Samples of Intern Position Descriptions

Although each HIP project is different and the intern job descriptions are by necessity specific to that project, the following samples of intern position descriptions from previous years and mentors may help during the process of finding the perfect intern candidate for your HIP project.

Example 1: Letter to colleagues in academia

My colleague <NAME> and I received funding to host a graduate student or post-doc for a 3-4 month internship at ARL, starting as early as May 2018. The intern's project would involve extending our current capabilities in coarse-grain modeling of energetic materials. The intern could work on a wide variety of projects, including, but not limited to the development of coarse-grain methods and models, and their application to large-scale simulations to explore the effects of material microstructure on the energetic material response.

The internship is through the High Performance Computing Modernization Program (HPCMP), where the aim is to provide experience to prospective DoD employees in defense-related R&D. The intern would receive a monthly stipend of $4000-5000. The intern must be a US citizen.

If you have a student or post doc that would be a good fit, let me know. We plan to interview the candidates over the next few weeks and offer the positions in early February. I can send the project specifics if you're interested.

Best wishes,
<NAME>

Example 2: Job Posting for Computational Sciences Intern

Description

- The intern will help improve algorithms to enhance automated path planning for ocean sensor platforms. Such platforms include automated sensor vehicles with various levels of remote control (controlling depth only, controlling depth and direction, fully powered, etc.), but those controls need to be exercised in such a way to maximize observation parameters. The problem is similar to managing a drone swarm, but in open water.
- Algorithms have already been prototyped that explore optimal paths efficiently using artificial intelligence (AI). However, the incorporation of uncertainty requires the inclusion of ensemble model statistical output into the AI approach. Two things must be accomplished: (1) determine the mechanics necessary for combining ensemble model uncertainty information with optimal path prediction and (2) parallelize this combination of ensembles and AI path prediction.
- Depending upon the student's skills and interests, he or she could either focus on (#1) the combination of AI algorithms and ensemble statistics or (#2) parallelization of a simplistic set of ensemble path prediction tasks. Both approaches need to be compared in terms of quality versus required compute cycles, so either is fruitful and necessary work.
    - Approach #1 would require post-graduate level work in statistics and/or AI. The student would be focusing on a hot topic in the area of machine learning.

- Approach #2 requires undergraduate level work or combined somewhat with Approach #1 at the post graduate level. In this case, the student's expertise should be more focused on computer science and/or parallel performance.

Required Qualifications

- Students majoring in Computer Science, Computer Engineering, Mathematics or Engineering.
- Experience with programming.
- Must have completed 2 years of college in relative studies.

Desired Qualifications

- Students with a BS in Computer Science, Computer Engineering, Mathematics or Engineering who are working toward an MS degree.
- Experience with artificial intelligence, data science, analytics, or statistics, and related programming.
- Experience with modern Fortran.
- Experience with parallel programming.

Example #3: Job Posting for Computational Sciences Intern

Description

- The intern will examine and evaluate the use of TensorFlow in the design of physics-based simulations. The project will start with a basic physics simulation implementation of the heat equation and extend to a more complicated simulation as time allows.
- The intern will write a final report, create a technical poster, and give a presentation on their findings on a quantitative performance comparison between a "traditional" implementation with CPU/GPUs using CUDA/OpenACC and a Tensorflow implementation using CPU/GPUs as well as a qualitative comparison on the ease of implementation using Tensorflow.

Required Qualifications

- Students majoring in Computer Science, Computer Engineering, Mathematics or Engineering.
- Experience with programming.
- Must have completed 2 years of college in relative studies.
- Parallel Programming Experience with MPI and OpenMP.
- C, C++, or Fortran programming experience.

Desired Qualifications

- Students with a BS in Computer Science, Computer Engineering, Mathematics or Engineering who are working toward an MS degree.
- Programming Experience with GPGPUs (CUDA, OpenACC, OpenCL)
- Experience with TensorFlow

Example #4: Announcement circulated to academic (or other relevant) institutions
See following 2 pages from AFRL's 711th Human Performance Wing

High Performance Computing Internship Program (HIP)

Genetic Variability of Phenotypic Outcomes for Individualized Force Health Protection

711th Human Performance Wing

United States Air Force School of Aerospace Medicine

Department of Aeromedical Research

Project Synopsis: Protecting the health of military operators involves assessing, treating and developing countermeasures to illness, injury, or exposure to foreign substances commonly encountered in harsh and varied environments. A complicating factor in this is the wide range of responses that exist for every treatment or exposure due to underlying differences in each person's genetic profile. Understanding how genetics influences response to chemical exposure is critical for advancing personalized medicine and the Air Force's Total Exposure Health (TEH) initiative. This project seeks to use cellular phenotypic signatures to identify individuals that display extreme hypo/hypersensitivity to chemical toxicants and then identify correlations to specific genetic polymorphisms (i.e. mutations) that may contribute to the differential response profile. The ultimate goal is to develop a genetics-based predictive model that can identify individuals that are at a higher risk of adverse health response to toxicant exposure.

To accomplish this, we use genetically-characterized lymphoblast cell lines derived from human patients. Treating a large library of these cells with known toxic agents can elucidate genetic traits and factors that may confer resistance or sensitivity to morbidity caused by exposure to specific agents. These biological effects are assessed by measuring thousands of morphological features in cellular images of lymphoblasts, using high performance computing resources. This project involves "big data" applications, as each experiment measures over 11,000 features of every cell in an image, creating terabytes of data for each experiment. We have created a software-based analytics pipeline to manage and analyze the data.

The goal of this specific internship effort is to design bioinformatic analyses for determining genetic linkages to cellular phenotypes thereby identifying genetic markers (e.g., SNPs) that correlate with differential cellular phenotypic response to chemical or toxin exposure. Specifically, we propose using a published "triangle approach" (Jack, Rotroff et al. 2014), which has three components to the analysis: 1) multivariate analysis of covariance to identify SNPs (i.e., genomic markers) that correlate with the dose-dependent phenotypic signatures for a chemical, 2) qualitative trait locus mapping of SNPs, and 3) analysis and validation of the predicted target genes associated with a phenotype. Students will emerge with rich experience in an on-demand field, and have the opportunity to collaborate with biologists, engineers and programmers, with the goal to publish the work in peer-reviewed journals. The project will provide the student with a challenging, real-world environment to develop technical and professional skills.

Desired Student Level: PhD, Master's, Bachelor's

Desired Discipline: bioinformatics, computer/information science, statistics, genetics/genomics.

Mentor's Short Narrative Bio: Heather Pangburn, PhD, is the Lead Toxicologist in the USAF School of Aerospace Medicine, Department of Aeromedical Research, overseeing and conducting research related to Force Health Protection to include precision medicine/total exposure health efforts, in vitro toxicology, hazard detection and air quality monitoring to evaluate human risk and molecular/synthetic biology. Dr. Pangburn brings 10+ years' experience in toxicology, molecular biology, cell biology and biochemistry. She received her PhD in Molecular Toxicology from the University of Colorado Health Sciences Center (UCHSC) wherein she examined the biologic and biochemical mechanisms of the chemopreventive effects of non-steroidal anti-inflammatory drugs. Heather subsequently executed her postdoctoral fellowship in the Regenerative Medicine and Stem Cell Biology Program at the University of Colorado Denver studying genetic pathways and identifying genetic alterations that occur in acquired skin diseases such as cancer. Following her fellowship, Dr. Pangburn served as Research Scientist and Team Lead in the Human Signatures Branch of Air Force Research Laboratories 711th Human Performance Wing where she led a team of scientists in identifying and exploiting molecular mechanisms to provide enhanced human performance and injury protection to the warfighter in extreme environments.

High Performance Computing Internship Program (HIP)
Information and Application Instructions

Program Dates	• Minimum June 5 – August 11, 2017 (arrive June 4 – depart August 12) • Option to continue through school year from students institution
Program Hours	• Summer: 40 hours per week Monday-Friday • School year (optional): flexible hours
Stipend	• Competitive; commensurate with experience
Research location	• Summer: Wright-Patterson AFB, Dayton, OH • School year (optional): from students institution
Requirement	• Undergraduate/graduate student or postdoctoral fellow • Must have a GPA of 3.0 or higher • Must be a U.S. citizen • Must be able to obtain/maintain clearance (NACI)
Application Deadline	April, 7 2017 at 5:00 PM EST
Deliverables	Final research paper, presentation, and poster
Proof of U.S. citizenship will be required	• **Copy** of U.S. Passport • **Copy** of Certified birth certificate issued by the city, county or state of birth • **Copy of** Consular Report of Birth (of U.S. citizen) Abroad or Certification of Birth • **Copy** of Naturalization Certificate • **Copy** of Certificate of Citizenship
Computer access	Students selected will be required to undergo a National Agency Check prior to being granted access to government computer systems.
Notification	Students selected for the program will receive a fellowship with UES, Inc. to perform intern duties in the 711th Human Performance Wing, United States Air Force School of Aerospace Medicine
For More Info and to Apply	Send CV/resume to: Heather Pangburn, Ph.D. USAFSAM Force Health Protection Lead Toxicologist Aeromedical Research Department United States Air Force School of Aerospace Medicine email: heather.pangburn.1@us.af.mil