

## Job Description

**Job Title:** Computational Scientist Postdoctoral Research Associate

**Job ID:** 9079

**Location:**

**Full/Part Time:** Full-Time

**Regular/Temporary:** Regular

---

[Email to Friend](#)   [Save Job](#)   [Apply Now](#)   [Return to Previous Page](#)

---

### Job Information

Job Title: Computational Scientist Postdoctoral Research Associate

Org: Fuel Modeling & Simulation

Contact: Laurie Taylor, [laurie.taylor@inl.gov](mailto:laurie.taylor@inl.gov)

Work Location: Idaho Falls, ID (Town)

Position Description Number: 9079/14646

---

### Mission/Vision Statement

**Mission:** Discover, demonstrate and secure innovative nuclear energy solutions, other clean energy options and critical infrastructure.

**Vision:** INL will change the world's energy future and secure our critical infrastructure.

---

### Responsibilities

Since the accident at the Fukushima Daiichi Nuclear Power Station, enhancing the accident tolerance of light water reactors has become an important research topic. In particular, the community is actively developing enhanced fuels and cladding for LWRs to improve safety in the event of accidents in the reactor or spent fuel pools. A concept of this type is referred to as an accident tolerant fuel (ATF).

The Nuclear Energy Advanced Modeling and Simulation (NEAMS) program in DOE has for some time been creating advanced computational analysis tools. These include BISON and Marmot, under development primarily at Idaho National Laboratory (INL) and tailored to nuclear fuel at the engineering scale and grain scale, respectively. Recently, NEAMS has introduced what it calls High Impact Problems (HIPs) into its program plan. These HIPs are intended to make a significant advance in a particular area of nuclear power research in a short period of time. NEAMS has chosen an ATF project at INL, which emphasizes utilizing BISON and Marmot to model proposed materials, as its first HIP.

The Fuel Modeling and Simulation Department at Idaho National Laboratory (INL) includes experts in engineering software development, computer science, and material science. The department creates software tools to tackle the most difficult questions in nuclear fuel behavior, questions that are beyond the reach of custom legacy tools or modern general purpose commercial products. The team focuses on delivering useful tools to answer current questions, as opposed to creating research-centric applications. Still, research is a large component of the work, and the department publishes a significant number of journal papers each year.

The Fuel Modeling and Simulation Department seeks well-qualified candidates to fill a computational scientist postdoctoral position to assist with the development of ATF computational capabilities. The successful candidate will be responsible for developing models, methods, and verification/validation strategies supporting nuclear fuel performance simulations associated with ATF materials such as iron-chromium-aluminum alloys and uranium silicide. It is anticipated that the bulk of the research and development would take place using the engineering scale code BISON.

The skills necessary to compete for this position include a knowledge of the finite element method in a solid mechanics setting. Experience with one of the following is required with experience in multiple areas greatly strengthening the application: iron-chromium-aluminum alloy behavior, uranium silicide behavior, effects of irradiation on materials, thermomechanics, fracture mechanics, creep modeling, composite mechanics, multiscale methods, and uncertainty quantification.

In addition to engineering expertise, the position requires significant numerical methods, software development, and computer science talent. Knowledge of iterative solvers, nonlinear solvers, preconditioning, PETSc, meshing, parallel computing, agile software development practices, C++, Python, Paraview, git, and Linux/Mac OS X will be an advantage.

Furthermore, the position requires excellent communication skills. The successful candidate will document work in journal papers and program reports. Frequent communication with program sponsors, experiment designers, post-irradiation examination experts, and team members is essential. Oral presentations will also be required. In short, the position requires clear, high quality communication whether in a written form, a formal oral setting, or in day-to-day interactions with peers and stakeholders.

---

### Qualifications

**REQUIRED QUALIFICATIONS:**

- PhD requirements in mechanical engineering, civil engineering, nuclear engineering, applied mathematics, physics, or a related field or in related fields must be completed by commencement of appointment and within the previous 5 years
- US Citizens, legal permanent residence (LPR) or applicants with up to date visas and eligibility to work in the US will be considered for this position
- Strong written and verbal communication, in English

**Special Requirements and/or Training:**

Direct experience with the finite element method in a solid mechanics setting. Direct experience with iron-chromium-aluminum alloys, uranium silicide, or other nuclear materials.

Appreciable knowledge of numerical methods, computational science, scientific computing, and scientific software engineering. Ability to coordinate and execute project/program activities relative to work package scope, deliverables, and milestones. Demonstrated ability to productively collaborate with others and to conceive and execute computational mechanics research. Excellent technical writing and oral communication skills.

---

**Essential Functions**

An Essential Function is a core duty required for the job position which the employee must be able to fulfill, with or without accommodation. Information provided below will be used during the interview to help describe the job so the applicant has a reasonable understanding of the job duties/expectations.

Fine motor control (hands); Intermittent repetitive work; Near/far vision; Depth perception; Basic color discrimination; Ability to hear audio alarms; Typing/keyboard; Working > 8 hrs./day; Overtime/irregular hours; Working alone.

---

**Environmental, Safety & Health**

Must be familiar with, and comply with all relevant health and safety requirements. Must be knowledgeable of emergency action policies and procedures, methods for reporting/resolving work practices or conditions to available cognizant professionals.

---

**Other Information**

When applying to positions, please provide a resume and answer all questions on the following screens. Applicants, who fail to provide a resume or answer the questions, may be deemed ineligible for consideration.

---

**Please Apply Before:**

07/19/2015 (Midnight).

---

**INL Overview**

The INL is a science-based, applied engineering national laboratory dedicated to supporting the U.S. Department of Energy's mission in nuclear energy research, science, and national defense. With 3,800 scientist, researchers and support staff, the laboratory works with national and international governments, universities and industry partners to discover new science and develop technologies that underpin the nation's nuclear and renewable energy, national security and environmental missions.

---

**The Idaho Falls Area**

Idaho Falls is conveniently situated near many national treasures such as Yellowstone National Park, Teton National Park, Jackson, WY, etc. For more information about the area, please visit [www.visitidahofalls.com](http://www.visitidahofalls.com) and [www.visitidaho.org](http://www.visitidaho.org).

---

**Equal Employment Opportunity**

Idaho National Laboratory (INL) is an Equal Employment Opportunity (EEO) employer. It is the policy of INL to provide equal employment opportunities to all qualified applicants without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, protected veteran or disabled status, or genetic information.

---

[Email to Friend](#)   [Save Job](#)   [Apply Now](#)

[Return to Previous Page](#)

---