES*
  Alali, A. H., Hamon, F. P., Mallison, B. T., Tchelepi, H. A.
  2020
- **Two-phase multiscale numerical framework for modeling thin films on curved solid surfaces in porous media** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Qin, Z., Esmaeilzadeh, S., Riaz, A., Tchelepi, H. A.
  2020; 413
- **Continuous Relative Permeability Model for Compositional Simulation** *TRANSPORT IN POROUS MEDIA*
  Khebzegga, O., Iranshahr, A., Tchelepi, H.
  2020
- **Simulation of mineral dissolution at the pore scale with evolving fluid-solid interfaces: review of approaches and benchmark problem set** *COMPUTATIONAL GEOSCIENCES*
  Molins, S., Soulaine, C., Prasianakis, N. I., Abbasi, A., Poncet, P., Ladd, A. J. C., Starchenko, V., Roman, S., Trebotich, D., Tchelepi, H. A., Steefel, C. I.
  2020
- **Cell-centered finite-volume method for elastic deformation of heterogeneous media with full-tensor properties** *JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS*
  Terekhov, K. M., Tchelepi, H. A.
  2020; 364
- **Uncertainty Propagation for Compositional Flow Using a Probability Distribution Method** *Transport in Porous Media*
  Fuks, O., et al
  2020
- **MESHFREEFLOWNET: A Physics-Constrained Deep Continuous Space-Time Super-Resolution Framework**
  Jiang, C., Esmaeilzadeh, S., Azizzadenesheli, K., Kashinath, K., Mustafa, M., Tchelepi, H. A., Marcus, P., Prabhat, Anandkumar, A., IEEE
  IEEE.2020
- **Method of distributions for quantification of geologic uncertainty in flow simulations** *Method of distributions for quantification of geologic uncertainty in flow simulations*
  Yang, H. J., Boso, F., Tchelepi, H. A., Tartakovsky, D. M.
  2020
- **Scaling analysis of coupled compaction, kerogen conversion, and petroleum expulsion during geological maturation** *Journal of Petroleum Science and Engineering*
  Yuan, Q., Mehmani, Y., Burnham, A. K., Lapene, A., Wendebourg, J., Tchelepi, H. A.
  2020; 192
- **Pore-scale study of water salinity effect on thin-film stability for a moving oil droplet.** *Journal of colloid and interface science*
  Abu-Al-Saud, M. O., Esmaeilzadeh, S. n., Riaz, A. n., Tchelepi, H. A.
  2020; 569: 366–77
- **A two-stage preconditioner for multiphase poromechanics in reservoir simulation** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
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