

Hamdi Tchelepi

Professor & Chair
Department of Energy Science and Engineering
Green Earth Sciences Building, 096
Stanford University
Stanford, CA 94305-2220
Phone: (650) 723-9476
email: tchelepi@stanford.edu

Experience

- 9/2022 – Present Chair,
Department of Energy Science and Engineering (ESE)
Stanford University, Stanford, CA.
- 9/2018 – 8/2022 Chair,
Energy Resources Engineering Department
Stanford University, Stanford, CA.
- 7/2003 – Present Faculty Member (Professor)
Energy Resources Engineering Department
Stanford University, Stanford, CA.
- 3/1994 – 7/2003 Research Scientist, Reservoir Simulation Research Team,
Chevron Energy Technology Company (ETC),
La Habra, then San Ramon, CA.
Various Research Positions including Staff Research Scientist.

Education

- 9/1988 – 3/1994 Stanford University, Stanford, CA.
Ph.D in Petroleum Engineering.
Dissertation: ‘Viscous Fingering, Gravity Segregation and Permeability Heterogeneity in Two-Dimensional and Three-Dimensional Flows’.
- 9/1985 – 6/1988 King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia.
M.Sc in Petroleum Engineering.
Thesis: ‘The Effect of Electroosmosis on the Relative Permeability of Sandstones’.
- 9/1981 – 6/1985 University of Petroleum and Minerals, Dhahran, Saudi Arabia.
B.Sc in Petroleum Engineering.

University Service

- 1/2016 - Present Council Member, School of Earth Sciences, Stanford
- 9/2010 - 9/2018 Co-Director, Stanford Center for Computational Earth &
Environmental Science (CEES)
- 1/2010 - Present Co-Director, Stanford Earth Sciences Algorithms & Architectures

Initiative (SES-AAI)
1/2006 - Present Co-Director, Reservoir Simulation Industrial Affiliates Consortium
(SUETRI-B)
1/2004 - 1/2017 Graduate Admissions Committee, Energy Resources Engineering

Awards

- Distinguished Member, SPE (2020).
- Robert Earll McConnell Award - SPE and AIME Societies (2020).
- President Individual Achievement Award:
Chevron & Schlumberger for Completion
of Research Phase of INTERSECT - the Next-Generation
Industrial Reservoir Simulator (2003).
- Stanford University's 1994 Nominee for the Council of
Graduate Schools Distinguished Dissertation Award.
- Edmund Littlefield Fellow for 1993-1994.
- 1989 SPE Western Region Graduate Fellowship Award.
- B.Sc Degree Conferred with Highest Honors.
- Top Rank: Undergraduate Petroleum Engineering Class.

Ph.D. Advisees (Graduated)

Sergey Klevtsov - (June, 2023)
Dissertation: 'Multi-Level Multiscale Linear Solver for Coupled Flow and Geomechanics'.

Jaewoo An - (June 2023)
Dissertation: 'Nonlinear Solvers for Fluid-Structure Interactions in Fractured Reservoirs'.

Weiyu Li - co-advised with Daniel Tartakovsky (June, 2023)
Dissertation: 'Pore-Scale Simulation of Lithium-Based Battery Cells'.

Ricardo Deucher - (July, 2022)
Dissertation: 'Adaptive Multiscale Modeling of Reactive Transport in Porous Media'.

Jiawei Li - (June, 2022)
'Sequential Implicit Newton Method for Compositional Reservoir Simulation'.

Timothy Yeo - (June, 2022)
'Coupled Nonlinear Thermal-Mechanics in Heterogeneous Porous Formations'.

Hyung Yang - co-advised with Prof. Daniel Tartakovsky (March, 2022)
'Uncertainty Quantification for Flow in Heterogeneous Formations'.

Farzaneh Rajabi - (June, 2021)
'Stochastic Models for Nonlinear Transport in Multiscale and Multiphase
Heterogeneous Media'.

Ruixiao Sun - (June, 2021)
'Compositional Space Parameterization for Compositional Three-Phase Displacements'.

Jie Yang - co-advised with Prof. Tony Kavscek (June, 2021)

‘Phase-Field Model for Fracture Propagation in Heterogeneous Porous Media’.

Ouassim Khebzegga - (June, 2020)
‘Three-Phase Relative Permeability Models for Near-Miscible Displacements’.

Olga Fuks - (June, 2020)
‘Distribution Method for Uncertainty Quantification of Compositional Displacements’.

Soheil Ismaeialzadeh - (June, 2020)
‘Level-Set Method for the Moving Contact Line Problem in Complex Geometry’.

Sebastian Bosma - (June, 2020)
‘Adaptive Localization for Flow and Transport in Heterogeneous Formations’.

Karine Levonyan (June, 2019)
‘Multiscale Formulation for Coupled Geomechanics and Flow in Naturally Fractured Reservoirs’.

Yang Wong - co-advised with Prof. Roland Horne (December, 2018)
‘Sequential Implicit Newton method for Geothermal Reservoir Simulation’.

Amir Delgoushaie (June, 2018)
‘Stochastic Models for Flow and Transport in Heterogeneous Porous Media’.

Michael Connelly - (March, 2018)
‘Nonlinear Trust-Region Solvers for Thermal Processes’.

Rui (Forest) Jiang - co-advised with Lou Durlofsky (March, 2018)
‘Accelerating Oil-Water Subsurface Flow Simulation Through
Reduced-Order Modeling and Advances in Nonlinear Analysis’.

Ruslan Rin (October, 2017)
‘Implicit Coupling Framework for Multi-Physics Reservoir Simulation’.

Moataz Abu Al-Saud (September, 2017)
‘Direct Numerical Simulation of Immiscible Two-Phase Flow at the Pore Scale’.

Francois Hamon (January, 2017)
‘Implicit Hybrid Upwinding and Advanced Nonlinear Solver for Multiphase
Flow and Transport in Porous Media’.
Awarded: The 2017 Ramey Fellowship (recognizes most prominent research
in the Energy Resources Engineering Department)

Fay Ibrahima (August, 2016)
‘Stochastic PDF methods for Uncertainty Quantification of
Subsurface Flow Performance Predictions’.

Sara Farshidi - co-advised with Prof. Lou Durlofsky (April, 2016)
‘Modeling Reactive Multi-Component Multiphase Transport in Porous Media’.

Amir Salehi (December, 2015)
‘Upscaling of Compositional Displacements in Heterogenous Reservoirs’.

Abdulrahman Manea (December, 2015)
‘Parallel Multigrid and Multiscale Flow Solvers For

High-Performance-Computing Architectures’.

Yixuan Wang (December, 2015)
‘Algebraic Multiscale Solver for Generally Unstructured Grids’.

Rustem Zaydullin (June, 2015)
‘Compositional Space Parameterization Methods for
Thermal-Compositional Simulation’.

Boxiao Li - co-advised with Sally Benson (November, 2014)
‘Modeling Geological CO₂ Sequestration: Translation Across Spatial
Scales and Advances in Nonlinear Solvers’.

Guillaume Moog (June, 2013)
‘Advanced Discretization Methods for Flow Simulation using Unstructured Grids’.

Mohammad Shahvali (December, 2012)
‘Sequential Implicit Methods for Coupled Flow and Transport
in Porous Media’.

Xiaochen Wang (November, 2012)
‘Trust-Region Newton Solver for Multiphase Flow and
Transport in Porous Media.

Yifan Zhou - co-advised with Prof. Khalid Aziz (November, 2012)
‘Automatic Differentiation for General-Purpose Simulation of Reservoirs
and Advanced Wells’.

Alireza Iranshahr (March, 2012)
‘Tie-Simplex Simulation Framework for Thermal-Compositional Displacements’.
Awarded: 2010 Ramey Fellowship (recognizes most prominent research
in the Energy Resources Engineering Department)

Rami Younis - co-advised with Prof. Khalid Aziz (June, 2011)
‘Automatic Differentiation and Globally Convergent Nonlinear Solvers
for Multiphase Flow in Porous Media’.
Awarded: 2008 Ramey Fellowship (recognizes most prominent research
in the Energy Resources Engineering Department)

Pipat Likanapaisal (May, 2010)
‘Statistical Moment Equations for Forward and Inverse Modeling
of Multiphase Flow in Porous Media’.

Yaqing Fan - co-advised with Prof. Lou Durlofsky (May, 2010)
‘Chemical Reaction Modeling in a Subsurface Flow Simulator with
Application to In-Situ Upgrading and CO₂ Mineralization’.

Hui Zhou (March, 2010)
‘Algebraic Multiscale Finite-Volume Methods for Reservoir Simulation’.

Jihoon Kim (March, 2010)
‘Sequential Methods for Coupled Geomechanics and Multiphase Flow’.

Anshul Agarwal (June, 2009)
'Adaptive Implicit Method for Thermal-Compositional Flows'.

Sebastien Matringe (February, 2008)
'Mixed Finite-Element Methods for Discretization and Streamline Tracing'.
Winner: 2008 International SPE Student Paper Contest (PhD Division).

Marc Hesse - co-advised with Lynn Orr (January, 2008)
Dissertation: 'Mathematical Modeling and Multiscale Simulation of CO₂ Storage in Saline Aquifers'.

Yuanlin Jiang - co-advised with Prof. Khalid Aziz (December, 2007)
'Techniques for General-Purpose Simulation of Reservoirs and Advanced Wells'.
Awarded: 2007 Ramey Fellowship (recognizes most prominent research in the Energy Resources Engineering Department).

Felix Kwok (December, 2007)
'Scalable Linear and Nonlinear Algorithms for Multiphase Flow in Porous Media'.

Ph.D. Advisees (Current)

Ryan Aronson - (Expected March, 2024)
Dissertation: 'Stabilized Discretizations for Fluid Flows and Coupled Poromechanics'.

Rasim Hasanzade - (Expected June, 2024)
Dissertation: 'Adaptive Implicit/Explicit Discretization of Multiphase Darcy Flow'.

Cedric Fraces - (Expected June, 2024)
Dissertation: 'Physics-Based Uncertainty Quantification of Subsurface Flow Predictions'.

Teja Tripuraneni - (Expected June, 2025)
Dissertation: 'Method of Distributions for Subsurface Poromechanics'.

Sohail Waziri - (Expected June, 2025)
Dissertation: 'Nonlinear MultiScale Finite-Volume Formulation for Compositional Flow'.

Isaac Ju - (Expected June, 2026)
Dissertation: 'Virtual Element Method for Coupled Flow and Geomechanics'.

Ralph Piazza - (Expected June, 2027)
Dissertation: 'Nonlinear Domain Decomposition for Multiphase Flow in Fractured Formations'.

Shaunak Joshi - (Co-Advised with Daniel Tartakovsky, Expected June, 2028)
Dissertation: 'Modeling Fluid-Structure Interactions in Silicon-Rich Meso-Porous Particles'.

Changgyun Son - (Expected June, 2028)
Dissertation: 'Fully Implicit Multi-Scale Finite-Volume Formulation for Nonlinear Fluid Flow in Porous Media'.

Niklaus Leuenberger - (Expected June, 2028)
Dissertation: 'Image-Based Pore-Scale Numerical Simulator of Fluid Flow and Ion Transport in Lithium Batteries'.

Ammar Al-Ali - (Expected June, 2027)
Dissertation: ‘Nonlinear Solver for Capillary Heterogeneity in Fractured Formations’.

Post-Docs & Research Associates

Sidian Chen (2023 – Present)
Matteo Frigo (2023 – Present)
Catherine Spurin (2022 – Present)
Jacques Franc (2019 – 2023)
Andrea Franceschini (2018 - 2020)
Mamadou N’Diaye (2018 - 2020)
Igor Shovkun (2018 – 2022)
Qingwang (Kevin) Yuan (2017 - 2019)
Jiamin Jiang (2017 - 2020)
Yashar Mehmani (2015 - 2020)
Pavel Tomin (2015 – 2019)
Timur Garipov (2010 – 2018)
Bo Guo (2015 - 2018)
Kirill Terekhov (2014 – 2017)
Cyprien Soullaine (2013 – 2017)
Nicola Castelletto (2013 – 2018)
Ahmad Abu-Shaikha (2015 – 2017)
Qinzhao Liao (2015 – 2016)
Per Pettersson (2013 – 2014)
Xavier Tunc (2012 – 2014)
Hadi Hajibeygi (2011 – 2012)
Rami Younis (2011 – 2012)
Daniel Meyer (2008 – 2010)
Jianlin Fu - with Jef Caers (2008 – 2010)
Amir Riaz (2003 – 2007)
Liyong Li (1998 – 2000)

Teaching

Energy 121/221 - Fundamentals of Multiphase Flow (Annual, Winter, 2003-2024)
Energy 223 - Reservoir Simulation (Annual, Winter, 2004-2024)
Energy 224 - Advanced Reservoir Simulation (Annual, Fall, 2004-2024)
Energy 246 - Reservoir Characterization & Flow Modeling (Annual, Fall, 2006-2012)
Energy 175 - Well Test Analysis (Spring, 2005)
Energy 180/280 - Production Engineering (Spring 2004 & 2006)

Publications

Only Granted U.S.A Patents are Listed Below. U.S.A Patent Applications, Non-U.S. Patents and Patent Applications are Not Listed.

Refereed Publications

- [1] Spurin, C., Ellman, S., Bultreys, T., and Tchelepi, H. A.: “The role of injection method on residual trapping at the pore-scale in continuum-scale samples,” *International Journal of Greenhouse Gas Control* (2024) **131**, 104035.
- [2] Franc, J., Møyner, O., and Tchelepi, H. A.: “Coupling-strength criteria for sequential implicit formulations,” *Journal of Computational Physics* (2023) **492**, 112413.
- [3] Jenny, P., Hasanzade, R., and Tchelepi, H.: “Tightly coupled hyperbolic treatment of buoyant two-phase flow and transport in porous media,” *Journal of Computational Physics* (2023) **489**, 112205.
- [4] Ndiaye, M., Hamon, F. P., and Tchelepi, H. A.: “Comparison of nonlinear field-split preconditioners for two-phase flow in heterogeneous porous media,” *Computational Geosciences* (2023) **27**, No. 2, 337–353.
- [5] Li, J., Tomin, P., and Tchelepi, H.: “Sequential fully implicit newton method for flow and transport with natural black-oil formulation,” *Computational Geosciences* (2023) **27**, No. 3, 485–498.
- [6] Li, W., Tchelepi, H. A., and Tartakovsky, D. M.: “Screening of Electrolyte-Anode Buffers to Suppress Lithium Dendrite Growth in All-Solid-State Batteries,” *Journal of The Electrochemical Society* (2023) **170**, No. 5, 050510.
- [7] Spurin, C., Roberts, G. G., O’Malley, C. P., Kurotori, T., Krevor, S., Blunt, M. J., and Tchelepi, H. A.: “Pore-Scale Fluid Dynamics Resolved in Pressure Fluctuations at the Darcy Scale,” *Geophysical Research Letters* (2023) **50**, No. 18.
- [8] Jiang, J., Tomin, P., and Tchelepi, H.: “Accelerated nonlinear domain decomposition solver for multi-phase flow and transport in porous media,” *Journal of Computational Physics* (2023) **490**, 112328.
- [9] Flemisch, B., Nordbotten, J. M., Fernø, M., Juanes, R., Both, J. W., Class, H., Delshad, M., Doster, F., Ennis-King, J., Franc, J., et al.: “The FluidFlower Validation Benchmark Study for the Storage of CO₂,” *Transport in Porous Media* (2023) 1–48.
- [10] Yang, J., Tchelepi, H. A., and Kovscek, A. R.: “Core-scale numerical simulation and comparison of breakdown of shale and resulting fractures using sc-CO₂ and water as injectants,” *Gas Science and Engineering* (2023) **118**, 205109.
- [11] Klockiewicz, B., Cambier, L., Humble, R., Tchelepi, H., and Darve, E.: “Second-Order Accurate Hierarchical Approximate Factorizations for Solving Sparse Linear Systems,” *International Journal for Numerical Methods in Engineering* (2022).
- [12] Deucher, R. H. and Tchelepi, H. A.: “High Resolution Adaptive Implicit Method for Reactive Transport in Heterogeneous Porous Media,” *Journal of Computational Physics* (2022) 111391.
- [13] Li, W., Tchelepi, H. A., Ju, Y., and Tartakovsky, D. M.: “Stability-Guided Strategies to Mitigate Dendritic Growth in Lithium-Metal Batteries,” *Journal of The Electrochemical Society* (2022) **169**, No. 6.
- [14] Yang, H. J., Tchelepi, H. A., and Tartakovsky, D. M.: “Method of Distributions for Two-Phase Flow in Heterogeneous Porous Media,” *Water Resources Research* (2022).
- [15] Franceschini, A., Castelletto, N., White, J. A., and Tchelepi, H. A.: “Scalable Preconditioning for the Stabilized Contact Mechanics Problem,” *Journal of Computational Physics* (2022) **459**, 111150.
- [16] Shovkun, I. and Tchelepi, H.: “A Cut-Cell Polyhedral Finite Element Model for Coupled Fluid Flow and Mechanics in Fractured Reservoirs,” *SPE Journal* (2022) **27**, No. 02, 1221–1243.
- [17] Bosma, S., Hamon, F., Mallison, B., and Tchelepi, H.: “Smooth Implicit Hybrid Upwinding for Compositional Multiphase Flow in Porous Media,” *Computer Methods in Applied Mechanics and Engineering* (2022) **388**, 114288.

- [18] Mehmani, Y., Anderson, T., Wang, Y., Aryana, S. A., Battiato, I., Tchelepi, H. A., and Kovscek, A. R.: “Striving to Translate Shale Physics Across Ten Orders of Magnitude: What Have We Learned?,” *Earth-Science Reviews* (2021) **223**, 103848.
- [19] Boelens, A. M. and Tchelepi, H. A.: “QuantImpPy: Minkowski Functionals and Functions with Python,” *SoftwareX* (2021) **16**, 100823.
- [20] Li, J., Tomin, P., and Tchelepi, H. A.: “Sequential Fully Implicit Newton Method for Compositional Flow and Transport,” *Journal of Computational Physics* (2021) **444**, 110541.
- [21] Deucher, R. H. and Tchelepi, H. A.: “Adaptive Formulation for Two-Phase Reactive Transport in Heterogeneous Porous Media,” *Advances in Water Resources* (2021) **155**, 103988.
- [22] Mehmani, Y., Castelletto, N., and Tchelepi, H.: “Nonlinear Convergence in Contact Mechanics: Immersed Boundary Finite Volume,” *Computer Methods in Applied Mechanics and Engineering* (2021) **383**, 113929.
- [23] Alali, A. H., Hamon, F. P., Mallison, B. T., and Tchelepi, H. A.: “Finite-Volume Simulation of Capillary-Dominated Flow in Matrix-Fracture Systems Using Interface Conditions,” *Computational Geosciences* (2021) **25**, No. 1, 17–33.
- [24] Khebzegga, O., Iranshahr, A., and Tchelepi, H.: “A Nonlinear Solver with Phase Boundary Detection for Compositional Reservoir Simulation,” *Transport in Porous Media* (2021) **137**, No. 3, 707–737.
- [25] Molins, S., Soulaire, C., Prasianakis, N. I., Abbasi, A., Poncet, P., Ladd, A. J., Starchenko, V., Roman, S., Trebotich, D., Tchelepi, H. A., and Steefel, C.: “Simulation of Mineral Dissolution at The Pore Scale With Evolving Fluid-Solid Interfaces: Review of Approaches and Benchmark Problem Set,” *Computational Geosciences* (2021) **25**, No. 4, 1285–1318.
- [26] Kashinath, K., Mustafa, M., Albert, A., Wu, J., Jiang, C., Esmailzadeh, S., Azizzadenesheli, K., Wang, R., Chattopadhyay, A., Singh, A., et al.: “Physics-informed machine learning: case studies for weather and climate modelling,” *Philosophical Transactions of the Royal Society A* (2021) **379**, No. 2194, 20200093.
- [27] Yang, J., Tchelepi, H. A., and Kovscek, A. R.: “Phase-field modeling of rate-dependent fluid-driven fracture initiation and propagation,” *International Journal for Numerical and Analytical Methods in Geomechanics* (2021) **45**, No. 8, 1029–1048.
- [28] Boelens, A. M. and Tchelepi, H. A.: “The Effect of Topology on Phase Behavior under Confinement,” *Processes* (2021) **9**, No. 7, 1220.
- [29] Mehmani, Y., Castelletto, N., and Tchelepi, H. A.: “Multiscale formulation of frictional contact mechanics at the pore scale,” *Journal of Computational Physics* (2021) **430**, 110092.
- [30] Connolly, M., Pan, H., Imai, M., and Tchelepi, H. A.: “Reduced method for rapid multiphase isenthalpic flash in thermal simulation,” *Chemical Engineering Science* (2021) **231**, 116150.
- [31] Abu-Al-Saud, M. O., Esmailzadeh, S., Riaz, A., and Tchelepi, H. A.: “Pore-scale study of water salinity effect on thin-film stability for a moving oil droplet,” *Journal of colloid and interface science* (2020) **569**, 366–377.
- [32] Fuks, O., Ibrahima, F., Tomin, P., and A Tchelepi, H.: “Uncertainty Propagation for Compositional Flow Using a Probability Distribution Method,” *Transport in Porous Media* (2020) **132**, No. 1, 113–133.
- [33] Terekhov, K. M. and Tchelepi, H. A.: “Cell-centered finite-volume method for elastic deformation of heterogeneous media with full-tensor properties,” *Journal of Computational and Applied Mathematics* (2020) **364**, 112331.

- [34] Esmailzadeh, S., Qin, Z., Riaz, A., and Tchelepi, H. A.: “Wettability and capillary effects: Dynamics of pinch-off in unconstricted straight capillary tubes,” *Physical Review E* (2020) **102**, No. 2, 023109.
- [35] Khebzegga, O., Iranshahr, A., and Tchelepi, H.: “Continuous relative permeability model for compositional simulation,” *Transport in Porous Media* (2020) **134**, No. 1, 139–172.
- [36] Fuks, O. and Tchelepi, H. A.: “Limitations of physics informed machine learning for nonlinear two-phase transport in porous media,” *Journal of Machine Learning for Modeling and Computing* (2020) **1**, No. 1.
- [37] Franceschini, A., Castelletto, N., White, J. A., and Tchelepi, H. A.: “Algebraically stabilized Lagrange multiplier method for frictional contact mechanics with hydraulically active fractures,” *Computer Methods in Applied Mechanics and Engineering* (2020) **368**, 113161.
- [38] Yang, H. J., Boso, F., Tchelepi, H. A., and Tartakovsky, D. M.: “Method of distributions for quantification of geologic uncertainty in flow simulations,” *Water Resources Research* (2020) **56**, No. 7, e2020WR027643.
- [39] Likanapaisal, P. and Tchelepi, H. A.: “Uncertainty Space Expansion: A Consistent Integration of Measurement Errors in Linear Inversion,” *SPE Journal* (2020) **25**, No. 06, 3317–3331.
- [40] Qin, Z., Esmailzadeh, S., Riaz, A., and Tchelepi, H. A.: “Two-phase multiscale numerical framework for modeling thin films on curved solid surfaces in porous media,” *Journal of Computational Physics* (2020) **413**, 109464.
- [41] Yuan, Q., Mehmani, Y., Burnham, A. K., Lapene, A., Wendebourg, J., and Tchelepi, H. A.: “Scaling Analysis of Coupled Compaction, Kerogen Conversion, and Petroleum Expulsion During Geological Maturation,” *Journal of Petroleum Science and Engineering* (2020) **192**, 107285.
- [42] Moncorgé, A., Møyner, O., Tchelepi, H. A., and Jenny, P.: “Consistent Upwinding for Sequential Fully Implicit Multiscale Compositional Simulation,” *Computational Geosciences* (2020) **24**, No. 2, 533–550.
- [43] Vega, B., Yang, J., Tchelepi, H., and Kavscek, A.: “Investigation of Stress Field and Fracture Development During Shale Maturation Using Analog Rock Systems,” *Transport in Porous Media* (2020) **131**, No. 2, 503–535.
- [44] Guo, B., Mehmani, Y., and Tchelepi, H. A.: “Multiscale Formulation of Pore-Scale Compressible Darcy-Stokes Flow,” *Journal of Computational Physics* (2019) **397**, 108849.
- [45] Ferronato, M., Franceschini, A., Janna, C., Castelletto, N., and Tchelepi, H. A.: “A general preconditioning framework for coupled multiphysics problems with application to contact-and poro-mechanics,” *Journal of Computational Physics* (2019) **398**, 108887.
- [46] White, J. A., Castelletto, N., Klevtsov, S., Bui, Q. M., Osei-Kuffuor, D., and Tchelepi, H. A.: “A Two-Stage Preconditioner for Multiphase Poromechanics in Reservoir Simulation,” *Computer Methods in Applied Mechanics and Engineering* (2019) **357**, 112575.
- [47] Jun Yang, H., Boso, F., Tchelepi, H. A., and Tartakovsky, D. M.: “Probabilistic forecast of single-phase flow in porous media with uncertain properties,” *Water Resources Research* (2019) **55**, No. 11, 8631–8645.
- [48] Pan, H., Connolly, M., and Tchelepi, H.: “Multiphase Equilibrium Calculation Framework for Compositional Simulation of CO₂ Injection in Lowerature Reservoirs,” *Industrial and Engineering Chemistry Research* (2019) **58**, No. 5, 2052–2070.
- [49] Mehmani, Y. and Tchelepi, H. A.: “Multiscale computation of pore-scale fluid dynamics: Single-phase flow,” *Journal of Computational Physics* (2018) **375**, 1469–1487.

- [50] Jiang, J. and Tchelepi, H. A.: “Dissipation-based continuation method for multiphase flow in heterogeneous porous media,” *Journal of Computational Physics* (2018) **375**, 307–336.
- [51] Myner, O. and Tchelepi, H. A.: “A mass-conservative sequential implicit multiscale method for isothermal equation-of-state compositional problems,” *SPE Journal* (2018) **23**, No. 6, 2376–2393.
- [52] Guo, B., Ma, L., and Tchelepi, H. A.: “Image-based micro-continuum model for gas flow in organic-rich shale rock,” *Advances in Water Resources* (2018) **122**, 70–84.
- [53] Soulaïne, C., Roman, S., Kavscek, A., and Tchelepi, H. A.: “Pore-scale modelling of multiphase reactive flow: Application to mineral dissolution with production of CO₂,” *Journal of Fluid Mechanics* (2018) **855**, 616–645.
- [54] Delgosaïe, A. H., Glynn, P. W., Jenny, P., and Tchelepi, H. A.: “A Flexible Temporal Velocity Model for Fast Contaminant Transport Simulations in Porous Media,” *Water Resources Research* (2018) **54**, No. 10, 8500–8513.
- [55] Alzayer, A. N., Voskov, D. V., and Tchelepi, H. A.: “Relative Permeability of Near-Miscible Fluids in Compositional Simulators,” *Transport in Porous Media* (2018) **122**, No. 3, 547–573.
- [56] Ibrahim, F., Tchelepi, H. A., and Meyer, D. W.: “An efficient distribution method for nonlinear two-phase flow in highly heterogeneous multidimensional stochastic porous media,” *Computational Geosciences* (2018) **22**, No. 1, 389–412.
- [57] Castelletto, N., Klevtsov, S., Hajibeygi, H., and Tchelepi, H.: “Multiscale two-stage solver for Biot’s poroelasticity equations in subsurface media,” *Computational Geosciences* (2018).
- [58] Abu-Al-Saud, M. O., Popinet, S., and Tchelepi, H. A.: “A Conservative and Well-Balanced Surface Tension Model,” *Journal of Computational Physics* (2018).
- [59] Hamon, F. P., Mallison, B. T., and Tchelepi, H. A.: “Implicit Hybrid Upwinding for Two-Phase Flow In Heterogeneous Porous Media with Buoyancy and Capillarity,” *Computer Methods in Applied Mechanics and Engineering* (2018) **331**, 701–727.
- [60] Schneider, M., Flemisch, B., Helmig, R., Terekhov, K., and Tchelepi, H. A.: “Monotone Nonlinear Finite-Volume Method for Challenging Grids,” *Computational Geosciences* (2018) **22**, No. 2, 565–586.
- [61] Bosma, S., Hajibeygi, H., Tene, M., and Tchelepi, H. A.: “Multiscale Finite Volume Method for Discrete Fracture Modeling on Unstructured Grids,” *Journal of Computational Physics* (2017) **351**, 145–164.
- [62] Soulaïne, C., Roman, S., Kavscek, A., and Tchelepi, H. A.: “Mineral Dissolution and Wormholing from a Pore-Scale Perspective,” *Journal of Fluid Mechanics* (2017) **827**, 457–483.
- [63] Graveleau, M., Soulaïne, C., and Tchelepi, H. A.: “Pore-Scale Simulation of Interphase Multicomponent Mass Transfer for Subsurface Flow,” *Transport in Porous Media* (2017) **120**, No. 2, 287–308.
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