IRINA KALASHNIKOVA TEZAUR, PH.D.

Distinguished Member of Technical Staff, Quantitative Modeling & Software Engineering Department
P.O. Box 969, MS 9060, Livermore, CA 94551, USA
E-mail: ikalash@sandia.gov, Phone: 925-294-2474, URL: www.sandia.gov/~ikalash

EDUCATION AND TRAINING

University of Pennsylvania	Mathematics	B.A.	2006
University of Pennsylvania	Mathematics (Advisor: Prof. A. Kirillov)	M.A.	2006
Stanford University	Computational & Mathematical Engineering (Advisor: Prof. C. Farhat)	Ph.D.	2011

PROFESSIONAL APPOINTMENTS

Graduate Research Assistant	Stanford University	2006—2011
Graduate Technical Intern (Year-Round)	Sandia National Laboratories Aerosciences Department	2007—2011
Senior Member of Technical Staff	Sandia National Laboratories Computational Mathematics Department	2011—2014
Principal Member of Technical Staff	Sandia National Laboratories Quantitative Modeling & Analysis Department	2015—2021
Distinguished Member of Technical Staff	Sandia National Laboratories Quantitative Modeling & Software Engineering Department	2021—present

HONORS AND AWARDS

- Recipient of Robert J. Melosh Medal for Best Paper in Finite Element Analysis (2008).
- 2 Fellowships: U.S. Department of Defense National Defense Science & Engineering Graduate (NDSEG) Fellowship (2007—2010), National Physical Science Consortium (NPSC) Graduate Fellowship (2010-2011)
- Recipient of Sandia National Laboratories' Early Career Laboratory Directed Research & Development (LDRD) award (2012)
- Sandia National Laboratories' Public Good Innovator Award for Albany 2.0, an open-source multi-physics finite element code (2014)
- 2 Sandia National Laboratories' SPOT Awards (2012, 2019)
- 2 Sandia National Laboratories' Employee Recognition Awards (ERA) (2012, 2016)
- Recipient of Presidential Early Career Award for Scientists and Engineers (PECASE) for "developing new, impactful mathematical methods and computer algorithms to enable real-time analysis, control,

and decision-making on computationally prohibitive problems relevant to nuclear security mission and climate modeling" (2019)

- Nominated for/promoted to full membership of Sigma Xi Scientific Research Honor Society for noteworthy achievements as an original investigator (2019)
- Nominated by Sandia National Laboratories' Director Dr. James Peery for the 2021 Blavatnik Award for Young Scientists (2020)
- Awarded a Simons Fellowship to visit the Isaac Newton Institute as part of "Mathematical & Statistical Foundation of Future Data-Driven Engineering" workshop held during winter/spring 2023.

CURRENT AND PAST RESEARCH SUPPORT/PROJECT LEADERSHIP

- **Principal Investigator.** Sandia National Laboratories Laboratory Directed Research & Development (LDRD) Award, "Reduced Order Modeling for Prediction & Control of Large-Scale Systems", $470K, 2012—2014.
- **Technical Lead.** Sandia National Laboratory Directed Research & Development (LDRD) Award, "The Aeras Next Generation Global Atmosphere Model", $1.8M, 2013—2016.
- **Principal Investigator.** Sandia National Laboratories Advanced Simulation & Computing (ASC) Program, "Model Reduction for Compressible Cavity Simulations Towards Uncertainty Quantification of Structural Loading", $785K, 2014—2018.
- **Performance Lead.** Department of Energy (DOE) SciDAC4 (BER + ASCR), "Probabilistic Sea-Level Projections from Ice Sheet and Earth System Models (ProSPect)", $3.275M, 2017—2022.
- **Technical Lead: Global Sensitivity Analysis.** Sandia National Laboratories Directed Research & Development (LDRD), Earth Science Research Foundation, "Arctic Tipping Points Triggering Global Change", $1.3M, 2017—2020.
- **Verification Lead.** Department of Energy (DOE) Biological and Environmental Research (BER), "Climate Model Development and Verification (CMDV) Software", $5.4M, 2018—2020.
- **Principal Investigator.** U.S. Department of Energy Presidential Early Career Award for Scientists and Engineers (PECASE) Award, $250K, 2019—2023.
- **Technical Lead: Simulation-Driven Anomaly Detection Methods.** Department of Energy (DOE) Office of Science Advanced Scientific Computing Research (ASCR), Base Computer Science, "In-Situ Machine Learning for Exascale Platforms", $2.4M, 2020—2024.
- **Technical Lead.** Sandia National Laboratories Grand Challenge Laboratory Directed Research & Development (LDRD), "CLDERA - CLimate impact: Dynamically tRacEd Attribution**",** $15M, 2021—2024.
- **Co-Principal Investigator.** Sandia National Laboratories Laboratory Directed Research & Development (LDRD), Computing and Information Sciences (CIS) Research Foundation, "Rigorous and agile coupling of conventional and data-driven models for heterogeneous multi-physics, multi-scale simulations", $1.732M, 2021—2024.
- **Sandia Principal Investigator.** National Nuclear Security Administration (NNSA) Minority Serving Institutions Partnership Program (MSIPP), "The Rio Grande Consortium for Advanced Research on Exascale Simulation (Grande CARES)", $927K, 2022—2027.
- **Sandia Principal Investigator.** Department of Energy (DOE) Office of Science (SC) Advanced Scientific Computing Research (ASCR) Mathematical Multifaceted Integrated Capability Centers (MMICCs), "M2dt: Multifaceted Mathematics for Predictive Digital Twins", $2.5M, 2022-2027.

PENDING RESEARCH SUPPORT

- **Principal Investigator.** Sandia National Laboratories Laboratory Directed Research & Development (LDRD), Engineering Science Research Foundation (ESRF), "Accelerating the analyst workflow: adaptive hybrid models via domain decomposition", $2.229M, 2024—2027.
- **Key Team Member.** Sandia National Laboratories Laboratory Directed Research & Development (LDRD), Earth Science Research Foundation, "Predicting frozen soil stability to protect Arctic infrastructure in thawing environments", $1.785M, 2024—2027.
- **Thrust Lead.** Department of Energy (DOE) Office of Science (SC) Advanced Scientific Coputing Research (ASCR) Competitive Portfolios for Advanced Scientific Computing Research, "ASCEND: Applied mathematics and Scientific Computing Ecosystem for the New Digital era", $30M, 2024-2027.
- **Sandia Principal Investigator.** National Nuclear Security Administration (NNSA) Minority Serving Institutions Partnership Program (MSIPP), "Consortium for Workforce & Research Infrastructure Development in Engineering Relevant to NSE", $1.75K, 2024-2029.
- **Sandia Principal Investigator.** Department of Energy (DOE) Office of Science (SC) Advanced Scientific Computing Research (ASCR), "Optimal learning of data-driven models for optimization and uncertainty quantification of exascale simulations", $1.8M, 2024-2027.

SCIENTIFIC LEADERSHIP AND PROFESSIONAL SERVICE

- Invited review Panelist for National Defense Science & Engineering Graduate (NDSEG) Fellowship (2014).
- Conference organizer/scientific committee member for 8 conferences (ICCS 2015, SIAM GS 2017, ESCO 2018, ESCO 2020, PASC 2021, ESCO 2022, ESCO 2024, MORe 2024).
- Invited selection committee member for Sandia National Laboratories' prestigious John von Neumann Fellowship in Computational Science (2018—present).
- Invited member of judging panel for student paper/poster competition at the World Congress on Computational Mechanics (WCCM) 2018.
- Invited member of SIAM Geosciences Prize committee (2019).
- By invitation, served "Opponent" role in Ph.D. thesis defense at Uppsala University (2019).
- Reviewer/judge for 2020 Society of Women Engineers (SWE) 2020 Freshman Scholarship.
- Invited member of scientific advisory board for 6-month program to be held at the Isaac Newton Institute entitled "The Mathematical & Statistical Foundation of Future Data-Driven Engineering" (2020).
- Invited panel member for AIAA SciTech 2021 technical panel entitled "Data-Driven Modeling for Complex Fluid Physics".
- Organizer of ~40 conference minisymposia worldwide (SIAM CS&E 2015, ICCS 2015, ICIAM 2015, SIAM UQ 2016, SIAM MPE 2016, SIAM CS&E 2017, FEF 2017, SIAM Geosciences 2017, ESCO 2018, WCCM 2018, SIAM CS&E 2019, ICIAM 2019, ESCO 2020, SIAM AN 2020, SIAM CSE 2021, PASC 2021, SIAM GS 2021, SIAM UQ 2022, ESCO 2022, SIAM MPE 2022, WCCM 2022, SIAM CS&E 2023, CFC 2023, COUPLED 2023, SIAM GS 2023, USNCCM 2023, SIAM UQ 2024, ECCOMAS 2024, ESCO 2024, WCCM 2024, JMM 2025) and ~10 workshops (including Banff International Research Station, Isaac Newton Institute, Institute for Mathematical & Statistical Innovation).
- Directly supervised 14 postdocs (including 2 John von Neumann Fellows) and 16 students (including from Stanford and Caltech), many of whom are currently staff scientists at Sandia.
- Reviewer for 16 journals (including *Int. J. Numer. Meth. Fluids, Int. J. Numer. Meth. Engng., J. Comput. Phys., J. Comput. Appl. Math., AIAA J., J. Fluid Mechanics, Comput. Meth. Appl. Mech. Engng., J. Geoscientific Model Dev., Nature Climate Change, J. Sci. Comput, SISC, Comp. Mech., Proc. R. Soc. A*).

- Book reviewer for World Scientific Publishing Company.
- Creator of Albany Land Ice (ALI) model, currently the land-ice component of the Department of Energy's Energy Exascale Earth System Model (E3SM).
- Proposal reviewer for the Platform for Advanced Computing (PASC) and Sandia National Laboratories' LDRD program.
- Co-organizer of breakout session entitled "Coastal dynamics, Ocean and Ice" at the Artificial Intelligence for Earth System Predictability (AI4ESP) workshop series sponsored by the DOE's Office of Biological and Environmental Research (BER).
- Selection committee chair for 2022 SIAG/MPE Prize and SIAG/MPE Early Career Prize.
- Associate Editor of IEEE's Computing in Science & Engineering (CiSE) Technical Magazine (by nomination).
- Guest editor for special issue of the Journal of Computational & Applied Mathematics (JCAM) devoted to contributions from the European Seminar on COmputing (ESCO) 2022.
- Society for Industrial and Applied Mathematics (SIAM) Geosciences Activity Group Secretary for the 2023-2025 term (by nomination and SIAM general election).
- SIAM Mathematics of Planet Earth (MPE) Activity Group Vice Chair for the 2023-2025 term (by nomination and SIAM general election).
- Reviewer of student presentations at the at 22nd IACM ComputationL Fluids Conference (CFC) 2023, Cannes, France. April 25-28, 2023.
- Founding member and chair of U.S. Association for Computational Mechanics (USACM) Energy and Earth Systems Technical Thrust Area for 2023-2026 term.
- Co-editor of several special issues of Computing in Science & Engineering (CiSE): Special Issue on the Future of Research Software Engineers in the United States—Part I (Volume 24, Issue 5), Special Issue on the Future of Research Software Engineers in the United States—Part II (Volume 24, Issue 6), Special Issue on Computational Modeling of Ice Sheets and Glaciers (Volume 25, Issue 3).
- Editorial Board Member for the International Journal for Numerical Methods in Engineering.
- Reviewer for AI4DifferentialEquations In Science International Conference on Learning Representations (ICLR) 2024 Workshop.
- Ph.D. dissertation defense committee member for Giulia Sambataro (University of Bordeaux/INRIA) and Joshua Barnett (Stanford University).
- Invited member of the Industrial Advisory Board (IAB) for the Mechanical Engineering Department at Texas A&M Kingsville.

IN-THE-NEWS: FEATURE ARTICLES AND NEWS RELEASES

- "Rapid development of an ice sheet climate application using the components-based approach", *2015 Sandia National Laboratories HPC Annual Report*.
- "Ice sheet modeling of Greenland, Antarctica helps predict sea-level rise", *Sandia Lab News/Sandia Press Release,* Feb. 5, 2016. The article was picked up by the following sources: Space Daily, PhysOrg, Scientific Computing, Eurasia Review, One News Page, Science Codex, Environmental News Network, Observatorio del Plastico, and the National Nuclear Security Administration (NNSA).
- "Addressing Challenges in Reduced-Order Modeling", *SIAM News,* Mar. 1, 2016.
- "NNSA's work and missions help save the earth", *NNSA Highlight*, Apr. 18, 2016.
- "Forecasting, not fearing, sea-level rise", *Clean Technica*, Apr. 28, 2016.
- "Improving ice sheet models through algebraic multigrid methods", *SIAM News*, Oct. 6, 2016.

- Land-Ice modeling performed under the PISCEES project featured in the "Climate" section of the *2017 Sandia National Laboratories' Labs Accomplishment Report.*
- "How to Fit a Planet Inside a Computer: Developing the Energy Exascale Earth System Model", *DOE Office of Science Highlight*, July 12, 2018.
- "Concurrent multiscale coupling in solid mechanics", *2017 Sandia National Laboratories HPC Annual Report.*
- "Simulating Ice at the Bottom of the World: Modeling the Antarctic Ice Sheets", *DOE Office of Science Highlight*, June 12, 2019.
- "President Donald J. Trump Announced Recipients of the Presidential Early Career Award for Scientists and Engineers", *White House Press Release*, July 3, 2019. Additional press releases subsequently issued by the NNSA, Sandia Lab News, SNL's Center 8000, the ABQ journal, the Livermore Independent News, and the Secretary of Energy Rick Perry.
- "Getting to the nuts and bolts of the nuts and bolts", *Sandia Lab News/Sandia Press Release,* Aug. 29, 2019.
- "Sandia in the Arctic: The Arctic Science and Security Initiative Report 2016-2019", Sept. 2019.
- "From Moscow to Livermore: A Sandia Computer Scientist Tells of Her Compelling Journey", *Livermore Independent News,* Oct. 3, 2019.
- "Congressman Swallwell visits Sandia/California", *Sandia Lab News/Sandia Press Release,* Nov. 21, 2019.
- LDRD-funded work highlighted in Sandia's FY19 LDRD Annual Report.
- "Advancing the field of reduced-order modeling" and "Pressio: an HPC library to enable reduced-order modeling", *2020 Sandia National Laboratories HPC Annual Report.*
- The following Nature paper that came out on projected land ice contributions to twenty-first century sea level rise, made using land-ice models which include the MALI model I help to develop under the ProSPect project. The main takeaway is that sea level rise from the melting of polar ice sheets could be halved by 2100 if we meet the Paris Agreement target of limiting global warming to 1.5 degrees C. There are several general audience articles and news releases that discuss the results in the paper (King's College of London News Centre, LANL News Release, NERSC Science News, The New York Times and The Washington Post). May 5, 2021.
- "Scientists Recommend a Multidisciplinary Approach to Predicting Outbreaks", published in a special issue of One Health/One Planet, May 2022.
- "Large-scale PDE-constrained Optimization for Ice Sheet Model Initialization", *SIAM News*, June 1, 2022.
- "New center will develop the mathematical and computational foundations of digital twins for complex energy systems", *UT Austin Oden Institite News*, September 26, 2022.
- "UTEP Receives $1.25M Grant from DOE to Produce Pipeline of Scientists and Engineers: Project Will Focus on Recruiting and Training Scientists and Engineers from Under-represented Groups", *University of El Paso (UTEP) News*, February 6, 2023.
- "Lab mentor program engages minority students, aims to attract STEM hires", *Sandia Lab News/ Sandia Press Release*, August 11, 2023.
- "An innovative HPC approach for modeling Arctic permafrost degradation and coastal erosion", one of 12 articles featured in *2023 Sandia National Laboratories HPC Annual Report.*

RESEARCH ADVISING AND MENTORING

Postdoctoral Researchers:

1. *Jeff Fike* (9/2014-9/2016), Ph.D. from Stanford University, currently staff scientist at SNL in the Aerosciences Department.
    - Project: projection-based reduced order models for compressible flow.
2. *Payton Lindsay* (8/2017-4/2018), Ph.D. from Purdue University, currently staff scientist at SNL in the Computational Solid Mechanics & Structural Dynamics Department.
    - Project: projection-based reduced order models for solid mechanics; preconditioned Least Squares Petrov-Galerkin (LSPG) reduced order models.
3. *Jerry Watkins* (1/2018-11/2018), Ph.D. from Stanford University, currently staff scientist at SNL in the Quantitative Modeling & Analysis Department.
    - Project: performance portability of the Albany Land Ice (ALI) model/code to advanced architectures using the Kokkos library and programming model.
4. *Irina Demeshko* (8/2013-1/2016), Ph.D. from Tokyo Institute of Technology, currently Senior Software Engineer at NVIDIA.
    - Project: performance portability of the Albany code base to advanced architectures using the Kokkos library and programming model.
5. *Kookjin Lee* (8/2019-3/2021)*:* Ph.D. from University of Maryland, currently Assistant Professor at Arizona State University.
    - Project: model reduction on nonlinear manifolds using deep convolutional autoencoders.
6. *Eric Parish* (8/2019-6/2020, John von Neumann Postdoctoral Fellow)*:* Ph.D. from University of Michigan, currently staff scientist at SNL in the Extreme Scale Data Science & Analytics Department.
    - Project: windowed least-squares model reduction for dynamical systems; residual-based stabilized reduced order models constructing using discrete and continuous projection
7. *Chad Sockwell* (10/2021-12/2021), Ph.D. from Florida State University, became staff scientist at SNL 1/2022 in the Computational Mathematics Department (deceased as of 4/2022).
    - Project: flexible heterogeneous numerical methods for coupling conventional and data-driven models.
8. *Yukiko Shimizu* (8/2019-7/2022), Ph.D. from University of Michigan.
    - Project: windowed least-squared reduced order models; alternating Schwarz-based coupling of conventional and data-driven models.
9. *Graham Harper* (10/2021-9/2023), Ph.D. from Colorado State University, currently staff scientist at SNL in the Computational Mathematics Department.
    - Project: establishing connective source-impact relationships in Earth's climate using novel profiling techniques involving the Energy Exascale Earth System Model (E3SM).
10. *Daria Koliesnikova* (5/2022-8/2023), Ph.D. from CEA Aix-Marseille Université, currently post doctoral fellow at SNL in the Mechanics of Materials Department.
    - Project: developing the Schwarz alternating method for multi-scale mechanical contact simulations.
11. *Hunter Brown* (10/2021-present), Ph.D. from Texas A&M University, currently post doctoral fellow at SNL in the Atmospheric Sciences Department.
    - Project: establishing connective source-impact relationships in Earth's climate using novel simulation strategies of Stratospheric Aerosol Injection (SAI).
12. *Max Carlson* (9/2022-present), Ph.D. from University of Utah, currently post doctoral fellow at SNL in the Quantitative Modeling & Software Engineering Department
    - Projects: performance portability of the Albany Land Ice (ALI) model using the Kokkos library and programming model; discovery of climate source-impact pathways using anomaly detection and clustering methods.

13. *Anthony Gruber* (9/2022-present), Ph.D. from Texas Tech University, currently John von Neumann Postdoctoral Fellow at SNL in the Computational Mathematics Department
    - Project: learning operators for structure-informed surrogate models.
14. *Chris Wentland* (2/2023-present), Ph.D. from University of Michigan, currently post doctoral fellow at SNL in the Quantitative Modeling & Software Engineering Department
    - Projects: developing the Schwarz alternating method as a means for coupling of conventional and data-driven models; developing novel methods for climate attribution.
15. *Elyce Bayat* (1/2024-present), Ph.D. from University of California at Santa Barbara, currently post doctoral fellow at SNL in the Climate Systems Department
    - Projects: development and calibration of the Arctic Costal Erosion (ACE) model.

Graduate Student Interns:

1. *Jeff Fike* (6/2013-9/2013), Ph.D. from Stanford University, currently staff scientist at SNL in the Aerosciences Department.
    - Project: energy-stable reduced order models for compressible flow.
2. *Syuzanna Sargsyan* (6/2015-8/2015), Ph.D. from University of Washington, currently at HERE Technologies.
    - Project: structure-preserving LSPG model reduction.
3. *Jerry Watkins* (6/2016-1/2018), Ph.D. from Stanford University, currently staff scientist at SNL in the Quantitative Modeling & Analysis Department.
    - Project: performance portability of the Aeras atmosphere model using the Kokkos library and programming model.
4. *Nicolas Morales* (5/2016-8/2016), Ph.D. from University of North Carolina, current limited term employee at SNL in the Scalable Modeling & Analysis Department.
    - Project: performance portability of the Albany/LCM solid mechanics code to next-generation architectures using the Kokkos library and programming model.
5. *Danielle Maddix Robinson* (6/2017-9/2017), Ph.D. from Stanford University, currently at AWS Deep Learning.
    - Project: structure-preserving LSPG model reduction.
6. *Greg Phlipot* (06/2018-09/2018), Ph.D. from California Institute of Technology, currently at Johns Hopkins Applied Physics Laboratory.
    - Project: the Schwarz alternating method for concurrent multi-scale coupling in dynamic solid mechanics.
7. *Xiaoshu Zeng* (06/2018-09/2018), Ph.D. student at University of Southern California.
    - Project: uncertainty quantification for tsunami models.
8. *Zhiheng Wang* (06/2018-09/2018), Ph.D. student at University of Southern California.
    - Project: uncertainty quantification for tsunami models.
9. *Kyle Shen* (1/2020-3/2020), M.S. from Stanford University, currently at Micron Technology.
    - Project: automated performance tracking using changepoint detection algorithms.
10. *Carolyn Kao* (3/2020-6/2020), M.A. student at Stanford University, currently at TSMC.
    - Project: automated parameter tuning for land ice simulations.
11. *Jonathan Hoy* (6/2021-8/2021), Ph.D. student at University of Southern California.
    - Project: developing the Schwarz alternating method for multi-scale mechanical contact simulations.

12. *Max Carlson* (6/2020-8/2022), Ph.D. student at University of Utah, currently post doctoral researcher at Sandia National Laboratories.
    - Project: performance portability of the Albany Land Ice (ALI) model using the Kokkos library and programming model; in-situ anomaly detection.
13. *Joshua Barnett* (6/2022-3/2024), Ph.D. student at Stanford University, currently at Cadence Design Systems.
    - Project: coupling of conventional and data-driven models using the Schwarz alternating method.
14. *Will Snyder* (5/2023-8/2023), Ph.D. student at Virginia Tech
    - Project: coupling of conventional models and physics-informed neural networks (PINNs) using the Schwarz alternating method.
15. *Jinny Chung, Peter Krenek, Siqi Ma* (9/2023-12/2023), M.S. students at Stanford University.
    - Project: coupling and optimal parameter tuning for PINN-PINN coupling using the overlapping and non-overlapping Schwarz alternating method.
16. *Jake Nichol* (10/2020-present), Ph.D. student at University of New Mexico
    - Project: identifying source-impact pathways in climate models using random forest regression and causal modeling.
17. *Amy de Castro* (10/2021-present), Ph.D. student at Clemson University
    - Project: developing novel methods for coupling conventional and data-driven models.
18. *Rafael Calleros Delgato* (05/2024-present), M.S. student at New Mexico State University.
    - Project: research, development and implementation of modern performance anslysis/tuning tools towards the monitoring of high-resolution simulations of Earth's polar ice sheets on large supercomputers.
19. *Ian Moore* (05/2024-present), Ph.D. student at Virginia Tech
    - Project: advancing the Schwarz alternating method as a means to couple together subdomain-local operator inference (OpInf) reduced order models with each other and with subdomain-local high-fidelity models.
20. *Arjun Vijaywargiya* (06/2024-present), Ph.D. student at University of Notre Dame
    - Project: developing an approach for generating parametric operator inference (OpInf) reduced order models.

PEER-REVIEWED PUBLICATIONS

1. M.F. Barone, **I. Kalashnikova**, D.J. Segalman, H. Thornquist. "Stable Galerkin Reduced Order Models for Linearized Compressible Flow". *J. Comput. Phys.* 288 1932-1946, 2009. https://doi.org/10.1016/j.jcp.2008.11.015
2. **I. Kalashnikova**, C. Farhat, R. Tezaur. "A Discontinuous Enrichment Method for the Solution of Advection-Diffusion Problems in High Peclet Number Regimes". *Fin. El. Anal. Des.* 45 238-250, 2009. https://doi.org/10.1002/nme.2706
3. C. Farhat, **I. Kalashnikova**, R. Tezaur. "A Higher-Order Discontinuous Enrichment Method for the Solution of High Peclet Advection-Diffusion Problems on Unstructured Meshes". *Int. J. Numer. Meth. Engng.* 81 604-636, 2010. https://doi.org/10.1002/nme.2706
4. **I. Kalashnikova**, M.F. Barone. "On the Stability and Convergence of a Galerkin Reduced Order Model (ROM) of Compressible Flow with Solid Wall and Far-Field Boundary Treatment". *Int. J. Numer. Meth. Engng.* 83 1345-1375, 2010. https://doi.org/10.1002/nme.2867

5. **I. Kalashnikova**, R. Tezaur, C. Farhat. "A Discontinuous Enrichment Method for Variable Coefficient Advection-Diffusion at High Peclet Number". *Int. J. Numer. Meth. Engng.* 87 309-335, 2010. https://doi.org/10.1002/nme.3058
6. **I. Kalashnikova**, M.F. Barone. "Efficient Non-Linear Proper Orthogonal Decomposition (POD)/Galerkin Reduced Order Models with Stable Penalty Enforcement of Boundary Conditions", *Int. J. Numer. Meth. Engng.* 90(11) 1337-1362, 2012. https://doi.org/10.1002/nme.3366
7. **I. Kalashnikova**, M.F. Barone, M.R. Brake. "A Stable Reduced Order Model for Coupled Fluid/Structure Interaction Problems", *Int. J. Numer. Meth. Engng.* 95(2) 121-144, 2013. https://doi.org/10.1002/nme.4499
8. R. Tezaur, **I. Kalashnikova**, C. Farhat. "Discontinuous Enrichment Method for Variable Wavenumber Medium-Frequency Helmholtz Problems". *Comput. Meth. Appl. Mech. Engng.* 268 126-140, 2014. https://doi.org/10.1016/j.cma.2013.08.017
9. **I. Kalashnikova**, B.G. van Bloemen Waanders, S. Arunajatesan, M.F. Barone. "Stabilization of Projection-Based Reduced Order Models for Linear Time-Invariant Systems via Optimization-Based Eigenvalue Reassignment". *Comput. Meth. Appl. Mech. Engng.* 272 251-270, 2014. https://doi.org/10.1016/j.cma.2014.01.011
10. **I. Kalashnikova**, M.F. Barone, S. Arunajatesan, B.G. van Bloemen Waanders. "Construction of Energy-Stable Projection-Based Reduced Order Models". *Appl. Math. Computat.* 249 569-596, 2014. https://doi.org/10.1016/j.amc.2014.10.073
11. **I. Tezaur**, M. Perego, A. Salinger, R. Tuminaro, S. Price. "*Albany/FELIX*: A Parallel, Scalable and Robust Finite Element Higher-Order Stokes Ice Sheet Solver Built for Advanced Analysis", *Geosci. Model Develop.* 8 1-24, 2015. https://doi.org/10.5194/gmd-8-1197-2015
12. **I. Tezaur**, R. Tuminaro, M. Perego, A. Salinger, S. Price. "On the scalability of the *Albany/FELIX* first-order Stokes approximation ice sheet solver for large-scale simulations of the Greenland and Antarctic ice sheets", *Procedia Computer Science,* 51 2026-2035, 2015. https://doi.org/10.1016/j.procs.2015.05.467
13. M. Balajewicz, **I. Tezaur**, E. Dowell. "Minimal subspace rotation on the Stiefel manifold for stabilization and enhancement of projection-based reduced order models for the compressible Navier-Stokes equations", *J. Comput. Phys.* 321 224-241, 2016. https://doi.org/10.1016/j.jcp.2016.05.037
14. R. Tuminaro, M. Perego, **I. Tezaur**, A. Salinger, S. Price. "A matrix dependent/algebraic multigrid approach for extruded meshes with applications to ice sheet modeling", *SIAM J. Sci. Comput.* 38(5) C504-C532, 2016. https://doi.org/10.1137/15M1040839
15. A. Salinger, R. Bartlett, A. Bradley, Q. Chen, I. Demeshko, X. Gao, G. Hansen, A. Mota, R. Muller, E. Nielsen, J. Ostien, R. Pawlowski, M. Perego, E. Phipps, W. Sun, **I. Tezaur**. "Albany: Using Agile Components to Develop a Flexible, Generic Multiphysics Analysis Code", *Int. J. Multiscale Comput. Engng* 14(4) 415-438, 2016. https://doi.org/10.1615/IntJMultCompEng.2016017040
16. S. Price, M. Hoffman, J. Bonin, T. Neumann, I. Howat, J. Guerber, **I. Tezaur**, J. Saba, J. Lanaerts, D. Chambers, W. Lipscomb, M. Perego, A. Salinger, R. Tuminaro. "An ice sheet model validation framework for the Greenland ice sheet", *Geosci. Model Dev.* 10 255-270, 2017. https://doi.org/10.5194/gmd-10-255-2017
17. A. Mota, **I. Tezaur**, C. Alleman. "The Schwarz alternating method in solid mechanics", *Comput. Meth. Appl. Mech. Engng.* 319, 19-51, 2017. https://doi.org/10.1016/j.cma.2017.02.006
18. M. Salloum, N. Fabian, D. Hensinger, J. Lee, E. Allendorf, A. Bhagatwala, M. Blaylock, J. Chen, J. Templeton, **I. Tezaur**. "Optimal Compressed Sensing and Reconstruction of Unstructured Mesh Datasets", *Data Sci. & Engng.* 1-23, 2017. https://doi.org/10.1007/s41019-017-0042-4
19. I. Demeshko, J. Watkins, **I. Tezaur**, O. Guba, W. Spotz, A. Salinger, R. Pawlowski, M. Heroux. "Towards performance-portability of the Albany finite element analysis code using the Kokkos library", *J. HPC Appl.* 1-23, 2018. https://doi.org/10.1177/1094342017749957

20. M. Hoffman, M. Perego, S. Price, W. Lipscomb, T. Zhang, D. Jacobsen, **I. Tezaur**, A. Salinger, R. Tuminaro, L. Bertagna, "MPAS-Albany Land Ice (MALI): A variable resolution ice sheet model for Earth system modeling using Voronoi grid", *Geosci. Model Develop* 11 3747-3780, 2018. https://doi.org/10.5194/gmd-11-3747-2018
21. K. Evans, J. Kennedy, D. Lu, M. Forrester, S. Price, J. Fyke, A. Bennett, M. Hoffman, **I. Tezaur**, C. Zender, M. Vizcaino. "LIVVkit 2.1: Automated and extensible ice sheet model validation", *Geosci. Model Develop* 12 1067-1086, 2019. https://doi.org/10.5194/gmd-12-1067-2019
22. L. Bertagna, M. Deakin, O. Guba, D. Sunderland, A. Bradley, **I. Tezaur**, M. Taylor, A. Salinger. "A Performance Portable Atmospheric Dynamical Core for the Energy Exascale Earth System Model", *Geosci. Model Develop*. 12 1423-1441, 2019. https://doi.org/10.5194/gmd-12-1423-2019
23. J. Watkins, **I. Tezaur**, I. Demeshko. "A study on the performance portability of the finite element assembly process within the Albany land ice solver", E. van Brummelen, A. Corsini, S. Perotto, G. Rozza, eds. *Numerical Methods for Flows: FEF 2017 Selected Contributions*, Elsevier, 2019. https://www.springer.com/gp/book/9783030307042.
24. J. Frederick, A. Mota, **I. Tezaur**, D. Bull. "A thermo-mechanical terrestrial model of Arctic coastal erosion", *J. Comput. Appl. Math.* 397 113533, 2021. https://www.sciencedirect.com/science/article/pii/S0377042721001527?via%3Dihub
25. A. Mota, **I. Tezaur**, G. Phlipot. "The Schwarz alternating method for dynamic solid mechanics", *Int. J. Numer. Meth. Engng*. 123 (21) 5036-5071, 2022. https://doi.org/10.1002/nme.6982
26. P. Lindsay, J. Fike, **I. Tezaur**, K. Carlberg "Preconditioned Least-Squares Petrov-Galerkin Reduced Order Models", *Int. J. Numer. Meth. Engng.* 123 (20) 4809-4843, 2022. https://doi.org/10.1002/nme.7056
27. **I. Tezaur**, K. Peterson, A. Powell, J. Jakeman, E. Roesler. "Global sensitivity analysis using the ultra-low resolution Energy Exascale Earth System Model", Journal of Advances in Modeling Earth Systems, 14, e2021MS002831, 2022. https://doi.org/10.1029/2021MS002831
28. T. Shead, **I. Tezaur**, W. Davis, M. Carlson, D. Dunlavy, E. Parish, P. Blonigan, J. Tencer, F. Rizzi, H. Kolla. "A novel *in situ* machine learning framework for intelligent data capture and event detection", in *Machine Learning and Its Application to Reacting Flows,* N. Swaminathan and A. Parente, eds., 53-87, 2023. https://link.springer.com/book/10.1007/978-3-031-16248-0
29. A. de Castro, P. Kuberry, **I. Tezaur**, P. Bochev. "A Novel Partitioned Approach for Reduced Order Model - Finite Element Model (ROM-FEM) and ROM-ROM Coupling", *Proceedings of the ASCE Earth and Space 18th Biennial International Conference,* 475-489, 2023. https://ascelibrary.org/doi/abs/10.1061/9780784484470.044
30. M. Carlson, J. Watkins, **I. Tezaur**. "Automatic performance tuning for MPAS-Albany Land Ice", *J. Comput. Appl. Math.* 115222, 2023. https://doi.org/10.1016/j.cam.2023.115222
31. J. Niederhaus, S. Bova, J. Carpenter, K. Cochrane, M. Crockatt, W. Dong, T. Fuller, B. Granzow, D. Ibanez, S. Kennon, C. Luchini, R. Moral, C. O'Brien, M. Powell, A. Robinson, A. Rodriguez, J. Sanchez, A. Scott, C. Siefert, A. Stagg, **I. Tezaur**, T. Voth. "ALEGRA: Finite Element Modeling for Shock Hydrodynamics and MultiPhysics", *Int. J. Impact Engng.* 180 104693, 2023. https://doi.org/10.1016/j.ijimpeng.2023.104693
32. J. Watkins, M. Carlson, K. Shan, **I. Tezaur**, M. Perego, L. Bertagna, C. Kao, M. Hoffman, S. Price. "Performance portable ice sheet modeling with MPAS-Albany Land Ice", *Int. J. HPC Appl., 37*(5), 600-625, 2023. https://doi.org/10.1177/10943420231183688
33. A Gruber, **I. Tezaur.** "Canonical and noncanonical Hamiltonian operator inference", *Comput. Meth. Appl. Mech. Engng.* 416, 116334, 2023. https://doi.org/10.1016/j.cma.2023.116334
34. A. de Castro, P. Bochev, P. Kuberry, **I. Tezaur**. "Explicit synchronous partitioned scheme for coupled reduced order models based on composite reduced bases", *Comput. Meth. Appl. Mech. Engng.* 417B 116398, 2023. https://doi.org/10.1016/j.cma.2023.116398

MANUSCRIPTS IN PRESS

MANUSCRIPTS UNDER REVIEW

1. E. Parish, M. Yano, **I. Tezaur**, T. Iliescu. "Residual-based stabilized reduced-order models of transient partial differential equations obtained through discrete and continuous projection", submitted to *Comput. Meth. Appl. Mech. Engng*. https://arxiv.org/abs/2302.09355
2. A. Mota, D. Koliesnikova, **I. Tezaur**, J. Hoy. "A Fundamentally New Coupled Approach to Contact Mechanics via the Dirichlet-Neumann Schwarz Alternating Method", submitted to *Int. J. Numer. Meth. Engng.* https://arxiv.org/abs/2311.05643
3. A. Gruber, **I. Tezaur**. "Variationally consistent Hamiltonian reduced order models", submitted to *SIAM J. Appl. Dyn. Systems*. https://arxiv.org/abs/2404.15315

MANUSCRIPTS IN PREPARATION

1. C. Wentland, **I. Tezaur**, J. Barnett, F. Rizzi. "An alternating Schwarz-based plug-and-play framework for the coupling of subdomain-local reduced order models and/or full order models,", in preparation.
2. L. Bertagna, G. Harper, A. Steyer, J. Watkins, **I. Tezaur,** D. Bull. "In-situ space-time analysis of pathways activated by stratospheric aerosol injection in an idealized atmosphere", in preparation.
3. J. Frederick, D. Bull, A. Mota, **I. Tezaur**, B. Jones, E. Bristol, C. Choens, C. Flanary, C. Jones, M. Jones, M. Thomas. "The Arctic Coastal Erosion Model: Calibration and Validation at Drew Point, Alaska", in preparation.
4. E. Parish, **I. Tezaur**, P. Blonigan. "Reduced-order modeling of hyperbolic systems using an entropy-stable hyper-reduction approach", in preparation.
5. E. Parish, **I. Tezaur**, A. Gruber. "Structure-preserving operator inference of hyperbolic systems discretized in entropy variables", in preparation.

CONFERENCE AND PROCEEDINGS PAPERS

1. M.F. Barone, D.J. Segalman, H. Thornquist, **I. Kalashnikova**. "Galerkin Reduced Order Models for Compressible Flow with Structural Interaction". *AIAA-2008-0612 , 46th AIAA Aerospace Science Meeting and Exhibit*, Reno, NV, 2008. https://doi.org/10.2514/6.2008-612
2. **I. Kalashnikova**, M.F. Barone. "Stable and Efficient Galerkin Reduced Order Models for Non-Linear Fluid Flow", *AIAA-2011-3110, 6th AIAA Theoretical Fluid Mechanics Conference*, Honolulu, HI, 2011. https://doi.org/10.2514/6.2011-3110
3. **I. Kalashnikova**, S. Arunajatesan. "A Stable Galerkin Reduced Order Model (ROM) for Compressible Flow", *WCCM-2012-18407, 10th World Congress on Computational Mechanics (WCCM)*, Sao Paulo, Brazil, 2012.
4. H. Waisman, J. Bassis, S. Price, R. Tuminaro, **I. Tezaur**. "A physics-based iceberg calving model coupled with a global ice-sheet flow model for accurate assessment of sea level rise", *Advancing X-cutting Ideas for Computational Climate Science (AXICCS) 2016*, Rockville, MD, 2016.

5. A. Salinger, **I. Tezaur**, M. Perego, and the Albany and Trilinos development teams. "Component-Based Application Code Development, Part 1: The Agile Components Strategy and Albany Code", *Advancing X-cutting Ideas for Computational Climate Science (AXICCS),* Rockville, MD, 2016.
6. **I. Tezaur**, A. Salinger, M. Perego, R. Tuminaro. "Component-Based Application Code Development, Part 2: Demonstration on a Land-Ice Model and Proposed Extension to Other Climate Components", *Advancing X-cutting Ideas for Computational Climate Science (AXICCS) 2016*, Rockville, MD, 2016.
7. M. Carlson, J. Watkins, **I. Tezaur**. "Improvements to the performance portability of boundary conditions in Albany Land Ice", in *Computer Science Research Institute Summer Proceedings 2020*, A.A. Rushdi and M.L. Parks, eds., Technical Report SAND2020-12580R, Sandia National Laboratories, 177-187, 2020. https://www.cs.sandia.gov/summerproceedings/CCR2020.html
8. J. Hoy, **I. Tezaur**, A. Mota. "The Schwarz alternating method for multiscale contact mechanics", in *Computer Science Research Institute Summer Proceedings 2021.* E. Galvan and D. Smith, eds., Technical Report SAND2021-9886C, Sandia National Laboratories, 2021. https://cfwebprod.sandia.gov/cfdocs/CompResearch/docs/proceedings/CSRI-2021-proceedings.pdf
9. J. Niederhaus, S. Bova, J. Carleton, K. Cochrane, M. Crockatt, W. Dong, T. Fuller, B. Branzow, D. Ibanez, S. Kennon, C. Luchini, R. Moral, C. O'Brien, M. Powell, A. Robinson, A. Rodriguez, J. Sanchez, A. Scott, C. Siefert, A. Stagg, **I. Tezaur**, T. Voth. "ALEGRA: Finite Element Modeling for Shock Hydrodynamics and Multiphysics", *Proceedings of the 2022 Hypervelocity Impact Symposium (HVIS 2022)*, Alexandria, VA, 2022.
10. J. Barnett, **I. Tezaur**, A. Mota. "The Schwarz alternating method for the seamless coupling of nonlinear reduced order models and full order models", in *Computer Science Research Institute Summer Proceedings 2022.* S. Seritan and J.D. Smith, eds., Technical Report SAND 2022-10280R, Sandia National Laboratories, 2022. https://www.sandia.gov/app/uploads/sites/210/2022/12/CSRI-2022-proceedings.pdf#page=39, https://arxiv.org/abs/2210.12551
11. A. de Castro, P. Kuberry, **I. Tezaur**, P. Bochev. "A synchronous partitioned scheme for coupled reduced order models based on separate reduced order bases for interface and interior variables", in *Computer Science Research Institute Summer Proceedings 2022.* S. Seritan and J.D. Smith, eds., Technical Report SAND 2022-10280R, Sandia National Laboratories, 2022. https://www.sandia.gov/app/uploads/sites/210/2022/12/CSRI-2022-proceedings.pdf#page=86
12. W. Snyder, **I. Tezaur**, C. Wentland. "Domain decomposition-based coupling of physics-informed neural networks via the Schwarz alternating method", *Computer Science Research Institute Summer Proceedings 2023*, S. Seritan and B. Reuter, eds., Technical Report SAND 2023-13916R, Sandia National Laboratories, 2023, pp 390-411. https://arxiv.org/abs/2311.00224

TECHNICAL REPORTS AND WHITE PAPERS

1. **I. Kalashnikova**. "Galerkin Reduced Order Model (ROM) for Compressible Flow: Enforcement of Boundary Conditions and Analysis of Coupled Fluid/Structure System". *Sandia National Laboratories Internal Memorandum, SAND No. 5255161*. Sandia National Laboratories, Albuquerque, NM, 2007.
2. **I. Kalashnikova**. "A Mathematical Analysis of the Well-Posedness, Stability and Convergence of a Galerkin Reduced Order Model (ROM) for Coupled Fluid/Structure Interaction Problems". *Sandia National Laboratories Internal Memorandum, SAND No. 2008-5799P*. Sandia National Laboratories, Albuquerque, NM, 2008.
3. **I. Kalashnikova**. "Stable and Efficient Galerkin Reduced Order Models (ROMs) with 'Best Points' Interpolation for Non-Linear Fluid Flow". *Sandia National Laboratories Internal Memorandum, SAND No. 2009-6125P*. Sandia National Laboratories, Albuquerque, NM, 2009.

4. **I. Kalashnikova** . "Well-Posed Eigenvalue and Boundary Value Problems for the "Split" Turbulent Velocity Fluctuation Equations of L.J. Dechant, and Numerical Methods for their Solution". *Sandia National Laboratories Internal Memorandum, SAND No. 2009-6783P*. Sandia National Laboratories, Albuquerque, NM, 2009.
5. M.F. Barone, **I. Kalashnikova**, M.R. Brake, D.J. Segalman. "Reduced Order Modeling of Fluid/Structure Interaction". *Sandia National Laboratories Report, SAND No. 2009-7189*. Sandia National Laboratories, Albuquerque, NM, 2009.
6. **I. Kalashnikova**. "Pressure Fluctuation Power Spectral Density (PSD) Model for Turbulent Boundary Layer". *Sandia National Laboratories Report, SAND No. PR*. Sandia National Laboratories, Albuquerque, NM, 2010.
7. **I. Kalashnikova**. "Preconditioner and Convergence Study for the Quantum Computer Aided Design (QCAD) Nonlinear Poisson Problem Posed on the Ottawa Flat 270 Design Geometry". *Sandia National Laboratories Report, SAND No. 2012-4460*. Sandia National Laboratories, Albuquerque, NM, 2012.
8. **I. Kalashnikova**. "ML Enhancements via the Calculation of Rigid Body Modes (RBMs) for Mechanics Problems Implemented within the Albany Code Base". *Sandia National Laboratories Report, SAND No. 2016-10753*. Sandia National Laboratories, Albuquerque, NM, 2012.
9. **I. Kalashnikova**, M.F. Barone, S. Arunajatesan, B.G. van Bloemen Waanders. "Construction of Energy-Stable Galerkin Reduced Order Models". *Sandia National Laboratories Report, SAND No. 2013-4063*. Sandia National Laboratories, Albuquerque, NM, 2013.
10. E. Nielsen, X. Gao, **I. Kalashnikova**, R. P. Muller, A. G. Salinger, R. W. Young. "QCAD Simulation and Optimization of Semiconductor Double Quantum Dots". *Sandia National Laboratories Report, SAND No. 2013-10575*. Sandia National Laboratories, Albuquerque, NM, 2013.
11. **I. Kalashnikova**, S. Arunajatesan, M.F. Barone, B.G. van Bloemen Waanders, J.A. Fike. "Reduced Order Modeling for Prediction and Control of Large-Scale Systems". *Sandia National Laboratories Report, SAND No. 2014-4693*. Sandia National Laboratories, Albuquerque, NM, 2014.
12. D. Bickel, P. Bochev, M. Boslough, D. Bull, L. Bynum, A. Doerry, A. Ellis, M. Lave, N. Miner, M. Perego, K. Peterson, A. Raynal, M. Slinkard, **I. Tezaur**, M. Thompson, B. Tise, J. Weiss. "Land and Sea Ice: Mapping and Prediction". White Paper, Sandia National Laboratories, Albuquerque, NM, 2016.
13. W. Spotz, P. Bosler, S. Bova, I. Demeshko, J. Fike, O. Guba, J. Overfelt, A. Salinger, T. Smith, **I. Tezaur**, J. Watkins. "The Aeras Next Generation Global Atmosphere Model". *Sandia Laboratories Report, Sand No. 2016-9802*. Sandia National Laboratories, Albuquerque, NM, 2016.
14. **I. Tezaur**, J. Fike, K. Carlberg, M. Balajewicz, M. Barone, E. Mussoni. "Model Reduction for Compressible Cavity Simulations Towards Uncertainty Quantification of Structural Loading". *Sandia Laboratories Report, Sand No. 2016-9463*. Sandia National Laboratories, Albuquerque, NM, 2016.
15. K. Peterson, D. Bull, **I. Tezaur**, M. Perego, J. Frederick, E. Roesler, R. Bambha, P. Bochev, P. Bosler, M. Boslough, L. Bynum, L. Dennis, D. Dexheimer, B. Hillman, A. Ilgen, M. Ivey, K. Klise, H. Knox, M. McChesney, H. Michelsen, M. Taylor. "Arctic Climate Science Roadmap". *Sandia Laboratories Report, Sand No. 2016-XXXX*. Sandia National Laboratories, Albuquerque, NM, 2016.
16. J. Watkins, **I. Tezaur**. "Performance Portability of the Aeras Atmosphere Model to Next Generation Architectures using Kokkos". *Sandia Laboratories Report, Sand No. 2016-10327*. Sandia National Laboratories, Albuquerque, NM, 2016.
17. Advancing Cross-Cutting Ideas for Computational Climate Science Workshop Report, September 12-13, 2016, Rockville, MD.
18. **I. Tezaur** , J. Fike, K. Carlberg, M. Barone, D. Maddix, E. Mussoni, M. Balajewicz. "Advanced Fluid Reduced Order Models for Compressible Flow". *Sandia Laboratories Report, Sand No. 2017-10335*. Sandia National Laboratories, Albuquerque, NM, 2017.
19. M. Salloum, N. Fabian, D. Hensinger, M. Khalil, J. Lee, K. Chowdhary, K. Johnson, J. Bishop, B. van Bloemen Waanders, J. Aytac, L. Peng, E. Allendorf, A. Bhagatwala, M. Blaylock, J. Chen, J. Templeton,

I. Tezaur, D. Dagel. "Compressed Sensing, Wavelets and Time series for Data Compression". *Sandia Laboratories Report, Sand No. 2017-10651*. Sandia National Laboratories, Albuquerque, NM, 2017.

20. C. Ober, R. Pawlowski, **I. Tezaur**, S. Conde, E. Cyr. "The Tempus Time-Integration Package". *Sandia Laboratories Report, Sand No. 2017-12233PE.* Sandia National Laboratories, Albuquerque, NM, 2017.
21. J. Fike, **I. Tezaur**, K. Carlberg, M. Barone. "Captive Carry Reduced Order Modeling", *Sandia Laboratories Report, Sand No. 2018-10824*. Sandia National Laboratories, Albuquerque, NM, 2018.
22. S. Bova, J. Carleton, B. Granzow, G. Hansen, E. Love, C. Luchini, J. Niederhaus, A. Robinson, J. Sanchez, T. Voth, R. Drake, R. Kramer, D. Labreche, B. Perschbacher, C. Siefert, M. Swan, **I. Tezaur**. "ALEGRA User Manual", *Sand No. 2019-0784*. Sandia National Laboratories, Albuquerque, NM, 2019.
23. K. Peterson, A. Powell, **I. Tezaur**, E. Roesler, J. Nichol, M. Peterson, W. Davis, D. Stracuzzi, D. Bull. "Arctic Tipping Points Triggering Global Change LDRD Final Report", *Sand No. 2020-9932.* Sandia National Laboratories, Albuquerque, NM, 2020.
24. D. Bull, C. Flanary, C. Jones, J. Frederick, A. Mota, **I. Tezaur**, J. Kasper, E. Brown, B. Jones, M. Jones, E. Bristol, C. Choens, C. Connoly, J. McClelland. "Arctic Coastal Erosion: Modeling and Experimentation". *Sand No. 2020-10223*. Sandia National Laboratories, Albuquerque, NM, 2020.
25. A. Powell, **I. Tezaur**, W. Davis, K. Peterson, S. Rempe, C. Smallwood, E. Roelser. "Predicting Future Disease Burden in a Rapidly Changing Climate". *Sand No. 2020-10322.* Sandia National Laboratories, Albuquerque, NM, 2020.
26. D. Bull, L. Swiler, K. Peterson, **I. Tezaur**, L. Shand, W. Davis, B. Wagman, M. Peterson, E. Roesler. "Climate Intervention Assessment and Attribution". *Sand No. 2021-1590O. White Paper Submitted to DOE's BER Earth and Environmental Science Division (EESSD) to Advance Artificial Intelligence Framework for Earth System Predictability (AI4ESP)*, Feb. 2021.
27. A. Powell, E. Acquesta, W. Davis, J. Nichol**, I. Tezaur**, K. Peterson, S. Rempe, G. Huerta. "Water Cycle-Driven Infectious Diseases as Multiscale, Reliable, Continuously Updating Water Cycle Sensors". *Sand No. 2021-1667O. White Paper Submitted to DOE's BER Earth and Environmental Science Dicision (EESSD) to Advance Artificial Intelligence Framework for Earth System Predictability (AI4ESP),* Feb. 2021.

INVITED (ALL EXPENSES PAID) TALKS AND SEMINARS

1. **I. Kalashnikova**. "A Discontinuous Enrichment Method for the Solution of the Advection-Diffusion Equation". *Robert J. Melosh Medal Competition for the Best Student Paper on Finite Element Analysis*, Department of Civil and Environmental Engineering, Duke University, Durham, NC, April 25, 2008.
2. **I. Kalashnikova**, R. Tezaur, C. Farhat. "The Discontinuous Enrichment Method for Advection-Dominated Transport Phenomena in Computational Fluid Dynamics". *10th Bay Area Scientific Computing Day (BASCD 2011)*, Institute for Computational & Mathematical Engineering, Stanford University, Stanford, CA, May 8, 2011.
3. **I. Tezaur**. "Computational Methods in Ice Sheet Modeling for Next-Generation Climate Simulations", *Civil and Environmental Engineering Seminar*, Duke University, Durham, NC, November 16, 2015.
4. **I. Tezaur**, M. Barone, J. Fike, M. Balajewicz, S. Arunajatesan, B. van Bloemen Waanders, E. Dowell. "Approaches for building stable projection-based reduced order models for compressible flow", *Virginia Tech Mathematics Department Colloquium*, Blacksburg, VA, May 1, 2017.
5. **I. Tezaur**. "Next-generation modeling and simulation of large-scale ice sheets towards probabilistic sea-level change projections", *University of Michigan Institute for Computational Discovery and Engineering (MICDE) Seminar*, Ann Arbor, MI, Oct. 25, 2017.
6. **I. Tezaur,** M. Barone, J. Fike, M. Balajewicz, S. Arunajatesan, B. van Bloemen Waanders, E. Dowell. " Stability-preserving projection-based model order reduction for compressible flows", *University of*

California Berkeley / Lawrence Berkeley Laboratory Applied Mathematics Seminar, Berkeley, CA, Dec. 6, 2017.

7. **I. Tezaur.** "Albany Land-Ice (ALI): A Next-Generation Variable-Resolution Ice Sheet Model Towards Probabilistic Projections of Sea-Level Change", *Scientific Computing Seminar*, Uppsala University, Uppsala, Sweden. Oct. 17, 2019.
8. **I. Tezaur**, A. Mota, C. Alleman, G. Phlipot. "Concurrent multiscale coupling in solid mechanics using the Schwarz alternating method". *2020 Pacific Northwest Numerical Analysis Seminar (PNWNAS)*, Online Meeting, Oct. 17, 2020.
9. A. Mota, **I. Tezaur**, C. Alleman, G. Phlipot. "The Schwarz alternating method as a means for concurrent multiscale coupling in solid mechanics". *Seminar*, Lawrence Livermore National Laboratory, Livermore, CA. Jan. 7, 2020.
10. **I. Tezaur.** Computational Methods in Ice Sheet Modeling for Next-Generation Climate Simulations. *Computational & Mathematical Engineering (CME) 500 Seminar: Computational Math in Industry and Beyond*, Stanford University, Stanford, CA. Feb. 22, 2021.
11. **I. Tezaur.** Computational Methods in Ice Sheet Modeling for Next-Generation Climate Simulations. *Aerospace and Mechanical Engineering Seminar*, College of Engineering, University of Notre Dame, Notre Dame, Indiana. Feb. 23, 2021.
12. **I. Tezaur**. My Career as a Computational Scientist at Sandia National Labs. *STEM Career Seminar*, School of Science at Casper College, Casper, Wyoming. Apr. 15 2021
13. J. Frederick, A. Mota, **I. Tezaur**, D. Bull. Advanced modeling and simulation of Arctic coastal erosion. *Advanced Modeling & Simulation Seminar*, University of Texas El Paso, El Paxo, TX. May 7. 2021.
14. J. Frederick, A. Mota, **I. Tezaur**, C. Choens, D. Bull. Development of a novel thermo-mechanical model for simulating permafrost demise and Arctic coastal erosion. *Glaciological Seminar,* ETH Zurich, Zurich, Switzerland. Apr. 28 2022.
15. D. Bull, K. Peterson, **I. Tezaur**, L. Shand, L. Swiler. "An Overview of the CLDERA Grand Challenge LDRD Project: Developing a Novel Foundational Approach for Attributing Climate Impacts". *CSRI Summer Seminar Series 2022*, Sandia National Laboratories, August 23, 2022.
16. **I. Tezaur**, A. Mota, C. Alleman, G. Phlipot, J. Barnett. "The Schwarz alternating method as a means for concurrent multi-scale coupling of conventional and data-driven models". *Department of Mathematics & Statistics Colloquium,* University of Nevada, Reno, NV, February 2, 2023.
17. **I. Tezaur**, J. Barnett, A. Mota, A. de Castro, P. Kuberry, P. Bochev. "Component-based coupling of first-principles and data-driven models". *1st ARIA Workshop on Model Reduction*, INRIA Bordeaux, Bordeaux, France, Mar. 8-10, 2023.
18. **I. Tezaur**, C. Wentland, F. Rizzi, J. Barnett, A. Mota, A. de Castro, P. Bochev. "Rigorous component-based coupling of first-principles and data-driven models". *Numerical Analysis of Galerkin ROMs (NA-GROMs) seminar series.* Virtual, April 30, 2024.
19. **I. Tezaur**, A. Mota, C. Alleman, G. Phlipot, C. Wentland, J. Barnett, F. Rizzi. "Accelerating mod/sim workflows through hybrid domain decomposition-based models and the Schwarz alternating method". *European Seminar on COmputing (ESCO) 2024.* Pilsen, CZ. Plenary invited presentation. June 10-14, 2024.

INVITED MINISYMPOSIUM TALKS

1. **I. Kalashnikova**, S. Arunajatesan. "A Stable Galerkin Reduced Order Model (ROM) for Compressible Flow". *10th World Congress on Computational Mechanics (WCCM)*, Sao Paulo, Brazil, July 13, 2012.
2. **I. Kalashnikova**, S. Arunajatesan. "Towards Feedback Control of Compressible Flows Using Galerkin Reduced Order Models". *Second International Workshop on Model Reduction for Parametrized Systems (MoRePaS II)*, Schloss Reisensburg, Gunzburg,Germany, Oct. 2-5, 2012.
3. **I. Kalashnikova**, S. Arunajatesan, B. van Bloemen Waanders. "Energy-Stable Galerkin Reduced Order Models for Prediction and Control of Fluid Systems". *SIAM Conference on Computational Science and Engineering (CSE13)*, Boston, MA, Feb. 26, 2013.
4. **I. Kalashnikova**, B.G. van Bloemen Waanders, S. Arunajatesan, M.F. Barone. "Stabilized Projection-Based Reduced Order Models for Uncertainty Quantification". *SIAM Conference on Uncertainty Quantification (SIAM UQ14)*, Savannah, GA, Mar. 31-Apr. 3, 2014.
5. **I. Kalashnikova**, J.A. Fike, M.F. Barone, S. Arunajatesan, B. van Bloemen Waanders. "Energy-stable Galerkin Reduced Order Models for Nonlinear Compressible Flow", *World Congress on Computational Mechanics (WCCM XI)*, Barcelona, Spain, July 20-25, 2014.
6. **I. Tezaur**, A. Salinger, M. Perego, R. Tuminaro. "On the Development and Performance of a First Order Stokes Finite Element Ice Sheet Dycore Built Using Trilinos Software Components", *SIAM Conference on Computational Science & Engineering (CS&E)* , Salt Lake City, Utah, March 13-18, 2015.
7. **I. Tezaur**, B. van Bloemen Waanders, S. Arunajatesan, M. Barone, J. Fike. "Stabilization of Projection-Based Reduced Order Models via Optimization-Based Eigenvalue Reassignment", *1st Pan-American Congress on Computational Mechanics (PANACM) 2015*, Buenos Aires, Argentina, April 27-29, 2015.
8. **I. Tezaur**, R. Tuminaro, M. Perego, A. Salinger, S. Price. "On the Scalability of the Albany/FELIX First-Order Stokes Approximation Ice Sheet Solver for Large-Scale Simulations of the Greenland and Antarctic Ice Sheets", *International Conference on Computational Science (ICCS) 2015*, Reykjavik, Iceland, June 1-3, 2015.
9. M. Balajewicz, **I. Tezaur**. "Stabilization and fine-tuning of projection-based reduced order models for compressible flow via minimal subspace rotation on the Stiefel manifold", *International Congress on Industrial and Applied Mathematics (ICIAM) 2015*, Beijing, China, August 10-14, 2015.
10. **I. Tezaur**, A. Salinger, M. Perego, J. Jakeman, M. Eldred, I. Demeshko, R. Tuminaro, S. Price. "Albany/FELIX: A Robust and Scalable Trilinos- Based Finite-Element Ice Flow Dycore Built for Advanced Architectures and Analysis", *International Congress on Industrial and Applied Mathematics (ICIAM) 2015*, Beijing, China, August 10-14, 2015.
11. **I. Tezaur**, M. Balajewicz. "A minimal subspace rotation approach for stabilizing and fine-tuning projection-based reduced order models for fluid applications", *West Coast ROM Workshop*, Livermore, CA, November 19, 2015.
12. **I. Tezaur**. "Land-Ice and Atmospheric Modeling at Sandia: the Albany/FELIX and Aeras Solvers", *Center 8300 Climate Kickoff Workshop*, Livermore, CA, December 9, 2015.
13. **I. Tezaur**, J. Jakeman, M. Eldred, M. Perego, A. Salinger, S. Price, "Towards Uncertainty Quantification in 21st Century Sea-Level Rise Predictions: Efficient Methods for Bayesian Calibration and Forward Propagation of Uncertainty for Land-Ice Models", *SIAM Conference on Uncertainty Quantification*, Lausanne, Switzerland, April 5-8, 2016.
14. **I. Tezaur**, M. Balajewicz. "A minimal subspace rotation approach for obtaining stable & accurate low-order projection-based reduced order models for nonlinear compressible flow", *World Congress on Computational Mechanics (WCCM) 2016*, Seoul, South Korea, July 25-30, 2016.
15. **I. Tezaur**, A. Salinger, M. Perego, R. Tuminaro, S. Price, J. Watkins, G. Hansen. "The Albany/FELIX First-Order Stokes Finite Element Ice Sheet Dynamical Core Built Using Trilinos Software Components: Performance, Next-Generation Capabilities and Validation", *SIAM Conference on Mathematics of Planet Earth 2016*, Philadelphia, PA, Sept. 30-Oct. 2, 2016.

16. **I. Tezaur**, M. Balajewicz. "A minimal subspace rotation approach for extreme model reduction in fluid mechanics", *Recent Developments in Numerical Methods for Model Reduction*, Paris, France, Nov. 7-10, 2016.
17. **I. Tezaur**, A. Mota, C. Alleman. "Continuum-to-continuum concurrent multiscale coupling in solid mechanics via the Schwarz alternating method". *SIAM Conference on Computational Science and Engineering (CSE) 2017*, Atlanta, GA, Feb. 27-Mar. 3, 2017.
18. **I. Tezaur**, J. Watkins, I. Demeshko. "A Performance-Portable Implementation of the Finite Element Assembly in an Atmosphere and Land-Ice Code using the Kokkos Library". *IACM 19th International Conference on Finite Elements in Flow Problems (FEF 2017)*, Rome, Italy, April 5-7, 2017.
19. **I. Tezaur**, A. Mota, C. Alleman. "The Schwarz alternating method for concurrent multiscale coupling in solid mechanics", *VII International Conference on Computational Methods for Coupled Problems in Science and Engineering (COUPLED 2017)*, Rhodes Island, Greece, June 12-14, 2017.
20. **I. Tezaur**, J. Jakeman, M. Perego, S. Price. "Large-scale deterministic inversion and Bayesian calibration in land-ice modeling", *US National Congress on Computational Mechanics (USNCCM) 2017*, Montreal, Quebec, Canada, July 17-20, 2017.
21. **I. Tezaur**, J. Watkins, R. Tuminaro, I. Demeshko. "Performance and Performance Portability of the Albany/FELIX Finite Element Land-Ice Solver", *SIAM Conference on Mathematical and Computational Issues in Geosciences (GS) 2017*, Erlangen, Germany, Sept. 11-14, 2017.
22. **I. Tezaur,** J. Watkins, I. Demeshko. "Towards performance-portability of the Albany/FELIX land-ice solver to new and emerging architectures using Kokkos", *6th European Seminar on Scientific COmputing (ESCO 2018)*, Pilsen, Czech Republic, June 3-8, 2018.
23. **I. Tezaur,** A. Mota, G. Phlipot. "The Schwarz alternating method for dynamic multi-scale coupling in solid mechanics", *World Congress on Computational Mechanics (WCCM) 2018,* New York, NY, July 22-27, 2018.
24. **I. Tezaur,** A. Salinger, G. Hansen, D. Ibanez. "Albany: a Trilinos-based multi-physics partial differential equation research tool created using the Agile Components code development strategy," *SIAM Conference on Computational Science and Engineering (CSE) 2019 (featured minisymposium entitled "Multiphysics: Extensible, Composable Algorithms and Software")*, Spokane, WA. Feb. 25-Mar. 1, 2019.
25. **I. Tezaur**, J. Watkins, R. Tuminaro, M. Perego, A. Salinger, S. Price. "*Trilinos/Kokkos*-based strategy towards achieving a performance portable land-ice model", *Banff International Research Station for Mathematical Innovation and Discovery (BIRS) workshop entitled Mathematical Modelling in Glaciology (20w5198),* Banff, Alberta, Canada. Jan. 12-17, 2020.
26. A. Mota, J. Frederick, C. Choens, D. Bull, **I. Tezaur**. "Development of a strongly-coupled thermo-mechanical model of permafrost for the simulation of Arctic coastal erosion", *European Seminar on COmputing (ESCO) 2020*, Online Meeting. June 8-12, 2020.
27. **I. Tezaur**. "Model Reduction at Sandia National Labs". *AIAA SciTech 2021, Technical Panel entitled "Application of Data-Driven Methods to Chemically Reacting Flows",* Online Meeting. Jan. 20, 2021.
28. J. Watkins, M. Carlson, **I. Tezaur.** "Performance portability of the Albany multi-physics finite element code on the road to exascale", *Platform for Advanced Scientific Computing (PASC) 2021*, Online Meeting. July 5-9, 2021.
29. A. Mota, J. Frederick, **I. Tezaur**, D. Bull. "A thermo-mechanical model of permafrost for the simulation of Arctic coastal erosion", *16th U.S. National Congress on Computational Mechanics (USNCCM 16).* July 25-29, 2021.
30. P. Lindsay, J. Fike, K. Carlberg, **I. Tezaur.** "Preconditioned Least-Squares Petrov-Galerkin reduced order models for fluid and solid mechanics problems". *Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering and Technology (MMLDT-CSET)*, San Diego, CA. Sept. 26-29, 2021.

31. A. Mota, **I. Tezaur**, J. Hoy. "The Schwarz alternating method for multi-scale coupling and contact in solid mechanics". *3rd Pan American Congress on Computational Mechanics.* Rio de Janeiro, Brazil. Nov. 9-12, 2021.
32. **I. Tezaur,** K. Peterson, A. Powell, J. Jakeman, E. Roesler. "Global sensitivity analysis using the ultra-low resolution Energy Exascale Earth System Model". *SIAM Conference on Uncertainty Quantification (UQ) 2022,* Atlanta, GA, April 12-15, 2022.
33. P. Lindsay, J. Fike, **I. Tezaur**, K. Carlberg. "Preconditioned Least-Squares Petrov-Galerkin Reduced Order Models for Fluid and Solid Mechanics Problems". *Minisymposium keynote talk at 8th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS) 2022*, Oslo, Norway, June 5-9, 2022.
34. **I. Tezaur,** K. Peterson, A. Powell, J. Jakeman, E. Roesler. "Global sensitivity analysis using the ultra-low resolution Energy Exascale Earth System Model". *European Seminar on COmputing (ESCO) 2022,* Pilsen, CZ, June 13-17, 2022.
35. **I. Tezaur,** K. Peterson, A. Powell, J. Jakeman, E. Roesler. "Global sensitivity analysis using the ultra-low resolution Energy Exascale Earth System Model". *SIAM Conference on Mathematics of Planet Earth (MPE) 2022,* Atlanta, GA, July 13-15, 2022.
36. **I. Tezaur**, M. Carlson, J. Watkins, M. Perego, K. Shan, C. Kao, K. Liegeois. "Achieving and maintaining performance and performance portability within the Albany multi-physics code: perspectives and tools", *SIAM Conference on Computational Science & Engineering (CSE) 2023,* Amsterdam, The Netherlands, Feb. 27-Mar. 3, 2023.
37. D. Bull, K. Peterson, **I. Tezaur,** L. Shand, L. Swiler. "CLDERA: Developing a Novel Founcational Approach for Attributing Localized Source Forcings in the Climate". *Minisymposium Keynote Talk at 22nd IACM ComputationL Fluids Conference (CFC) 2023,* Cannes, France. April 25-28, 2023.
38. **I. Tezaur**, J. Barnett, A. Mota, C. Wentland, W. Snyder. "Alternating Schwarz-based coupling of conventional and data-driven models". *10th International Conference on Computational Methods for Coupled Problems in Science & Engineering (COUPLED 2023),* Chania, Greece. June 5-7, 2023.
39. **I. Tezaur,** K. Peterson, A. Powell, J. Jakeman, E. Roesler. "Ensemble design for sensitivity analysis using the Energy Exascale Earth System Model (E3SM)". *Conference on Mathematical & Computational Issues in the Geosciences (GS23)*, Bergen, Norway. June 19-22, 2023.
40. J. Frederick, A. Mota, **I. Tezaur**, C. Choens, D. Bull, E. Bayat. "Development and calibration of the Arctic Coastal Erosion (ACE) Model, Towards UQ of Climate Change-Induced Arctic Permafrost Degradation", *SIAM Conference on Uncertainty Quantification (UQ24),* Trieste, Italy. Feb. 27-Mar. 1, 2024.

OTHER TALKS

1. **I. Kalashnikova**, M.F. Barone. "Stable and Efficient Galerkin Reduced Order Models for Non-Linear Fluid Flow". *6th AIAA Theoretical Fluid Mechanics Conference*, Honolulu, HI, June 27, 2011.
2. **I. Kalashnikova**, R. Tezaur, C. Farhat. "The Discontinuous Enrichment Method for Multi-Scale Fluid Problems". *7th International Congress on Industrial and Applied Mathematics (ICIAM 2011)*, Vancouver, BC, Canada, July 22, 2011.
3. **I. Kalashnikova**, A. Salinger, R. Tuminaro. "A new unstructured variable-resolution finite element ice sheet stress-velocity solver within the MPAS/Trilinos FELIX dycore of PISCEES". *CESM Land Ice Working Group Meeting*, National Center for Atmospheric Research (NCAR) - Mesa Lab, Boulder, CO, Feb. 14, 2013.

4. **I. Kalashnikova** , B.G. van Bloemen Waanders, S. Arunajatesan, M.F. Barone. "Stabilization of Galerkin Reduced Order Models (ROMs) for LTI Systems Using Controllers". *SIAM Conference on Control and Its Applications (CT13)*, San Diego, CA, July 9, 2013.
5. **I. Kalashnikova**, A. Salinger, M. Perego, R. Tuminaro, J. Jakeman, M. Eldred. "FELIX: the Albany Ice Sheet Modeling Code". *Albany User Group Meeting*, Sandia National Laboratories, Albuquerque, NM, Jan. 15-16, 2014.
6. **I. Kalashnikova**, A. Salinger, M. Perego, R. Tuminaro, S. Price. "The Albany/FELIX First-Order Stokes Dycore". *CESM Land Ice Working Group Meeting*, National Center for Atmospheric Research (NCAR) - Mesa Lab, Boulder, CO, Jan. 30-31, 2014.
7. **I. Kalashnikova**. Albany/FELIX: A New Parallel, Scalable and Robust First-Order Stokes Ice Sheet Simulation Code", Technical Seminar, Sandia National Laboratories, Livermore, CA, July 3, 2014.
8. **I. Kalashnikova**, A. Salinger, M. Perego, R. Tuminaro, S. Price. "An Update on the Albany/FELIX First Order Stokes Finite Element Solver and Its Coupling to Land Ice Dycores", *CESM Annual Workshop*, Breckenridge, CO, June 16-19, 2014.
9. **I. Kalashnikova**, J.A. Fike, M.F. Barone, S. Arunajatesan, B. van Bloemen Waanders. "Approaches for Building Stable Projection-Based Reduced Order Models", *Reduced-Order Modeling Workshop*, Sandia National Laboratories, Livermore, CA, August 7, 2014.
10. **I. Kalashnikova**, M. Perego, A. Salinger, R. Tuminaro, S. Price. "Update on the Albany/FELIX First Order Stokes Solver and the CISM-Albany and MPAS-Albany Dycores", *CESM Land Ice Working Group Meeting*, National Center for Atmospheric Research (NCAR) - Mesa Lab, Boulder, CO, February 2-3, 2015.
11. **I. Tezaur**, M. Balajewicz. "A minimal subspace rotation approach for obtaining stable & accurate low-order projection-based reduced order models for nonlinear compressible flow", *European Congress on Computational Methods in Applied Sciences & Engineering (ECCOMAS) 2016*, Crete, Greece, June 5-10, 2016.
12. **I. Tezaur**, A. Salinger, M. Perego, R. Tuminaro, J. Jakeman, M. Eldred, J. Watkins, S. Price, I. Demeshko. "The Albany/FELIX Land-Ice Dynamical Core". *2017 Albany User's Group Meeting*, Livermore, CA, Jan. 17-18, 2017.
13. **I. Tezaur**. "Proper Orthogonal Decomposition (POD) Closure Models for Turbulent Flows", *Data Science Reading Group Seminar*, Livermore, CA, May 18, 2017.
14. A. Mota, **I. Tezaur**, C. Alleman, G. Phlipot. "The Schwarz alternating method for multiscale coupling in solid mechanics", *VIII International Conference on Computational Methods for Coupled Problems in Science and Engineering (COUPLED 2019)*, Sitges, Spain. June 3-5, 2019.
15. A. Mota, **I. Tezaur**, C. Alleman, G. Phlipot. "The Schwarz alternating method for multiscale coupling in solid mechanics", *International Conference on Computational Science (ICCS) 2019*, Faro, Portugal. June 12-14, 2019.
16. A. Mota, **I. Tezaur,** C. Alleman, G. Phlipot. "The Schwarz alternating method for multiscale coupling in solid mechanics". *Computational Methods in Multi-Scale, Multi-Uncertainty and Multi-Physics Problems (CM4P 2019)*, Porto, Portugal. July 15-17 2019.
17. **I. Tezaur** *et al.* "Verification and Testing Infrastructure and Demonstrations", *DOE Energy Exascale Earth System Model (E3SM) All-Hands Meeting*, Crystal City, MD. November 19-21, 2019.
18. T. Voth, **I. Tezaur,** J. Niederhaus. "XFEM Development in the ALEGRA code", *ALEGRA Winter Workshop 2019*, Sandia National Laboratories, Albuquerque, NM. December 10-12, 2019.
19. **I. Tezaur**, A. Mota, C. Alleman, G. Phlipot. "The Schwarz alternating method for continuum-to-continuum multiscale coupling in solid mechanics", *Albany User Meeting (AUM) 2020*, Albuquerque, NM. Jan. 27-28, 2020.

20. A. Mota, J. Frederick, C. Choens, D. Bull, **I. Tezaur**. "Development of a strongly-coupled thermo-mechanical model of permafrost for the simulation of Arctic coastal erosion", *Climate Modeling Seminar*, Sandia National Laboratories. June 24, 2020.
21. A. Mota, **I. Tezaur**, C. Alleman, G. Phlipot. "Concurrent multiscale coupling in solid mechanics using the Schwarz alternating method". *Engineering Sciences Seminar*, Sandia National Laboratories, Livermore, CA and Albuquerque, NM. Nov. 12, 2020.
22. A. Mota, **I. Tezaur**, D. Koliesnikova, J. Hoy. "The Schwarz alternating method for multi-scale contact dynamics". *Congress on Numerical Methods in Engineering (CMN) 2023*, Las Palmas de Gran Canaria, Spain. Sept. 12-14, 2022.

POSTER PRESENTATIONS

1. **I. Kalashnikova**, C. Farhat, R. Tezaur. "Recent extensions of the discontinuous enrichment method (DEM) to advection-dominated fluid mechanics problems". *10th U.S. National Congress on Computational Mechanics (USACM)*, Ohio State University, Columbus, OH (July 2009).
2. A.G. Salinger, **I. Kalashnikova**, M. Perego, R.S. Tuminaro, M.S. Eldred, J.D. Jakeman. "Rapid development of an ice sheet climate application using the component-based approach". *CIS External Review*, Sandia National Laboratories, Albuquerque, NM (May 2013).
3. **I. Kalashnikova**, D. Martin, S. Price. "Ice sheet dynamical core development for PISCEES". *SciDAC Principal Investigator Meeting*, Hilton Executive Meeting Center, Rockville, MD (July 2013).
4. A. Salinger, A. Bradley, I. Demeshko, G. Hansen, M. Perego, E. Phipps, **I. Tezaur**, R. Tuminaro, B. Granzow, D. Ibanez, M. Shephard. "Albany: Integrating Algorithmic Components to Build Advanced Applications". *SciDAC Principal Investigator Meeting*, Hyatt Regency Bethesda, Bethesda, MD (July 2015).
5. C. Jackson, J. Jakeman, **I. Tezaur**, S. Price, M. Eldred, P. Heimeback, M. Perego, A. Salinger, G. Stadler. "PISCEES: Ice Sheet Model Experiments for Evaluating Sea Level Rise". *SciDAC Principal Investigator Meeting*, Hyatt Regency Bethesda, Bethesda, MD (July 2015).
6. **I. Tezaur**, M. Perego, R. Tuminaro, A. Salinger, J. Jakeman, M. Eldred, L. Ju, T. Zhang, M. Gunzburger, S. Price. "Progress on the PISCEES FELIX Ice Sheet Dynamical Cores". *SciDAC Principal Investigator Meeting* , Hyatt Regency Bethesda, Bethesda, MD (July 2015).
7. **I. Tezaur**, A. Salinger, M. Perego, R. Tuminaro. "Component-Based Application Code Development, Part 2: Demonstration on a Land-Ice Model and Proposed Extension to Other Climate Components". *Advancing X-cutting Ideas for Computational Climate Science (AXICCS) 2016*, Rockville, MD (Sept. 2016).
8. W. Spotz, **I. Tezaur**, P. Bosler, J. Fike, O. Guba, T. Smith, J. Watkins, I. Demeshko. "A Performance Portable, High-Resolution Global Atmosphere Model". *American Geophysical Union (AGU) 2016 Fall Meeting*, San Francisco, CA (Dec. 2016).
9. L. Bertagna, M. Deakin, O. Guba, D. Sunderland, A. Salinger, **I. Tezaur**. "C++/Kokkos Refactor of the HOMME Dycore: CMDV Software", *ACME All-Hands Meeting,* Potomac, MD (June 2017).
10. A. Mota, **I. Tezaur**, C. Alleman. "The Schwarz alternating method for concurrent multiscale coupling in solid mechanics", *SIAM Conference on Parallel Processing for Scientific Computing (SIAM PP) 2018*, Tokyo, Japan (March 2018).
11. M. Perego, L. Bertagna, D. Martin, S. Price, M. Hoffman, **I. Tezaur**. "Probabilistic Sea-Level Projections from Ice Sheet and Earth System Models 1: Ice Sheet Model Development and Applications", *SciDAC Principal Investigator Meeting*, Rockville, MD (July 2018).

12. M. Perego, L. Bertagna, D. Martin, S. Price, M. Hoffman, **I. Tezaur**, J. Watkins, J. Jakeman. "Probabilistic Sea-Level Projections from Ice Sheet and Earth System Models 3: Performance, Optimization and Uncertainty Quantification", *SciDAC Principal Investigator Meeting*, Rockville, MD (July 2019).
13. **I. Tezaur**, J. Barnett, A. Mota, A. de Castro, P. Kuberry, P. Bochev, C. Wentland. "Component-based Coupling of First-Principles & Data-Driven Models". *Isaac Newton Institute Workshop on Computational Challenges and Emerging Tools (held as part of "The mathematical and statistical foundation of future & data-driven engineering" program).* Cambridge, UK, April 24-28, 2023.
14. **I. Tezaur**, P. Bochev, P. Kuberry, A. Gruber, C. Eldred, E. Parish, P. Blonigan. "Structurure-Presering Model Order Reduction (SP-MOR)", *MMICC-3 All-Hands Meeting,* Albuquerque, NM, Jan. 9-10, 2024.
15. **I. Tezaur**, P. Bochev, P. Kuberry, C. Wentland, J. Barnett, A. de Castro, E. Hawkins, J. Owen, E. Huynh. "Component-based coupling of first-principles and data-driven models", *MMICC-3 All-Hands Meeting,* Albuquerque, NM, Jan. 9-10, 2024.
16. A. Mota, J. Frederick, **I. Tezaur**, D. Bull, E. Bayat, C. Choens, B. Jones, C. Flanary. "Assessing permafrost demose and infrastructure destabilization using the Arctic Coastal Erosion (ACE) model", *Los Alamos-Sandia Climate Summit,* Los Alamos, NM. May 7, 2024.
17. A. Mota, J. Frederick, **I. Tezaur**, D. Bull, E. Baya, C. Choens, B. Jones, C. Flanary. "Assessing permafrost demose and infrastructure destabilization using the Arctic Coastal Erosion (ACE) model", *European Seminar on COmputing (ESCO) 2024,* Pilsen, CZ. June 10-14, 2024.

SOFTWARE DEVELOPMENT

- **Albany multi-physics code.** Albany is an open-source multi-physics analysis package based on the Trilinos multiphysics framework housing a variety of application areas from climate modeling, to computational solid mechanics, to quantum device modeling. ***My role is that of lead developer and product owner.*** https://github.com/SNLComputation/Albany
- **In-Situ Machine Learning (ISML).** ISML is a Python code that enables in-situ, unsupervised anomaly/event detection on exascale platforms using a communication-minimizing workflow comprised of *signatures*, *measures*, and *decisions* [Shead *et al.*, 2022]. ***I have orchestrated extensions of ISML to land ice, coupled climate and model reduction applications with unstructured, spatially-evolving meshes.*** https://github.com/sandialabs/isml
- **Community Ice Sheet Model (CISM).** CISM is a next-generation ice sheet model used to predict ice sheet retreat and sea-level rise in a warming climate, freely available as part of NCAR's Community Earth System Model (CESM). ***My role was to create an interface between CISM and the Albany Land-Ice Model (ALI), a Trilinos-based finite element model that greatly improved CISM's robustness and performance.*** https://github.com/cism/cism
- **Albany Land-Ice (ALI).** A next-generation finite-element land-ice model that serves as the land-ice component in the DOE's Energy Exascale Earth System Model. ***I am the original creator of ALI within the Albany code base, and currently serve as its performance lead.*** https://github.com/E3SM-Project/E3SM
- **Trilinos.** Trilinos is a suite of algorithms and enabling technologies within an object-oriented software framework for the solution of large-scale complex, multi-physics engineering and scientific problems on new and emerging HPC. ***I am a developer of the Tempus time-integration package in Trilinos, and a product owner of the Piro package for embedded nonlinear analysis.*** https://github.com/trilinos/Trilinos
- **SPARC (Sandia Parallel Aerodynamics and Reentry Code).** SPARC is a next-generation transonic and hypersonic CFD code developed at Sandia to support the aerodynamic, aerothermal and

aerostructural simulation needs of the lab***. I helped integrate nonlinear solvers and time-integrators from Trilinos into SPARC.***

- **ALEGRA (Arbitrary Lagrangian-Eulerian General Research Applications).** ALEGRA is a next-generation large-deformation shock physics code at Sandia that is based on Arbitrary Lagrangian-Eulerian (ALE) formulation. ***I am a lead developer of the eXtended Finite Element Method (XFEM) capability in ALEGRA, which enables correct multi-material simulations for impact problems.***
- **Sierra/Solid Mechanics (SM).** A Sandia Lagrangian 3D code for the finite element analysis of solids and structures. ***I helped develop and implement a novel alternating Schwarz formulation, currently used by analysist for multi-scale fastener simulations, within Sierra/SM.***

PROFESSIONAL MEMBERSHIPS: Society for Industrial & Applied Mathematics (SIAM), SIAM Activity Group on Computational Science & Engineering, SIAM Activity Group on Geosciences, SIAM Activity Group on Mathematics of Planet Earth, SIAM Activity Group on Supercomputing, SIAM Activity Group on Uncertainty Quantification, Full Member of Sigma Xi Scientific Research Society (by nomination), Society of Women Engineers (SWE), American Geophysical Union (AGU), United States Association for Computational Mechanics (USACM), Institute of Electrical and Electronics Engineers (IEEE) Computer Society.