

## Peer-reviewed Publications

- [1] N. Anderson, L. Lawless, L. Bahn, K. Wakefield, R. Tang, B. Bentz, F. Panerai, and J. Engerer. Solar-thermal testing of ablator materials in an atomic oxygen plasma. 2024.
- [2] N. A. Anderson, J. D. Engerer, and Panerai F. Solar-thermal testing of ablator materials in an atomic oxygen plasma. In *AIAA Scitech*, 2024.
- [3] N. A. Anderson, P. Zolfaghari, S. Bhattacharya, L. Capponi, T. Oldham, R. M. Sankaran, G. Elliott, , and F. Panerai. Flow reactor experiments of high-temperature graphite oxidation and nitridation. *High Temperature Corrosion of Materials*, 2024.
- [4] Nicholas A Anderson, Souvik Bhattacharya, Kaan K Kirmanoglu, Kelly A Stephani, Gregory Elliott, R Mohan Sankaran, and Francesco Panerai. High temperature oxidation of graphite under non-thermal oxygen plasma. In *AIAA SCITECH 2022 Forum*, page 0114, 2022.
- [5] Amanda Bienz, Luke N. Olson, William D. Gropp, and Shelby Lockhart. Modeling data movement performance on heterogeneous architectures. In *2021 IEEE High Performance Extreme Computing Conference (HPEC)*, pages 1–7, 2021.
- [6] Jaemin Choi, Zane Fink, Sam White, Nitin Bhat, David F Richards, and Laxmikant V Kale. Gpu-aware communication with ucx in parallel programming models: Charm++, mpi, and python. In *2021 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*, pages 479–488. IEEE, 2021.
- [7] Jaemin Choi, Zane Fink, Sam White, Nitin Bhat, David F Richards, and Laxmikant V Kale. Accelerating communication for parallel programming models on gpu systems. *Parallel Computing*, 113:102969, 2022.
- [8] Seung Whan Chung and Jonathan B Freund. An optimization method for chaotic turbulent flow. *Journal of Computational Physics*, 457:111077, 2022.
- [9] Esteban Cisneros-Garibay, Carlos Pantano, and Jonathan Freund. Inert versus reacting turbulent flow in a supersonic cavity flameholder. In *AIAA Scitech 2022 Forum*, 2022.
- [10] Matthias Diener and Laxmikant Kale. Unified data movement for offloading charm++ applications. In *2020 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*, pages 471–474. IEEE, 2020.
- [11] Zane Fink, Simeng Liu, Jaemin Choi, Matthias Diener, and Laxmikant V Kale. Performance evaluation of python parallel programming models: Charm4py and mpi4py. In *2021 IEEE/ACM 6th International Workshop on Extreme Scale Programming Models and Middleware (ESPM2)*, pages 38–44. IEEE, 2021.
- [12] Zane Fink, Konstantinos Parasyris, Giorgis Georgakoudis, and Harshitha Menon. Hpac-offload: Accelerating hpc applications with portable approximate computing on the gpu. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis*, pages 1–14, 2023.
- [13] Zane Fink, Konstantinos Parasyris, Praneet Rathi, Giorgis Georgakoudis, Harshitha Menon, and Peer-Timo Bremer. Hpac-ml: A programming model for embedding ml surrogates in scientific applications. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis*, 2024.
- [14] Massimo Franco, Lorenzo Capponi, Sreevishnu Oruganti, Gregory S. Elliott, and Francesco Panerai. Investigation of slug calorimeter heat flux measurements in the plasmatron x wind tunnel. In *AIAA Scitech*, 2024.

- [15] I. Gessman, S. Ghanekar, G. S. Lee, K. Kim, N. Kato, J. Yoo, and T. Lee. Scramjet inflow characterization based on thermodynamic analysis of arc-heater plenum. *AIAA Scitech 2023 Forum*, 2023.
- [16] Isabella Gessman, Shruti Ghanekar, Gyu Sub Lee, Keunsoo Kim, Nozomu Kato, Jihyung Yoo, and Tonghun Lee. Scramjet inflow characterization based on thermodynamic analysis of arc-heater plenum. In *AIAA SCITECH 2023 Forum*, page 2332, 2023.
- [17] Kaan Kirmanoglu, Nicholas A. Anderson, Francesco Panerai, and Kelly Stephani. Simulating oxidation of carbon surfaces by atomic oxygen coupled with a finite rate oxidation model. *AIAA SciTech 2022 forum*, 2022.
- [18] Kaan K. Kirmanoglu, Nicholas A Anderson, Francesco Panerai, Kelly A Stephani, Joseph C Ferguson, and Sigrid Close. Simulating oxidation of carbon surfaces by atomic oxygen coupled with a finite rate oxidation model. In *AIAA SCITECH 2022 Forum*, page 0674, 2022.
- [19] Kaushik G. Kulkarni. *Domain-Specific Code Transformations for Computational Science based on the Polyhedral Model*. Thesis, University of Illinois at Urbana-Champaign, August 2023.
- [20] Gyu Sub Lee, Peter Sakkos, Isabella Gessman, Jie Lim, Nozomu Kato, Branden M Kirchner, Gregory Elliott, and Tonghun Lee. Piv measurements and total temperature thermometry of a mach 4.5 arc-heated nozzle flow. In *AIAA SCITECH 2022 Forum*, page 2337, 2022.
- [21] Shelby Lockhart, Amanda Bienz, William Gropp, and Luke Olson. Performance analysis and optimal node-aware communication for enlarged conjugate gradient methods. *ACM Trans. Parallel Comput.*, Jan 2023.
- [22] Shelby Lockhart, Amanda Bienz, William D. Gropp, and Luke N. Olson. Characterizing the performance of node-aware strategies for irregular point-to-point communication on heterogeneous architectures. *Parallel Computing*, page 103021, 2023.
- [23] Shelby Lockhart, David J. Gardner, Carol S. Woodward, Stephen Thomas, and Luke N. Olson. Performance of low synchronization orthogonalization methods in Anderson accelerated fixed point solvers. In *Proceedings of the 2022 SIAM Conference on Parallel Processing for Scientific Computing*, pages 49–59.
- [24] Arthur Paganini, Jie Lim, Gyu Sub Lee, Nozomu Kato, Mitchell D’Agostino, Isabella Gessman, and Tonghun Lee. Cavity ignition and periodic flame stabilization modes in rectangular supersonic flowpath. In *AIAA Scitech*, 2024.
- [25] Jonathan E Retter, Matthew Koll, Daniel Richardson, and Sean P Kearney. Time-domain self-broadened and air-broadened nitrogen s-branch raman linewidths at 80-200 K recorded in an underexpanded jet. *The Journal of Chemical Physics*, 2022.
- [26] Tulio R. Ricciardi, Massimo Franco, Kunkun Tang, Henry X. Varona, Francesco Panerai, Gregory S. Elliott, and Jonathan B. Freund. Combustion heat flux estimation for design of carbon fiber-based thermal protection systems. In *AIAA Aviation 2024*, July 2024. submitted.
- [27] Tulio R. Ricciardi, Kunkun Tang, and Jonathan B. Freund. Analysis of thermal protective systems in combustor environments. In *13th Ablation Workshop*, November 2023.
- [28] Seung Won Suh, Jonathan F MacArt, Luke N Olson, and Jonathan B Freund. Physics-constrained neural-network sub-grid-scale model for a flame in isotropic turbulence. *19th International Conference on Numerical Combustion*, May 7-10, 2024.

- [29] Kunkun Tang, Tulio Ricciardi, and Jonathan B. Freund. Model selection and dimension reduction of chemical kinetics models for turbulent combustion. In *16th World Congress on Computational Mechanics and 4th Pan American Congress on Computational Mechanics – WCCM-PANACM 2024*, 2024.
- [30] Kunkun Tang, Tulio Ricciardi, and Jonathan B. Freund. Uncertainty analysis of combustion-wall interaction. In *9th European Congress on Computational Methods in Applied Sciences and Engineering – ECCOMAS CONGRESS 2024*, 2024.
- [31] Henry X. Varona, Jacob Faibussowitsch, Kelly A. Stephani, Harley T. Johnson, Gregory S. Elliott, Jonathan B. Freund, and Francesco Panerai. Material response of isotropic graphite due to oxidation induced degradation. In *AIAA Scitech 2022 Forum*.

## One-time Publications

- [1] N. A. Anderson, J. D. Engerer, and Panerai F. Experimental survey across graphite grades and purification methods of graphite. In *13th Ablation Workshop*, 2023.
- [2] Nicholas J. Christensen and Eric J. Parish. A parallel-in-time approach to solving the 1D advection equation using the Euler-Lagrange equations. In *CSRI Summer Proceedings 2021*, 2022.
- [3] Esteban Cisneros-Garibay. *Mixing and Sustained Combustion in a Cavity Flameholder for Scramjet Propulsion*. PhD thesis, University of Illinois at Urbana-Champaign, 2021.
- [4] Zane Fink, Simeng Liu, Jaemin Choi, Matthias Diener, and Laxmikant V. Kale. Performance evaluation of Python parallel programming models: Charm4Py and mpi4py. In *International Workshop on Extreme Scale Programming Models and Middleware (ESPM2)*, 2021.
- [5] Massimo Franco, Henry X. Varona, Seth Westfall, Gregory S. Elliott, and Francesco Panerai. Axisymmetric shear flow ablation test. In *13th Ablation Workshop*, 2023.
- [6] Kaan Kirmanoglu, Nicholas A. Anderson, Lorenzo Capponi, Francesco Panerai, and Kelly Stephani. Poster: Particle based simulations of the high temperature oxidation of carbon fibers. In *12th Ablation Workshop*, November 2022.
- [7] Kaushik Kulkarni. *Domain-Specific Code Transformations for Computational Science based on the Polyhedral Model*. PhD thesis, University of Illinois Urbana-Champaign, 2023.
- [8] Shelby Lockhart. *Reducing communication bottlenecks in iterative solvers*. PhD thesis, University of Illinois Urbana-Champaign, 2023.
- [9] Seung Won Suh, Jonathan MacArt, Luke Olson, and Jonathan Freund. Quantifying overheads in charm++ and hpx using task bench. In *IACM Computational Fluids Conference*, 2023.
- [10] Kunkun Tang, Francesco Panerai, and Jonathan B. Freund. Sensitivity analysis for effective conductivity of anisotropic fibrous materials. *UNCECOMP Proceedings*, pages 511–525, 2023.
- [11] Kunkun Tang, Tulio Ricciardi, and Jonathan B. Freund. Model selection of reduced kinetics models for large-scale turbulent combustion simulation. In *5th ECCOMAS Thematic Conference on Uncertainty Quantification in Computational Science and Engineering – UNCECOMP 2023*, 2023.
- [12] H. X. Varona, S. Westfall, M. Franco, G. S. Elliott, and F. Panerai. Manufacturing a low-density carbon phenolic ablator using domestic constituents for research. In *12th Ablation Workshop*, 2022.

- [13] Henry Xavier Varona, Mitchell Gosma, Lindsay Lawless, Lam Banh, Gregory S. Elliott, Francesco Panerai, Lincoln Collins, and Jeffrey D. Engerer. Manufacturing a low-density carbon phenolic ablator using domestic constituents for research. In *13th Ablation Workshop*, 2023.
- [14] Nanmiao Wu, Ioannis Gonidelis, Simeng Liu, Zane Fink, Nikunj Gupta, Karame Mohammadi-porshokoh, Patrick Diehl, Hartmut Kaiser, and Laxmikant V Kale. Quantifying overheads in charm++ and hpx using task bench. In *European Conference on Parallel Processing*, pages 5–16. Springer, 2022.

## Other Publications and Presentations

- [1] Seung Whan Chung and Jonathan Freund. Multi-point penalty-based optimization for optimal control of chaotic turbulent flow. In *APS Division of Fluid Dynamics Meeting Abstracts*, pages A31–005, 2021.
- [2] Seung Whan Chung and Jonathan Freund. Finding an optimal flow control with multi-point penalty method. *Bulletin of the American Physical Society*, 2022.
- [3] Esteban Cisneros-Garibay, Carlos Pantano, and Jonathan Freund. Sustained cavity combustion in a  $M = 3$  flow. APS, 2021.
- [4] M. Franco, H. X. Varona, S. Westfall, G. Elliott, and F. Panerai. Poster: Investigation of an axisymmetric transverse flow ablation test case in the plasmatron x wind tunnel. In *13th Ablation Workshop*, November 2023.
- [5] W. A. Hagen, I. V. Adamovich, and J. B. Freund. Arc simulation with a tightly coupled near-wall non-equilibrium sheath-layer model. In *APS Division of Plasma Physics Meeting Abstracts*, volume 2020, pages BO05–013, 2020.
- [6] Seung Won Suh, Jonathan MacArt, Luke Olson, and Jonathan Freund. Physics-constrained neural-network sub-grid-scale model for a flame in isotropic turbulence. In *19th International Conference on Numerical Combustion*, 2024.
- [7] Seungwon Suh, Jonathan MacArt, Luke Olson, and Jonathan Freund. Adjoint-based neural network optimization for sub-grid-scale combustion modeling. *Bulletin of the American Physical Society*, 2022.
- [8] Seungwon Suh, Jonathan MacArt, Luke Olson, and Jonathan Freund. Physics-constrained machine learning for les of turbulent premixed flames. *18th International Conference on Numerical Combustion*, 2022.
- [9] Kunkun Tang. Uncertainty Quantification with Parsl in Composite Material Modeling. In *ParslFest 2020 - The Parsl Community Meeting*, 2020.