



Dr. Patrick Diehl

Curriculum Vitæ

Research experience

- 06/24–current **Research scientist**, *Applied Computer Science (CCS-7)*, Los Alamos National Laboratory, Los Alamos, NM, USA
- 05/22–current **Adjunct faculty**, *Department of Physics & Astronomy*, Louisiana State University, Baton Rouge, LA, USA
- 10/18–06/24 **Research scientist**, *Center for Computation & Technology*, Louisiana State University, Baton Rouge, LA, USA
- 02/17–09/18 **Postdoctoral fellow**, *Laboratory of Multiscale Mechanics*, Polytechnique Montréal, QC, Canada
- 07/12–03/13 **Research Assistant**, *Institute for Simulation of large Systems*, University Stuttgart, Stuttgart, Germany
- 10/07–06/12 **Student**, *Computer Science (Major software engineering)*, University Stuttgart, Stuttgart, Germany

Visiting positions

- 2015 **Guest Research Assistant**, *Center for Computation and Technology*, Louisiana State University

Education

- 2017 **PhD**, *Applied mathematics*, University of Bonn, Germany
- 2012 **Diploma**, *Computer Science*, University of Stuttgart, Germany

Awards and Honors

- 2019 IEEE SCIVIS Contest 2019, First Prize, Visual Analysis of Structure Formation in Cosmic Evolution, Video, Poster, and Short paper

Editorial duties

Los Alamos National Laboratory – Los Alamos, NM 87545, USA

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- 06/20–current **Topic editor**, *Computational fracture mechanics, Applied mathematics, C++, asynchronous and task-based programming*, The Journal of Open Source Software
- 2025 **Topical issue editor**, *Recent advances in Asynchronous Many Task Runtime Systems, SN Computer Science*
- 2025 **Guest editor**, *Research Software Engineering – Code, Practices, and People, Future Generation Computer Systems*
- 2024 **Guest editor**, *Research Software Engineering – Software-Enabled Discovery and Beyond, Future Generation Computer Systems*
- 2023 **Topical issue editor**, *Applications and Frameworks using the Asynchronous Many Task Paradigm, SN Computer Science*
- 2022 **Guest editor**, *Special issue: Science Gateways: Accelerating Research and Education, Computing in Science & Engineering*
- 2021 **Guest editor**, *Special issue: Peridynamics and its Current Progress, Computer Modeling in Engineering & Sciences (CMES)*

Research Interests

Computational
engineering

- Peridynamics theory for the application in solids, like glassy or composite materials,
- Validation and verification of simulations against experimental data,
- Assembly of experimental data for comparison with simulations,
- Application of machine learning to experiments and simulations.

High Performance
Computing

- The C++ Standard Library for Parallelism and Concurrency (HPX),
- Asynchronous many task systems and their application in computational engineering.
- Efficient, performance portable, and scalable High-Performance Parallel Programming using Modern C++.

Open science

- Open Source Software for scientific applications,
- Open data for sharing raw experimental results.

Teaching experience

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Instructor

- Research Technologies and Methods (MEDP 7098), Department of Physics & Astronomy, Louisiana State University, Taught: 2022
- Parallel computational mathematics (M 4997), Department of Mathematics, Louisiana State University, Taught: 2019, 2020, and 2021

Teaching assistant

- Einführung in die Numerische Mathematik (Introduction to numerical mathematics), University of Bonn, 2015
- Algorithmische Mathematik (Mathematical algorithms), University of Bonn, 2013/2014
- Wissenschaftliches Rechnen 2 (Scientific Computing 2), University of Bonn, 2013

Certificates

Baden-Württemberg Certificate Certificate for successful completion of the program in higher education pedagogy by the center for educational development of the state of Baden-Württemberg.

Advising and related student services

Co-supervised theses

- University of Stuttgart:
 - Pfander, David: Eine künstliche Intelligenz für das Kartenspiel Tichu, Studienarbeit Nr. 2398, 2013.
 - Kanis, Sebastian: GPU-based Numerical Integration in the Partition of Unity Method, Diplomarbeit Nr. 3405, 2013.

Graduate Committee

Member

- Master thesis: M. Reeser (LSU, 2020) and C. He (2023)
- Honors project: J. Trepper (LSU, 2020)

Google Summer of Code

- University of Bonn: A. Nigam (2016)
- Polytechnique Montreal: M. Seshadri (2017), G. Laberge and J. Golinowski (2018)

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- Louisiana State University: P. Gadika (2020)

Google Season of Docs

- Louisiana State University: R. Stobaugh (2019)

NSF REU

- Louisiana State University: A. Edwards (2021), E. Downing (2022), and N. Tabb (2023).

Academic-related Professional and Public Service

08/25–current Chair of the USACM Technical Thrust Area (TTA) on Large Scale Structural Systems and Optimal Design (Large-Scale)

08/23–07/25 Vice Chair of the USACM Technical Thrust Area (TTA) on Large Scale Structural Systems and Optimal Design (Large-Scale)

01/213–current Mentor for the USACM Student Chapter

07/21–07/23 Member-at-Large of the USACM Technical Thrust Area (TTA) on Large Scale Structural Systems and Optimal Design (Large-Scale)

03/20–12/23 Liaison for the Louisiana district of the SIAM Texas-Louisiana Section Duties:

- Making sure that people at universities, research institutions and industry in your district know about our activities and getting their suggestions on what we can do better

- Serving on the organizing committee for the annual meeting

10/17–09/18 ASSEP Labor relations officers for postdoctoral fellows

Organization of Conferences, Workshops, and Symposia

Committee

- Programming Frameworks, Technical Papers, Member
- ChapelCon '25, Program Committee
- AI track of 54th International Conference on Parallel Processing, Program Committee
- 2nd Annual Conference of the US Research Software Engineer Association, Publication chair
- SC25 Reproducibility Challenge, Committee member
- 1st Annual Conference of the US Research Software Engineer Association, Special Issue Editor

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- Science Gateways Conference 2023, Program committee member
- The First International Workshop on Democratizing High-Performance Computing (D-HPC 2023), Program committee member
- Science Gateways Conference 2022, Publication chair
- The International Conference for High Performance Computing, Networking, Storage, and Analysis (SC) 21, AD/AE Appendices
- Science Gateways Conference 2021, Program committee member
- The International Conference for High Performance Computing, Networking, Storage, and Analysis (SC) 21, Virtual logistics

Symposia

- Modeling and Simulation for Complex Material Behavior, 14th U.S. National Congress on Computational Mechanics, Link.
- Peridynamic Theory and Multiscale Methods for Complex Material Behavior, 14th World Congress on Computational Mechanics (WCCM XIV).
- Peridynamic Theory and Multiscale Methods for Complex Material Behavior, 16th National Congress on Computational Mechanics.
- Nonlocal Models in Mathematics and Computation, 3rd Annual Meeting of the SIAM Texas-Louisiana Section, 2020
- Peridynamic Theory and Multiscale Methods for Complex Material Behavior, 15th World Congress on Computational Mechanics (WCCM XV).
- Recent Developments in Peridynamics Modeling, 19th U.S. National Congress on Theoretical and Applied Mechanics.
- Peridynamic Theory and Multiscale Methods for Complex Material Behavior, 9th GACM Colloquium on Computational Mechanics
- Theoretical and Computational Aspects of Nonlocal Operator, 7th Annual Meeting of SIAM Central States Section
- Nonlocal Models in Mathematics and Computation, 5th Annual Meeting of the SIAM Texas-Louisiana Section, 2022
- Recent Developments in Peridynamics Modeling, 17th U.S. National Congress on Computational Mechanics, 2023
- Nonlocal Modeling, Analysis, and Computation, 10th International Congress on Industrial and Applied Mathematics, 2023
- Computational and analytical advances in nonlocal modeling, 16th World Congress on Computational Mechanics, 2024

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- Recent developments in peridynamics modeling, 16th World Congress on Computational Mechanics, 2024
- Computational and Analytical Advances in Nonlocal Modeling, SIAM Conference on Mathematical Aspects of Materials Science, 2024
- Peridynamic Theory and Multiscale Methods for Complex Material Behavior, 18th National Congress on Computational Mechanics, 2025

Mathematisches
Forschungsinstitut
Oberwolfach

- Fracture as an Emergent Phenomenon, 7 January - 12 January 2024
(Co-Organizers: Anna Pandolfi, Robert Lipton, and Thomas Wick)

Workshop

- Workshop on Experimental and Computational Fracture Mechanics: Validating peridynamics and phase field models for fracture prediction and experimental design, Link. Sponsored by
 - US Association for Computational Mechanics,
 - Center for Computation & Technology at Louisiana State University,
 - Oak Ridge National Laboratory,
 - Society for Experimental Mechanics,
 - U.S. National Committee on Theoretical and Applied Mechanics (Amer-iMech)
- Asynchronous Many-Task systems for Exascale 2021 held in conjunction with Euro-Par 2021, Link
- Asynchronous Many-Task systems for Exascale 2022 held in conjunction with Euro-Par 2022, Link
- Workshop on Workshop on Asynchronous Many-Task Systems and Applications 2023, Link Sponsored by
 - Tactical Computing Lab,
 - Center for Computation & Technology at Louisiana State University,
 - HPE Enterprise
- Asynchronous Many-Task systems for Exascale 2023 held in conjunction with Euro-Par 2023, Link
- Workshop on Workshop on Asynchronous Many-Task Systems and Applications 2024, Link
- Workshop on Experimental and Computational Fracture Mechanics, Link.

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- Asynchronous Many-Task systems for Exascale 2024 held in conjunction with Euro-Par 2024, [Link](#)
- Workshop on Workshop on Asynchronous Many-Task Systems and Applications 2024, [Link](#)
- Workshop on Asynchronous Many-Task Systems and Applications 2025, [Link](#)
- Workshop on Asynchronous Many-Task Systems and Applications 2026, [Link](#)

Panel

- D-HPC Workshop Panel : S4PST: Stewardship of Programming Systems and Tools, Panelist, International Conference for High Performance Computing, Networking, Storage and Analysis (SC)" 2023
- Joint USACM Large-Scale TTA – EMI Computational Mechanics Committee Career Path Panel, Organizer, Engineering Mechanics Institute Conference 2023
- Joint USACM Large-Scale TTA – EMI Computational Mechanics Committee Career Path Panel, Speaker, Engineering Mechanics Institute Conference 2022
- TBAA: Task-Based Algorithms and Applications, Moderator, "International Conference for High Performance Computing, Networking, Storage and Analysis (SC)" 2020. [Link](#)
- AI Ethics/Algorithmic Justice, Organizer, Colloquium on Artificial Intelligence Research and Optimization, Louisiana State University.

Meeting

- 3rd Annual Meeting of the SIAM Texas-Louisiana Section, October 16 - 18, 2020. [Link](#).
- 4th Annual Meeting of the SIAM Texas-Louisiana Section, November, 5 - 7, 2021 [Link](#).
- 5th Annual Meeting of the SIAM Texas-Louisiana Section, November, 4 - 6, 2022 [Link](#).
- 6th Annual Meeting of the SIAM Texas-Louisiana Section, November, 3 - 5, 2023 [Link](#).

Colloquium

- Colloquium on Artificial Intelligence Research and Optimization, Louisiana State University. [Link](#).

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- Large-Scale TTA Early-Career Colloquium, USACM. [Link](#)
- Large-Scale TTA Industrial Colloquium, USACM. [Link](#)
- Applied Computer Science Invited Speaker Series, LANL. [Link](#)

Short course

- SC16-001 Advanced Parallel Programming in C++, 16th U.S. National Congress on Computational Mechanics
- Advanced Parallel Programming in C++, 15th World Congress on Computational Mechanics
- SC17-002 Advanced Parallel Programming in C++, 17th U.S. National Congress on Computational Mechanics

Mentoring events

- 18th U.S. National Congress on Computational Mechanics, 2025
- 17th U.S. National Congress on Computational Mechanics, 2023
- 6th Annual Meeting of the SIAM Texas-Louisiana Section, 2023
- 15th World Congress on Computational Mechanics, 2022
- 5th Annual Meeting of the SIAM Texas-Louisiana Section, 2022

Conference and Workshop Grants

- 2020 **AmeriMech symposium:** Experimental and Computational Fracture Mechanics: Validating peridynamics and phase field models for fracture prediction and experimental design (\$4000)

Travel Awards

- 2023 SIAM Travel Award - 10th International Congress on Industrial and Applied Mathematics (ICIAM) (\$1750)

Grant history

Current Research (chronological order; most recent one first)

1. Grant #4000211901 (Hartmut Kaiser)

Name of Funding Organization: UT-Battelle, LLC

Amount Awarded: \$9,999

Period of Grant Award: July 15 2022 - April 30 2024

Title of Project: S4PST, Sustainability for Node Level Programming Systems and Tools

Role on Project: Senior Personal

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Completed Research (chronological order; most recent one first)

1. Grant #2229751 (Rod Tohid)

Name of Funding Organization: National Science Foundation

Amount Awarded: \$300,000

Period of Grant Award: Sept 15 2022 - Oct 31 2023

Title of Project: POSE: Phase I: Constellation: A Pathway to Establish the STE||AR Open-Source Organization

Role on Project: Co-PI

2. Grant #524125 (Hartmut Kaiser)

Name of Funding Organization: Pacific Northwest National Laboratory

Amount Awarded: \$50,000

Period of Grant Award: June 25 - Oct 31 2020

Title of Project: High Performance Data Analytics (HPDA) Scalable Second-Order Optimization (SSO)

Role on Project: Co-PI

Allocations

Current Allocations (chronological order; most recent one first)

1. Project xpress (Alice Koniges)

Title of Project: HPX and OpenMP

Amount awarded: CPU node hours 4300 and GPU node hours 1700

Cluster: Perlmutter @ NERSC

Role on Project: Senior personal

Completed Allocations (chronological order; most recent one first)

1. Project hp210311 (Patrick Diehl)

Title of Project: Porting Octo-Tiger, an astrophysics program simulating the evolution of star systems based on the fast multipole method on adaptive Octrees

Type: Test-bed

Amount awarded: 21k node hours

Cluster: Fugaku @ RIKEN Center for Computational Science, Japan

Role on Project: PI

2. Project PaDi032321F (Patrick Diehl)

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Title of Project: Porting Octo-Tiger, an astrophysics program simulating the evolution of star systems based on the fast multipole method on adaptive Octrees

Type: Test-bed

Amount awarded: 10k node hours

Cluster: Ookami @ Stonybrook University, USA

Role on Project: PI

Publications

Preprints

N. Nader, P. Diehl, S. R. Brandt, and H. Kaiser. LLM & HPC: Benchmarking DeepSeek's Performance in High-Performance Computing Tasks. *arXiv preprint arXiv:2504.03665*, 2025, 2504.03665.

A. Mhatre, N. Nader, P. Diehl, and D. Gupta. LLM-GUARD: Large Language Model-Based Detection and Repair of Bugs and Security Vulnerabilities in C++ and Python. *arXiv preprint arXiv:2508.16419*, 2025, arXiv:2508.16419.

S. Gupta, K. Kamalakkannan, M. Moraru, G. Shipman, and P. Diehl. From Legacy Fortran to Portable Kokkos: An Autonomous Agentic AI Workflow. *arXiv preprint arXiv:2509.12443*, 2025, arXiv:2509.12443.

S. R. Brandt, M. Morris, P. Diehl, C. Bowen, J. Tucker, L. Bristol, and G. G. R. III. Locking Down Science Gateways. *arXiv preprint arXiv:2509.18548*, 2025, arXiv:2509.18548.

A. Barai, K. Kamalakkannan, P. Diehl, M. Moraru, J. Dominguez-Trujillo, H. Pritchard, N. Santhi, F. Fatollahi-Fard, and G. Shipman. Bridging Simulation and Silicon: A Study of RISC-V Hardware and FireSim Simulation. *arXiv preprint arXiv:2509.18472*, 2025, arXiv:2509.18472.

Books

P. Diehl, S. R. Brandt, and H. Kaiser. *Parallel C++ – Efficient and Scalable High-Performance Parallel Programming Using HPX*, volume 1. Springer Cham, 2024.

Edited books

J. Singer, Y. Elkhatib, D. B. Heras, P. Diehl, N. Brown, and A. Ilic, editors. *Euro-Par 2022 International Workshops, Glasgow, UK, August 22–26, 2022, Revised Selected Papers*, volume 13835 of *Lecture Notes in Computer Science (LNCS)*. Springer, 2022.

P. Diehl, P. Thoman, H. Kaiser, and L. Kale, editors. *Asynchronous Many-Task Systems and Applications*, volume 13861 of *Lecture Notes in Computer Science (LNCS)*. Springer, 2023.

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P. Diehl, J. Schuchart, P. Valero-Lara, and G. Bosilca, editors. *Asynchronous Many-Task Systems and Applications*, volume 14626 of *Lecture Notes in Computer Science (LNCS)*. Springer, 2024.

P. Diehl and S. Gesing, editors. *Editorial: Research Software Engineering – Software-Enabled Discovery and Beyond*, Future Generation Computer Systems. Elsevier, 2025.

P. Diehl and R. F. da Silva, editors. *Science Gateways: Accelerating Research and Education—Part I*, volume 25 of *Computing in Science & Engineering*, Los Alamitos, CA, USA, 2023. IEEE.

P. Diehl and R. da Silva, editors. *Science Gateways: Accelerating Research and Education—Part II*, volume 25 of *Computing in Science & Engineering*, Los Alamitos, CA, USA, 2023. IEEE.

P. Diehl, Q. Cao, T. Herault, and G. Bosilca, editors. *Asynchronous Many-Task Systems and Applications*, volume 15690 of *Lecture Notes in Computer Science (LNCS)*. Springer, 2025.

R. Chaves, D. B. Heras, A. Ilic, D. Unat, R. M. Badia, A. Bracciali, P. Diehl, A. Dubey, O. Sangyoong, S. L. Scott, and L. Ricci, editors. *Euro-Par 2021: Parallel Processing Workshops (Euro-Par 2021 International Workshops, Lisbon, Portugal, August 30-31, 2021, Revised Selected Papers)*, volume 13098 of *Lecture Notes in Computer Science (LNCS)*. Springer, 2021.

S. Caino-Lores, D. Zeinalipour, T. D. Doudali, D. E. Singh, G. E. M. Garzón, L. Sousa, D. Andrade, T. Cucinotta, D. D'Ambrosio, P. Diehl, M. F. Dolz, A. Jukan, R. Montella, M. Nardelli, M. Garcia-Gasulla, and S. Neuwirth, editors. *Euro-Par 2024: Parallel Processing Workshops (Volume 2)*, volume 15386 of *Lecture Notes in Computer Science (LNCS)*. Springer, 2025.

S. Caino-Lores, D. Zeinalipour, T. D. Doudali, D. E. Singh, G. E. M. Garzón, L. Sousa, D. Andrade, T. Cucinotta, D. D'Ambrosio, P. Diehl, M. F. Dolz, A. Jukan, R. Montella, M. Nardelli, M. Garcia-Gasulla, and S. Neuwirth, editors. *Euro-Par 2024: Parallel Processing Workshops (Volume 1)*, volume 15385 of *Lecture Notes in Computer Science (LNCS)*. Springer, 2025.

D. Blanco Heras, G. Pallis, H. Herodotou, D. Balouek, P. Diehl, T. Cojean, K. Fürlinger, M. H. Kirby, M. Nardelli, P. Di Sanzo, and e. Zeinalipour, Demetris, editors. *Euro-Par 2023 International Workshops, Limassol, Cyprus, 28 August – 1 September, 2023 Revised Selected Papers*, volume 14351 of *Lecture Notes in Computer Science (LNCS)*. Springer, 2024.

D. Blanco Heras, G. Pallis, H. Herodotou, D. Balouek, P. Diehl, T. Cojean, K. Fürlinger, M. H. Kirby, M. Nardelli, P. Di Sanzo, and e. Zeinalipour, Demetris, editors. *Euro-Par 2023 International Workshops, Limassol, Cyprus, 28 August – 1 September, 2023 Revised Selected Papers*, volume 14352 of *Lecture Notes in Computer Science (LNCS)*. Springer, 2024.

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Reviews and Surveys

P. Diehl, R. Lipton, T. Wick, and M. Tyagi. A comparative review of peridynamics and phase-field models for engineering fracture mechanics. *Computational Mechanics*, Feb 2022.

P. Diehl, S. Prudhomme, and M. Lévesque. A review of benchmark experiments for the validation of peridynamics models. *Journal of Peridynamics and Nonlocal Modeling*, 1(1):14–35, 2019.

Journal Papers

P. K. Jha, P. Diehl, and R. Lipton. Nodal finite element approximation of peridynamics. *Computer Methods in Applied Mechanics and Engineering*, 434, 2025.

J. Frank, A. Straub, S. Shiber, P. Amini, D. C. Marcello, P. Diehl, T. Ertl, F. Sadlo, and S. Frey. Visualizing the mass transfer flow in direct-impact accretion. *Monthly Notices of the Royal Astronomical Society*, 543(4):4003–4019, 10 2025.

P. Diehl, C. Soneson, R. C. Kurchin, R. Mounce, and D. S. Katz. The Journal of Open Source Software (JOSS): Bringing Open-Source Software Practices to the Scholarly Publishing Community for Authors, Reviewers, Editors, and Publishers. *Journal of Librarianship and Scholarly Communication*, 12, 2 2025.

P. Diehl, N. Nader, M. Moraru, and S. R. Brandt. LLM Benchmarking with LLaMA2: Evaluating Code Development Performance Across Multiple Programming Languages. *Journal of Machine Learning for Modeling and Computing*, 6(3):95–129, 2025.

P. Diehl, E. Downing, A. Edwards, and S. Prudhomme. Coupling Approaches with Non-matching Grids for Classical Linear Elasticity and Bond-based Peridynamic Models in 1D. *Journal of Peridynamics and Nonlocal Modeling*, 7(2), 2025.

G. Daiß, P. Diehl, J. Yan, J. K. Holmen, R. Gayatri, C. Junghans, A. Straub, J. R. Hammond, D. Marcello, M. Tsuji, D. Pflüger, and H. Kaiser. Asynchronous-many-task systems: Challenges and opportunities - Scaling an AMR astrophysics code on exascale machines using Kokkos and HPX. *The International Journal of High Performance Computing Applications*, 2025.

S. Shiber, O. De Marco, P. M. Motl, B. Munson, D. C. Marcello, J. Frank, P. Diehl, G. C. Clayton, B. N. Skinner, H. Kaiser, G. Daiß, D. Pflüger, and J. E. Staff. Hydrodynamic simulations of white dwarf-white dwarf mergers and the origin of R Coronae Borealis stars. *Monthly Notices of the Royal Astronomical Society*, 10 2024.

N. Nader, P. Diehl, M. D'Elia, C. Glusa, and S. Prudhomme. ML-based

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identification of the interface regions for coupling local and nonlocal models. *Journal of Machine Learning for Modeling and Computing*, 2024.

P. Diehl, G. Daiß, K. Huck, D. Marcello, S. Shiber, H. Kaiser, and D. Pflüger. Simulating stellar merger using HPX/Kokkos on A64FX on Supercomputer Fugaku. *The Journal of Supercomputing*, April 2024.

P. Diehl, S. R. Brandt, and H. Kaiser. Shared Memory Parallelism in Modern C++ and HPX. *SN Computer Science*, 5(5):459, April 2024.

M. Birner, P. Diehl, R. Lipton, and M. A. Schweitzer. A multiscale fracture model using peridynamic enrichment of finite elements within an adaptive partition of unity: Experimental validation. *Mechanics Research Communications*, April 2024.

B. Aksoylu, F. Celker, and P. Diehl. Construction of Nonlocal Governing Operators with Local Boundary Conditions on a General Interval. *Journal of Peridynamics and Nonlocal Modeling*, 2024.

B. Aksoylu, F. Celker, and P. Diehl. Analysis and Implementation of Nonlocal Governing Operators with Local Boundary Conditions on a General Interval. *Journal of Peridynamics and Nonlocal Modeling*, 2024.

D. J. Littlewood, M. L. Parks, J. T. Foster, J. A. Mitchell, and P. Diehl. The Peridigm Meshfree Peridynamics Code. *Journal of Peridynamics and Nonlocal Modeling*, May 2023.

D. Bhattacharya, R. Lipton, and P. Diehl. Quasistatic fracture evolution using a nonlocal cohesive model. *International Journal of Fracture*, Jun 2023.

P. Diehl and S. Prudhomme. Coupling approaches for classical linear elasticity and bond-based peridynamic models. *Journal of Peridynamics and Nonlocal Modeling*, Mar 2022.

P. Diehl and R. Lipton. Quasistatic fracture using nonlinear-nonlocal elastostatics with explicit tangent stiffness matrix. *International Journal for Numerical Methods in Engineering*, May 2022.

P. Diehl and S. R. Brandt. Interactive C++ code development using C++ Explorer and GitHub classroom for educational purposes. *Concurrency and Computation: Practice and Experience*, 2022.

M. Birner, P. Diehl, R. Lipton, and M. A. Schweitzer. A fracture multiscale model for peridynamic enrichment within the partition of unity method. *Advances in Engineering Software*, 176, Nov 2022.

D. C. Marcello, S. Shiber, O. De Marco, J. Frank, G. C. Clayton, P. M. Motl, P. Diehl, and H. Kaiser. Octo-Tiger: a new, 3D hydrodynamic code for stellar mergers that uses HPX parallelisation. *Monthly Notices of the Royal Astronomical Society*, 2021.

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P. K. Jha and P. Diehl. Nlmech: Implementation of finite difference/mesh-free discretization of nonlocal fracture models. *Journal of Open Source Software*, 6(65):3020, 2021.

P. Diehl, D. Marcello, P. Armini, H. Kaiser, S. Shiber, G. C. Clayton, J. Frank, G. Daiss, D. Pfleiderer, D. C. Eder, A. Koniges, and K. Huck. Performance Measurements within Asynchronous Task-based Runtime Systems: A Double White Dwarf Merger as an Application. *Computing in Science & Engineering*, 2021.

P. Diehl, G. Daiß, D. Marcello, K. Huck, S. Shiber, H. Kaiser, J. Frank, G. C. Clayton, and D. Pfleiderer. Octo-Tiger's New Hydro Module and Performance Using HPX+ CUDA on ORNL's Summit. In *2021 IEEE International Conference on Cluster Computing (CLUSTER)*, pages 204–214. IEEE, 2021.

S. Prudhomme and P. Diehl. On the treatment of boundary conditions for bond-based peridynamic models. *Computer Methods in Applied Mechanics and Engineering*, 372:113391, 2020.

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D. S. Katz, P. Diehl, and W. Gearty. Joss: A journal for open source software that is an open source software project. US Research Software Engineering Conference 2025 (USRSE'25), 6.10-08.10 2025, Philadelphia, USA.

P. Diehl. Asynchronous-Many-Task Systems: Challenges and Opportunities – Scaling an AMR Astrophysics Code on Exascale machines using Kokkos and HPX. Algorithms For Multiphysics Models In The Post-Moore's Law Era, 02.06-13.06 2025, Los Alamos, USA.

P. Diehl. Asynchronous-Many-Task Systems: Challenges and Opportunities – Scaling an AMR Astrophysics Code on Exascale machines using Kokkos

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P. Diehl. The Journal of Open Source Software: Developing a Software Review Community. Computer Science Seminar Series at Argonne National Laboratory, 12.11 2024, Virtual event.

P. Diehl. Kokkos Pitch. US-RSE Community Call, 12.09 2024, Virtual event.

P. Diehl. Is RISC-V ready for HPC workloads? (random access talk). Salishan Conference on High Speed Computing, 22.04-25.04 2024, Lincoln Beach, USA.

P. Diehl. HPX with Spack and Singularity Containers: Evaluating Overheads for HPX/Kokkos using an astrophysics application. Workshop on Asynchronous Many-Task Systems and Applications 2024, 14.02-16.02 2024, Knoxville, US.

P. Diehl. Evaluating HPX and Kokkos on RISC-V using an Astrophysics Application Octo-Tiger. 21th Annual Workshop on Charm++ and Its Application, 25.04-26.04 2024, Champaign, USA.

P. Diehl. Preparing for HPC on RISC-V: Examining Vectorization and Distributed Performance of an Astrophysics Application with HPX and Kokkos. International workshop on RISC-V for HPC held in conjunction with the International Conference on High Performance Computing, Network, Storage, and Analysis 2024, 18.11 2024, Atlanta, US.

P. Diehl. Evaluating AI-generated code for C++, Fortran, Go, Java, Julia, Matlab, Python, R, and Rust. Asynchronous Many-Task systems for Exascale (AMTE24) held in conjunction with 30th International European Conference on Parallel and Distributed Computing (EuroPar24), 26.08-30.08 2024, Madrid, Spain.

P. Diehl. JOSS and FLOSS for science: Examples for promoting open source software and science communication. SIGDIUS Seminars, 14.06 2023, Virtual event.

P. Diehl. Simulating Stellar Merger using HPX/Kokkos on A64FX on Supercomputer Fugaku. The 24th IEEE International Workshop on Parallel

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P. Diehl. Recent developments in HPX and Octo-Tiger. Physics & Astronomy Colloquium, 23.1 2023, Baton Rouge, USA.

P. Diehl. AI-based identification of coupling regions for local and non-local one-dimensional coupling approaches. 17th U. S. National Congress on Computational Mechanics (USNCCM), 23.07-27.07 2023, Albuquerque, US.

P. Diehl. A Fracture Multiscale Model for Peridynamic enrichment within the Partition of Unity Method: Experimental validation. XVII International Conference on Computational Plasticity, Fundamentals, and Applications (COMPLAS 23), 05.09-07.09 2023, Barcelona, Spain.

P. Diehl. AI-based identification of coupling regions for local and non-local one-dimensional coupling approaches. 10th International Congress on Industrial and Applied Mathematics (ICIAM), 20.08-25.08 2023, Tokyo, Japan.

P. Diehl. Benchmarking the Parallel 1D Heat Equation Solver in Chapel, Charm++, C++, HPX, Go, Julia, Python, Rust, Swift, and Java. Asynchronous Many-Task systems for Exascale (AMTE23) held in conjunction with 29th International European Conference on Parallel and Distributed Computing (EuroPar23), 28.08-01.09 2023, Limassol, Cyprus.

P. Diehl and G. Daiß. Porting our astrophysics application to Arm64FX and adding Arm64FX support using Kokkos. Ookami user group meeting, 10.02 2022, Virtual event.

P. Diehl and S. Brandt. Interactive C++ code development using C++ Explorer and GitHub Classroom for educational purposes. emBO++ Embedded C++ and C conference, 25.03-23.03 2022, Virtual event.

P. Diehl. Quasistatic Fracture using Nonlinear-Nonlocal Elastostatics with an Explicit Tangent Stiffness Matrix for arbitrary Poisson ratios. 15th. World Congress on Computational Mechanics (WCCM XV), 31.07-05.08 2022, Virtual event.

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P. Diehl. Recent developments in HPX and Octo-Tiger. ISTI Seminar Series, 1.11 2022, Los Alamos, USA.

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P. Diehl. A tale of two approaches for coupling nonlocal and local models. Continuum Mechanics Seminar (CMS), 10.11 2022, Lincoln, USA.

P. Diehl. Quantifying Overheads in Charm++ and HPX using Task Bench. Asynchronous Many-Task systems for Exascale (AMTE) 2022, 23.08 2022, Glasgow, UK.

P. Diehl and S. Prudhomme. Challenges for coupling approaches for classical linear elasticity and bond-based peridynamic models for non-uniform meshes and damage . Society of Engineering Science Annual Technical Meeting (SES2022), 16.10-19.10 2022, College Station, USA.

P. Diehl. Quantifying Overheads in Charm++ and HPX using Task Bench. The Charm++ Workshop 2022, 19.10-20.10 2022, College Park , USA.

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P. Diehl. Quasistatic Fracture using Nonliner-Nonlocal Elastostatics with an Analytic Tangent Stiffness Matrix. 16th U.S. National Congress on Computational Mechanics (USNCCM16), 25.07-29.07 2021, Virtual event.

P. Diehl. A comparative review of peridynamics and phase-field models for engineering fracture mechanics. 14th. World Congress on Computational Mechanics (WCCM XIII), 11.01-15.01 2021, Virtual event.

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P. Diehl and S. R. Brandt. Deploying a Task-based Runtime System on Raspberry Pi Clusters. IEEE/ACM 4th International Workshop on Extreme Scale Programming Models and Middleware (ESPM2'20), 09.11-19.11 2020, Virtual event.

P. Diehl. On the treatment of boundary conditions for bond-based peridynamic models. 3rd Annual Meeting of the SIAM Texas-Louisiana Section, 16.10-18.10. 2020, Virtual event.

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P. Diehl. A review of benchmark experiments for the validation of peridynamics models. Workshop on Experimental and Computational Fracture Mechanics, 26.02-28.02. 2020, Baton Rouge, USA.

P. Diehl. Long term availability of raw experimental data in experimental fracture mechanics. Scientific Computing Around Louisiana (SCALA), 07.02-08.02. 2020, Baton Rouge, USA.

P. Diehl. Implementation of Peridynamics utilizing HPX—the C++ standard library for parallelism and concurrency. Engineering Mechanics Institute Conference, 18.06-21.06 2019, Pasadena, USA.

P. Diehl. Computational Analysis of Coupling Methods for Classical Continuum Mechanics and Peridynamics Models. 15th U.S. National Congress on Computational Mechanics (USNCCM15), 28.07-01.08 2019, Austin, USA.

P. Diehl. An overview for coupling finite elements with peridynamics. International Congress on Industrial and Applied Mathematics, 15.07-19.07 2019, Valencia, Spain.

P. Diehl. Extracting constitutive mechanical parameters in linear elasticity using the virtual fields method within the ordinary state-based peridynamics framework. 18th U.S. National Congress for Theoretical and Applied Mechanics, 04.06-09.06 2018, Rosemont, US.

P. Diehl. A Review for Benchmark Experiments against Peridynamic Models. 13th. World Congress on Computational Mechanics (WCCM XIII), 23.07-27.07 2018, New York City, US.

P. Diehl. Integration of CUDA Processing within the C++ library for parallelism and concurrency (HPX). IEEE/ACM 4th International Workshop on Extreme Scale Programming Models and Middleware (ESPM2'18), 12.11-16.11 2018, Dallas, USA.

P. Diehl. A Review for Benchmark Experiments against Peridynamic Models. Nonlocal Methods in Fracture, 15.01-16.01 2018, Austin, USA.

P. Diehl. Extracting constitutive mechanical parameters in linear elasticity using the virtual fields method within the ordinary state-based peridynamics framework. Optimization days 2018, 07.05-09.05 2018, Montreal, Canada.

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Posters

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Reviewer

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