

Louis J. Durlafsky

*Otto N. Miller Professor in Earth Sciences, Department of Energy Science and Engineering,
Green Earth Sciences Building, Room 50
Stanford University, Stanford, CA 94305-2220
email: lou@stanford.edu
website: <https://profiles.stanford.edu/louis-durlafsky>*

Professional Experience

2003 – present	Professor of Petroleum Engineering / Professor of Energy Resources Engineering / Professor of Energy Science and Engineering, Stanford University
2006 – 2012	Chair, Department of Energy Resources Engineering, Stanford University
2001 – 2003	Associate Professor of Petroleum Engineering, Stanford University
1998 – 2001	Associate Prof. (Research) of Petroleum Engineering, Stanford University
1987 – 2004	Various positions in Reservoir Simulation Research Group (most recently Senior Staff Research Scientist) at Chevron Energy Technology Company, San Ramon, California
1986 – 1987	Postdoctoral Fellow, California Institute of Technology

Education

1986	Ph.D. Chemical Engineering	Massachusetts Institute of Technology
1982	M.S. Chemical Engineering	Massachusetts Institute of Technology
1981	B.S. Chemical Engineering	Pennsylvania State University

Research Areas and Programs

Research interests include general reservoir/subsurface flow simulation for geological carbon storage and oil and gas production, deep learning-based flow surrogate modeling, data assimilation/history matching, optimization of subsurface flow processes, fault and fracture modeling, up-scaling of detailed geological models for flow simulation, energy systems optimization. Codirector of Stanford Smart Fields Consortium, Stanford Center for Carbon Storage, and Stanford Reservoir Simulation Research Consortium.

Significant University Service

2006 – 2012	First Department Chair of Energy Resources Engineering (following shift from Petroleum Engineering)
2000 – present	Codirector of Stanford Reservoir Simulation Affiliate Program (SUETRI-B)
2010 – present	Codirector of Stanford Smart Fields Consortium (SFC)
2021 – present	Codirector of Stanford Center for Carbon Storage (SCCS)
2014 – 2021	Member of Executive Committee and Scientific Steering Committee for the Stanford-Chevron Center of Research Excellence
2018 – present	Member of Governance Group for Stanford Center for Computational Earth and Environmental Sciences
2018 – 2021	Member of Provost's University Capital Plan Committee

2018 – 2024	Member of ERE/ESE Admissions Committee
2017	Member of Dean Search Committee, Stanford School of Earth, Energy & Environmental Sciences
2006 – 2015	Member of Stanford School of Earth Sciences Core Council
1998 – 2010	Codirector of Stanford Advanced Wells Affiliate Program (SUPRI-HW)
2005	Interim Department Chair, January 2005 – June 2005
2004	Chair of Petroleum Engineering Admissions Committee

Significant External Editorial / Committee Work

Member of Advisory Board, Penn State Earth and Mineral Sciences Energy Institute, from 2023–present. Member, from 2002–2022, of the Scientific Committee for ECMOR (European Conference on the Mathematics of Geological Reservoirs, formerly European Conference on the Mathematics of Oil Recovery). Co-organized the 2017 UCLA Institute of Pure and Applied Mathematics long program on *Computational Issues in Oil Field Applications*. Member of the editorial boards of the journals *Computational Geosciences* and *Mathematical Geosciences*. Associate Editor of *Multiscale Modeling and Simulation* from 2011–2013, and member of *SPE Journal* editorial board from 1996–2006. Technical chair of 2001 SPE Reservoir Simulation Symposium and 2005 SPE Advanced Technology Workshop on Modeling and Optimization of Smart Wells. Served on External Review Committees for Penn State Petroleum and Natural Gas Engineering Program (2018) and TU Delft (The Netherlands) Geo-Cluster (2015–2016).

Key Awards

- Election to National Academy of Engineering, 2022
- Best Paper Award, *Mathematical Geosciences*, 2016
- Otto N. Miller Chair in Earth Sciences, Stanford University, 2009
- Best Paper Award, *Mathematical Geosciences*, 2009
- Society of Petroleum Engineers (SPE) Distinguished Member, 2007
- SPE Lester C. Uren Award (for distinguished achievement before age 45), 2007
- SPE Outstanding Technical Editor Award, *SPE Journal*, 2004
- SPE Reservoir Engineering Award, 2002
- Stanford University School of Earth Sciences Excellence in Teaching Award, 2001
- Chevron Corporation Chairman’s Award (highest corporate award in Chevron), 1999
- Chevron Petroleum Technology Company R&D Award, 1995

Professional Activities (Invited Talks, Short Courses, Conference Organization, External Reviews) and Undergraduate and Graduate Courses Taught

See online profile: <https://profiles.stanford.edu/louis-durlafsky>

Publications

(also listed on google scholar, see <https://scholar.google.com/citations?user=lb7BrecAAAAJ&hl=en>)

Book Chapters

1. Teng, W., Han, Y., Wang, N., Durlofsky, L.J., Hierarchical data assimilation procedures for carbon storage under geological scenario uncertainty. In *Subsurface Data Assimilation: Theory and Applications*, X. Luo, A. Emerick, O. Leeuwenburgh, eds., Elsevier (to appear).
2. Jiang, S., Durlofsky, L.J., Deep-neural-network surrogate flow models for history matching and uncertainty quantification. In *Machine Learning Applications in Subsurface Energy Resource Management, State of the Art and Future Prognosis*, pp. 271-290, S. Mishra, ed., Taylor & Francis Group/CRC Press (2023).
3. Cameron, D.A., Durlofsky, L.J., Optimization and data assimilation for geological carbon storage. In *Computational Models for CO₂ Sequestration and Compressed Air Energy Storage*, pp. 357-388, R. Al-Khoury and J. Bundschuh, eds., Taylor & Francis Group/CRC Press (2014).
4. Zhou, X., Karimi-Fard, M., Durlofsky, L.J., Aydin, A., Fluid flow through porous sandstone with overprinting and intersecting geological structures of various types. In *Advances in the Study of Fractured Reservoirs*, Geological Society, London, Special Publications **374**, pp. 211-249, G.H. Spence et al., eds. (2014).
5. Wen, Z., Durlofsky, L.J., Van Roy, B., Aziz, K, Approximate dynamic programming for optimizing oil production. In *Reinforcement Learning and Approximate Dynamic Programming for Feedback Control, IEEE Press Series on Computational Intelligence*, pp. 560-581, F. Lewis, D. Liu, eds., Wiley – IEEE Press (2013).
6. Durlofsky, L.J., Chen, Y., Uncertainty quantification for subsurface flow problems using coarse-scale models. In *Numerical Analysis of Multiscale Problems, Lecture Notes in Computational Science and Engineering* **83**, pp. 163-202, I.G. Graham, T.Y. Hou, O. Lakkis, R. Scheichl, eds., Springer (2012).
7. Echeverría Ciaurri, D., Mukerji, T., Durlofsky, L.J., Derivative-free optimization for oil field operations. In *Computational Optimization and Applications in Engineering and Industry, Studies in Computational Intelligence* **359**, pp. 19-55, X.-S. Yang, S. Koziel, eds., Springer-Verlag (2011).
8. Gerritsen, M.G., Durlofsky, L.J., Modeling fluid flow in oil reservoirs. In *Annual Review of Fluid Mechanics* **37**, 211-238 (2005).

Peer-Reviewed Journal Articles

1. Di Federico, G., Durlofsky, L.J., Three-dimensional latent diffusion models for parameterizing and history matching facies systems under hierarchical uncertainty. *Mathematical Geosciences*, to appear.
2. Han, Y., Durlofsky, L.J., Recurrent transformer U-Net surrogate for flow modeling and data assimilation in subsurface formations with faults. *Journal of Computational Physics* **556**, 114801 (2026).

3. He, X., Jiang, S., Durlofsky, L.J., Prediction of fault slip tendency in CO₂ storage using data-space inversion. *Computers & Geosciences* **210**, 106134 (2026).
4. Tang, H., Durlofsky, L.J., Graph network surrogate model for optimizing the placement of horizontal injection wells for CO₂ storage. *International Journal of Greenhouse Gas Control* **145**, 104404 (2025).
5. Teng, W., Durlofsky, L.J., Likelihood-free inference and hierarchical data assimilation for carbon storage. *Advances in Water Resources* **201**, 104961 (2025).
6. Wang, N., Durlofsky, L.J., Deep learning framework for history matching CO₂ storage with 4D seismic and monitoring well data. *Geoenergy Science and Engineering* **248**, 213736 (2025).
7. Di Federico, G., Durlofsky, L.J., Latent diffusion models for parameterization of facies-based geomodels and their use in data assimilation. *Computers & Geosciences* **194**, 105755 (2025).
8. Han, Y., Hamon, F.P., Durlofsky, L.J., Accelerated training of deep learning surrogate models for surface displacement and flow, with application to MCMC-based history matching of CO₂ storage operations. *Geoenergy Science and Engineering* **246**, 213589 (2025).
9. Tang, H., Durlofsky, L.J., Graph network surrogate model for subsurface flow optimization. *Journal of Computational Physics* **512**, 113132 (2024).
10. Crain, D.M., Benson, S.M., Saltzer, S.D., Durlofsky, L.J., An integrated framework for optimal monitoring and history matching in CO₂ storage projects. *Computational Geosciences* **28**, 211-225 (2024).
11. Jiang, S., Durlofsky, L.J., History matching for geological carbon storage using data-space inversion with spatio-temporal data parameterization. *International Journal of Greenhouse Gas Control* **134**, 104124 (2024).
12. Han, Y., Hamon, F.P., Jiang, S., Durlofsky, L.J., Surrogate model for geological CO₂ storage and its use in hierarchical MCMC history matching. *Advances in Water Resources* **187**, 104678 (2024).
13. Nasir, Y., Durlofsky, L.J., Multi-asset closed-loop reservoir management using deep reinforcement learning. *Computational Geosciences* **28**, 23-42 (2024).
14. Zou, A., Durlofsky, L.J., Integrated framework for constrained optimization of horizontal/deviated well placement and control for geological CO₂ storage. *SPE Journal* **28**, 2462-2481 (2023) (also SPE paper 212228).
15. Nasir, Y., Durlofsky, L.J., Practical closed-loop reservoir management using deep reinforcement learning. *SPE Journal* **28**, 1135-1148 (2023) (also SPE paper 212237).
16. Kim, Y.D., Durlofsky, L.J., Neural network surrogate for flow prediction and robust optimization in fractured systems. *Fuel* **351**, 128756 (2023).
17. Kim, Y.D., Durlofsky, L.J., Convolutional – recurrent neural network proxy for robust optimization and closed-loop reservoir management. *Computational Geosciences* **27**, 179-202 (2023).
18. Nasir, Y., Durlofsky, L.J., Deep reinforcement learning for optimizing well settings in subsurface systems with uncertain geology. *Journal of Computational Physics* **477**, 111945 (2023).

19. Jiang, S., Durlofsky, L.J., Use of multifidelity training data and transfer learning for efficient construction of subsurface flow surrogate models. *Journal of Computational Physics* **474**, 111800 (2023).
20. Ma, Z., Kim, Y.D., Volkov, O., Durlofsky, L.J., Optimization of subsurface flow operations using a dynamic proxy strategy. *Mathematical Geosciences* **54**, 1261-1287 (2022).
21. Tang, H., Durlofsky, L.J., Use of low-fidelity models with machine-learning error correction for well placement optimization. *Computational Geosciences* **26**, 1189-1206 (2022).
22. Deucher, R.H., Durlofsky, L.J., A new flow-kinematics-based model for time-dependent effective dispersion in mixing-limited reactions. *Water Resources Research* **58**, e2022WR032156 (2022).
23. Zou, A., Ye, T., Volkov, O., Durlofsky, L.J., Effective treatment of geometric constraints in derivative-free well placement optimization. *Journal of Petroleum Science and Engineering* **215**, 110635 (2022).
24. Tang, M., Ju, X., Durlofsky, L.J., Deep-learning-based coupled flow-geomechanics surrogate model for CO₂ sequestration. *International Journal of Greenhouse Gas Control* **118**, 103692 (2022).
25. Ma, Z., Volkov, O., Durlofsky, L.J., Multigroup strategy for well control optimization. *Journal of Petroleum Science and Engineering* **214**, 110448 (2022).
26. Nasir, Y., Volkov, O., Durlofsky, L.J., A two-stage optimization strategy for large-scale oil field development. *Optimization and Engineering* **23**, 361-395 (2022).
27. Jiang, S., Durlofsky, L.J., Treatment of model error in subsurface flow history matching using a data-space method. *Journal of Hydrology* **603**, 127063 (2021).
28. Kim, Y.D., Durlofsky, L.J., A recurrent neural network-based proxy model for well-control optimization with nonlinear output constraints. *SPE Journal* **26**, 1837-1857 (2021) (also SPE paper 203980).
29. Jiang, S., Hui, M., Durlofsky, L.J., Data-space inversion with a recurrent autoencoder for naturally fractured systems. *Frontiers in Applied Mathematics and Statistics* **7**, 686754 (2021).
30. Orsini, R.M., Brodrick, P.G., Brandt, A.R., Durlofsky, L.J., Computational optimization of solar thermal generation with energy storage. *Sustainable Energy Technologies and Assessments* **47**, 101342 (2021).
31. Liu, Y., Durlofsky, L.J., 3D CNN-PCA: A deep-learning-based parameterization for complex geomodels. *Computers & Geosciences* **148**, 104676 (2021).
32. De Brito, D.U., Durlofsky, L.J., Field development optimization using a sequence of surrogate treatments. *Computational Geosciences* **25**, 35-65 (2021).
33. Jiang, S., Durlofsky, L.J., Data-space inversion using a recurrent autoencoder for time-series parameterization. *Computational Geosciences* **25**, 411-432 (2021).
34. Tang, M., Liu, Y., Durlofsky, L.J., Deep-learning-based surrogate flow modeling and geological parameterization for data assimilation in 3D subsurface flow. *Computer Methods in Applied Mechanics and Engineering* **376**, 113636 (2021).

35. Tang, M., Liu, Y., Durlofsky, L.J., A deep-learning-based surrogate model for data assimilation in dynamic subsurface flow problems. *Journal of Computational Physics* **413**, 109456 (2020).
36. Jin, Z.L., Liu, Y., Durlofsky, L.J., Deep-learning-based surrogate model for reservoir simulation with time-varying well controls. *Journal of Petroleum Science and Engineering* **192**, 107273 (2020).
37. Jiang, S., Sun, W., Durlofsky, L.J., A data-space inversion procedure for well control optimization and closed-loop reservoir management. *Computational Geosciences* **24**, 361-379 (2020).
38. Kostakis, F., Mallison, B.T., Durlofsky, L.J., Multifidelity framework for uncertainty quantification with multiple quantities of interest. *Computational Geosciences* **24**, 761-773 (2020).
39. De Brito, D.U., Durlofsky, L.J., Well control optimization using a two-step surrogate treatment. *Journal of Petroleum Science and Engineering* **187**, 106565 (2020).
40. Liu, Y., Durlofsky, L.J., Multilevel strategies and geological parameterizations for history matching complex reservoir models. *SPE Journal* **25**, 81-104 (2020) (also SPE paper 193895).
41. Jin, Z.L., Garipov, T., Volkov, O., Durlofsky, L.J., Reduced-order modeling of coupled flow and quasistatic geomechanics. *SPE Journal* **25**, 326-346 (2020) (also SPE paper 193863).
42. Liu, Y., Sun, W., Durlofsky, L.J., A deep-learning-based geological parameterization for history matching complex models. *Mathematical Geosciences* **51**, 725-766 (2019).
43. Jiang, R., Durlofsky, L.J., Implementation and detailed assessment of a GNAT reduced-order model for subsurface flow simulation. *Journal of Computational Physics* **379**, 192-213 (2019).
44. Sun, W., Durlofsky, L.J., Data-space approaches for uncertainty quantification of CO₂ plume location in geological carbon storage. *Advances in Water Resources* **123**, 234-255 (2019).
45. Volkov, O., Bokshtynov, V., Durlofsky, L.J., Aziz, K., Gradient-based Pareto optimal history matching for noisy data of multiple types. *Computational Geosciences* **22**, 1465-1485 (2018).
46. Trehan, S., Durlofsky, L.J., Machine-learning-based modeling of coarse-scale error, with application to uncertainty quantification. *Computational Geosciences* **22**, 1093-1113 (2018).
47. Brodrick, P.G., Brandt, A.R., Durlofsky, L.J., Optimal design and operation of integrated solar combined cycles under emissions intensity constraints. *Applied Energy* **226**, 979-990 (2018).
48. Jin, Z.L., Durlofsky, L.J., Reduced-order modeling of CO₂ storage operations. *International Journal of Greenhouse Gas Control* **68**, 49-67 (2018).
49. Hui, M., Karimi-Fard, M., Mallison, B., Durlofsky, L.J., A general modeling framework for simulating complex recovery processes in fractured reservoirs at different resolutions. *SPE Journal* **23**, 598-613 (2018) (also SPE paper 182621).
50. Shirangi, M.G., Volkov, O., Durlofsky, L.J., Joint optimization of economic project life and well controls. *SPE Journal* **23**, 482-497 (2018) (also SPE paper 182642).

51. Brodrick, P.G., Brandt, A.R., Durlofsky, L.J., Operational optimization of an integrated solar combined cycle under practical time-dependent constraints. *Energy* **141**, 1569-1584 (2017).
52. Sun, W., Hui, M., Durlofsky, L.J., Production forecasting and uncertainty quantification for naturally fractured reservoirs using a new data-space inversion procedure. *Computational Geosciences* **21**, 1443-1458 (2017).
53. Trehan, S., Carlberg, K., Durlofsky, L.J., Error modeling for surrogates of dynamical systems using machine learning. *International Journal for Numerical Methods in Engineering* **112**, 1801-1827 (2017).
54. Sun, W., Durlofsky, L.J., A new data-space inversion procedure for efficient uncertainty quantification in subsurface flow problems. *Mathematical Geosciences* **49**, 679-715 (2017).
55. Jansen, J.D., Durlofsky, L.J., Use of reduced-order models in well control optimization. *Optimization and Engineering* **18**, 105-132 (2017).
56. Aliyev, E., Durlofsky, L.J., Multilevel field development optimization under uncertainty using a sequence of upscaled models. *Mathematical Geosciences* **49**, 307-339 (2017).
57. Rabinovich, A., Li, B., Durlofsky, L.J., Analytical approximations for effective relative permeability in the capillary limit. *Water Resources Research* **52**, 7645-7667 (2016).
58. Trehan, S., Durlofsky, L.J., Trajectory piecewise quadratic reduced-order model for subsurface flow, with application to PDE-constrained optimization. *Journal of Computational Physics* **326**, 446-473 (2016).
59. Shirangi, M.G., Durlofsky, L.J., A general method to select representative models for decision making and optimization under uncertainty. *Computers & Geosciences* **96**, 109-123 (2016).
60. Karimi-Fard, M., Durlofsky, L.J., A general gridding, discretization, and coarsening methodology for modeling flow in porous formations with discrete geological features. *Advances in Water Resources* **96**, 354-372 (2016).
61. Vo, H.X., Durlofsky, L.J., Regularized kernel PCA for the efficient parameterization of complex geological models. *Journal of Computational Physics* **322**, 859-881 (2016).
62. Kang, C.A., Brandt, A.R., Durlofsky, L.J., Jayaweera, I., Assessment of advanced solvent-based post-combustion CO₂ capture processes using a bi-objective optimization technique. *Applied Energy* **179**, 1209-1219 (2016).
63. Cameron, D.A., Durlofsky, L.J., Benson, S.M., Use of above-zone pressure data to locate and quantify leaks during carbon storage operations. *International Journal of Greenhouse Gas Control* **52**, 32-43 (2016).
64. Li, H., Durlofsky, L.J., Upscaling for compositional reservoir simulation. *SPE Journal* **21**, 873-887 (2016) (also SPE paper 173212).
65. Li, H., Durlofsky, L.J., Ensemble level upscaling for compositional flow simulation. *Computational Geosciences* **20**, 525-540 (2016).
66. Kang, C.A., Brandt, A.R., Durlofsky, L.J., A new carbon capture proxy model for optimizing the design and time-varying operation of a coal-natural gas power station. *International Journal of Greenhouse Gas Control* **48**, 234-252 (2016).

67. Li, H., Durlofsky, L.J., Local-global upscaling for compositional subsurface flow simulation. *Transport in Porous Media* **111**, 701-730 (2016).
68. Shirangi, M.G., Durlofsky, L.J., Closed-loop field development under uncertainty by use of optimization with sample validation. *SPE Journal* **20**, 908-922 (2015) (also SPE paper 173219).
69. Bukshtynov, V., Volkov, O., Durlofsky, L.J., Aziz, K., Comprehensive framework for gradient-based optimization in closed-loop reservoir management. *Computational Geosciences* **19**, 877-897 (2015).
70. Vo, H.X., Durlofsky, L.J., Data assimilation and uncertainty assessment for complex geological models using a new PCA-based parameterization. *Computational Geosciences* **19**, 747-767 (2015).
71. Rabinovich, A., Itthisawatpan, K., Durlofsky, L.J., Upscaling of CO₂ injection into brine with capillary heterogeneity effects. *Journal of Petroleum Science and Engineering* **134**, 60-75 (2015).
72. He, J., Durlofsky, L.J., Constraint reduction procedures for reduced-order subsurface flow models based on POD-TPWL. *International Journal for Numerical Methods in Engineering* **103**, 1-30 (2015).
73. Brodrick, P.G., Kang, C.A., Brandt, A.R., Durlofsky, L.J., Optimization of carbon-capture-enabled coal-gas-solar power generation. *Energy* **79**, 149-162 (2015).
74. Kang, C.A., Brandt, A.R., Durlofsky, L.J., Optimizing heat integration in a flexible coal-natural gas power station with CO₂ capture. *International Journal of Greenhouse Gas Control* **31**, 138-152 (2014).
75. He, J., Durlofsky, L.J., Reduced-order modeling for compositional simulation by use of trajectory piecewise linearization. *SPE Journal* **19**, 858-872 (2014) (also SPE paper 163634).
76. Isebor, O.J., Echeverría Ciaurri, D., Durlofsky, L.J., Generalized field-development optimization with derivative-free procedures. *SPE Journal* **19**, 891-908 (2014) (also SPE paper 163631).
77. Vo, H.X., Durlofsky, L.J., A new differentiable parameterization based on Principal Component Analysis for the low-dimensional representation of complex geological models. *Mathematical Geosciences* **46**, 775-813 (2014).
78. Rousset, M.A.H., Huang, C.K., Klie, H., Durlofsky, L.J., Reduced-order modeling for thermal recovery processes. *Computational Geosciences* **18**, 401-415 (2014).
79. Isebor, O.J., Durlofsky, L.J., Echeverría Ciaurri, D., A derivative-free methodology with local and global search for the constrained joint optimization of well locations and controls. *Computational Geosciences* **18**, 463-482 (2014).
80. Isebor, O.J., Durlofsky, L.J., Biobjective optimization for general oil field development. *Journal of Petroleum Science and Engineering* **119**, 123-138 (2014).
81. Kourounis, D., Durlofsky, L.J., Jansen, J.D., Aziz, K., Adjoint formulation and constraint handling for gradient-based optimization of compositional reservoir flow. *Computational Geosciences* **18**, 117-137 (2014).

82. Wilson, K.C., Durlofsky, L.J., Optimization of shale gas field development using direct search techniques and reduced-physics models. *Journal of Petroleum Science and Engineering* **108**, 304-315 (2013).
83. He, J., Sarma, P., Durlofsky, L.J., Reduced-order flow modeling and geological parameterization for ensemble-based data assimilation. *Computers & Geosciences* **55**, 54-69 (2013).
84. Karimi-Fard, M., Durlofsky, L.J., Accurate resolution of near-well effects in upscaled models using flow-based unstructured local grid refinement. *SPE Journal* **17**, 1084-1095 (2012) (also SPE paper 141675).
85. Bellout, M.C., Echeverría Ciaurri, D., Durlofsky, L.J., Foss, B., Kleppe, J., Joint optimization of oil well placement and controls. *Computational Geosciences* **16**, 1061-1079 (2012).
86. Cameron, D.A., Durlofsky, L.J., Optimization of well placement, CO₂ injection rates, and brine cycling for geological carbon sequestration. *International Journal of Greenhouse Gas Control* **10**, 100-112 (2012).
87. Fan, Y., Durlofsky, L.J., Tchelep, H.A., A fully-coupled flow-reactive-transport formulation based on element conservation, with application to CO₂ storage simulations. *Advances in Water Resources* **42**, 47-61 (2012).
88. Aouizerate, G., Durlofsky, L.J., Samier, P., New models for heater wells in subsurface simulations, with application to the in situ upgrading of oil shale. *Computational Geosciences* **16**, 519-533 (2012).
89. Nakashima, T., Li, H., Durlofsky, L.J., Near-well upscaling for three-phase flows. *Computational Geosciences*, **16**, 55-73 (2012).
90. Wang, H., Echeverría Ciaurri, D., Durlofsky, L.J., Cominelli, A., Optimal well placement under uncertainty using a retrospective optimization framework. *SPE Journal* **17**, 112-121 (2012) (also SPE paper 141950).
91. Kang, C.A., Brandt, A.R., Durlofsky, L.J., Optimal operation of an integrated energy system including fossil fuel power generation, CO₂ capture and wind. *Energy* **36**, 6806-6820 (2011).
92. Wilson, C.E., Aydin, A., Karimi-Fard, M., Durlofsky, L.J., Sagy, A., Brodsky, E.E., Kreylos, O., Kellog, L.H., From outcrop to flow simulation: constructing discrete fracture models from a LIDAR survey. *AAPG Bulletin* **95**, 1883-1905 (2011).
93. Onwunalu, J., Durlofsky, L.J., A new well pattern optimization procedure for large-scale field development. *SPE Journal* **16**, 594-607 (2011) (also SPE paper 124364).
94. He, J., Saetrom, J., Durlofsky, L.J., Enhanced linearized reduced-order models for subsurface flow simulation. *Journal of Computational Physics* **230**, 8313-8341 (2011).
95. Wilson, C.E., Aydin, A., Durlofsky, L.J., Boucher, A., Brownlow, D.T., Use of outcrop observations, geostatistical analysis, and flow simulation to investigate structural controls on secondary hydrocarbon migration in the Anacacho Limestone, Uvalde, TX. *AAPG Bulletin* **95**, 1181-1206 (2011).
96. Scheidt, C., Caers, J., Chen, Y., Durlofsky, L.J., A multi-resolution workflow to generate high-resolution models constrained to dynamic data. *Computational Geosciences* **15**, 545-563 (2011).

97. Echeverría Ciaurri, D., Isebor, O.J., Durlofsky, L.J., Application of derivative-free methodologies to generally constrained oil production optimisation problems. *International Journal of Mathematical Modelling and Numerical Optimisation* **2**, 134-161 (2011).
98. Chen, Y., Park, K., Durlofsky, L.J., Statistical assignment of upscaled flow functions for an ensemble of geological models. *Computational Geosciences* **15**, 35-51 (2011).
99. Livescu, S., Durlofsky, L.J., Aziz, K., A semianalytical thermal multiphase wellbore flow model for use in reservoir simulation. *SPE Journal* **15**, 794-804 (2010) (also SPE paper 115796).
100. Nakashima, T., Durlofsky, L.J., Accurate representation of near-well effects in coarse-scale models of primary oil production. *Transport in Porous Media* **83**, 741-770 (2010).
101. Cardoso, M.A., Durlofsky, L.J., Use of reduced-order modeling procedures for production optimization. *SPE Journal* **15**, 426-435 (2010) (also SPE paper 119057).
102. Fan, Y., Durlofsky, L.J., Tchelepi, H., Numerical simulation of the in-situ upgrading of oil shale. *SPE Journal* **15**, 368-381 (2010) (also SPE paper 118958).
103. Livescu, S., Durlofsky, L.J., Aziz, K., Ginestra, J.C., A fully-coupled thermal multiphase wellbore flow model for use in reservoir simulation. *Journal of Petroleum Science and Engineering* **71**, 138-146 (2010).
104. Chen, T., Gerritsen, M.G., Lambers, J.V., Durlofsky, L.J., Global variable compact multipoint methods for accurate upscaling with full-tensor effects. *Computational Geosciences* **14**, 65-81 (2010).
105. Onwunalu, J., Durlofsky, L.J., Application of a particle swarm optimization algorithm for determining optimum well location and type. *Computational Geosciences* **14**, 183-198 (2010).
106. Cardoso, M.A., Durlofsky, L.J., Linearized reduced-order models for subsurface flow simulation. *Journal of Computational Physics* **229**, 681-700 (2010).
107. Krogstad, S., Durlofsky, L.J., Multiscale mixed-finite-element modeling of coupled wellbore/near-well flow. *SPE Journal* **14**, 78-87 (2009) (also SPE paper 106179).
108. Cardoso, M.A., Durlofsky, L.J., Sarma, P., Development and application of reduced-order modeling procedures for subsurface flow simulation. *International Journal for Numerical Methods in Engineering* **77**, 1322-1350 (2009).
109. Chen, Y., Durlofsky, L.J., Ensemble-level upscaling for efficient estimation of fine-scale production statistics. *SPE Journal* **13**, 400-411 (2008) (also SPE paper 106086).
110. Chen, Y., Mallison, B.T., Durlofsky, L.J., Nonlinear two-point flux approximation for modeling full-tensor effects in subsurface flow simulations. *Computational Geosciences* **12**, 317-335 (2008).
111. Sarma, P., Durlofsky, L.J., Aziz, K., Computational techniques for closed-loop reservoir modeling with application to a realistic reservoir. *Petroleum Science and Technology* **26**, 1120-1140 (2008).
112. Sarma, P., Chen, W.H., Durlofsky, L.J., Aziz, K., Production optimization with adjoint models under nonlinear control-state path inequality constraints. *SPE Reservoir Evaluation & Engineering* **11**, 326-339 (2008) (also SPE paper 99959).

113. Gong, B., Karimi-Fard, M., Durlofsky, L.J., Upscaling discrete fracture characterizations to dual-porosity, dual-permeability models for efficient simulation of flow with strong gravitational effects. *SPE Journal* **13**, 58-67 (2008) (also SPE paper 102491).
114. Sarma, P., Durlofsky, L.J., Aziz, K., Kernel principal component analysis for efficient, differentiable parameterization of multipoint geostatistics. *Mathematical Geosciences* **40**, 3-32 (2008).
115. Ahmadov, R., Aydin, A., Karimi-Fard, M., Durlofsky, L.J., Permeability upscaling of fault zones in the Aztec Sandstone, Valley of Fire State Park, Nevada, with a focus on slip surfaces and slip bands. *Hydrogeology Journal* **15**, 1239-1250 (2007).
116. Durlofsky, L.J., Efendiev, Y., Ginting, V., An adaptive local-global multiscale finite volume element method for two-phase flow simulations. *Advances in Water Resources* **30**, 576-588 (2007).
117. Wen, X.H., Chen, Y., Durlofsky, L.J., Efficient three-dimensional implementation of local-global upscaling for reservoir simulation. *SPE Journal* **11**, 443-453 (2006) (also SPE paper 92965).
118. Artus, V., Durlofsky, L.J., Onwunalu, J., Aziz, K., Optimization of nonconventional wells under uncertainty using statistical proxies. *Computational Geosciences* **10**, 389-404 (2006).
119. He, C., Durlofsky, L.J., Structured flow-based gridding and upscaling for modeling subsurface flow. *Advances in Water Resources* **29**, 1876-1892 (2006).
120. Karimi-Fard, M., Gong, B., Durlofsky, L.J., Generation of coarse-scale continuum flow models from detailed fracture characterizations. *Water Resources Research* **42**, W10423, doi:10.1029/2006WR005015 (2006).
121. Lohne, A., Virnovsky, G., Durlofsky, L.J., Two-stage upscaling of two-phase flow: from core to simulation scale. *SPE Journal* **11**, 304-316 (2006) (also SPE paper 89422).
122. Mlacnik, M.J., Durlofsky, L.J., Heinemann, Z.E., Sequentially adapted flow-based PEBI grids for reservoir simulation. *SPE Journal* **11**, 317-327 (2006) (also SPE paper 90009).
123. Sternlof, K.R., Karimi-Fard, M., Pollard, D.D., Durlofsky, L.J., Flow effects of compaction bands in sandstone at scales relevant to aquifer and reservoir management. *Water Resources Research* **42**, W07425, doi:10.1029/2005WR004664 (2006).
124. Chen, Y., Durlofsky, L.J., Efficient incorporation of global effects in upscaled models of two-phase flow and transport in heterogeneous formations. *SIAM Multiscale Modeling and Simulation* **5**, 445-475 (2006).
125. Sarma, P., Durlofsky, L.J., Aziz, K., Chen, W.H., Efficient real-time reservoir management using adjoint-based optimal control and model updating. *Computational Geosciences* **10**, 3-36 (2006).
126. Mlacnik, M.J., Durlofsky, L.J., Unstructured grid optimization for improved monotonicity of discrete solutions of elliptic equations with highly anisotropic coefficients. *Journal of Computational Physics* **216**, 337-361 (2006).
127. Chen, Y., Durlofsky, L.J., Adaptive local-global upscaling for general flow scenarios in heterogeneous formations. *Transport in Porous Media* **62**, 157-185 (2006).

128. Prevost, M., Lepage, F., Durlofsky, L.J., Mallet, J.-L., Unstructured 3D gridding and upscaling for coarse modeling of geometrically complex reservoirs. *Petroleum Geoscience* **11**, 339-345 (2005).
129. Hui, M., Durlofsky, L.J., Accurate coarse modeling of well-driven, high mobility ratio displacements in heterogeneous reservoirs. *Journal of Petroleum Science and Engineering* **49**, 37-56 (2005).
130. Aitokhuehi, I., Durlofsky, L.J., Optimizing the performance of smart wells in complex reservoirs using continuously updated geological models. *Journal of Petroleum Science and Engineering* **48**, 254-264 (2005).
131. Hui, M.H., Zhou, D., Wen, X.H., Durlofsky, L.J., Development and application of a new technique for upscaling miscible processes. *SPE Reservoir Evaluation & Engineering* **8**, 189-195 (2005) (also SPE paper 89435).
132. Shi, H., Holmes, J.A., Diaz, L.R., Durlofsky, L.J., Aziz, K., Drift-flux parameters for three-phase steady-state flow in wellbores. *SPE Journal* **10**, 130-137 (2005) (also SPE paper 89836).
133. Shi, H., Holmes, J.A., Durlofsky, L.J., Aziz, K., Diaz, L.R., Alkaya, B., Oddie, G., Drift-flux modeling of two-phase flow in wellbores. *SPE Journal* **10**, 24-33 (2005) (also SPE paper 84228).
134. Yeten, B., Brouwer, D.R., Durlofsky, L.J., Aziz, K., Decision analysis under uncertainty for smart well deployment. *Journal of Petroleum Science and Engineering* **43**, 183-199 (2004).
135. Sternlof, K.R., Chapin, J.R., Pollard, D.D., Durlofsky, L.J., Permeability effects of deformation band arrays in sandstone. *AAPG Bulletin* **88**, 1315-1329 (2004).
136. Flodin, E.A., Durlofsky, L.J., Aydin, A., Upscaled models of flow and transport in faulted sandstone: boundary condition effects and explicit fracture modeling. *Petroleum Geoscience* **10**, 173-181 (2004).
137. Efendiev, Y., Durlofsky, L.J., Accurate subgrid models for two-phase flow in heterogeneous reservoirs. *SPE Journal* **9**, 219-226 (2004) (also SPE paper 79680).
138. Karimi-Fard, M., Durlofsky, L.J., Aziz, K., An efficient discrete fracture model applicable for general purpose reservoir simulators. *SPE Journal* **9**, 227-236 (2004) (also SPE paper 79699).
139. Wen, X.H., Durlofsky, L.J., Edwards, M.G., Use of border regions for improved permeability upscaling. *Mathematical Geology* **35**, 521-547 (2003).
140. Yeten, B., Durlofsky, L.J., Aziz, K., Optimization of nonconventional well type, location, and trajectory. *SPE Journal* **8**, 200-210 (2003) (also SPE paper 77565).
141. Wen, X.H., Durlofsky, L.J., Edwards, M.G., Upscaling of channel systems in two dimensions using flow-based grids. *Transport in Porous Media* **51**, 343-366 (2003).
142. Wolfsteiner, C., Durlofsky, L.J., Aziz, K., Calculation of well index for nonconventional wells on arbitrary grids. *Computational Geosciences* **7**, 61-82 (2003).
143. Oddie, G., Shi, H., Durlofsky, L.J., Aziz, K., Pfeffer, B., Holmes, J.A., Experimental study of two and three phase flows in large diameter inclined pipes. *International Journal of Multiphase Flow* **29**, 527-558 (2003).

144. Valvatne, P.H., Serve, J., Durlofsky, L.J., Aziz, K., Efficient modeling of nonconventional wells with downhole inflow control devices. *Journal of Petroleum Science and Engineering* **39**, 99-116 (2003).
145. Efendiev, Y., Durlofsky, L.J., A generalized convection-diffusion model for subgrid transport in porous media. *SIAM Multiscale Modeling and Simulation* **1**, 504-526 (2003).
146. Chen, Y., Durlofsky, L.J., Gerritsen, M., Wen, X.H., A coupled local-global upscaling approach for simulating flow in highly heterogeneous formations. *Advances in Water Resources* **26**, 1041-1060 (2003).
147. Efendiev, Y., Durlofsky, L.J., Numerical modeling of subgrid heterogeneity in two phase flow simulations. *Water Resources Research* **38**(8), 1128 (2002).
148. Jourde, H., Flodin, E.A., Aydin, A., Durlofsky, L.J., Wen, X.H., Computing permeability of fault zones in eolian sandstone from outcrop measurements. *AAPG Bulletin* **86**, 1187-1200 (2002).
149. He, C., Edwards, M.G., Durlofsky, L.J., Numerical calculation of equivalent cell permeability tensors for general quadrilateral control volumes. *Computational Geosciences* **6**, 29-47 (2002).
150. Jenny, P., Wolfsteiner, C., Lee, S.H., Durlofsky, L.J., Modeling flow in geometrically complex reservoirs using hexahedral multiblock grids. *SPE Journal* **7**, 149-157 (2002) (also SPE paper 66357).
151. Wallstrom, T.C., Christie, M.A., Durlofsky, L.J., Sharp, D.H., Effective flux boundary conditions for upscaling porous media equations. *Transport in Porous Media* **46**, 139-153 (2002).
152. Wallstrom, T.C., Hou, S., Christie, M.A., Durlofsky, L.J., Sharp, D.H., Zou, Q., Application of effective flux boundary conditions to two-phase upscaling in porous media. *Transport in Porous Media* **46**, 155-178 (2002).
153. Darman, N.H., Durlofsky, L.J., Sorbie, K.S., Pickup, G.E., Upscaling immiscible gas displacements: quantitative use of fine-grid flow data in grid-coarsening schemes. *SPE Journal* **6**, 47-56 (2001) (also SPE paper 59452).
154. Durlofsky, L.J., An approximate model for well productivity in heterogeneous porous media. *Mathematical Geology* **32**, 421-438 (2000).
155. Mascarenhas, O., Durlofsky, L.J., Coarse scale simulation of horizontal wells in heterogeneous reservoirs. *Journal of Petroleum Science and Engineering* **25**, 135-147 (2000).
156. Wolfsteiner, C., Durlofsky, L.J., Aziz, K., Approximate model for productivity of non-conventional wells in heterogeneous reservoirs. *SPE Journal* **5**, 218-226 (2000) (also SPE paper 56754).
157. Durlofsky, L.J., Milliken, W.J., Bernath, A., Scaleup in the near-well region. *SPE Journal* **5**, 110-117 (2000) (also SPE paper 51940).
158. Efendiev, Y., Durlofsky, L.J., Lee, S.H., Modeling of subgrid effects in coarse scale simulations of transport in heterogeneous porous media. *Water Resources Research* **36**, 2031-2041 (2000).

159. Tchelepi, H.A., Durlofsky, L.J., Chen, W.H., Bernath, A., Chien, M.C.H., Practical use of scale up and parallel reservoir simulation technologies in field studies. *SPE Reservoir Evaluation and Engineering* **2**, 368-376 (1999) (also SPE paper 38886).
160. Wallstrom, T.C., Hou, S., Christie, M.A., Durlofsky, L.J., Sharp, D.H., Accurate scale up of two phase flow using renormalization and nonuniform coarsening. *Computational Geosciences* **3**, 69-87 (1999).
161. Lee, S.H., Durlofsky, L.J., Lough, M.F., Chen, W.H., Finite difference simulation of geologically complex reservoirs with tensor permeabilities. *SPE Reservoir Evaluation and Engineering* **1**, 567-574 (1998) (also SPE paper 38002).
162. Durlofsky, L.J., Coarse scale models of two phase flow in heterogeneous reservoirs: volume averaged equations and their relationship to existing upscaling techniques. *Computational Geosciences* **2**, 73-92 (1998).
163. Durlofsky, L.J., Use of higher moments for the description of upscaled, process independent relative permeabilities. *SPE Journal* **2**, 474-484 (1997) (also SPE paper 37987).
164. Durlofsky, L.J., Jones, R.C., Milliken, W.J., A nonuniform coarsening approach for the scale up of displacement processes in heterogeneous porous media. *Advances in Water Resources* **20**, 335-347 (1997).
165. Durlofsky, L.J., Behrens, R.A., Jones, R.C., Bernath, A., Scale up of heterogeneous three dimensional reservoir descriptions. *SPE Journal* **1**, 313-326 (1996) (also SPE paper 30709).
166. Dehghani, K., Basham, W.M., Durlofsky, L.J., Tucker, K.E., Modeling and scale up of steam-flood in a heterogeneous reservoir. *SPE Reservoir Engineering* **10**, 237-245 (Nov. 1995) (also SPE paper 28587).
167. Durlofsky, L.J., Accuracy of mixed and control volume finite element approximations to Darcy velocity and related quantities. *Water Resources Research* **30**, 965-973 (1994).
168. Chen, W.H., Durlofsky, L.J., Engquist, B., Osher, S., Minimization of grid orientation effects through use of higher order finite difference methods. *SPE Advanced Technology Series* **1**, 43-52 (1993) (also SPE paper 22887).
169. Durlofsky, L.J., A triangle based mixed finite element – finite volume technique for modeling two phase flow through porous media. *Journal of Computational Physics* **105**, 252-266 (1993).
170. Durlofsky, L.J., Modeling fluid flow through complex reservoir beds. *SPE Formation Evaluation* **7**, 315-322 (1992) (also SPE paper 21240).
171. Durlofsky, L.J., Representation of grid block permeability in coarse scale models of randomly heterogeneous porous media. *Water Resources Research* **28**, 1791-1800 (1992).
172. Durlofsky, L.J., Engquist, B., Osher, S., Triangle based adaptive stencils for the solution of hyperbolic conservation laws. *Journal of Computational Physics* **98**, 64-73 (1992).
173. Durlofsky, L.J., Numerical calculation of equivalent grid block permeability tensors for heterogeneous porous media. *Water Resources Research* **27**, 699-708 (1991).
174. Durlofsky, L.J., Brady, J.F., Dynamic simulation of bounded suspensions of hydrodynamically interacting particles. *Journal of Fluid Mechanics* **200**, 39-67 (1989).

175. Brady, J.F., Durlofsky, L.J., The sedimentation rate of disordered suspensions. *Physics of Fluids*, **31** 717-727 (1988).
176. Durlofsky, L.J., Brady, J.F., Analysis of the Brinkman equation as a model for flow in porous media. *Physics of Fluids* **30**, 3329-3341 (1987).
177. Durlofsky, L.J., Brady, J.F., Bossis, G., Dynamic simulation of hydrodynamically interacting particles. *Journal of Fluid Mechanics* **180**, 21-49 (1987).
178. Brady, J.F., Durlofsky, L.J., On rotating disk flow. *Journal of Fluid Mechanics* **175**, 363-394 (1987).
179. Durlofsky, L.J., Brady, J.F., The spatial stability of a class of similarity solutions. *Physics of Fluids* **27**, 1068-1076 (1984).
180. Tarbell, J.M., Ultman, J.S., Durlofsky, L.J., Oscillatory convective dispersion in a branching tube network. *Transactions of the ASME – Journal of Biomechanical Engineering* **104**, 338-342 (1982).

Other Journal Articles / Patent

1. Chen, Y., Durlofsky, L.J., Upscaling multiple geological models for flow simulation. U.S. Patent 9,110,193 B2, Issued Aug. 2015.
2. Kang, C.A., Brandt, A.R., Durlofsky, L.J., Optimal heat management in an integrated fossil-renewable energy system with CO₂ capture. *Energy Procedia* **37**, 2715-2726 (2013) (presented at the 11th International Conference on Greenhouse Gas Control Technologies (GHGT-11), Kyoto, Japan, Nov. 18-22, 2012).
3. Echeverría Ciaurri, D., Isebor, O.J., Durlofsky, L.J., Application of derivative-free methodologies to generally constrained oil production optimization problems. *Procedia Computer Science* **1**, 1301-1310 (2012) (presented at the International Conference on Computational Science (ICCS), Amsterdam, The Netherlands, May 31- June 2, 2010).
4. Sarma, P., Durlofsky, L.J., Aziz, K., Efficient closed-loop production optimization under uncertainty. *Journal of Petroleum Technology* **57**, 51-52 (2005).
5. Yeten, B., Durlofsky, L.J., Aziz, K., Optimization of intelligent well control. *World Oil* **224**, 35-40 (March 2003).
6. Durlofsky, L.J., Upscaling of geological models for reservoir simulation: issues and approaches. *Computational Geosciences* **6**, 1-4 (2002).

Conference Proceedings Papers*

1. Raji, O.Q., Volkov, O., Kavscek, A.R., Durlofsky, L.J., Optimization of well placement for geological CO₂ storage to minimize fault slip tendency. SPE paper 228340-MS, presented at the SPE Energy Transition Symposium, Sugar Land, TX, Sept. 8-10 (2025).

*SPE conference proceedings papers subsequently published in SPE journals are not listed in this section (these are listed above in Peer-Reviewed Journal Articles)

2. Di Federico, G., Durlofsky, L.J., Generative diffusion models for parameterizing and history matching complex geomodels. Proceedings of the European Conference on the Mathematics of Geological Reservoirs, Oslo, Norway, Sept. 2-5 (2024).
3. Crain, D., Saltzer, S., Benson, S.M., Durlofsky, L.J., An integrated framework for optimal monitoring and history matching in CO₂ storage projects. Proceedings of the European Conference on the Mathematics of Geological Reservoirs, The Hague, The Netherlands, Sept. 5-7 (2022).
4. Kim, Y.D., Durlofsky, L.J., Closed-loop reservoir management using a convolutional – recurrent neural network proxy for robust production optimization. Proceedings of the European Conference on the Mathematics of Geological Reservoirs, The Hague, The Netherlands, Sept. 5-7 (2022).
5. Tang, M., Liu, Y., Durlofsky, L.J., History matching complex 3D systems using deep-learning-based surrogate flow modeling and CNN-PCA geological parameterization. SPE paper 203924, prepared for the SPE Reservoir Simulation Conference, Galveston, TX, Oct. 4-6 (2021).
6. Nasir, Y., Volkov, O., Durlofsky, L.J., Large-scale field development optimization using a two-stage strategy. Proceedings of the 17th European Conference on the Mathematics of Oil Recovery, Online, Sept. 14-17 (2020).
7. Tang, M., Liu, Y., Durlofsky, L.J., Deep-learning-based 3D geological parameterization and flow prediction for history matching. Proceedings of the 17th European Conference on the Mathematics of Oil Recovery, Online, Sept. 14-17 (2020).
8. Tang, H., Volkov, O., Tchelepi, H.A., Durlofsky, L.J., Reduced-order modeling in a general reservoir simulation setting. SPE paper 200794, prepared for the SPE Western Regional Meeting, Bakersfield, CA, April 27 – May 1 (2020).
9. Jiang, S., Sun, W., Durlofsky, L.J., A data-space approach for well control optimization under uncertainty. Proceedings of the 16th European Conference on the Mathematics of Oil Recovery, Barcelona, Spain, Sept. 3-6 (2018).
10. Karimi-Fard, M., Durlofsky, L.J., An unstructured dual-grid model for flow in fractured and heterogeneous porous media. Proceedings of the 16th European Conference on the Mathematics of Oil Recovery, Barcelona, Spain, Sept. 3-6 (2018).
11. Kostakis, F., Mallison, B., Durlofsky, L.J., Multifidelity framework for uncertainty quantification with multiple quantities of interest. Proceedings of the 16th European Conference on the Mathematics of Oil Recovery, Barcelona, Spain, Sept. 3-6 (2018).
12. Sun, W., Hui, M., Durlofsky, L.J., Production forecasting and uncertainty quantification for a naturally fractured reservoir using a new data-space inversion procedure. Proceedings of the 15th European Conference on the Mathematics of Oil Recovery, Amsterdam, The Netherlands, Aug. 29 – Sept. 1 (2016).
13. Maier, C., Karimi-Fard, M., Lapene, A., Durlofsky, L.J., An MPFA-based dual continuum–discrete feature model for simulation of flow in fractured reservoirs. Proceedings of the 15th European Conference on the Mathematics of Oil Recovery, Amsterdam, The Netherlands, Aug. 29 – Sept. 1 (2016).

14. Mishra, S., Ganesh, P.R., Schuetter, J., He, J., Jin, Z., Durlofsky, L.J., Developing and validating simplified predictive models for CO₂ geologic sequestration. SPE paper 175097, presented at the SPE Annual Technical Conference and Exhibition, Houston, TX, Sept. 28-30 (2015).
15. Aliyev, E., Durlofsky, L.J., Multilevel field-development optimization using a sequence of upscaled models. SPE paper 173198, presented at the SPE Reservoir Simulation Symposium, Houston, TX, Feb. 23-25 (2015).
16. Li, H., Durlofsky, L.J., Ensemble level upscaling for compositional flow simulation, with application to uncertainty quantification. Proceedings of the 14th European Conference on the Mathematics of Oil Recovery, Catania, Sicily, Italy, Sept. 8-11 (2014).
17. Karimi-Fard, M., Durlofsky, L.J., Unstructured adaptive mesh refinement for flow in heterogeneous porous media. Proceedings of the 14th European Conference on the Mathematics of Oil Recovery, Catania, Sicily, Italy, Sept. 8-11 (2014).
18. Rousset, M.A.H., Durlofsky, L.J., Optimization-based framework for geological scenario determination using parameterized training images. Proceedings of the 14th European Conference on the Mathematics of Oil Recovery, Catania, Sicily, Italy, Sept. 8-11 (2014).
19. Farshidi, S.F., Fan, Y., Durlofsky, L.J., Tchelepi, H.A., Chemical reaction modeling in a compositional reservoir-simulation framework. SPE paper 163677, presented at the SPE Reservoir Simulation Symposium, The Woodlands, TX, Feb. 18-20 (2013).
20. Rousset, M.A.H., Huang, C.K., Klie, H., Durlofsky, L.J., Reduced-order modeling for thermal recovery processes. Proceedings of the 13th European Conference on the Mathematics of Oil Recovery, Biarritz, France, Sept. 10-13 (2012).
21. Isebor, O.J., Durlofsky, L.J., Echeverría Ciaurri, D., A derivative-free methodology with local and global search for the joint optimization of well location and control. Proceedings of the 13th European Conference on the Mathematics of Oil Recovery, Biarritz, France, Sept. 10-13 (2012).
22. Karimi-Fard, M., Durlofsky, L.J., A new global upscaling technique for 3D unstructured grids. Proceedings of the 13th European Conference on the Mathematics of Oil Recovery, Biarritz, France, Sept. 10-13 (2012).
23. Wilson, K.C., Durlofsky, L.J., Computational optimization of shale resource development using reduced-physics surrogate models. SPE paper 152946, presented at the SPE Western Regional Meeting, Bakersfield, CA, March 19-23 (2012).
24. Kang, C.A., Brandt, A.R., Durlofsky, L.J., Impact of CO₂ emissions policy and system configuration on optimal operation of an integrated fossil-renewable energy. CMTC paper 151446, presented at the Carbon Management Technology Conference, Orlando, FL, Feb. 7-9 (2012).
25. He, J., Sarma, P., Durlofsky, L.J., Use of reduced-order models for improved data assimilation within an EnKF context. SPE paper 141967, presented at the SPE Reservoir Simulation Symposium, The Woodlands, TX, Feb. 21-23 (2011).
26. Wen, Z., Durlofsky, L.J., Van Roy, B., Aziz, K., Use of approximate dynamic programming for production optimization. SPE paper 141677, presented at the SPE Reservoir Simulation Symposium, The Woodlands, TX, Feb. 21-23 (2011).

27. Wang, H., Echeverría Ciaurri, D., Durlofsky, L.J., Use of retrospective optimization for placement of oil wells under uncertainty. Proceedings of the 2010 Winter Simulation Conference, B. Johansson et al., eds., Baltimore, MD, Dec. 5-8 (2010).
28. He, J., Durlofsky, L.J., Use of linearized reduced-order modeling and pattern search methods for optimization of oil production. Proceedings of the 2nd International Conference on Engineering Optimization, Lisbon, Portugal, Sept. 6-9 (2010).
29. Echeverría Ciaurri, D., Isebor, O.J., Durlofsky, L.J., New approaches for generally constrained production optimization with an emphasis on derivative-free techniques. Proceedings of the 12th European Conference on the Mathematics of Oil Recovery, Oxford, UK, Sept. 6-9 (2010).
30. Aouizerate, G., Durlofsky, L.J., Samier, P., New models for heater wells in reservoir simulation. Proceedings of the 12th European Conference on the Mathematics of Oil Recovery, Oxford, UK, Sept. 6-9 (2010).
31. Scheidt, C., Caers, J., Chen, Y., Durlofsky, L.J., Rapid construction of ensembles of high-resolution reservoir models constrained to production data. Proceedings of the 12th European Conference on the Mathematics of Oil Recovery, Oxford, UK, Sept. 6-9 (2010).
32. Karimi-Fard, M., Durlofsky, L.J., An expanded well model for accurate simulation of reservoir-well interactions. Proceedings of the 12th European Conference on the Mathematics of Oil Recovery, Oxford, UK, Sept. 6-9 (2010).
33. Semanova, A., Livescu, S., Durlofsky, L.J., Aziz, K., Modeling of multisegmented thermal wells in reservoir simulation. SPE paper 130371, presented at the SPE Europec/EAGE Annual Conference and Exhibition, Barcelona, Spain, June 14-17 (2010).
34. Livescu, S., Aziz, K., Durlofsky, L.J., Development and application of a fully-coupled thermal compositional wellbore flow model. SPE paper 121306, presented at the SPE Western Regional Meeting, San Jose, CA, March 24-26 (2009).
35. Chen, T., Gerritsen, M.G., Durlofsky, L.J., Lambers, J.V., Adaptive local-global VCMP methods for coarse-scale reservoir modeling. SPE paper 118994, presented at the SPE Reservoir Simulation Symposium, The Woodlands, TX, Feb. 2-4 (2009).
36. Karimi-Fard, M., Durlofsky, L.J., Detailed near-well Darcy-Forchheimer flow modeling and upscaling on unstructured 3D grids. SPE paper 118999, presented at the SPE Reservoir Simulation Symposium, The Woodlands, TX, Feb. 2-4 (2009).
37. Onwunalu, J., Litvak, M., Durlofsky, L.J., Aziz, K., Application of statistical proxies to speed up field development optimization procedures. SPE paper 117323, presented at the Abu Dhabi International Petroleum Exhibition and Conference, Abu Dhabi, UAE, Nov. 3-6 (2008).
38. Chen, Y., Park, K., Durlofsky, L.J., Ensemble level upscaling of 3D well-driven flow for efficient uncertainty quantification. Proceedings of the 11th European Conference on the Mathematics of Oil Recovery, Bergen, Norway, Sept. 8-11 (2008).
39. Livescu, S., Durlofsky, L.J., Aziz, K., Ginestra, J.C., Application of a new fully-coupled thermal multiphase wellbore flow model. SPE paper 113215, presented at the SPE Improved Oil Recovery Symposium, Tulsa, April 19-23 (2008).
40. Hui, M., Gong, B., Karimi-Fard, M., Durlofsky, L.J., Development and application of new computational procedures for modeling miscible gas injection in fractured reservoirs. SPE

paper 109686, presented at the SPE Annual Technical Conference and Exhibition, Anaheim, Nov. 11-14 (2007).

41. Sarma, P., Durlofsky, L.J., Aziz, K., Chen, W.H., A new approach to automatic history matching using kernel PCA. SPE paper 106176, presented at the SPE Reservoir Simulation Symposium, Houston, Feb. 26-28 (2007).
42. Castro, S., Caers, J., Durlofsky, L.J., Improved modeling of 4D seismic response using flow-based downscaling of coarse grid saturations. Proceedings of the 10th European Conference on the Mathematics of Oil Recovery, Amsterdam, The Netherlands, Sept. 4-7 (2006).
43. Mallison, B.T., Chen, Y., Durlofsky, L.J., Nonlinear two-point flux approximations for simulating subsurface flows with full-tensor anisotropy. Proceedings of the 10th European Conference on the Mathematics of Oil Recovery, Amsterdam, The Netherlands, Sept. 4-7 (2006).
44. Mlacnik, M.J., Durlofsky, L.J., Grid optimization for improved monotonicity of MPFA solutions on unstructured grids. Proceedings of the 10th European Conference on the Mathematics of Oil Recovery, Amsterdam, The Netherlands, Sept. 4-7 (2006).
45. Sarma, P., Durlofsky, L.J., Aziz, K., Computational techniques for closed-loop reservoir modeling with application to a realistic reservoir. Proceedings of the 10th European Conference on the Mathematics of Oil Recovery, Amsterdam, The Netherlands, Sept. 4-7 (2006).
46. Durlofsky, L.J., Upscaling and gridding of fine scale geological models for flow simulation. Proceedings of the 8th International Forum on Reservoir Simulation, Stresa, Italy, June 20-25 (2005).
47. Sarma, P., Durlofsky, L.J., Aziz, K., Efficient closed-loop production optimization under uncertainty. SPE paper 94241, presented at the 14th Europec Biennial Conference, Madrid, Spain, June 13-16 (2005).
48. Hui, M., Durlofsky, L.J., Wen, X.H., Application of a new upscaling technique to a miscible gas injection field study. Proceedings of the 13th EAGE Symposium on Improved Oil Recovery, Budapest, Hungary, April 25-27 (2005).
49. Sarma, P., Aziz, K., Durlofsky, L.J., Implementation of adjoint solution for optimal control of smart wells. SPE paper 92864, presented at the SPE Reservoir Simulation Symposium, Houston, Jan. 31 – Feb. 2 (2005).
50. Lødøen, O.P., Omre, H., Durlofsky, L.J., Chen, Y., Assessment of uncertainty in reservoir production forecasts using upscaled flow models. *Geostatistics Banff 2004, Volume 1, Quantitative Geology and Geostatistics*, p. 713-722, O. Leuangthong, C.V. Deutsch, eds., Springer (2005) (presented at the Seventh International Geostatistics Congress, Banff, Canada, Sept. 26 – Oct. 1, 2004).
51. Chen, Y., Durlofsky, L.J., Wen, X.H., Robust coarse scale modeling of flow and transport in heterogeneous reservoirs. Proceedings of the 9th European Conference on the Mathematics of Oil Recovery, Cannes, France, Aug. 30 – Sept. 2 (2004).
52. Prevost, M., Lepage, F., Durlofsky, L.J., Mallet, J.-L., Unstructured 3D gridding and upscaling for coarse modeling of geometrically complex reservoirs. Proceedings of the 9th European Conference on the Mathematics of Oil Recovery, Cannes, France, Aug. 30 – Sept. 2 (2004).

53. Aitokhuehi, I., Durlofsky, L.J., Artus, V., Yeten, B., Aziz, K., Optimization of advanced well type and performance. Proceedings of the 9th European Conference on the Mathematics of Oil Recovery, Cannes, France, Aug. 30 – Sept. 2 (2004).
54. Durlofsky, L.J., Upscaling of geocellular models for reservoir flow simulation: a review of recent progress. Proceedings of the 7th International Forum on Reservoir Simulation, Bühl/Baden-Baden, Germany, June 23-27 (2003).
55. Lee, S.H., Wolfsteiner, C., Durlofsky, L.J., Jenny, P., Tchelepi, H.A., New developments in multiblock reservoir simulation: black oil modeling, nonmatching subdomains and near-well upscaling. SPE paper 79682, presented at the SPE Reservoir Simulation Symposium, Houston, Feb. 3-5 (2003).
56. Wan, J., Durlofsky, L.J., Hughes, T.J.R., Aziz, K., Stabilized finite element methods for coupled geomechanics – reservoir flow simulations. SPE paper 79694, presented at the SPE Reservoir Simulation Symposium, Houston, Feb. 3-5 (2003).
57. Yeten, B., Durlofsky, L.J., Aziz, K., Optimization of smart well control. SPE paper 79031, presented at the SPE International Thermal Operations and Heavy Oil Symposium and International Horizontal Well Technology Conference, Calgary, Nov. 4-7 (2002).
58. Wolfsteiner, C., Durlofsky, L.J., Near-well radial upscaling for the accurate modeling of non-conventional wells. SPE paper 76779, presented at the SPE Western Regional Meeting, Anchorage, May 20-22 (2002).
59. Flodin, E.A., Aydin, A., Durlofsky, L.J., Yeten, B., Representation of fault zone permeability in reservoir flow models. SPE paper 71617, presented at the SPE Annual Technical Conference and Exhibition, New Orleans, Sept. 30 – Oct. 3 (2001).
60. Wolfsteiner, C., Aziz, K., Durlofsky, L.J., Modeling conventional and non-conventional wells. Proceedings of the 6th International Forum on Reservoir Simulation, Hof/Salzburg, Austria, Sept. 3-7 (2001) (also appearing in the Proceedings of the International Energy Agency Symposium on Enhanced Oil Recovery, Vienna, Austria, Sept. 9-12, 2001).
61. Valvatne, P.H., Durlofsky, L.J., Aziz, K., Semi-analytical modeling of the performance of intelligent well completions. SPE paper 66368, presented at the SPE Reservoir Simulation Symposium, Houston, Feb. 11-14 (2001).
62. Wen, X.H., Durlofsky, L.J., Lee, S.H., Edwards, M.G., Full tensor upscaling of geologically complex reservoir descriptions. SPE paper 62928, presented at the SPE Annual Technical Conference and Exhibition, Dallas, Oct. 1-4 (2000).
63. Castellini, A., Edwards, M.G., Durlofsky, L.J., Flow based modules for grid generation in two and three dimensions. Proceedings of the 7th European Conference on the Mathematics of Oil Recovery, Baveno, Italy, Sept. 5-8 (2000).
64. Christie, M.A., Wallstrom, T.C., Durlofsky, L.J., Hou, S., Sharp, D.H., Zou, Q., Effective medium boundary conditions in upscaling. Proceedings of the 7th European Conference on the Mathematics of Oil Recovery, Baveno, Italy, Sept. 5-8 (2000).
65. Yeten, B., Wolfsteiner, C., Durlofsky, L.J., Aziz, K., Approximate finite difference modeling of the performance of horizontal wells in heterogeneous reservoirs. SPE paper 62555, presented at the SPE Western Regional Meeting, Long Beach, June 19-23 (2000).

66. Wallstrom, T.C., Hou, S., Christie, M.A., Durlofsky, L.J., Sharp, D.H., Zou, Q., Effective medium boundary conditions for upscaling relative permeabilities. Upscaling Downunder Conference Proceedings, Melbourne, Australia, Feb. 7-10 (2000) (also Tech. Report LA-UR-99-6488, Los Alamos National Laboratory).
67. Wolfsteiner, C., Durlofsky, L.J., Aziz, K., Efficient estimation of the effects of wellbore hydraulics and reservoir heterogeneity on the productivity of non-conventional wells. SPE paper 59399, presented at the SPE Asia Pacific Conference on Integrated Modelling and Asset Management, Yokohama, Japan, April 25-26 (2000).
68. Mascarenhas, O., Durlofsky, L.J., Scale up in the vicinity of horizontal wells. Proceedings of the 20th Annual International Energy Agency Workshop and Symposium, Paris, Sept. 22-24 (1999).
69. Wallstrom, T.C., Hou, S., Christie, M.A., Durlofsky, L.J., Sharp, D.H., Application of a new two-phase upscaling technique to realistic reservoir cross sections. SPE paper 51939, presented at the SPE Reservoir Simulation Symposium, Houston, Feb. 14-17 (1999).
70. Chambers, K.T., DeBaun, D.R., Durlofsky, L.J., Taggart, I.J., Bernath, A., Shen, A.Y., Legarre, H.A., Goggin, D.J., Geologic modeling, upscaling and simulation of faulted reservoirs using complex, faulted stratigraphic grids. SPE paper 51889, presented at the SPE Reservoir Simulation Symposium, Houston, Feb. 14-17 (1999).
71. Durlofsky, L.J., Milliken, W.J., Upscaling of geologic models for reservoir simulation. Proceedings of the 19th Annual International Energy Agency Workshop and Symposium, Carmel, Oct. 4-7 (1998).
72. Durlofsky, L.J., Milliken, W.J., Dehghani, K., Jones, R.C., Application of a new scale up methodology to the simulation of displacement processes in heterogeneous reservoirs. SPE paper 28704, presented at the SPE International Petroleum Conference and Exhibition of Mexico, Veracruz, Oct. 10-13 (1994).
73. Durlofsky, L.J., Jones, R.C., Milliken, W.J., A new method for the scale up of displacement processes in heterogeneous reservoirs. Proceedings of the 4th European Conference on the Mathematics of Oil Recovery, Roros, Norway (1994).
74. Durlofsky, L.J., Chien, M.C.H., Development of a mixed finite element based compositional reservoir simulator. SPE paper 25253, presented at the SPE Reservoir Simulation Symposium, New Orleans, Feb. 28 – March 3 (1993).
75. Durlofsky, L.J., Chung, E.Y., Effective permeability of heterogeneous reservoir regions. Proceedings of the 2nd European Conference on the Mathematics of Oil Recovery, D. Guerillot, O. Guillon, eds., Editions Technips, Paris, 57-64 (1990).

U.S. Department of Energy Reports

1. Jin, L.Z., He, J., Durlofsky, L.J., Simplified predictive models for CO₂ sequestration performance assessment – Reduced-order method (ROM) based models. Research Topical Report on Task #4, DOE Award No. DE-FE0009051 (2015) 88 pp.
2. Hou, T.Y., Durlofsky, L.J., Efendiev, Y., Tchelepi, H., Multiscale analysis and computation for flows in heterogeneous media. Annual Report to U.S. Department of Energy (Year 1), contract no. DE-FG02-06ER25727 (2006) (http://www.math.tamu.edu/~yalchin.efendiev/doe_joint.html).

3. Durlofsky, L.J., Aziz, K., Advanced techniques for reservoir simulation and modeling of non-conventional wells. Final Report to U.S. Department of Energy, contract no. DE-AC26-99BC15213 (2004) 213 pp.
4. Durlofsky, L.J., Aziz, K., Advanced techniques for reservoir simulation and modeling of non-conventional wells. Annual Report to U.S. Department of Energy (Year 4), contract no. DE-AC26-99BC15213 (2003) 200 pp.
5. Durlofsky, L.J., Aziz, K., Advanced techniques for reservoir simulation and modeling of non-conventional wells. Annual Report to U.S. Department of Energy (Year 3), contract no. DE-AC26-99BC15213 (2002) 139 pp.
6. Durlofsky, L.J., Aziz, K., Advanced techniques for reservoir simulation and modeling of non-conventional wells. Annual Report to U.S. Department of Energy (Year 2), contract no. DE-AC26-99BC15213 (2001) 141 pp.
7. Durlofsky, L.J., Aziz, K., Advanced techniques for reservoir simulation and modeling of non-conventional wells. Annual Report to U.S. Department of Energy (Year 1), contract no. DE-AC26-99BC15213 (2000) 140 pp.