Andrew Michael Jones, Ph.D.

Computational Mathematician and Scientist
High Performance Computing, Software Engineer
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As a Ph.D. in Computing with nearly a decade of hands-on high-performance computing experience, I bring strong analytical and problem-solving skills applicable to technical characterization work. My background in particle-in-cell plasma simulations, computational fluid dynamics, and complex numerical methods—combined with proficiency in Python, C++, and FORTRAN—provides a solid foundation for data analysis and algorithm development. My experience developing sophisticated parallel algorithms and working with precision scientific computing applications demonstrates the technical depth and analytical approach valuable for measurement and characterization roles.

Security Clearance: DOE-Q

Skills

Computer Skills:

- **Programming Languages and Software Development Tools:** Python, C, C++, FORTRAN, Bash, Git, GNU Make, CMake
- **Operating Systems:** Linux (i.e. RHEL/CentOS, Ubuntu), Windows
- **HPC Tools:** Kokkos, OpenMP, MPI, CUDA, PBS, SLURM
- **Physics, Mathematics, Engineering Tools**: Trilinos, OpenFOAM, Matlab, Cubit, Solidworks, FreeCAD, Gmsh, MeshLab
- **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, finite difference/volume, iterative 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.

- Developed framework for ion mobility spectrometer simulations using Particle-in-Cell (PIC) plasma code for monitoring SF6 leaks, a compound utilized in the electrical and energy sector.
- Introduced shared memory parallelism to MPI enabled PIC code.
- 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

- Utilized high-performance KD-tree and KNN search algorithms for flexible PDE solvers.
- Adapted meshfree methods for atmospheric flow problems with applications climate and weather prediction.
- Created 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.
- Developed novel computational techniques for modeling charged particle transport applicable to spectrometry applications.
- Examined and deisgned meshfree approximation schemes (RBFFD, GMLS, GFD) for high order surface operators with applications to bulk-surface coupled phenomena 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

- Andrew M. Jones and Peter A. Bosler. "Radial Basis Functions in the Tangent Plane: Meshfree Approximation Methods for the Sphere." Computer Science Research Institute Summer Proceedings 2020, pages 57–67. (2020). (No DOI available)

- 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
