Job Description

Job Title  Compressible Computational Fluid Dynamics Postdoctoral Appointee
Job ID  664661
Location  Albuquerque, NM
Full/Part Time  Full-Time
Regular/Temporary  Temporary

What Your Job Will Be Like

Are you passionate about your work and dream of utilizing state-of-the-art facilities to explore solutions? Do you want to join a dynamic team that solves significant issues for our nation’s security?

We are seeking Postdoctoral Appointees to work with our team to develop algorithms, models and software to simulate compressible turbulent flows from subsonic to hypersonic Mach numbers.

On any given day, you may be called on to:

- Analyze, develop, implement, and evaluate models and algorithms for compressible Direct Numerical Simulations (DNS), Large Eddy Simulations (LES), Reynolds Averaged Navier Stokes (RANS) simulations, and hybrid RANS/LES simulations
- Analyze and improve performance of codes on next generation computing architectures
- Support areas of development including: structured and unstructured high-order finite volume, finite difference, and finite element methods applied to transonic and hypersonic fluid flow; algorithms for GPUs, many-core, and other advanced architectures; mesh adaptation for petascale and larger simulations; and coupling approaches for multi-physics problems such as conjugate heat transfer and fluid-structure interaction in high-speed flows
- Contribute to algorithms for simulating aerodynamic heating, aerothermodynamics and develop physical models for material response in hypersonic flow

Qualifications We Require

- PhD, conferred within 5 years prior to employment, in the aerospace engineering, mechanical engineering, or applied mathematics/computational engineering sciences (with concentration in fluid dynamics)
- Development experience in CFD for compressible high Reynolds number turbulent flows
- Experience with computational approaches (finite element, finite difference, and finite volume methods) for CFD simulations
- Experience with code development
- Good communication skills as evidenced by a history of publication of results in peer-reviewed journals and external presentations at appropriate scientific conferences
- Ability to obtain and maintain a DoE L clearance

Qualifications We Desire

- Experience working with a diverse team
- Experience solving hypersonic flows, especially methods for predicting mechanical and thermal loading and response
- Experience with turbulence modeling (LES, RANS, Hybrid RANS-LES models) for compressible turbulent flows
- Experience in numerical simulation of coupled fluid/thermal or fluid/structure interactions
- Experience with using advanced scientific software (CFD, FEA, etc.) on massively parallel computing clusters
- Experience with scientific software development, including working with development teams using object-oriented frameworks
- Experience with parallel programming for scientific software applications
- Experience in next-generation computing programming models (e.g. OpenMP, CUDA, Kokkos)
- Experience with Matlab, scripting languages, and grid generation software
- Experience with code and solution verification, validation, and uncertainty quantification

Position Information

This postdoctoral position is a temporary position for up to one year, which may be renewed at Sandia's discretion up to five additional years. The PhD must have been conferred within five years prior to employment.

Individuals in postdoctoral positions may bid on regular Sandia positions as internal candidates, and in some cases may be converted to regular career positions during their term if warranted by ongoing operational needs, continuing availability of funds, and satisfactory job performance.

About Our Team

The Aerosciences Department and the Computational Thermal and Fluid Mechanics Department develop aerodynamics, aerothermodynamics, compressible fluid mechanics, and flight dynamics simulation software to execute on a variety of high performance computing platforms. These codes will be used to perform highly detailed simulations for use in the design, development and qualification of nuclear weapons, as well as aeronautics projects funded through the U.S. Department of Defense, DARPA, NASA, and industry. The code development efforts are focused on providing tools for analysts at Sandia and partner institutions. The code areas are primarily in thermal analysis and compressible flow (subsonic, transonic and hypersonic), and shock physics. Our broader code development team also develops simulation capabilities for modeling shock physics, solid mechanics, structural dynamics, participating media radiation, fire environments, and incompressible fluid flow (with capillary hydrodynamics, drying, porous flow -- multi-physics). Code teams are typically five to ten people, and strong interaction with the analysis teams is an important part of the code development process. Our projects span the Mach number range from subsonic through hypersonic and involve systems ranging from aircraft released ordnance to reentry systems and rocket systems. Technical activities include experimental, analytical, and computational efforts plus support of flight test activities, both pre-flight/post-flight analyses and field test operations.

About Sandia
Sandia National Laboratories is the nation’s premier science and engineering lab for national security and technology innovation, with teams of specialists focused on cutting-edge work in a broad array of areas. Some of the main reasons we love our jobs:

• Challenging work with amazing impact that contributes to security, peace, and freedom worldwide
• Extraordinary co-workers
• Some of the best tools, equipment, and research facilities in the world
• Career advancement and enrichment opportunities
• Flexible schedules, generous vacations, strong medical and other benefits, competitive 401k, learning opportunities, relocation assistance and amenities aimed at creating a solid work/life balance*


*These benefits vary by job classification.

Security Clearance

Position requires a Department of Energy (DOE) L-level security clearance.

Sandia is required by DOE to conduct a pre-employment drug test and background review that includes checks of personal references, credit, law enforcement records, and employment/education verifications. Applicants for employment must be able to obtain and maintain a DOE L-level security clearance, which requires U.S. citizenship. If you hold more than one citizenship (i.e., of the U.S. and another country), your ability to obtain a security clearance may be impacted.

Applicants offered employment with Sandia are subject to a federal background investigation to meet the requirements for access to classified information or matter if the duties of the position require a DOE security clearance. Substance abuse or illegal drug use, falsification of information, criminal activity, serious misconduct or other indicators of untrustworthiness can cause a clearance to be denied or terminated by the DOE, resulting in the inability to perform the duties assigned and subsequent termination of employment.

EEO

All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability, or veteran status.

https://hrss.sandia.gov/psc/pspr1/EMPLOYEE/HRMS/c/HRS_HRPM.HRS_JOB_OPENING...