Andrew Michael Jones, Ph.D.

Computational Mathematician and Scientist
High Performance Computing, Software Engineer
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Summary

Highly motivated and forward-thinking Ph.D. in Computing with expertise in high performance computing, computational science, and numerical methods for partial differential equations, particularly meshfree approaches. Proven ability to design, develop, and implement complex software solutions for modeling scientific phenomena, fluid dynamics, bulk-surface interactions, reaction-diffusion systems, and plasma physics. Skilled in utilizing advanced computational methods and parallel programming techniques to solve challenging scientific problems across diverse domains. Seeking a challenging and impactful role leveraging this computational expertise in a research and development environment.
Security Clearance: DOE-Q

Skills

Computer Skills:

- **Programming Languages and Software Development Tools:** Python, C, C++, FORTRAN, Bash, Git
- **Operating Systems:** Linux (i.e. RHEL/CentOS, Ubuntu), Windows
- **Specialized Tools:** Particle-in-Cell (PIC) plasma modeling frameworks, OpenFOAM, Trilinos, Kokkos, OpenMP, MPI
- **Computational Methods:** KD-tree algorithms, KNN search optimization, Moving Least Squares (MLS) approximation, Radial Basis Functions (RBFs), meshfree discretization techniques, spectral and finite element methods,

Professional Experience

Sandia National Laboratories (NM) - Postdoctoral Appointee

December 2022 - September 2025
Thermal and Fluids Group

- Designed and developed high performance computing software utilizing advanced computational methods, including meshfree approaches, for complex scientific simulations.

- Implemented and collaborated on development of ion mobility spectrometer simulations using Particle-in-Cell (PIC) plasma models for monitoring SF6 leaks, a compound utilized in the electrical and energy sector.
- Implemented parallel algorithms for PIC modeling, significantly improving computational efficiency for large-scale simulations.
- Developed and applied algorithms for smoothing high-intensity surface heating in plasma models and meshfree frameworks for electrode material modeling.

Sandia National Laboratories (NM) - Graduate Research Intern

May 2020 - December 2022
Computational Science Group | Thermal and Fluids Group

- Adapted meshfree methods for atmospheric flow problems with applications climate and weather prediction.
- Developed efficient numerical solvers for diffusion-reaction equations in heterogeneous media using RBF-FD methods.

Boise State University - Graduate Research Assistant

September 2019 - May 2022
Mathematics Department

- Conducted research in numerical methods for partial differential equations, with a strong emphasis on meshfree approaches.
- Examined and designed meshfree approximation schemes (RBFFD, GMLS, GFD) for high order surface operators with applications to bulk-surface coupled phenomena (fluids) with applications to interface dynamics.
- Fast meshfree multigrid solver of surface PDEs with extension to domains with boundaries.
- Performed data visualization and analysis of simulation results for complex physical systems.

Education

Boise State University, Boise, Idaho

Ph.D. in Computing, *August 2018 - December 2022*
Emphasis: Computational Science, Mathematics and Engineering
Dissertation: "Meshfree Methods for PDEs on Surfaces"

Kennesaw State University, Kennesaw, Georgia

B.S. in Physics, *August 2015 - May 2018*
Senior Project: "The sub-Eddington boundary for the quasar mass-luminosity plane"

Publications

- Andrew M. Jones, Peter A. Bosler, Grady B. Wright. "Generalized moving least squares vs. radial basis function finite difference methods for approximating surface derivatives." Computers &

Mathematics with Applications, Volume 147, 1 October 2023, Pages 1-13. DOI: https://doi.org/10.1016/j.camwa.2023.07.015

- Grady B. Wright, Andrew M. Jones, Varun Shankar. "MGM: A meshfree geometric multilevel method for systems arising from elliptic equations on point cloud surfaces." Journal of Computational Physics, Volume 450, 2022. DOI: https://doi.org/10.1016/j.jcp.2022.110898

- David Garofalo, Damian J. Christian, Andrew M. Jones. "The sub-Eddington boundary for the quasar mass-luminosity plane: A theoretical perspective." Universe, Volume 5, Issue 2, 2019. DOI: https://doi.org/10.3390/universe5020045

- David Garofalo, Chandra B. Singh, Dylan T. Walsh, Damian J. Christian, Andrew M. Jones, Alexa Zack, Brandt Webster, Matthew I. Kim. "The redshift distribution of BL Lacs and FSRQs." Research in Astronomy and Astrophysics, Volume 18, 2018. DOI: https://doi.org/10.1088/1674-4527/18/4/006

Conferences

Posters, Talks, and Presentations

- “Optimization of Ion Focusing Optics in IMS Detectors”, American Society Mass Spectrometry, June 2025
- "Meshfree Multilevel Methods for Surface PDEs", Society of Industrial Applied Mathematics Computational Science and Engineering (CSE) Conference, 2021
- "Meshfree Multilevel Methods", Copper Mountain Conference on Iterative and Multigrid Methods, 2022
- "Towards a Hybrid RBF-SEM Framework for Bulk-Surface PDEs", Biennial Society of Industrial Applied Mathematics Pacific NorthWest Section Meeting, 2019

- "Preliminary CFD study of Pebble Size and its Effect on Heat Transfer in a Pebble Bed Reactor", American Physical Society Division of Fluid Dynamics (APS DFD), November 2017
