A Meaningful Internship: *Come join the best and brightest minds in the world at one of the most innovative and creative multidisciplinary research institutions engaged in strategic science on behalf of U.S. national security. The work that we do at Los Alamos National Laboratory (LANL) matters to our country and the world.*

HPC Design Group: Upcoming Student Project Opportunities (Handout III)

Project **Optimizing "spack containerize" for use with Charliecloud**

(Lead Mentor: Tim Randles)

The Spack software package manager has the ability to output software build recipes as dockerfiles. These dockerfiles often require hand-editing to work well with Charliecloud. In this project you will work with the Charliecloud team at Los Alamos to identify common problems with Spack dockerfiles. You will then determine if these problems are best addressed by making changes to Charliecloud's dockerfile support or if there are improvements that should be proposed to Spack's containerize functionality. The intern will be expected to implement suggested changes. At the end of the summer the intern will present their work.

Project **Building a Gitlab test infrastructure using the Ansible Repository**

(Lead Mentor: Cory Lueninghoener)

Use Gitlab's CI/CD pipeline and runner functionality to build an automated test infrastructure for checkins to our Git-backed Ansible repository. This would start out with getting familiar with Gitlab's automated pipeline capabilities and running tasks on code checkin, and move on to simple linting tests that run each time a change is checked in. From there, it could move on to running larger test suites on VMs or in containers, all the way up to building and testing virtual clusters and tagging good cluster image releases.

About the HPC DES Group

The High Performance Computing Design Group focuses on future technologies and systems related to HPC while providing technical resources when needed to the more production focused HPC Groups. Areas of focus include I/O and storage, future HPC architectures, system management, hardware accelerators, and reliability and resiliency. Production timescales of projects vary from weeks in the future for production deployments to 10 years or more for some of the reliability and future architecture work.

Where You Will Work

Our diverse workforce enjoys a collegial work environment focused on creative problem solving, where everyone's opinions and ideas are valued. We are committed to work-life balance, as well as both personal and professional growth. We consider our creative and dedicated scientific professionals to be our greatest assets, and we take pride in cultivating their talents, supporting their efforts, and enabling their successes. We provide mentoring to help new staff build a solid technical and professional foundation, and to smoothly integrate into the culture of LANL.

Los Alamos, New Mexico enjoys excellent weather, clean air, and outstanding public schools. This is a safe, low-crime, family-oriented community with frequent concerts and events as well as quick travel to many top ski resorts, scenic hiking & biking trails, and mountain climbing. The short drive to work includes stunning views of rugged canyons and mesas as well as the Sangre de Cristo mountains. Many employees choose to live in the nearby state capital, Santa Fe, which is known for world-class restaurants, art galleries, and opera.

About LANL

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 High Performance Computing (HPC) Division provides production high performance computing systems services to the Laboratory. HPC Division serves all Laboratory programs requiring a world-class high-performance computing capability to enable solutions to complex problems of strategic national interest. Our work starts with the early phases of acquisition, development, and production readiness of HPC platforms, and continues through the maintenance and operation of these systems and the facilities in which they are housed. HPC Division also manages the network, parallel file systems, storage, and visualization infrastructure associated with the HPC platforms. The Division directly supports the Laboratory's HPC user base and aids, at multiple levels, in the effective use of HPC resources to generate science. Additionally, we engage in research activities that we deem important to our mission.