

## CURRICULUM VITÆ

October, 2025

### SUSAN E. MINKOFF

Dept. of Applied Mathematics  
Computing and Data Sciences Directorate  
Brookhaven National Labs  
PO Box 5000  
Upton, NY 11973-5000  
Phone: (443) 604-1146  
Email: sminkoff@bnl.gov

### EDUCATION

Ph.D. 5/1995	Rice University, Houston, TX, Computational and Applied Mathematics
M.A. 5/1993	Rice University, Houston, TX, Computational and Applied Mathematics
B.S. 5/1986	Duke University, Durham, NC, Mathematics and Computer Science ( <i>magna cum laude</i> )

### Research and Professional Experience

2024–	Brookhaven National Laboratory, Chair of Applied Mathematics, Computing and Data Sciences Directorate, Upton, NY
2025–	Adjunct Professor, Department of Electrical and Computer Engineering, and the Institute for Advanced Computational Science, Stony Brook University, Stony Brook, NY
2024–present	Adjunct Professor, Department of Sustainable Earth Systems Sciences, University of Texas at Dallas, Richardson, TX
2012–2024	University of Texas at Dallas, Professor, Department of Mathematical Sciences, Affiliated Professor, Geosciences Department, Affiliated Professor, Department of Science/Mathematics Education, Richardson, TX
2018	Statistical and Applied Mathematical Sciences Institute (SAMSI) Faculty Research Fellow, (Joint between NSF, Duke, UNC, and NC State Universities), Durham, NC.
2017–2024	Associate Director for industrial research consortium: “UT Dallas 3D + 4D Seismic Research Consortium”, Department of Geosciences and Department of Mathematical Sciences, UTD.
2012	University of Maryland, Baltimore County, Professor, Department of Mathematics and Statistics, Baltimore, MD
2006–2012	University of Maryland, Baltimore County, Associate Professor with Tenure, Department of Mathematics and Statistics, Baltimore, MD
2007	Oden Faculty Research Fellow, Institute for Computational Engineering Sciences

and the Department of Petroleum and Geosystems Engineering, University of Texas at Austin, Austin, TX.

2000–2006	University of Maryland, Baltimore County, Assistant Professor, Department of Mathematics and Statistics, Baltimore, MD
2000	Sandia National Labs, Senior Member of Technical Staff, Geophysical Technology Dept, Albuquerque, NM.
1997–2000	Sandia National Labs, Von Neumann Fellow in Computational Sciences, Applied Mathematics Dept., Albuquerque, NM.
1995–1997	University of Texas at Austin & British Petroleum, National Science Foundation Industrial Postdoctoral Fellow, Computational and Applied Mathematics, Austin and Houston, TX
1989–1995	Rice University, Graduate Research Assistant, Computational and Applied Mathematics, Houston, TX
1988–1989	Exxon Company U.S.A., Senior Systems Analyst, Houston, TX
1986–1988	Exxon Company U.S.A., Systems Analyst, Houston, TX

## **RESEARCH INTERESTS**

My research interests are in scientific computing, numerical analysis and mathematical modeling.

## **PROFESSIONAL MEMBERSHIPS**

The Society for Industrial and Applied Mathematics and the Society of Exploration Geophysicists

## **HONORS RECEIVED**

2004	Honorable Mention for Best Paper: <i>Geophysics</i>
1999	Outstanding Reviewer: <i>Geophysics</i>
1996	The Robert Lowrey Patten Service Award, Rice University
1993	The Graduate Student Association Service Award, Rice University
1985	Phi Beta Kappa, Duke University

## **RESEARCH SUPPORT AND FELLOWSHIPS**

2025–2026	P.I. \$70,000, “Uncertainty-Aware Perception and Sensor Fusion for Humanoid Robots,” Stony Brook University/Brookhaven Seed Grant Program, Co-P.I.: P. Djuric, SBU.
2024–2025	Co-P.I. \$135,000, “UT Dallas 3D + 4D Seismic Research Consortium”, Sponsors include BHP, BP, and Shell. P.I.: D. Lumley, additional Co-P.I.: H. Zhu.
2023	Co-P.I. \$180,000, “UT Dallas 3D + 4D Seismic Research Consortium”,

- Sponsors include BHP, BP, ExxonMobil, and Shell.  
P.I.: D. Lumley, additional Co-P.I.: H. Zhu.
- 2022–2023 Co-P.I. \$1500, “Recruitment of Women Faculty into the Mathematical Sciences at UTD,” UTD ASPIRE<sup>2</sup> STRIDE Faculty Recruitment Grant Program (NSF), P.I.: J. Zweck, additional Co-P.I.’s: V. Dragovic, S. Biswas, Y. Lou.
- 2022 Co-P.I. \$180,000, “UT Dallas 3D + 4D Seismic Research Consortium”, Sponsors include BHP, BP, ExxonMobil, and Shell.  
P.I.: D. Lumley, additional Co-P.I.: H. Zhu.
- 2021–2024 Co-P.I. \$340,000 (UTD total is \$100,00), National Science Foundation, “CDS&E: Collaborative Research: Surrogates and Reduced Order Modeling for High Dimensional Coupled Systems,” P.I.: E. Spiller (Marquette University), other co-P.I.’s: E. Bruce Pitman (SUNY at Buffalo), R. Smith (NC State University).
- 2021 Co-P.I. \$175,000, “UT Dallas 3D + 4D Seismic Research Consortium”, Sponsors include BHP, BP, PetroChina, Pioneer Natural Resources, Shell. P.I.: D. Lumley, additional Co-P.I.: H. Zhu.
- 2020 Co-P.I. \$210,000, “UT Dallas 3D + 4D Seismic Research Consortium”, Sponsors include BHP, BP, ExxonMobil, PetroChina, Pioneer Natural Resources, Shell. P.I.: D. Lumley, additional Co-P.I.: H. Zhu.
- 2019 Co-P.I. \$245,000, “UT Dallas 3D + 4D Seismic Research Consortium”, Sponsors include BHP, BP, Denbury Resources, ExxonMobil, PetroChina, Pioneer Natural Resources, Shell. P.I.: D. Lumley, additional co-P.I.: H. Zhu.
- 2018–2021 Co-P.I. \$360,037 (UTD total, additional funds received at UTRGV), National Science Foundation, “Collaborative Research: Enhancing Diversity in the Mathematics Graduate Applicant Pool,” P.I.: V. Dragovic; additional co-P.I.’s: S. Biswas, V. Ramakrishna, J. Gonzalez.
- 2016–2020 Co-P.I. \$149,157 (UTD total, additional funds received at Baylor), National Science Foundation, “Collaborative Research: Multiphysics Modeling and Analysis of Thermo-Visco-Acoustic Equations with Applications to the Design of Trace Gas Sensors,” P.I.: J. Zweck; Additional co-P.I.: R. Kirby (Baylor University).
- 2015–2017 Co-P.I. \$80,115, National Science Foundation, “UTeach Dallas Robert Noyce Scholarship Program Supplement: Pedagogical Coaches to Develop Geometric Imagination and Conceptual Thinking for Calculus III,” P.I.: M. Urquhart; additional Co-P.I.’s: J. Zweck, J. Neal, H. Montgomery.
- 2015–2018 P.I. \$598,805, National Science Foundation, “EDT: Team Training Mathematical Scientists Through Industrial Collaborations,” co-P.I.’s: Y. Cao, Y. Gel, F. Pereira, J. Zweck.
- 2014–2019 Co-P.I. \$799,686, National Science Foundation, “UTeach Dallas Robert Noyce Scholarship Program”, P.I.: M. Urquhart; additional Co-P.I.’s: J. Zweck, J. Neal, H. Montgomery.
- 2014 P.I. \$10,000, Pioneer Natural Resources gift,  
“Investigation of Microseismic Source Location via Full Waveform Inversion.”
- 2012–2013 Co-P.I. \$46,100, Subgrant from National Science Foundation:  
Engineering Research Center on Mid InfraRed Technologies for Health and the Environment (MIRTHE): “Geometrical Dependence of Tuning Fork  $Q$ -factors

- for Optimized QEPAS Sensors,” P.I.: J. Zweck (UMBC), Co-P.I.: F. Tittel (Rice U.)).
- 2011–2012 P.I. \$2,000, Society for Industrial and Applied Math, Infinite Possibilities Conference Sponsorship.
- 2011–2012 P.I. \$1,000, IBM T J Watson Research Center, Infinite Possibilities Conference Sponsorship.
- 2011–2012 P.I. \$3,000, British Petroleum, Infinite Possibilities Conference Sponsorship.
- 2011–2012 Co-P.I. \$46,200, Subgrant from National Science Foundation: Engineering Research Center on Mid InfraRed Technologies for Health and the Environment (MIRTHE): “Geometrical Dependence of Tuning Fork  $Q$ -factors for Optimized QEPAS Sensors,” P.I.: J. Zweck, (UMBC), Co-P.I.: F. Tittel (Rice U.)).
- 2011–2012 P.I. \$45,000, National Science Foundation, “Infinite Possibilities Conference 2012”, Co-P.I.’s: T. Moore (Building Diversity in Science), and L. Khadjavi (Loyola Marymount University).
- 2011–2012 P.I. \$49,000, National Security Agency “Infinite Possibilities Conference 2012”, Co-P.I.’s: T. Moore (Building Diversity in Science), L. Harris (The College of New Jersey), and L. Khadjavi (Loyola Marymount University).
- 2010–2011 Co-P.I. \$47,380, National Science Foundation: Engineering Research Center MIRTHE: “Design Optimization of Tuning Forks for QEPAS and ROTADE Sensors”, P.I.: J. Zweck (UMBC), Co-P.I.: A. Kosterev, (Rice U).
- 2009–2010 Co-P.I. \$46,700, National Science Foundation Engineering Research Center MIRTHE: “Development, Verification, and Validation of Three-Dimensional Models for QEPAS and ROTADE Sensors,” P.I.: J. Zweck (UMBC), Co-P.I.: A. Kosterev (Rice U.).
- 2008–2009 Co-P.I. \$48,000, National Science Foundation Engineering Research Center MIRTHE: “Computational Modeling of Quartz-Enhanced Photoacoustic and Optothermal Spectroscopy Sensors”, P.I.: J. Zweck (UMBC), Co-P.I.’s: C. Menyuk (UMBC), and A. Kosterev (Rice U.).
- 2007–2010 P.I. \$60,000, US Department of Energy Basic Energy Sciences, “Imaging Permeability and Fluid Mobility in a Deformable Medium,” Contract with Lawrence Berkeley National Labs. (Collaboration with D. Vasco at LBNL. Additional funds were awarded to LBNL for this project.)
- 2007–2011 P.I. \$120,000, National Science Foundation, Division of Mathematical Sciences Computational Mathematics Program, “Collaborative Research: Multiscale Aspects of Wave Propagation Inverse Problems,” Co-P.I.: W. Symes (Rice University). Additional funds were awarded to Rice University for this project.
- 2008–2009 P.I. \$5,000, National Science Foundation, Research Experience for Undergraduates Supplement to NSF grant “Multiscale Aspects of Wave Propagation Inverse Problems.”
- 2007–2008 Co-P.I. \$48,000, National Science Foundation Engineering Research Center MIRTHE: “Computational Modeling of Quartz-Enhanced Photoacoustic Spectroscopy Sensors,” P.I.: J. Zweck (UMBC), Co-P.I.’s: C. Menyuk (UMBC), and A. Kosterev (Rice U.).

2007–2008	P.I. \$30,000, ADVANCE Research Assistantship (for graduate student S. Griffith).
2007	P.I. \$30,000, Oden Faculty Research Fellowship (co-funded by the Carbon Capture Project Phase II) Institute for Computational Engineering Sciences and the Department of Petroleum and Geosystems Engineering, University of Texas at Austin.
2006–2007	Co-P.I. \$40,000, National Science Foundation Engineering Research Center MIRTHE: “Computational Modeling of Quartz-Enhanced Photoacoustic Spectroscopy Sensors,” P.I.: J. Zweck (UMBC), Co-P.I.’s: C. Menyuk (UMBC), and A. Kosterev (Rice U.).
2005–2006	P.I. \$45,000, NASA Goddard Graduate Fellowship Award (for graduate student T. Vdovina).
2002–2006	P.I. \$192,692, National Science Foundation: “Collaborative Math/Geoscience Research: Statistical Seismic Imaging,” Co-P.I.’s: W. Symes and A. Levander (Rice University). Additional funds have been awarded to Rice University for this project.
2002–2003	P.I. \$34,937, NASA Goddard/UMBC Center for Advanced Study of Photonics Research Initiative: “Numerical Simulation and Analysis of Fiber Optic Compensators,” Co-P.I.: J. Zweck (UMBC).
2002–2003	P.I. \$20,000, U.S. Department of Energy, Natural Gas and Oil Technology Partnership Program: “Coupled Flow and Geomechanics for Time-Lapse Seismic Modeling,” (Contract with Sandia National Labs.)
2002	P.I. \$40,000, U.S. Department of Energy, Natural Gas and Oil Technology Partnership Program: ‘Coupled Flow and Geomechanics for Time-Lapse Seismic Modeling,’ (Contract with Sandia National Labs.)
2000–2001	P.I. \$40,000, U.S. Department of Energy, Natural Gas and Oil Technology Partnership Program: “Coupled Flow and Geomechanics for Time-Lapse Seismic Modeling,” (Contract with Sandia National Labs.)

## PUBLICATIONS

*Names in italics are students or postdocs whose work I supervised or co-supervised. Student names with superscript U are undergraduate researchers.*

*SIAM is the Society for Industrial and Applied Mathematics.*

1. *Mrad, P.*, Kim, K-T., Cui, T., Peherstorfer, B., **Minkoff, S.**, and Petra, N., “Joint Parameter and State Dimension Reduction for Bayesian Inverse Problems with Application to Nonlinear Ice Sheet Flow Models,” submitted 2025.
2. *Harikumar, R.*, and **Minkoff, S. E.**, “Machine Learning for Seismic Low-Frequency Extrapolation,” *Geophysical Journal International*, in revision 2025.
3. Symes, W.W., *Chen, H.*, and **Minkoff, S. E.**, “A numerical investigation of Matched Source Waveform Inversion applied to acoustic transmission data,” *Inverse Problems*, Vol. 41, No. 6, 065022, 2025.

4. *Dolski, T.*, Spiller, E., and **Minkoff, S. E.**, “Gaussian Process Emulation for High-Dimensional Coupled Systems,” *Technometrics*, (2024) pp. 1-15, <https://doi.org/10.1080/00401706.2024.2322651>.
5. *Harikumar, R.*, **Minkoff, S. E.**, and Lou, Y., “A Low-Rank Tensor Reconstruction and Denoising Method for Enhancing CNN Performance,” *2024 IEEE Southwest Symposium on Image Analysis and Interpretation (SSIAI)*, Santa Fe, NM, pp. 69-72, doi: 10.1109/SSIAI59505.2024.10508687.
6. *Popa, J.*, Lou, Y., and **Minkoff, S. E.**, “Low-rank tensor data reconstruction and denoising via ADMM: algorithm and convergence analysis,” *Journal of Scientific Computing*, 97:49, pp. 1-26, 2023, <https://doi.org/10.1007/s10915-023-02364-6>.
7. *Mozumder, A.*, *Safin, A.*, **Minkoff, S. E.**, and Zweck, J., “A Two-Way Coupled Model of Visco-Thermo-Acoustic Forcing for a Photoacoustic Trace Gas Sensor,” *SIAM J. Applied Math*, Vol. 83, No. 3, pp. 1074-1097, 2023.
8. Symes, W.W., *Chen, H.*, and **Minkoff, S. E.**, “Solution of an Acoustic Transmission Inverse Problem by Extended Inversion,” *Inverse Problems*, Vol. 38, No. 11, 115003, 2022.
9. *Chen, H.*, Symes, W. W., and **Minkoff, S. E.**, “Use of extended source inversion for estimating the noise level in seismic data,” *Proceedings of the Second International Meeting for Applied Geoscience & Energy, IMAGE 2022*, (Houston, TX.), pp. 887-891, 2022.
10. *Popa, J.*, **Minkoff, S. E.**, and Lou, Y., “Tensor-Based Reconstruction Applied to Regularized Time-Lapse Data,” *Geophysical Journal International*, Vol. 231, No. 1, pp. 638-649, 2022.
11. *Popa, J.*, **Minkoff, S. E.**, and Lou, Y., “An Improved Seismic Data Completion Algorithm using Low-Rank Tensor Optimization: Cost Reduction and Optimal Data Orientation,” *Geophysics*, Vol. 86, No.3, pp. V219-V232, 2021.
12. *Popa, J.*, **Minkoff, S. E.**, and Lou, Y., “Improving Seismic Data Completion via Low-Rank Tensor Optimization,” *Proceedings of the 90th Annual International Meeting of the Society of Exploration Geophysicists*, (Houston, TX.), pp. 2774-2778, 2020.
13. Symes, W. W., *Chen, H.*, and **Minkoff, S. E.**, “Full Waveform Inversion by Source Extension: Why it Works,” *Proceedings of the 90th Annual International Meeting of the Society of Exploration Geophysicists*, (Houston, TX.), pp. 765-769, 2020.
14. *Safin, A.*, Zweck, J., and **Minkoff, S. E.**, “A One-Way Coupled Model for the Vibration of Tuning Fork-Based Trace Gas Sensors Driven by a Thermoacoustic Wave,” *Applied Physics B: Lasers and Optics*, Vol. 126, No. 2, p. 29:DOI:10.1007/s00340-020-7376-8020, 2020.
15. *Stuart, G. K.*, **Minkoff, S. E.**, and Pereira, F., “A Two-Stage Markov Chain Monte Carlo Method for Seismic Inversion and Uncertainty Quantification,” *Geophysics*, Vol. 84, No. 6, pp. R1015-R1032, 2019.
16. *Popa, J.*, **Minkoff, S. E.**, and Lou, Y., “Improving Seismic Data Completion and Efficiency Using Tensors,” *Proceedings of the 89th Annual International Meeting of the Society of Exploration Geophysicists*, (San Antonio, TX.), pp. 4034-4038, 2019.
17. *Stuart, G. K.*, **Minkoff, S. E.** and Pereira, F., “Enhanced Neural Network Sampling for Two-Stage Markov chain Monte Carlo Seismic Inversion,” *Proceedings of the 89th Annual International Meeting of the Society of Exploration Geophysicists*, (San Antonio, TX.), pp. 1670-1674, 2019.
18. Lee, H., Spiller, E. T., and **Minkoff, S. E.**, “Dimension Reduction and Global Sensitivity Metrics Using Active Subspaces for Coupled Flow and Deformation Modeling,” *Proceedings of the 89th Annual International Meeting of the Society of Exploration Geophysicists*, (San Antonio, TX.), pp. 3240-3244, 2019.

19. *Safin, A., Minkoff, S.* and *Zweck, J.*, “A Preconditioned Finite Element Solution of the Coupled Pressure-Temperature Equations Used to Model Trace Gas Sensors,” *SIAM J. Scientific Computing*, Vol. 40, No. 5, pp. B1470-B1493, 2018.
20. *Kaderli, J., McChesney, M. D.*, and *Minkoff, S. E.*, “A Self-Adjoint Velocity-Stress Full Waveform Inversion Approach to Microseismic Source Estimation,” *Geophysics*, Vol. 83, No. 5, pp. R413-R427, 2018.
21. *Lai, C.*, and *Minkoff, S.*, “Nearly Perfectly Matched Layer Boundary Conditions for Operator Upscaling of the Acoustic Wave Equation,” *Computational Geosciences*, DOI: 10.1007/s10596-017-9616-5, Vol. 21, No. 3, pp. 359–372, 2017.
22. *Kaderli, J., Zweck, J., Safin, A.*, and *Minkoff, S.*, “An Analytic Solution to the Coupled Pressure-Temperature Equations for Modeling of Photoacoustic Trace Gas Sensors,” *Journal of Engineering Mathematics*, DOI 10.1007/s10665-016-9867-5, Vol. 103, pp. 173–193, 2017.
23. *McChesney, M. D., Minkoff, S. E.* and *McMechan, G. A.*, “Rate and State Flow and Deformation Simulation of Microseismicity with Elastic Emission Wavefield Synthesis,” *Proceedings of the 86th Annual International Meeting of the Society of Exploration Geophysicists*, (Dallas, TX.), pp. 5055–5059, 2016.
24. *Stuart, G. K., Yang, W., Minkoff, S. E.*, and *Pereira, F.*, “A Two-Stage Markov Chain Monte Carlo Method for Velocity Estimation and Uncertainty Quantification,” *Proceedings of the 86th Annual International Meeting of the Society of Exploration Geophysicists*, (Dallas, TX.), pp. 3682–3687, 2016.
25. *Kaderli, J., McChesney, M.* and *Minkoff, S.*, “Microseismic Event Estimation in Noisy Data via Full Waveform Inversion,” *Proceedings of the 85th Annual International Meeting of the Society of Exploration Geophysicists* (New Orleans, LA), pp. 1159–1164, 2015.
26. *Nunes, V.*, and *Minkoff, S.*, “Imaging via Subgrid Upscaling and Reverse Time Migration,” *Proceedings of the 84th Annual International Meeting of the Society of Exploration Geophysicists* (Denver, CO.), pp. 4008–4013, 2014.
27. *Brennan, B., Kirby, R.C., Zweck, J.* and *Minkoff, S.E.*, 2013. “High-performance Python-Based Simulations of Pressure and Temperature Waves in a Trace Gas Sensor,” *Proceedings of PyHPC 2013: Python for High Performance and Scientific Computing*.
28. *Vasco, D.* and *Minkoff, S.*, “On the Propagation of a Disturbance in a Heterogeneous, Deformable, Porous Medium Saturated with Two Fluid Phases,” *Geophysics*, **77**, pp. L25–L44, 2012.
29. *Petra, N., Zweck, J., Minkoff, S., Kosterev, A.*, and *Doty, J.*, “Modeling and Design Optimization of a Resonant Optoacoustic Trace Gas Sensor,” *SIAM Journal on Applied Mathematics*, **71**, pp. 309–332, 2011.
30. *Petra, N., Zweck, J., Minkoff, S., Kosterev, A.*, and *Doty, J.*, “Validation of a Model of a Resonant Optoacoustic Trace Gas Sensor,” in *Conference on Lasers and Electro-optics*, Optical Society of America, 2011, paper JTul115.
31. *Petra, N., Kosterev, A. A., Zweck, J., Minkoff, S. E.*, and *Doty, J. H. III*, “Numerical and Experimental Investigation for a Resonant Optoacoustic Sensor,” in *Conference on Lasers and Electro-Optics*, Optical Society of America, 2010, paper CMJ6.
32. *Chang, K., Minkoff, S.* and *Bryant, S.*, “Simplified Model for CO<sub>2</sub> Leakage and its Attenuation due to Geological Structures,” *9th International Conference on Greenhouse Gas Control Technologies*, Energy Procedia (Elsevier) **1**(1): pp. 3453–3460, ISSN 1876-6102, DOI: 10.1016/j.egypro.2009.02.136.
33. *Vdovina, T., Minkoff, S.*, and *Griffith, S.*, “A Two-Scale Solution Algorithm for the Elastic Wave Equation,” *SIAM Journal on Scientific Computing*, **31**, pp. 3356–3386, 2009.

34. Petra, N., Zweck, J., Kosterev, A., **Minkoff, S.**, and Thomazy, D., “Theoretical Analysis of a Quartz-Enhanced Photoacoustic Spectroscopy Sensor,” *Applied Physics B: Lasers and Optics*, **94**, pp. 673–680, 2009: DOI:10.1007/s00340-009-3379-1.
35. Vasco, D. and **Minkoff, S.**, “Modeling Flow in a Pressure-Sensitive, Heterogeneous Medium,” *Geophysical Journal International*, vol. 179, pp. 972–989:DOI:10.1111/j.1365-246X.2009.04330.x.
36. Vdovina, T. and **Minkoff, S.**, “An A Priori Error Analysis of Operator Upscaling for the Acoustic Wave Equation,” *International Journal of Numerical Analysis and Modeling*, **5**, pp. 543–569, 2008.
37. Chang, K., **Minkoff, S.**, and Bryant, S. “Modeling Leakage through Faults of CO<sub>2</sub> Stored in an Aquifer,” *Society of Petroleum Engineers Annual Technical Conference and Exhibition*, (Denver, CO), SPE 115929, 2008.
38. Zweck, J. and **Minkoff, S.**, “Modeling Compensation for Optical Fiber Communication Systems,” *SIAM Journal on Optimization*, **17**, pp. 738–775, 2006.
39. **Minkoff, S.** and Kridler, N.<sup>U</sup>, “A Comparison of Adaptive Time Stepping Methods for Coupled Flow and Deformation Modeling,” *Applied Mathematical Modeling*, **30**, pp. 993–1009, 2006.
40. Korostyshevskaya, O. and **Minkoff, S.**, “A Matrix Analysis of Operator-Based Upscaling for the Wave Equation,” *SIAM Journal on Numerical Analysis*, **44**, pp. 586–612, 2006.
41. Dean, R., Gai X., Stone, C., and **Minkoff, S.**, “A Comparison of Techniques for Coupling Porous Flow and Geomechanics,” *Society of Petroleum Engineers Journal*, **11**, pp. 132–140, 2006.
42. Vdovina, T., **Minkoff, S.**, and Korostyshevskaya, O., “Operator Upscaling for the Acoustic Wave Equation,” *Multiscale Modeling and Simulation*, **4**, pp. 1305–1338, 2005.
43. **Minkoff, S.**, Stone, C., Bryant, S., Peszynska, M., “Coupled Geomechanics and Flow Simulation for Time-Lapse Seismic Modeling,” **Honorable Mention for Best Paper Geophysics**, **69**, pp. 200–211, 2004.
44. Kridler, N.<sup>U</sup>, “Numerical Simulation of Coupled Fluid Flow and Mechanical Deformation Models,” *UMBC Review*, **5** pp. 98–111, 2004.
45. **Minkoff, S.**, Stone, C., Bryant, S., Peszynska, M., and Wheeler, M., “Coupled Fluid Flow and Geomechanical Deformation Modeling,” *Journal of Petroleum Science and Engineering*, **38**, pp. 37–56, 2003.
46. Stone, C., **Minkoff, S.**, Webb, S., and Sobolik, S., “Two-Way Coupling of a Nonlinear Geomechanics Code with Several Porous Flow Simulators,” *Proceedings of the 2nd M.I.T. Conference on Computational Fluid and Solid Mechanics* (Cambridge, MA), Elsevier, pp. 1521–1523, 2003.
47. Zweck, J., **Minkoff, S.**, Lima, A., Lima, I. and Menyuk, C., “A Comparative Study of Feedback Controller Sensitivity to All Orders of PMD for a Fixed DGD Compensator,” *2003 Optical Society of America, Optical Fiber Communications Meeting*, (Atlanta, GA), pp. 590–591, 2003.
48. Dean, R., Gai, X., Stone, C. and **Minkoff, S.**, “A Comparison of Techniques for Coupling Porous Flow and Geomechanics”, *Proceedings of the 17th Society of Petroleum Engineers’ Reservoir Simulation Symposium* (Houston, TX), SPE 79709, 2003.
49. **Minkoff, S. E.**, “Spatial Parallelism of a 3D Finite Difference, Velocity-Stress Elastic Wave Propagation Code,” *SIAM Journal on Scientific Computing*, **24**, pp. 1–19, 2002.
50. **Minkoff, S.**, Stone, C., Arguello, J., Bryant, S., Eaton, J., Peszynska, M., and Wheeler, M., “Coupled Geomechanics and Flow Simulation for Time-Lapse Seismic Modeling,” *Proceedings of the 69th Annual International Meeting of the Society of Exploration Geophysicists* (Houston, TX.), pp. 1667–1670, 1999.



51. **Minkoff, S.**, Stone, C., Arguello, J., Bryant, S., Eaton, J., Peszynska, M., and Wheeler, M., “Staggered In Time Coupling of Reservoir Flow Simulation and Geomechanical Deformation: Step 1 — One-Way Coupling”, *Proceedings of the 1999 Society of Petroleum Engineers’ Reservoir Simulation Symposium* (Houston, TX.), pp. 329–330, 1999.
52. Arbogast, T., **Minkoff, S.E.**, and Keenan, P.T., “An Operator-Based Approach to Upscaling the Pressure Equation”, in Burganos, V., Karatzas, G., Payatakes, A., Brebbia, C., Gray, W., and Pinder, G., Eds. *Computational Methods in Water Resources XII: Computational Mechanics Publications*, pp. 405–412, 1998.
53. **Minkoff, S.**, Symes, W., Bryant, S., Eaton, J., and Wheeler, M., “Reservoir Characterization via Time-Lapse Prestack Seismic Inversion,” *Proceedings of the 68th Annual International Meeting of the Society of Exploration Geophysicists* (New Orleans, LA.), pp. 44–47, 1998.
54. Ober, C., Gjertsen, R., **Minkoff, S.**, Womble, D., “3D Finite-Difference Seismic Migration with Parallel Computers”, in DeSanto, J., Ed., *Mathematical and Numerical Aspects of Wave Propagation: SIAM*, pp. 381–385, 1998.
55. **Minkoff, S. E.** and Symes, W. W., “Full Waveform Inversion of Marine Reflection Data in the Plane-Wave Domain,” *Geophysics*, **62**, pp. 540–553, 1997.
56. Arbogast, T., **Minkoff, S.**, and Keenan, P. “An Operator-Based Approach to Upscaling the Pressure Equation”, Tech Report 97-30, Texas Institute for Computational and Applied Math, University of Texas, pp. 1–40, 1997.
57. **Minkoff, S. E.**, “A Computationally Feasible Approximate Resolution Matrix for Seismic Inverse Problems,” *Geophysical Journal International*, **126**, pp. 345–359, 1996.
58. **Minkoff, S. E.** and Symes, W. W., “Estimating the Energy Source and Reflectivity by Seismic Inversion,” *Inverse Problems* **11**, pp. 383–395, 1995.
59. **Minkoff, S. E.** and Symes, W. W., “Viscoelastic Modeling and Inversion of a Marine Data Set,” *Proceedings of the 64th Annual International Meeting of the Society of Exploration Geophysicists* (Los Angeles, CA.), pp. 1016–1019, 1994.
60. **Minkoff, S. E.** and Symes, W. W., “Estimating the Energy Source and Reflectivity by Seismic Inversion”, in *Mathematical Methods in Geophysical Imaging II*, Siamak Hassanzadeh, Editor, Proc. SPIE 2301, pp. 43–56, 1994.
61. **Minkoff, S. E.**, “Implementation of the Conjugate Gradient Algorithm in DSO”, Tech Report 94–31, Department of Computational and Applied Mathematics, Rice University, pp. 1–19, 1994.
62. **Minkoff, S. E.** and Symes, W. W., “Simultaneous Determination of the Source-Time Function and Reflectivity via Inversion,” *Proceedings of the 63rd Annual International Meeting of the Society of Exploration Geophysicists* (Washington, D.C.), pp. 649–652, 1993.

## PRESENTATIONS

*Names in bold indicate speaker. When no names are given, I was the presenter.*

### Conference Presentations (Refereed)

1. **Harikumar, R.**, Minkoff, S. E., and Lou, Y., “A Low-Rank Tensor Reconstruction and Denoising Method for Enhancing CNN Performance,” *2024 IEEE Southwest Symposium on Image Analysis and Interpretation*, (Santa Fe, NM), March 17–19, 2024.

2. **Chen, H.**, Symes, W. W., and Minkoff, S. E., “Use of extended source inversion for estimating the noise level in seismic data,” *IMAGE 2022 – International Meeting for Applied Geoscience & Energy*, (Houston, TX.), August 28–September 1, 2022.
3. **J. Popa**, S. E. Minkoff, and Y. Lou, “Improving Seismic Data Completion via Low-Rank Tensor Optimization,” *the 90th Annual International Meeting of the Society of Exploration Geophysicists*, (Houston, TX. virtual), October 11–16, 2020.
4. Symes, W. W., **Chen, H.**, and Minkoff, S. E., “Full Waveform Inversion by Source Extension: Why It Works,” *the 90th Annual International Meeting of the Society of Exploration Geophysicists*, (Houston, TX. virtual), October 11–16, 2020.
5. **G. K. Stuart**, S. E. Minkoff, and F. Pereira, “Enhanced Neural Network Sampling for Two-Stage Markov chain Monte Carlo Seismic Inversion,” *the 89th Annual International Meeting of the Society of Exploration Geophysicists*, (San Antonio, TX.), September 15–20, 2019 [poster].
6. H. Lee, E. T. Spiller, and **S. E. Minkoff**, “Dimension Reduction and Global Sensitivity Metrics Using Active Subspaces for Coupled Flow and Deformation Modeling,” *the 89th Annual International Meeting of the Society of Exploration Geophysicists*, (San Antonio, TX.), September 15–20, 2019.
7. **J. Popa**, S. E. Minkoff, and Y. Lou, “Improving Seismic Data Completion and Efficiency Using Tensors,” *the 89th Annual International Meeting of the Society of Exploration Geophysicists*, (San Antonio, TX.), September 15–20, 2019.
8. **G. K. Stuart**, S. E. Minkoff, and F. Pereira, “Enhanced Neural Network Sampling for Two-Stage Markov chain Monte Carlo Seismic Inversion,” *the 89th Annual International Meeting of the Society of Exploration Geophysicists*, (San Antonio, TX.), September 15–20, 2019 [poster].
9. **M. D. McChesney**, S.E. Minkoff, and G. A. McMechan, “Rate and State Flow and Deformation Simulation of Microseismicity with Elastic Emission Wavefield Synthesis,” *the 86th Annual International Meeting of the Society of Exploration Geophysicists*, Dallas, TX., October 16–21, 2016.
10. **G. K. Stuart**, W. Yang, S.E. Minkoff, and F. Pereira, “A Two-Stage Markov Chain Monte Carlo Method for Velocity Estimation and Uncertainty Quantification,” *the 86th Annual International Meeting of the Society of Exploration Geophysicists*, (Dallas, TX.), October 16–21, 2016.
11. **J. Kaderli**, M. McChesney, and S.E. Minkoff, “Microseismic Event Estimation in Noisy Data via Full Waveform Inversion,” *the 85th Annual International Meeting of the Society of Exploration Geophysicists*, New Orleans, LA., October 18–23, 2015.
12. “Imaging via subgrid upscaling and reverse time migration” *Society of Exploration Geophysicists’ Annual International Meeting*, Denver, CO., October 26–31, 2014.
13. N. Petra, **J. Zweck**, S.E. Minkoff, A.A. Kosterev, and J.H. Doty III, “Validation of a Model of a Resonant Optoacoustic Trace Gas Sensor”, *Conference on Lasers and Electro-Optics*, Baltimore, MD, May 3, 2011, paper JTuI115 [poster].
14. **N. Petra**, A. A. Kosterev, J. Zweck, S. E. Minkoff, and J.H. Doty III, “Numerical and experimental investigation for a resonant optoacoustic sensor”, *Conference on Lasers and Electro-Optics* San Jose, CA, May 16-21, 2010, paper CMJ6.
15. “Modeling Leakage of CO<sub>2</sub> along a Fault for Risk Assessment” at the *Sixth Annual Conference on Carbon Capture & Sequestration*, Pittsburgh, PA., May 9, 2007 (presentation given by Nicolas Huerta).
16. Zweck, J., Minkoff, S., Lima, A., Lima, I., and Menyuk, C., “A Comparative Study of Feedback Controller Sensitivity to All Orders of PMD for a Fixed DGD Compensator,” *Optical Fiber Communications 2003*, Atlanta, GA, March 22–27, 2003
17. “Coupled Geomechanics and Flow Simulation for Time-Lapse Seismic Modeling,” *Society of Exploration Geophysicists’ Annual International Meeting*, Houston, TX, October 31–November 5, 1999.

18. “Reservoir Characterization via Time-Varying Prestack Seismic Inversion,” *Society of Exploration Geophysicists’ Annual International Meeting*, New Orleans, LA, September 13–18, 1998.
19. “Viscoelastic Modeling and Inversion of a Marine Data Set,” at the *Society for Exploration Geophysicists’ Annual International Meeting*, Los Angeles, CA, October 23–28, 1994.
20. “Simultaneous Determination of the Source-Time Function and Reflectivity via Inversion,” at the *Society for Exploration Geophysicists’ Annual International Meeting*, Washington, D.C., September 26–30, 1993.

### Conference Presentations (Non-Refereed)

21. *Panel Moderator: New York Academy of Sciences, Science of Risk Discussion Forum Symposium on Mesoscale Weather Risk*, NYC, NY., September 23, 2025.
22. *Panel Moderator: New York Scientific Data Summit*, NYC, NY., September 11, 2025.
23. *Invited talk: “Low Frequency Extrapolation to Aid Solution of Seismic Inverse Problems,”* at the *The Third Joint SIAM/CAIMS Annual Meetings (AN25)*, Montreal, Canada, July 29, 2025.
24. *Invited talk: “Analysis of Matched Source Waveform Inversion to Overcome Cycle Skipping in Seismic Inversion,”* at the *SIAM Conference on Computational Science and Engineering (CSE25)*, Fort Worth, TX., March 4, 2025.
25. *Invited talk: “Digital Twins for Wind Energy and Leading Edge Erosion Detection,”* at the *IMSI Workshop on Uncertainty Quantification Strategies for Multi-Physics Systems and Digital Twins*, Institute for Mathematical and Statistical Innovation, Chicago, IL, February 25, 2025.
26. “Emulation for Multiphysics Simulations,” at the *SIAM Conference on Uncertainty Quantification (UQ24)*, Trieste, Italy, February 27, 2024.
27. *Invited talk: “Digital Twins for Wind Energy and Leading Edge Erosion Detection,”* at the *New York Scientific Data Summit 2024*, New York City, September 16, 2024.
28. “Use of Extended Source Inversion for Estimating the Noise Level in Seismic Data,” at the *6th Annual Meeting of the SIAM Texas-Louisiana Section (TXLA23)*, Lafayette, LA., Nov. 4, 2023.
29. **Mrad, P.**, and Minkoff, S. E., “Model Reduction for Bayesian Inversion,” at the *6th Annual Meeting of the SIAM Texas-Louisiana Section (TXLA23)*, Lafayette, LA., Nov. 4, 2023 (poster).
30. **Harikumar, R.**, Minkoff, S. E., and Lou, Y., “A Low-Rank Tensor Reconstruction and Denoising Method for Enhancing CNN Performance,” at the *6th Annual Meeting of the SIAM Texas-Louisiana Section (TXLA23)*, Lafayette, LA., Nov. 4, 2023 (poster).
31. *Invited talk: “Use of Extended Source Inversion for Estimating the Noise Level in Seismic Data,”* at the *New Ideas in Computational Inverse Problems Workshop*, Banff International Research Station (virtual), October 28, 2022.
32. **T. Dolski**, S. Minkoff, and E. Spiller, “Emulation and Uncertainty Quantification for a Coupled Model of Fluid Flow and Mechanical Deformation,” at the *SIAM Conference on Uncertainty Quantification*, Atlanta, GA, April 12, 2022.
33. “Uncertainty Quantification for Trace Gas Sensor Modeling,” at the *SIAM Conference on Uncertainty Quantification*, Atlanta, GA (virtual), April 12, 2022.
34. *Invited talk: “Using Extended Source Inversion to solve an Acoustic Transmission Inverse Problem, Extensions to Microseismic Source Estimation,”* at the *Women in Inverse Problems Workshop*, Banff International Research Station (virtual), December 6, 2021.

35. “How Extended Source Inversion Can Aid Solution of Seismic Inverse Problems,” at the *4th Annual Meeting of the SIAM Texas-Louisiana Section (TXLA21)*, South Padre Island, TX, Nov. 5, 2021.
36. “Reduced Order Modeling for Hydraulic Fracturing Simulation,” at the SIAM Conference on Computational Science and Engineering (virtual), March 4, 2021.
37. “Neural Network-Enhanced Two-Stage Hamiltonian Monte Carlo,” at the *3rd Annual SIAM TX/LA Section Meeting*, Texas A&M University, College Station, TX (virtual), Oct. 18, 2020.
38. **A. Mozumder**, S. Minkoff, J. Zweck, and A. Safin, “A Two-Way Coupled Model for Viscous Damping of a Vibrating Structure with Visco-Thermo-Acoustic Forcing,” at the *3rd Annual SIAM TX/LA Section Meeting*, Texas A&M University, College Station, TX (virtual), Oct. 16, 2020 [poster].
39. *Plenary*: “Seismic Inversion and Uncertainty Quantification to Better Understand Hydraulic Fracturing,” at the *2nd Annual SIAM TX/LA Section Meeting*, SMU, Dallas, TX, Nov. 3, 2019.
40. “Parameter Subset Selection for Coupled Flow and Deformation Modeling,” at the *SAMSI Model Uncertainty: Mathematical and Statistical (MUMS) Transition Workshop*, Chapel Hill, N.C., May 15, 2019.
41. “Did You Feel That? How We Use Mathematics to Locate Microseismic Events Generated During Hydraulic Fracturing,” at the *UTD IMPACT Summer Workshop*, Dallas, TX, May 20, 2019.
42. **G. K. Stuart**, S. Minkoff, and F. Pereira, “Reducing the Computational Expense of Gradient-Based Sampling Methods for Monte Carlo Inversion,” at the *2nd Annual SIAM TX/LA Section Meeting*, SMU, Dallas, TX, Nov. 1, 2019.
43. **G. K. Stuart**, S. Minkoff, and F. Pereira, “Reducing the Computational Cost of Uncertainty Quantification for Seismic Inversion,” at the *SIAM Conference on Mathematical & Computational Issues in the Geosciences* Houston, TX, March 14, 2019.
44. **J. Popa**, S. Minkoff, and Y. Lou, “Improving Seismic Data Completion Using Tensors”, at the *2nd Annual SIAM TX/LA Section Meeting*, SMU, Dallas, TX, Nov. 2, 2019 [poster].
45. **J. Popa**, S. Minkoff, and Y. Lou, “Seismic Data Completion Using Tensor Algebra,” at the *SIAM Conference on Mathematical & Computational Issues in the Geosciences* Houston, TX, March 14, 2019.
46. **A. Mozumder**, J. Zweck, and S. Minkoff, “An Analytical Solution of a Model for Visco-Thermo-Acoustic Forcing of a Vibrating Structure”, at the *2nd Annual SIAM TX/LA Section Meeting*, SMU, Dallas, TX, Nov. 2, 2019 [poster].
47. **T. Kozareva** and S. Minkoff, “Uncertainty Quantification for Hydraulic Fracture Modeling”, at the *2nd Annual SIAM TX/LA Section Meeting*, SMU, Dallas, TX, Nov. 2, 2019 [poster].
48. “A Two-Stage Markov Chain Monte Carlo Method for Seismic Inversion,” at the *SAMSI Model Uncertainty: Mathematical and Statistical (MUMS) Opening Meeting*, Durham, N.C., August 20-24, 2018 [poster].
49. **G. Stuart**, S. Minkoff, and F. Pereira “Seismic Velocity Inversion using Two-stage Markov Chain Monte Carlo and Operator Upscaling for the Acoustic Wave Equation,” at the *SIAM Annual Meeting*, Portland, OR., July 9, 2018.
50. **A. Safin**, J. Zweck, and S. Minkoff “Using the deal.II and PETSc Packages to Solve Multi-Physics Problems for Trace Gas Sensor Modeling,” at *Scientific Software Days Conference*, Austin, TX., April 26–27, 2018 [poster].
51. “A Two-Stage Markov Chain Monte Carlo Method for Seismic Inversion,” at the *Brown ICERM Workshop on Recent Advances in Seismic Modeling and Inversion: From Analysis to Applications*, Providence, R.I., November 9, 2017.

52. “Modeling and Inversion of Microseismic Sources,” at the *UCLA IPAM Computational Issues in Oil Field Applications Workshop II: Full Waveform Inversion and Velocity Analysis*, Los Angeles, CA., May 5, 2017.
53. **A. Safin**, J. Zweck and S. Minkoff, “A preconditioning scheme for finite element solution of the coupled pressure-temperature equations used for modeling trace gas sensors,” at the *International Conference On Preconditioning Techniques For Scientific And Industrial Applications*, Vancouver, Canada, August 1, 2017.
54. “A Two-Stage Markov chain Monte Carlo Method for Velocity Estimation and Uncertainty Quantification,” at the *SIAM Conference on Computational Science and Engineering*, Atlanta, GA., March 3, 2017.
55. **A. Safin**, S. Minkoff and J. Zweck, “Accurate Finite Element Solution of the Fully Coupled Thermoacoustic Equations for Modeling of Trace Gas Sensors,” at the *SIAM Conference on Computational Science and Engineering*, Atlanta, GA., March 2, 2017.
56. “UTD’s EDT Program: Team Training Mathematical Scientists Through Industrial Collaborations,” at the *Joint Mathematics Meetings, AMS/SIAM Panel on Broadening Research Experiences*, Atlanta, GA., January 5, 2017.
57. “UTD’s EDT Program: Team Training Mathematical Scientists Through Industrial Collaborations,” at the *SIAM Conference on Applied Mathematics Education*, Philadelphia, PA., September 30, 2016.
58. “Microseismic Event Estimation via Acoustic and Elastic Full Waveform Inversion,” at the *Society for Exploration Geophysicists’ Annual Meeting Post-Convention Workshop: Where are we Heading with FWI?*, Dallas, TX., October 21, 2016.
59. **G. Stuart**, W. Yang, S. Minkoff and F. Pereira, “Velocity Estimation Using Multi-Level Monte Carlo Bayesian Inversion,” at the *SIAM Annual Meeting*, Boston, MA., July 15, 2016.
60. **J. Kaderli**, M. McChesney, and S.E. Minkoff, “Microseismic Event Estimation in Noisy Data via Full Waveform Inversion,” *the 85th Annual International Meeting of the Society of Exploration Geophysicists*, New Orleans, LA., October 18–23, 2015.
61. *Invited*: “Microseismic Event Estimation Via Full Waveform Inversion,” *the Institute for Mathematics and Its Applications Hot Topics Workshop: Hydraulic Fracturing: From Modeling and Simulation to Reconstruction and Characterization*, Minneapolis, MN, May 11–14, 2015.
62. “Microseismic Event Estimation via Full Waveform Inversion,” at the *SIAM Conference on Computational Science and Engineering*, Salt Lake City, UT., March 14–18, 2015.
63. *Invited talk*: “Advances in Algorithm Development for Seismic Imaging of the Earth’s Subsurface,” *Sustainable Energy for South Texas Symposium*, The University of Texas–Pan American, Edinburg, TX., February 25, 2015.
64. “Reverse Time Migration Via a Multiscale Wave Propagation Model,” at the *SIAM Annual Meeting*, Chicago, IL., July 7–11, 2014.
65. “Multiscale Modeling for Wave Propagation,” at the *Society for Exploration Geophysicists’ Annual Meeting Post-Convention Workshop: Advances in Computational Mathematics for Geophysics*, Houston, TX., September 27, 2013.
66. “Modeling of Trace Gas Sensors,” at the *IMA Special Workshop: Career Options for Women in Mathematical Sciences*, Minneapolis, MN., March 3–5, 2013.
67. “Multiscale Seismic Imaging,” at the *SIAM Annual Meeting*, Minneapolis, MN., July 9–13, 2012 [poster].

68. **M. Barouti**, N. Petra, J. Zweck, S.E. Minkoff, A.A. Kosterev, J.H. Doty III, and F.K. Tittel, “Modeling and Optimization of QEPAS sensors,” *NSF MIRTHERC Site Visit Review*, Princeton University, Mar. 20, 2012 [poster]
69. *Invited minisymposium talk*: “Multiscale methods for seismic imaging,” at the *Joint Mathematics Meeting* AMS Special Session on “Mathematics in Natural Resource Modeling”, Boston, MA., January 4–7, 2012.
70. *Invited*: “Two scale wave equation modeling,” at the *Workshop on Wave Propagation and Scattering, Inverse Problems and Applications in Energy and the Environment*, Johann Radon Institute for Computational and Applied Mathematics (RICAM), Austrian Academy of Sciences, Linz, Austria, November 21–25, 2011.
71. “The Effect of Upscaling on Seismic Inversion,” at the *SIAM Annual Meeting*, Pittsburgh, PA., July 12–16, 2010.
72. *Invited minisymposium talk*: “Operator Upscaling for Seismic Inversion,” at the *SIAM Conference on Imaging Science*, Chicago, IL., April 12–14, 2010.
73. **N. Petra**, J. Zweck, S.E. Minkoff, and A.A. Kosterev, “Theoretical analysis of an optoacoustic sensor”, *MIRTHE Summer Workshop*, New York City, August 5, 2009.
74. **N. Petra**, J. Zweck, and S.E. Minkoff, “Application of BEM in Photoacoustic Spectroscopy”, at the *SIAM Annual Meeting*, Denver, CO, July 9, 2009.
75. **N. Petra**, J. Zweck, S.E. Minkoff, and A.A. Kosterev, “Models of QEPAS and ROTADE sensors”, *NSF MIRTHERC Site Visit Review*, Princeton University, Feb. 4, 2009.
76. “Coupled Multiphysics Simulation and Issues of Uncertainty” at the *DARPA Underground Technologies Workshop*, Arlington, VA, September 9, 2008.
77. **N. Petra**, J. Zweck, S.E. Minkoff, and A.A. Kosterev, “Theoretical Analysis of a Quartz-Enhanced Photoacoustic Spectroscopy Sensor”, *MIRTHE Summer Workshop*, Baltimore, August 6, 2008.
78. **N. Petra**, J. Zweck, S.E. Minkoff, and A.A. Kosterev, “Theoretical Analysis of a Quartz-Enhanced Photoacoustic Spectroscopy Sensor”, *NSF MIRTHERC Site Visit Review*, Princeton University, Jan. 30, 2008.
79. **N. Zakarias**, S.E. Minkoff, and J. Zweck, “Computational Modeling of Quartz-Enhanced Photoacoustic Spectroscopy (QEPAS) Sensors”, at the *SIAM Conference on Mathematics for Industry*, Philadelphia, PA, October 9–11, 2007
80. **N. Petra**, J. Zweck, S.E. Minkoff, and A.A. Kosterev, “Computational Modeling of QEPAS”, *MIRTHE Summer Workshop*, Princeton University, August 6–10, 2007.
81. *Keynote Address*: “A Discussion of Operator Upscaling Applied to the Wave Equation” at the *DOE sponsored Workshop on Modeling, Analysis and Simulation of Multiscale Nonlinear Systems*, Oregon State University, Corvallis, OR, June 27, 2007.
82. *Invited minisymposium talk*: “Modeling Leakage of Carbon Dioxide from Underground Storage Sites” at the *SIAM Conference on Mathematical and Computational Issues in the Geosciences*, Santa Fe, NM., March 19–22, 2007.
83. **N. Petra**, J. Zweck, S.E. Minkoff, and A.A. Kosterev, “Computational Modeling of QEPAS”, *NSF-ERC MIRTHERC Start-up Site Visit Review*, Princeton University, Nov. 14–15, 2006.
84. *Invited minisymposium talk*: “Operator Upscaling for the Wave Equation” at the *SIAM Annual Meeting*, Boston, MA., July 10–14, 2006.

85. **Vdovina, T.** and Minkoff, S., “Convergence Analysis of Operator Upscaling for the Acoustic Wave Equation” at the *SIAM Conference on Analysis of Partial Differential Equations*, Boston, MA., July 10–12, 2006.
86. “What Problem is Operator-Based Upscaling Really Solving?” at the *SIAM Conference on Mathematical and Computational Issues in the Geosciences*, Avignon, France, June 7–10, 2005.
87. **Vdovina, T.**, Minkoff, S. and Korostyshevskaya, O., “Operator-Based Upscaling for the Acoustic Wave Equation” at the *SIAM Conference on Mathematical and Computational Issues in the Geosciences*, Avignon, France, June 7–10, 2005.
88. “Numerical Simulation and Analysis of Fiber Optic Compensators” at the *SIAM Conference on Computational Science and Engineering*, Orlando, Florida, February 12–15, 2005.
89. *Invited minisymposium talk*: “Probing the Earth’s Interior by Statistical Seismic Imaging” at the *SIAM Annual Meeting*, Portland, Oregon, July 12–16, 2004.
90. “Determining the Earth’s Microstructure by Statistical Seismic Imaging” at the *Women of Applied Mathematics: Research and Leadership Conference*, College Park, MD, October 8–10, 2003.
91. “Numerical Simulation and Analysis of Fiber Optic Compensators” at the *SIAM Annual Meeting*, Montreal, QC, Canada, June 16–20, 2003.
92. **Kridler, N.**<sup>U</sup> and Minkoff, S., “Numerical Simulation of Coupled Fluid Flow and Mechanical Deformation Modeling” at the *SIAM Annual Meeting*, Montreal, QC, Canada, June 16–20, 2003.
93. **Korostyshevskaya, O.**, Vdovina, T., and Minkoff, S., “Subgrid Upscaling for the Acoustic Wave Equation: Theory” at the *SIAM Annual Meeting*, Montreal, QC, Canada, June 16–20, 2003.
94. **Vdovina, T.**, Korostyshevskaya, O. and Minkoff, S., “Subgrid Upscaling for the Acoustic Wave Equation: Numerical Implementation” at the *SIAM Annual Meeting*, Montreal, QC, Canada, June 16–20, 2003.
95. *Invited minisymposium talk*: “Coupled Flow and Mechanical Deformation for Time-Lapse Seismic Modeling: Accuracy, Robustness, and Efficiency” at the *SIAM Conference on Mathematical and Computational Issues in the Geosciences*, Austin, TX, March 17–20, 2003.
96. “Coupled Flow and Mechanics for Time-Lapse Seismic Modeling” at the *SIAM Annual Meeting*, Philadelphia, PA, July 8–12, 2002.
97. *Invited*: “Scaling: the Impact of Coupled Fluid Flow and Geomechanical Deformation Modeling on 4D Seismic” the *Institute for Mathematics and Its Applications Workshop: Inverse Problems and Quantification of Uncertainty*, Minneapolis, MN, April 23, 2002.
98. *Invited*: “Coupled Geomechanical Deformation, Fluid Flow, and Seismic Modeling” *Industrial Affiliates’ Meeting, Center for Subsurface Modeling*, University of Texas, Austin, TX, October 30, 2001.
99. *Invited minisymposium talk*: “Coupling of Fluid Flow and Geomechanical Deformation Modeling for Time-Lapse Seismic” at the *Sixth SIAM Conference on Mathematical and Computational Issues in the Geosciences*, Boulder, CO, June 11–14, 2001.
100. *Invited*: “Coupled Geomechanics and Flow Simulation for Time-Lapse Seismic Modeling” the *Institute for Mathematics and Its Applications Workshop: Resource Recovery*, Minneapolis, MN, February 11, 2000.
101. “Combined Flow Simulation, Geomechanics, and Seismic Modeling for Reservoir Characterization” at the *Fifth SIAM Conference on Mathematical and Computational Issues in the Geosciences*, San Antonio, TX, March 23–27, 1999.

102. “Reservoir Characterization via Time-Varying Prestack Seismic Inversion” at the *Fourth SIAM Conference on Mathematical and Computational Issues in the Geosciences*, Albuquerque, NM, June 16–19, 1997.
103. “An Operator-Based Upscaling Approach for Solving the Pressure Equation” at the *Gordon Research Conference on Modeling of Flow in Permeable Media*, Andover, NH, August 4–9, 1996 [poster].
104. “An Operator-Based Upscaling Approach for Solving the Pressure Equation” at the *SIAM Annual Meeting*, Kansas City, MO, July 22–26, 1996.
105. *Invited*: “Computing Resolution for Large Seismic Inverse Problems”, the *Association for Women in Mathematics’ Workshop on Inverse Problems at the SIAM Annual Meeting*, Kansas City, MO, July 22–23, 1996.
106. *Invited*: “Computing Resolution for Large Seismic Inverse Problems”, the *Institute for Mathematics and Its Applications Workshop: Women in Mathematical Sciences Connected to Industry*, Minneapolis, MN, February 23–25, 1996.
107. “An Example of a Computationally Feasible Approximate Resolution Matrix for Seismic Inverse Problems” at the *SIAM Symposium on Inverse Problems: Geophysical Applications*, Fish Camp, CA, December 16–19, 1995.
108. “The Use of Inversion to Estimate the Energy Source and Earth Parameters in a Reflection Seismic Experiment” at the *SIAM Annual Meeting*, San Diego, CA, July 25–29, 1994.
109. “Estimating Seismic Sources with Inversion” at the *International Society for Optical Engineering’s Annual Meeting*, San Diego, CA, July 24–29, 1994.

### Invited Colloquia and Seminars

110. “Machine Learning Tools for Seismic Low Frequency Extrapolation,” *Brookhaven AI Mixer Seminar*, Upton, NY, May 20, 2025.
111. “Digital Twins for Wind Energy and Leading Edge Erosion Detection,” *Oregon State University, Applied Mathematics and Computation Seminar*, May 2, 2025 (virtual).
112. *Keynote Address*: “An Overview of BNL, the Computing and Data Sciences Directorate (CDS), and the Applied Math Department,” *Institute for Advanced Computational Science Research Day, Stony Brook University*, Stony Brook, NY, April 17, 2025.
113. “Brookhaven National Laboratory Deputy Director Computational Science Initiative Research Talk,” *Brookhaven National Laboratory*, Upton, NY., February 6, 2024.
114. “Experience and Vision for Deputy Director Position, Computational Science Initiative, Brookhaven National Laboratory,” *Brookhaven National Laboratory*, Upton, NY., January 16, 2024 (virtual).
115. “Research and Vision for the Virginia Tech Mathematics Department,” *Virginia Tech*, Blacksburg, VA., April 7, 2023.
116. “Research and Vision for the Computational Mathematics, Science and Engineering Department at MSU,” *Michigan State University*, East Lansing, MI., March 28, 2023.
117. “University of Alabama Department of Mathematics Chair Interview Research Talk,” *University of Alabama*, Tuscaloosa, AL., February 9, 2023.
118. “University of Alabama Department of Mathematics Chair Interview Vision Talk,” *University of Alabama*, Tuscaloosa, AL., February 10, 2023.
119. “Applied Mathematics & Statistics Dept. Head Leadership Team Talk,” *Colorado School of Mines*, Golden, CO., April 18, 2022.



120. “Modeling of Trace Gas Sensors,” *Marquette University, Department of Mathematics Colloquium*, Milwaukee, WI. (virtual), April 1, 2022.
121. “Applied Mathematics & Statistics Dept. Head Introduction and Future Directions,” *Colorado School of Mines*, Golden, CO., February 28, 2022.
122. “Modern Uncertainty Quantification Applied to Geoscience Problems,” *ExxonMobil Applied Geophysics Research Seminar*, Houston, TX. (virtual), March 11, 2020.
123. “Did You Feel That? How We Use Mathematics to Locate Microseismic Events Generated During Hydraulic Fracturing,” at the *Perot Museum’s Social Science Program: Formulate*, Dallas, TX., April 27, 2018.
124. “Microseismic Source Estimation via Seismic Inversion,” *North Carolina State University Numerical Analysis Seminar*, Raleigh, N.C., September 25, 2018.
125. **A. Safin**, S. Minkoff, and J. Zweck “Modeling Trace Gas Sensors with the Coupled Pressure-Temperature Equations,” at the *Innovative Computing Laboratory, University of Tennessee*, Knoxville, TN., May 30, 2018.
126. “Modeling and Optimal Design of Trace Gas Sensors,” Department of Mathematics, Applied Mathematics and Computation Seminar *Oregon State University*, webinar, February 17, 2017.
127. “Multiscale Modeling for Wave Propagation,” Department of Mathematics, *The University of Texas at Arlington*, Arlington, TX., February 20, 2015.
128. “Multiscale Modeling for Wave Propagation,” Department of Mathematics, *Texas Christian University*, Fort Worth, TX., November 15, 2013.
129. “Staggered in-time coupling of fluid flow and geomechanical deformation modeling for 4D seismic,” *Pioneer Natural Resources*, Irving, TX., November 5, 2013.
130. “Modeling of Trace Gas Sensors” Department of Mathematics, *Southern Methodist University*, Dallas, TX, April 10, 2013.
131. “Multiscale Modeling and Analysis of the Wave Equation” Department of Mathematics Multiscale Modeling Group, *Texas A&M University*, College Station, TX, January 18, 2013.
132. “Sniffing for Leakage: Trace Gas Sensors”, Department of Mathematical Sciences, *University of Texas at Dallas*, Dallas, TX, November 16, 2012.
133. “Multiscale Modeling and Analysis of the Wave Equation” Department of Mathematical Sciences, *University of Texas at Dallas*, Dallas, TX, April 19, 2012.
134. “Sniffing for Leakage: Trace Gas Sensors and Carbon Sequestration” Department of Modeling, Simulation & Visualization Engineering, *Old Dominion University*, Norfolk, VA, April 12, 2012.
135. “Research Interests in Mathematical Geosciences” Mathematical Institute, *University of Oxford*, Oxford, U.K., March 12, 2012 (talk given by Skype due to illness).
136. “Multiscale Modeling and Analysis of the Wave Equation” Department of Mathematical Sciences Applied Mathematics Colloquium, *New Jersey Institute of Technology*, Newark, NJ, March 2, 2012.
137. “Sniffing for Leakage: Trace Gas Sensors and Carbon Sequestration” Applied & Computational Math Seminar, *George Mason University*, Fairfax, VA, November 19, 2010
138. “Two-Scale Wave Equation Modeling for Seismic Inversion” Department of Geophysics, *Stanford University*, Palo Alto, CA, February 25, 2009.
139. “A Discussion of Operator Upscaling Applied to the Wave Equation” *ExxonMobil Corporate Strategic Research*, Clinton, NJ, December 11, 2008.

140. "Modeling Leakage of CO<sub>2</sub> along a Fault for Risk Assessment" Differential Equations Seminar, Department of Mathematics and Statistics, *UMBC*, Baltimore, MD, April 21, 2008.
141. "A Discussion of Operator Upscaling Applied to the Wave Equation" Department of Mathematics, *Virginia Tech*, Blacksburg, VA, January 21, 2008.
142. "Staggered in-time coupling of fluid flow and geomechanical deformation modeling for 4D seismic" Jackson School of Geosciences, *The University of Texas*, Austin, TX, July 27, 2007.
143. "Computational Modeling for Photonics Applications" The Institute for Computational Engineering and Sciences, *The University of Texas*, Austin, TX, March 1, 2007.
144. "Staggered in-time coupling of fluid flow and geomechanical deformation modeling for 4D seismic" Department of Earth and Planetary Sciences, *Johns Hopkins University*, Baltimore, MD, November 20, 2006.
145. "A Survey of Problems in Subsurface Modeling" Center for Urban Environmental Research and Education, *UMBC*, September 22, 2006.
146. "Implementation and Convergence of Operator-Based Upscaling for Acoustics" Department of Applied Physics and Applied Mathematics Seminar, *Columbia University*, New York, NY, January 24, 2006.
147. "Numerical Simulation and Analysis of Fiber Optic Compensators" Essex Corporation Visit to CASPR, *UMBC*, Baltimore, MD, July 15, 2005.
148. "Numerical Simulation and Analysis of Fiber Optic Compensators" Differential Equations Seminar, Department of Mathematics and Statistics, *UMBC*, Baltimore, MD, April 4, 2005.
149. "Operator-Based Upscaling for the Wave Equation and the Plane-Wave Traveltime Inverse Model Problem" Applied Math Seminar, Department of Mathematical Sciences, *University of Delaware*, Newark, DE, October 12, 2004.
150. "Coupled Flow and Mechanics for Time-Lapse Seismic Modeling" Numerical Analysis Seminar, Department of Mathematics, *University of Maryland College Park*, College Park, MD, December 10, 2002.
151. "Staggered in-Time Coupling of Fluid Flow and Geomechanical Deformation Modeling for 4D Seismic" Mathematical and Computational Sciences Division, *National Institute of Standards and Technology*, Gaithersburg, MD March 28, 2002.
152. "Coupled Fluid Flow and Geomechanical Deformation Modeling for 4D Seismic" Earth Resources Laboratory, *Massachusetts Institute of Technology*, Cambridge, MA, July 9, 2001.
153. "Resolution and Upscaling in Oil Exploration and Recovery" Differential Equations Seminar, Department of Mathematics and Statistics, *UMBC*, Baltimore, MD, March 6, 2001.
154. "Coupled Geomechanics and Flow Simulation for Time-Lapse Seismic Modeling" Petroleum Recovery Research Center and the Department of Computer Science, *New Mexico Tech*, Socorro, NM, April 25, 2000.
155. "Coupled Geomechanics and Flow Simulation for Time-Lapse Seismic Modeling" Department of Mathematics, *Emory University*, Atlanta, GA, February 23, 2000.
156. "Coupled Geomechanics and Flow Simulation for Time-Lapse Seismic Modeling" Department of Mathematics, *University of North Texas*, Denton, TX, February 14, 2000.
157. "Coupled Geomechanics and Flow Simulation for Time-Lapse Seismic Modeling" Department of Mathematics, *University of Maryland, Baltimore County*, Baltimore, MD, February 4, 2000.
158. "Reservoir Characterization via Time-Varying Prestack Seismic Inversion" *PGS Seres Research*, Houston, TX, August 30, 1999.

159. “Combined Flow Simulation, Geomechanics, and Seismic Modeling for Reservoir Characterization” Department of Mathematics, *University of New Mexico*, Albuquerque, NM, April 15, 1999.
160. “Reservoir Characterization via Time-Varying Prestack Seismic Inversion” Department of Geophysics, *Stanford University*, Stanford, CA, August 7, 1998.
161. “Reservoir Characterization via Time-Varying Prestack Seismic Inversion” *Mobil Technology Company*, Dallas, TX, May 11, 1998.
162. “Seismic Resolution for Oil Exploration” *Chevron Petroleum Technology Co.*, La Habra, CA, April 21, 1997.
163. “Resolution and Upscaling in Oil Exploration and Recovery” Department of Mathematics, *Colorado School of Mines*, Golden, CO, March 31, 1997.
164. “Resolution and Upscaling in Oil Exploration and Recovery” Department of Mathematics, *Texas A&M University*, College Station, TX, March 26, 1997.
165. “Seismic Resolution for Oil Exploration” *Sandia National Labs*, Albuquerque, NM, March 21, 1997.
166. “Resolution and Upscaling in Oil Exploration and Recovery” Department of Mathematics, *Clemson University*, Clemson, SC, March 10, 1997.
167. “Resolution and Upscaling in Oil Exploration and Recovery” Department of Mathematics, *Washington State University*, Pullman, WA, February 27, 1997.

## STUDENTS

### Ph.D. in Progress

- Rohin Harikumar, research area: *Seismic Inversion, Machine Learning, and Data Completion*.

### Ph.D. Completed (Chair or Co-Chair)

- Preskella Mrad, *Model Reduction in Bayesian Inversion: Computational Frameworks for Geophysical Inverse Problems*, UTD 2025 [Co-Chair joint with Felipe Pereira, UTD Department of Mathematical Sciences].
- Huiyi Chen, *Investigation of Source Extension Methods, the Discrepancy Algorithm, and Noise Estimation to Overcome Cycle Skipping in Full Waveform Inversion*, UTD 2024 [Chair].
- Tamara Dolski, *Gaussian Process Emulation: Theory and Application to Coupled Physics*, UTD 2024, [Co-Chair joint with Elaine Spiller, Marquette University, Department of Mathematical and Statistical Sciences].
- Ali Mozumder, *Modeling and Sensitivity Analysis for Trace Gas Sensors*, UTD 2022, [Co-Chair joint with John Zweck, UTD Department of Mathematical Sciences]; currently Instructor in Department of Mathematics at Oregon State University.
- Jonathan Popa, *Seismic Data Reconstruction with Low-Rank Tensor Optimization*, UTD 2022, [Co-Chair joint with Yifei Lou, Department of Mathematical Sciences]; currently Engineer-Data-I, Systems Engineering Team, Verizon, Richardson, TX.
- Georgia Stuart, *Computationally Efficient Methods for Uncertainty Quantification in Seismic Inversion*, UTD 2020, [Co-Chair joint with Felipe Pereira, Department of Mathematical Sciences]; currently Research Scientist, Cyberinfrastructure & Research Support, Office of Information Technology, University of Texas at Dallas; formerly Peter O'Donnell, Jr. Postdoctoral Fellowship in Computational Engineering and Sciences at the Oden Institute, University of Texas at Austin.

- Artur Safin, *Modeling Trace Gas Sensors with the Coupled Pressure-Temperature Equations*, UTD 2018, [Co–Chair joint with John Zweck, Department of Mathematical Sciences]; formerly postdoctoral research associate in Computational Aquatic Data Science, Eawag (Swiss Federal Institute of Aquatics and Technology), Dübendorf–Zürich, Switzerland.
- Chen Lai, *Wave Propagation: Theory and Experiment*, UMBC 2018, [Co–Chair joint with Florian Potra, UMBC Department of Mathematics and Statistics]; currently Command, Control, Communication, and Cyberspace Electromagnetic Activities Branch Chief, U.S. Department of the Army, Aberdeen Proving Ground, Maryland.
- Jordan Kaderli, *An Analytic Solution to a Coupled System of Equations for Modeling Photoacoustic Trace Gas Sensors and a Full Waveform Inversion Approach to Microseismic Source Estimation*, UTD 2018 [Chair], currently a Mathematics Teacher at Cristo Rey Dallas College Prep, Dallas, TX.
- Isnardo Arenas-Navarro, *Numerical Simulations for Turbulent Drag Reduction Using Liquid Infused Surface*, UTD 2017, [Co–Chair, joint with Stefano Leonardi, UTD Department of Mechanical Engineering]; currently Professor and Mathematics Department Head at Universidad Militar Nueva Granada, Colombia.
- Noemi Petra, *Mathematical Modeling, Analysis, and Simulation of Trace Gas Sensors*, UMBC, 2010 [Co–Chair joint with John Zweck]; currently Associate Professor, Department of Applied Mathematics, University of California, Merced. Recipient of NSF Career Award August 2017.
- Tetyana Vdovina, *Operator Upscaling for the Wave Equation*, UMBC, 2006 [Chair]; currently Full Waveform Inversion Team Lead at ExxonMobil Upstream Research Company, Houston, TX.

#### Ph.D. Completed (Committee Member)

- Joey Lyon, *Correlated Sampling of Parallel Partial and Linked Emulators for Geophysical Applications*, Mathematical and Statistical Sciences, Marquette University, 2025.
- Lucas Seiffert, *Convergence Aspects in MCMC for Inverse Problems in Subsurface Flows: the Effective Sample Size and Multiscale Sampling Methods*, UTD, 2025 [Mathematical Sciences].
- Aprajita Singh, *Ordinal Patterns-Based Time Series Analysis*, UTD, 2024 [Mathematical Sciences]
- Kai Xiong, *High-Resolution Time-Lapse Seismic Velocity Estimation Using Improved Envelope Full Waveform Inversion*, UTD, 2023 [Geosciences].
- Bingxu Luo, *Using Seismic Waves to Monitor Environmental Changes*, UTD, 2023 [Geosciences].
- Vrushaly Shinglot, *Computation and Stability Analysis of Periodically Stationary Pulses in a Short Pulse Laser*, UTD, 2022 [Mathematical Sciences], currently Postdoctoral Researcher, Mathematics in Medicine Program, Houston Methodist Weill Cornell Medical College, Houston, TX.
- Alsadig Ali, *Multiscale Sampling for Subsurface Characterization*, UTD, 2021 [Mathematical Sciences].
- Siyuan Wang, *Bi-tensor Free Water Model with Positive Definite Diffusion Tensor and Fast Optimization*, UTD, 2021 [Mathematical Sciences].
- Abdoulaye Thiam, *On Inventory Control Problems with Learning*, UTD, 2021 [Mathematical Sciences].
- Sonam Lama, *The Stochastic Weighted Particle Method for the Computation of the Low Probability Tail of the Velocity Distribution in Spatially Homogeneous Plasmas*, UTD, 2020 [Mathematical Sciences]; currently postdoctoral research associate in Electrical and Computer Engineering, University of California, Santa Barbara.
- Mujibur Rahman Chowdhury, *Fractional-Order Total Variation Based Image Denoising, Deconvolution, and CT Reconstruction Under Poisson Statistics*, UTD, 2020 [Mathematical Sciences]; currently postdoctoral research associate at UTD.

- Ting Yan, *Advection-Reaction-Diffusion Model of Drug Concentration in a Lymph Node*, Southern Methodist University, 2020 [Mathematics]; currently Senior Scientist at Halliburton, Singapore.
- Jidong Yang, *Seismic Modeling, Imaging and Full-Waveform Inversion Using a Time-Domain Complex-Valued Viscoacoustic Wave Equation*, UTD, 2020 [Geosciences]; currently postdoctoral research associate at MIT, Cambridge, MA.
- Xiaowei Zhu, *Wall Modeling for Turbulent Flow over Complex Roughness*, UTD, 2018 [Mechanical Engineering]; currently postdoctoral research associate at Johns Hopkins University, Baltimore, MD.
- Chen Tang *From Multidirectional Vector-Based Seismic Reverse Time Migration and Angle-Domain Common-Image Gathers to Full Waveform Inversion Using Phase-Modified and Deconvolved Images in Acoustic and Elastic Media*, UTD, 2018 [Geosciences]; currently Research Geophysicist at TGS, Houston, TX.
- Yanping Chen, *Deterministic Computation of the Low Probability Tail of the Velocity Distribution due to Particle Collisions in Spatially Homogeneous Plasmas*, UTD, 2016 [Mathematical Sciences]; currently a Data Scientist at Elevate, Dallas, TX.
- Ana Maria Soane, *Variational Problems in Weighted Sobolev Spaces with Applications to Computational Fluid Dynamics*, UMBC, 2008 [Mathematics and Statistics]; currently Associate Professor, Mathematics Department, U.S. Naval Academy.

### Masters Completed

- Matt McChesney, *From a Hydromechanical Parametrization of Fracture Sliding Velocity to Simulation of Wavefields from Microseismic Sources*, UTD, 2020 [Co-Chair joint with George McMechan, UTD Department of Geosciences], currently Geophysicist III in the Technology and Monitoring Group, Battelle Memorial Institute, Columbus, Ohio.
- John Burghardt, *Implementation of Operator Upscaling for the Variable Density Acoustic Wave Equation in the IWAVE Inversion Framework*, UMBC, 2012 [Chair]; currently at the United States Army Materiel Systems Analysis Activity.
- Sean Griffith, *Use of Operator Upscaling for Seismic Inversion: Computationally Feasible Forward and Adjoint Calculations*, UMBC, 2008 [Chair]; currently at the Center for Inherited Disease Research, Johns Hopkins University, Baltimore, MD.
- Oksana Korostyshevskaya, *A Matrix Analysis of Operator-Based Upscaling for the Wave Equation*, UMBC, 2003 [Chair]. Currently at Georgetown Academic Studio, Washington, DC.

### Undergraduate

- Asmita Korde, NSF Undergraduate Research Assistant-ship (2008–2009): “Multiscale Aspects of Wave Propagation Inverse Problems.”
- Nicholas Kridler, Provost’s Research Fellowship, and departmental senior thesis (2002–2003): “Numerical Simulation of Coupled Fluid Flow and Mechanical Deformation Modeling.”

## PROFESSIONAL SERVICE

### Committees and Advocacy

- AWM representative to the AMS-ASA-MAA-SIAM Data Committee (JTDATA), February 1, 2025–January 31, 2028.

- SIAM Secretary (2020-2023). Duties included: Chair of the SIAM Committee on Committees and Appointments, Member of the SIAM Major Awards Committee, Chair of the Block Lecture Committee, Member of the SIAM President's Cabinet, Full Voting Member of the SIAM Council.
- Chair of the SIAM Geosciences Activity Group (2017–2018).
- Member of the Society of Exploration Geophysicists (SEG) Council (2014–2017).
- Member of the SIAM *Workshops Celebrating Diversity* Subcommittee (2013–2016).  
Committee Chair: 2014–2015.
- Member of the Prize Committee for the SIAM Geosciences Activity Group (2014–2015).
- Chair of the Membership Committee for the Society for Industrial and Applied Mathematics (SIAM) (2009-2013). (As one example of a number of activities in which the committee has been involved, in the first year we formalized a reciprocity agreement with the American Women in Mathematics (AWM)).
- Creator and editor of the “Careers in Mathematical Sciences” column (2010–2016). A total of twenty-four columns appeared in *SIAM News*.
- Local Organizing Chair for the Infinite Possibilities Conference held at UMBC in March, 2012. (The purpose of the Infinite Possibilities Conference is to promote, educate, encourage and support minority women interested in the mathematical and statistical sciences.)
- The American Mathematical Society representative to the 16th Annual Coalition for National Science Funding Exhibition & Reception on Capitol Hill April 14, 2010.
- Member of the SIAM Membership Committee (2008-2009).
- Attended Infinite Possibilities Conference at NC State University and co-chaired session on “Funding Opportunities for Graduate Students” (November 2007).

### Editorial Boards

- Associate Editor for the journal *Computational Geosciences*, Springer (2020–2023).
- Member of the Editorial Board for the journal *SIAM Undergraduate Research Online (SIURO)* (2015–2018).
- Member of the Editorial Board for SIAM's *Mathematics in Industry* book series (2014–).
- Member of the Editorial Board for *SIAM News* (2013–).

### Conference Organization

- *Member of Organizing Committee* for the New York Scientific Data Summit, September 11–12, 2025, New York City, NY.
- *Conference Co-Chair* (joint with Sorin Pop) of the SIAM Conference on Mathematical & Computational Issues in the Geosciences, March 11–14, 2019, Houston, TX.
- *Member of Organizing Committee* for the UCLA Institute for Pure & Applied Mathematics (IPAM) Workshop on Full Waveform Inversion and Velocity Analysis, May 1–5, 2017, Los Angeles, CA.
- *Member of Organizing Committee* for the SIAM Conference on Computational Science and Engineering held March 14–18, 2015, in Salt Lake City, UT.
- *Member of Organizing Committee* for the SIAM Conference on Mathematical and Computational Issues in the Geosciences held March 21–24, 2011, in Long Beach, CA.

- *Member of Organizing Committee* for the SIAM Conference on Mathematical and Computational Issues in the Geosciences held June 15–18, 2009, in Leipzig, Germany.
- *Member of Organizing Committee* for the SIAM Conference on Mathematical and Computational Issues in the Geosciences held March 19–22, 2007, in Santa Fe, New Mexico.

### Minisymposium Organization

- *Minisymposium organizer* (joint with Preskella Mrad): “Investigating Inverse Problems using Bayesian Inference: Challenges and Advances,” at the 2025 SIAM Conference on Computational Science and Engineering, Fort Worth, TX, March 3–7, 2025.
- *Minisymposium organizer* (joint with Rohin Harikumar): “Advancements in Data Driven Seismic Imaging,” at the 2025 SIAM Conference on Computational Science and Engineering, Fort Worth, TX, March 3–7, 2025.
- *Minisymposium organizer*: “Applications and Methods for Digital Twins,” at the 7th Annual SIAM TX-LA Section Meeting, Waco, TX, October 11–13, 2024.
- *Minisymposium organizer*: “Modern Methods for Solution of Inverse Problems,” at the 6th Annual SIAM TX-LA Section Meeting, Lafayette, LA, November 3–5, 2023.
- *Minisymposium organizer* (joint with Yifei Lou): “Tensor Modeling and Applications,” at the 5th Annual SIAM TX-LA Section Meeting, Houston, TX, November 4–6, 2022.
- *Minisymposium organizer* (joint with Elaine Spiller): “Emulation for Coupled Multiphysics Systems” at the SIAM Conference on Uncertainty Quantification (UQ22), Atlanta, GA, April 12–15, 2022.
- *Minisymposium organizer* (joint with Jean Virieux): “Extended-Model Versus Reduced-Model Strategies for Full Waveform Inversion - Parts I and II” at the SIAM Conference on Mathematical & Computational Issues in the Geosciences, Houston, TX., March 11–14, 2019.
- *Organizer*: “Career Panel” at the SIAM Conference on Mathematical & Computational Issues in the Geosciences, Houston, TX., March 11–14, 2019.
- *Minisymposium organizer* (joint with Artur Safin): “Parallelizable Preconditioners and Iterative Solvers” at the SIAM Conference on Computational Science and Engineering to be held in Atlanta, GA., February 27–March 3, 2017.
- *Minisymposium organizer*: “Examples from the National Science Foundation’s Enriched Doctoral Training Program” at the SIAM Conference on Applied Mathematics Education, Philadelphia, PA., September 30–October 2, 2016.
- *Minisymposium organizer* (Part of the Workshops Celebrating Diversity): “Computational Advances in Energy Research” at the SIAM Conference on Computational Science and Engineering: Salt Lake City, UT., March 14–18, 2015.
- *Minisymposium organizer* (Part of the Workshops Celebrating Diversity): “Fluid Transport Dynamics in Biology and Medicine ” at the SIAM Conference on Computational Science and Engineering: Salt Lake City, UT., March 14–18, 2015.
- *Minisymposium organizer* (Part of the Workshops Celebrating Diversity): “Modern Computational Modeling in Fluids” at the SIAM Conference on Computational Science and Engineering: Salt Lake City, UT., March 14–18, 2015.
- *Minisymposium organizer* (Part of the Workshops Celebrating Diversity): “Computational Science for Current Multidisciplinary Research Problems” at the SIAM Conference on Computational Science and Engineering: Salt Lake City, UT., March 14–18, 2015.

- *Minisymposium organizer* (Part of the Workshops Celebrating Diversity): “The System Dynamics of Social and Health Processes using Quantitative Data Sciences Methods” at the SIAM Conference on Computational Science and Engineering: Salt Lake City, UT., March 14–18, 2015.
- *Minisymposium organizer* (Part of the Workshops Celebrating Diversity): “Water Resources Management: How to add it all up” at the SIAM Conference on Computational Science and Engineering: Salt Lake City, UT., March 14–18, 2015.
- *Minisymposium organizer* (Part of the Workshops Celebrating Diversity): “Mathematical Modeling of Health Problems” at the SIAM Annual Meeting: Chicago, IL., July 7–11, 2014.
- *Minisymposium organizer* (Part of the Workshops Celebrating Diversity): “Applications in Human Performance, Counterterrorism, and Risk Analysis” at the SIAM Annual Meeting: Chicago, IL., July 7–11, 2014.
- *Minisymposium organizer* (Part of the Workshops Celebrating Diversity): “Theoretical and Numerical Results in Dynamical Systems” at the SIAM Annual Meeting: Chicago, IL., July 7–11, 2014.
- *Minisymposium organizer* (Part of the Workshops Celebrating Diversity): “Analysis and Applications of Optimization” at the SIAM Annual Meeting: Chicago, IL., July 7–11, 2014.
- *Minisymposium organizer* (Part of the Workshops Celebrating Diversity): “Applications in Human Performance, Counterterrorism, and Risk Analysis” at the SIAM Annual Meeting: Chicago, IL., July 7–11, 2014.
- *Minisymposium organizer* (Part of the Workshops Celebrating Diversity): “Applications in Human Performance, Counterterrorism, and Risk Analysis” at the SIAM Annual Meeting: Chicago, IL., July 7–11, 2014.
- *Minisymposium organizer* “Carbon Sequestration Modeling and Analysis - Parts I and II” at the SIAM Conference on Mathematical and Computational Issues in the Geosciences: Long Beach, CA, March 21–24, 2011.
- *Minisymposium organizer* (Joint with William Symes): “Multiscale Methods for Wave Propagation” at the SIAM Conference on Mathematical and Computational Issues in the Geosciences: Long Beach, CA, March 21–24, 2011.
- *Minisymposium organizer* (Joint with Jianliang Qian): “Efficient and Accurate Numerical Methods for Solution of the Wave Equation” at the SIAM Annual Meeting: Pittsburgh, PA, July 12–16, 2010.
- *Minisymposium organizer* “Multiscale Mathematical Techniques” at the SIAM Annual Meeting: Denver, CO, July 6–10, 2009.
- *Minisymposium organizer* (Joint with Noemi Petra): “Boundary Element Methods: Recent Developments and Applications” at the SIAM Annual Meeting: Denver, CO, July 6–10, 2009.
- *Minisymposium organizer* (Joint with Sean Griffith): “Multiscale Solution Algorithms with Applications to Earth Science” at the SIAM Annual Meeting: San Diego, CA, July 7–11, 2008.
- *Minisymposium organizer* (Joint with Steve Bryant): “Carbon Sequestration Modeling and Simulation - Parts I–II” at the SIAM Conference on Mathematical and Computational Issues in the Geosciences: Santa Fe, NM, March 19–22, 2007.
- *Minisymposium organizer* (Joint with Malgo Peszynska and Ralph Showalter): “Multiscale Modeling in the Earth Sciences - Parts I–III” at the SIAM Conference on Mathematical and Computational Issues in the Geosciences: Avignon, France, June 7–10, 2005.
- *Minisymposium organizer*: “Multiphysics and Multiresolution Modeling in the Earth Sciences” at the SIAM Annual Meeting: Philadelphia, PA, July 8–12, 2002.



- *Project review meeting organizer*: U.S. Department of Energy’s Natural Gas and Oil Technology Partnership Program: “Coupled Geomechanical Deformation, Fluid Flow, and Seismic Modeling”, Rice University, Houston, TX., August 1, 2001.
- *Minisymposium organizer*: “Data Integration and Multiphysics Simulations in the Earth Sciences – Parts I and II” at the Fifth SIAM Conference on Mathematical and Computational Issues in the Geosciences: San Antonio, TX., March 24–27, 1999.
- *Minisymposium organizer* (Joint with Cliff Nolan): “Practical Complexities and Some Solutions for the Seismic Inverse Problem” at the Fifth SIAM Conference on Mathematical and Computational Issues in the Geosciences: San Antonio, TX., March 24–27, 1999.
- *Minisymposium organizer*: “Resolution for Seismic Inverse Problems: Current Approximations and Uses” at the SIAM Annual Meeting: Kansas City, MO, July 22–26, 1996.
- *Member of Technical Program Committee* for the Society of Exploration Geophysicists’ 68th Annual International Meeting: New Orleans, LA., Sept. 13–18, 1998.

### Service as a Reviewer

- National Science Foundation Grant Review Panel Member: 2003, 2007, 2008, 2009, 2010 (two panels), 2013, 2015, 2017, 2023.
- U.S. Department of Energy Grant Review Panel Member: 2006, 2012, 2022, 2025.
- Reviewed a number of individual grants (providing mail-in reviews) for the U.S. Department of Energy, the National Science Foundation, and the American Chemical Society Petroleum Research Fund (1998–2011).
- Reviewed manuscript for a new textbook on numerical solution of ordinary differential equations, publisher: Brooks/Cole (2004).
- 1997–present: Reviewer for *Computer Methods in Applied Mechanics and Engineering*, *Computational Geosciences*, *Concurrency and Computation: Practice and Experience*, *CSIAM Transactions on Applied Mathematics*, *Geophysical Journal International*, *Geophysics*, *International Journal of Non-Linear Mechanics*, *International Journal of Rock Mechanics and Mining Sciences*, *Inverse Problems*, *Journal of Computational Physics*, *Journal of Petroleum Science and Engineering*, *Multiscale Modeling and Simulation*, *Optics Communications*, *Physics and Chemistry of the Earth*, *SIAM Journal on Scientific Computing*, *Society of Petroleum Engineering Journal*, *Transport in Porous Media*, and *Water Resources Research*.
- Reviewed new journal proposal for Institute of Physics Publishing (2001).

### University Service (UTD)

- Member of the College of Natural Sciences and Mathematics Sustainable Earth Systems Cluster Hire Search Committee (2023–2024).
- Member of the Faculty Senate and Faculty Senate Council (2023–2024).
- Co-Chair of the Identification and Recruitment Implementation Team for the UTD NSF ADVANCE ASPIRE<sup>2</sup> Grant (2021–2024).
- Member of the ASPIRE<sup>2</sup> Advocates and Allies Advisory Group (2023–2024).
- Member of the College of Natural Sciences and Mathematics Dean Search Committee (2020).
- Member of the Science/Mathematics Education Department Advisory Committee (2014–2024).

- Member of the Mathematics Education Search Committee in the Department of Science/Mathematics Education (2012–2013).
- Member of the Learning Management Tools Committee (2015–2018).
- Member of the Mid-Probationary Review Committee for Yunan Wu (2023–2024).
- Chair of the Mid-Probationary Review Committee for Carlos Arreche (2019–2020).
- Member of the Mid-Probationary Review Committee for Nathan Williams (2019–2020).
- Member of the Ad Hoc Tenure Review Committee for Anh Tran (2019–2020).
- Member of the Ad Hoc Tenure Review Committee for Will Anderson (Department of Mechanical Engineering, 2017–2018).
- Member of the Ad Hoc Tenure Review Committee for Qingwen Hu (2017–2018).
- Chair of the Mid-Probationary Review Committee for Dr. Yifei Lou (2016–2017).

### Departmental Service (UTD)

- Founder and Co-Faculty Advisor (with Y. Lou and A. Aceves), SIAM Student Chapter Joint Between UTD/SMU (2013–2020).
- Member of the Mathematical Sciences Department Hiring Committee (2019–2020, 2013–2015).
- Co-organizer (with J. Zweck) of the Computational Science Seminar (2014–2024).
- Graduate Advisor for Mathematics (2013–2014).
- Member of the Alumni Relations Committee for the Department (2017–2024).
- Member of the Mathematical Sciences Department Outreach Committee (2015–2017).
- Member of the Research Mentoring, Grant Writing and Peer Support Committee (2013–2020).
- Chair of the Research Mentoring, Grant Writing and Peer Support Committee (2012–2013, 2016–2019).
- Member of the Executive/Planning Committee for the Mathematical Sciences Department (2012–2024).
- Member of the Recruiting, Admission, TA Hiring, Early Ph.D. Advising (RATE) Committee (2012–2014).

### University Service (UMBC)

- Member of the UMBC Research Council (2008–2010).
- Co-organizer of visit to UMBC by Professor David Manderscheid (U. Iowa) who spoke on “Increasing the Number of Minority PhD’s in the Sciences” (November 10, 2006). Visit also included a workshop for Graduate Program Directors in Science at UMBC on “strategies for success”.
- Member of the Research Council and Office of Sponsored Programs staffing subcommittee (2006).
- Member of the Undergraduate Research and Creative Achievement Day Committee (2005–2006).
- Department of Mathematics and Statistics Liaison to NSF ADVANCE Program at UMBC (2004–2008).
- Co-organizer of Women in Science and Engineering (WISE) lecture: “Breaking with Tradition in Science and Engineering” (talk given by Dr. Linda Petzold of the University of California, Santa Barbara), October 10, 2003.

- Member of Steering Committee for Women in Science and Engineering (WISE) Group (2001–2002). Organized inaugural WISE lecture: “From Proofs to Products” (talk given by Dr. Margaret Wright of Bell Labs), April 11, 2001.
- Member of committee which drafted the Family and Medical Leave Policy for UMBC (2001).

### Departmental Service (UMBC)

- Founder and Faculty Advisor of the SIAM Student Chapter at UMBC (2008–2011). The chapter has organizing 8 professional development sessions for graduate students in the department on how to succeed in graduate school, how to prepare a research poster, technical writing, how to choose an advisor, etc.
- Chair of the Numerical Analysis Ph.D Comprehensive Exam Committee (2010–2012). Coordinated writing and grading of numerical analysis exams twice a year.
- Co-organizer of the Mid-Atlantic SIAM student chapter conference held at Shippensburg University (April 16, 2011).
- Organized (along with UMBC student chapter officers) the First Chesapeake SIAM Student Chapter Conference (April 27, 2010). Doug Arnold (SIAM President 2008–2010) was the keynote speaker for this event.
- Co-presented (with Manil Suri) professional development seminar on “Do’s and Dont’s for Giving a Successful Research Presentation” as part of the UMBC SIAM student chapter professional development series (February 21, 2011).
- Presented professional development seminar on writing a cv/resume and cover letters as part of the UMBC SIAM student chapter professional development series (April 1, 2009).
- Member of Mathematics Assistant Professor Search Committee (2008–2009).
- Subcommittee Chair for Third Year Review of Junior Numerical Analysis Faculty Member (2008).
- Member of the Planning Committee for the Mathematics and Statistics Department (2005–2008).
- Member of the Mathematics Assistant Professor Search Committee (2005–2006).
- Wrote, administered, and graded Ph.D qualifying exams for Math 620 (Numerical Analysis) and Math 630 (Matrix Analysis) (2004–2011).
- Member of GAANN (US Department of Education, Graduate Assistantships in Areas of National Need) Committee (2003–2005).
- Member of Undergraduate Committee (2001–2005).
- Co-organizer of the Math Major Recruiting Day (2002–2004).
- Member of Computer Committee (2000–2001).

### Community Service

- Presenter at NSF/Baltimore County Public Schools (BCPS)/UMBC Summer Seminar Week on “Real World Mathematics Related to Math and Science Instruction”, UMBC, June 15, 2006.
- Gave lecture to Maryland State Math Education Advisory Board on “Applications of Mathematics in the Oil Industry”, UMBC, April 11, 2002.