Sandia National Laboratories

Computational Plasma Physics Position
Sandia National Laboratories
Fluid Sciences and Engineering Department
Albuquerque, New Mexico

Department Description:
The Fluid Sciences and Engineering Department at Sandia National Laboratories provides a wide range of fluid modeling and experimental discovery and validation support in discipline areas such as: incompressible flow, porous flow, reactive flow, multiphase flow, thermal/fluid coupling, suspensions, plasma physics, and rarefied gas dynamics. The department supports activities spanning the entire research-design-analysis spectrum, from creating fundamental physical models, to developing computational algorithms and codes, to applying these models and codes to solve fluid and plasma problems in a wide range of applications.

Required Criteria:

- Ph.D. in Physics, Chemical Engineering, Mechanical Engineering, Aerospace Engineering, Electrical Engineering, Computer Science, Materials Science/Engineering, or other related science or engineering field.
- Experience with the numerical simulation of rarefied gas flows, plasma generation, and/or plasma physics.
- Record of peer-reviewed publications and reports.
- Strong academic credentials and personal/professional references (at least a 3.2 undergrad and 3.5 graduate GPA).
- Ability to obtain a DOE Q clearance (requires United States citizenship).

Desired Criteria:

- Demonstrated ability to work with multi-disciplinary teams.
- Experience developing computational simulation methods for rarefied gas flows, plasma generation, or plasma physics.
- Experience using and/or developing particle-based codes, such as PIC or DSMC.
- Familiarity with standard programming languages, including C or C++.
- Experience using advanced computer science algorithms to accelerate particle-based codes.
- Desire to solve real-world problems and understand how plasma physics affect a complicated system.

Job Description:
We are seeking an exceptional PhD-level scientist/engineer for a staff position to invent, develop, and apply advanced computational models for the kinetic simulation of rarefied-gas flows and low temperature, dynamic plasmas. We are looking for a candidate to perform research and development that would support two simulation tools that rely on the particle-based direct simulation Monte Carlo (DSMC) method: 1) an open-source code (SPARTA) for modeling rarefied neutral gas flows and 2) a proprietary code that combines Particle-In-Cell (PIC) and DSMC methods to simulate electrostatically coupled plasmas. Both capabilities are massively parallel, incorporate load balancing methods, and use a number of advanced computer science algorithms to accommodate large variations in spatial and temporal scales. Computational model development is tightly coupled to active verification and validation efforts.

A successful candidate will participate in research that seeks to understand and develop computational models to simulate rarefied-gases and plasmas (including both plasma generation through vacuum arc breakdown and plasma transport under external electric fields). Furthermore, the candidate will participate in basic research and development activities supporting the simulation of transient plasma generation and plasma flow. Experience with plasma physics, rarefied gas flow, PIC, or DSMC code development and simulation-based scientific investigation as part of a multi-disciplinary team are desired.

Please send an electronic resume, including GPA for all degrees, publications list, and references to:
Dr. Daniel Rader, Thermal/Fluid Component Science Department, via e-mail to djrader@sandia.gov or phone 505.844.0528.