Earth and Environmental Sciences Division

Job Title: **Computational Earth Scientist**
Geomechanics (Scientist 3/4)
Location: **Los Alamos, NM, US**
Organization Name: **EES-17/Geophysics**
Job ID: **IRC19552**

Department Description:
Located in northern New Mexico, Los Alamos National Laboratory (LANL) is a multidisciplinary research institution engaged in strategic science on behalf of national security. LANL enhances national security by ensuring the safety and reliability of the U.S. nuclear stockpile, developing technologies to reduce threats from weapons of mass destruction, and solving problems related to energy, environment, infrastructure, health, and global security concerns.

The mission of the Earth and Environmental Sciences (EES) Division of Los Alamos National Laboratory is to solve complex problems of importance in environment, energy, and national security by using our capabilities in earth and environmental sciences. The division is a highly interactive, well-funded research organization with an annual budget of approximately $100 million and a staff of approximately 240. The core disciplines of EES Division include Geology, Geochemistry, Geophysics, Geomaterials, Geography, Hydrology, Atmospheric Science, Ecology, Environmental Science, Computational Science and Geotechnical Engineering. The disciplines are organized into groups within the division, which consist of 30-40 Scientists, with approximately 20 support staff, post-docs, and students. Each group has a variety of scientific programs, on the order of $20-$25M in direct funding. The members of each group are organized into 3 or 4 teams, led by team leaders who support the Group Leader directly.

This job posting is for the Geophysics Group (EES-17). EES-17 performs research and develops capabilities for computing solutions to address challenges in dynamic response of rock material resulting from explosive and hydraulic stresses, seismology and earthquake hazards, clean energy development, environmental management, nuclear waste disposal, and resource extraction impacts. The Group is characterized by a balance of basic and applied research, encompassing experimental and computational analyses, which leads to the development of novel and integrated capabilities that are then utilized to address practical problems for sponsors in multiple offices in DOE, other federal agencies, and a variety of industries.

EES-17 is looking for a creative, experienced professional scientist or engineer to join our interdisciplinary team and take a leadership role in three-dimensional numerical modeling of fracture dynamics of rock. The successful candidate will apply numerical modeling (e.g. finite element, finite difference, discrete elements) for simulating response of geomaterials to various stress regimes applied to problems of large strain and large strain rate. In particular, we seek

researchers with experience and expertise in the development and implementation of geomechanical and geodynamic constitutive material models for finite element analyses. Ideally, the candidate will have experience with coupled thermal-mechanical-fluid modeling, particularly when related to fluid flow in fractured rock.

The successful candidate will conduct innovative research and investigation and will develop and lead projects supported by interdisciplinary teams of scientists and engineers. He/she will interact regularly with sponsors to understand their goals and will author programmatic reports that address problems of national importance. The candidate is expected to secure research funding, publish in peer-reviewed journals and present at national conferences.

The successful candidate will join the interdisciplinary Geodynamics team which collaborates with the EES Subsurface Flow and Transport team. These collaborations are formed to address problems related to hydraulic fracturing, explosive damage, impact damage and other geotechnical challenges. Ongoing research and application areas include geologic carbon sequestration, enhanced oil recovery, unconventional natural gas, geothermal energy, and other innovative energy solutions. Many of our projects address the nation's most challenging subsurface problems. Our team relies heavily on high-performance computing, but also interfaces with other teams that focus on observation and experimentation.

Detailed Description:

This position will be filled at either the Scientist 3 or 4 level, depending on the skills of the selected candidate. Additional job responsibilities (outlined below) will be assigned if the candidate is hired at the higher level.

Scientist 3   ($83,100 - $142,500)
The duties for the Scientist 3 include:

- Leading the development of new proposals that lead to internal and external funding
- Contributing to the leadership of projects in terms of overall direction and specific approaches to solving problems
- Representing the laboratory to external agencies in limited and defined capacities
- Contributing to the identification, promotion, and development of new technical capabilities within the Laboratory
- Leading and contributing to peer-reviewed publications
- Mentors students, post docs, and technicians
- Building and leading small teams to accomplish work objectives
- Participate in new program opportunities as directed
- Some travel may be required

Scientist 4   ($101,400 - $171,000)
The duties for the Scientist 4 include:

- Responsible for all job functions of a Scientist 3, except the duties will be carried out under nominal supervision

- Will providing strategic technical direction to multiple teams for Laboratory-wide initiatives
- Developing and implementing plans for new and significant project development opportunities
- Lead development of large, complex proposals
- May lead moderate to large teams to solve large and challenging problems
- May provide direction to assigned technical and scientific staff

Job Requirements:

Minimum Job Requirements:

- An extensive background in computational rock mechanics, constitutive model formulation, and some knowledge of fluid dynamics
- Demonstrated experience meeting sponsor expectations with respect to scope, schedule, budget and deliverables
- Strong oral and written communications skills, including a demonstrated record of peer-reviewed publications
- Demonstrated experience acquiring internal/external funding for self and others
- Demonstrated record of mentoring students and post docs
- Experience leading interdisciplinary teams of scientist and technicians

Additional Job Requirements for Scientist 4:
In addition to the Job Requirements outlined above, qualification at the Scientist 4 level requires:

- In addition to the Job Requirements outlined above, qualification at the Scientist 4 level requires:
- Prior experience developing and implementing plans for new and significant project development opportunities
- Demonstrated success in building and maintaining moderate to large research portfolios
- Demonstrated leadership in the development of innovative approaches to problem solving
- Discipline authority as demonstrated by publications, invited talks, fellowships and other awards

Desired Skills for Scientist 3 or Scientist 4:

- Experience in the development of novel theoretical methods and computational techniques related to simulation of rock fracture and/or large deformation,
- Experience with numerical modeling (e.g. finite element, finite difference, discrete elements) for simulating response of geomaterials to various stress regimes applied to problems of large strain and large strain rate is desired.
- Experience in the quantitative estimation of uncertainty in model parameters and predictions
- Fluency in one or more programming and/or scripting languages
- Experience in using high performance computing resources

- The ability to collaborate with experimentalists to better understand and simulate rock fracture

Education:

Typical educational requirement is an advanced degree in science from an accredited college or university. Ph.D. preferred, M.S with extensive experience acceptable, in Rock Mechanics, Geomechanics, Geosciences, Computational Sciences, or Engineering and at least 5 years professional experience with strong component of leadership.

Notes to Applicants:

LANL offers an excellent working environment and competitive compensation and benefits package. For further information, see http://www.lanl.gov/careers; job IRC19552. EES Division employs over 200 people, including many postdoctoral associates and graduate students, with expertise in various facets of earth science. EES fosters a family-friendly working environment. Additional information about this position and the Geophysics Group can be obtained by contacting Ken Rehfeldt (krehfeld@lanl.gov, (505) 667-1098).

Additional Details:

Clearance: Q (Position will be cleared to this level). Applicants selected will be subject to a Federal background investigation and must meet eligibility requirements* for access to classified matter.

*Eligibility requirements: To obtain a clearance, an individual must be at least 18 years of age; U.S. citizenship is required except in very limited circumstances. See DOE Order 472.2 for additional information

Pre-Employment Drug Test: The Laboratory requires successful applicants to complete a pre-employment drug test and maintains a substance abuse policy that includes random drug testing.

Regular position: Term status Laboratory employees applying for regular-status positions are converted to a regular status only with approval of the cognizant Principal Associate Director.

Equal Opportunity: Los Alamos National Laboratory is an equal opportunity employer and supports a diverse and inclusive workforce. We welcome and encourage applications from the broadest possible range of qualified candidates. The Laboratory is also committed to making our workplace accessible to individuals with disabilities and will provide reasonable accommodations, upon request, for individuals to participate in the application and hiring process. To request such an accommodation, please send an email to applyhelp@lanl.gov or call 1-505-665-5627.