Opportunity Title: Technical and Professional Internships - Graduate Students
Opportunity Reference Code: ORNL-GSO-TechProf-2021

Organization Oak Ridge National Laboratory (ORNL)

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How to Apply To continue to the next step, please click the "apply" button and complete the requested information.

You will need to upload the following documents:

1. Current transcripts (unofficial transcripts are acceptable at time of application; an updated official transcript will be required during onboarding)
2. Resume

Application Deadline 5/24/2021 11:59:59 PM Eastern Time Zone

Description Oak Ridge National Laboratory's Graduate Student Opportunities program provides opportunities for graduate students to engage with ORNL projects, connect with ORNL staff and researchers, and join associated enrichment activities. The program is designed to complement academic programs by utilizing the unique resources of Oak Ridge National Laboratory to enhance science, mathematics, engineering, and technology education; encourage careers in science and technology; and improve scientific literacy.

For more information, contact ORNL-GSO@orise.orau.gov.

Scientific discovery is a team effort. Technical and business professionals support achievements in science and technology by helping to manage and operate research projects and facilities. As the largest US Department of Energy science and energy laboratory, ORNL is a great place to gain experience in information technology, facilities and operations, human resources, legal counsel, communications, finance, health services, and other professional fields.

Program Details

- Up to ten week summer internship
- Full-time participation (40 hours/week)
- Appointments will start on **Monday, June 21, 2021**. Dates for individual appointments may be flexible to account for academic calendars and trimester schedules.
- Fully virtual / remote educational experience

Stipend

Participants receive a monthly stipend based on their educational level. Stipend payments are taxable as an educational benefit. There will be a delay before you receive you first stipend payment. **You should be prepared to cover all personal expenses for the first 30 days of your appointment.**

- **Dislocation allowance**: $1,500 one-time payment for a 10 week appointment, deposited near the beginning of the appointment. Housing allowances are paid to offset the costs associated with

housing and other living expenses.

- **Current Master's student* stipend**: $3,450 stipend per month
- **Current Doctoral student* stipend**: $3,725 stipend per month

** Denotes class status completed prior to start date with ORNL and as defined by college/university.*

Qualifications Relevant qualifications will depend on the specific project of interest.

Computing and Computational Sciences

- Reliability Characteristics**:** The Analytics & AI Methods at Scale group of the National Center for Computational Sciences and the Intelligent Systems & Facilities group are analyzing the reliability characteristics of Summit's GPUs. This project focuses on developing a basic understanding of Summit's monitoring and log data and of any GPU faults, errors and failures. The selected student will learn how to perform analytical modeling and statistical analysis of data. The ideal candidate will have a background in computer science, including experience with data analysis, machine learning, and Python.
- Supercomputer Operation: This project will explore the use of artificial intelligence or machine learning techniques that can help to operate modern supercomputers. ORNL will provide an opportunity to access to real-time power & thermal machine data and job scheduler allocation data from the Summit supercomputer. With this data, the selected student will explore machine learning and artificial intelligence techniques to predict near-future power & thermal behavior of Summit. The ideal candidate will have data science skills related to handling data and training machine learning models.
- Simplified Interface to Complex Memory: The Exascale Computing Project has an opportunity focused on Simplified Interface to Complex Memory (SICM). This project is accomplished through a collaboration with Los Alamos National Laboratory, Lawrence Livermore National Laboratory, the University of Tennessee and Oak Ridge National Laboratory. The selected student will learn about utilizing and improving the SICM interface. The ideal candidate will have a computer science background, with familiarity with the SICM interface.
- HPC Community Detection: This high-performance computing (HPC) project focuses on distributed community detection algorithm on bipartite networks. The selected student will learn about mapping domain problems such as identifying biomarkers for disease into community detection in a bipartite network. There will be a scaling aspect of community detection algorithms as well. The ideal candidate will have a computer science background, with interest in graph analytics algorithms and experience with HPC.
- HPC Bottleneck Prediction: This high-performance computing (HPC) project focuses on the widening gap between processor and disk performance gives rise to I/O bottlenecks which heavily impact the overall performance of the applications. Using machine learning tools, we can try to predict I/O patterns on the storage system that will allow

intelligent job scheduling and alleviate some of the I/O bottleneck caused due to I/O contention. The selected student will have an opportunity to learn about the HPC storage system on Summit, and apply machine learning techniques on real HPC workload I/O logs generated from Darshan, an I/O characterization tool. The ideal candidate will have experience with machine learning, with interest in HPC or computer systems.

Energy Science and Technology

- Heat Sink Characterization: The National Transportation Research Center has a project focused on heat sink characterization. The selected student will learn how to software for data acquisition and analysis for heat sinks design for high performance power modules. The ideal candidate may have a mechanical engineering background, with experience with MATLAB, basic programming, and the fundamentals of heat transfer.

Information Technology

- User Interface / User Experience: The Information Technology Services Division has a project focused on UI/UX evaluation. As part of an agile team and community of practice, the selected student will learn about user data analysis, heuristic and statistical analysis, and how to provide recommendations for improved user experience for software and system interfaces. The ideal candidate will have an understanding of UI design; experience / coursework with user research and associated data college and analysis; and user-centered design and design thinking.

Isotope Science and Engineering

- Fluid Dynamics: The Enrichment Science and Engineering Division's Modeling and Data Science Group has a project focuses on computational fluid dynamics. The selected student will explore ways to better inform the meshing requirements needed for these types of problems, using ORNL and commercial software for mesh adaptation. The ideal candidate may have a background in aerospace, mechanical, or a related engineering discipline.

National Security Sciences

- Project EAGLE: The National Securities Sciences Directorate has an opportunity for a student to connect with Project EAGLE, a partnership with the Air Force Research Lab Munitions Directorate to create more secure, fault-tolerant autonomous flight systems for military applications through software-based accuracy checking. The selected student will learn to use artificial intelligence and physics-based models to ensure a proper flight state and detect potential manipulation or malfunction in flight guidance systems. The student may contribute in the creation of potential software-based detection models that interface with the onboard data bus to determine system state and confirm the accuracy

of the data. The ideal candidate will have a background in computer science/engineering or mathematics, with experience with machine learning / neural networks.

Neutron Sciences

- Bibliometrics: Neutron Sciences has a project focused on bibliometrics and database searching. The selected student will learn about publication tracking including publication tracking up to date, gaining skills in bibliometrics and database searching. Other opportunities may include software testing; creating wireframes for software improvements; UX analysis; and creating charts and graphs to better understand facility performance. The ideal candidate will have a background in library and information sciences.

Office of Institutional Strategic Planning

- Library Sciences: The Office of Institutional Strategic Planning has an opportunity for a library school student to gain hands-on experience applying and developing the skills they learned in school. The selected student will gain a broad range of experiences and expand their professional network. The ideal candidate will have a background in library and information sciences. This project may offer a 12 month appointment.

Eligibility Requirements

- **Citizenship:** LPR or U.S. Citizen
- **Degree:** Currently pursuing a Master's Degree or Doctoral Degree.
- **Overall GPA:** 3.00
- **Discipline(s):**
  - **Business** (11)
  - **Chemistry and Materials Sciences** (12)
  - **Communications and Graphics Design** (6)
  - **Computer, Information, and Data Sciences** (17)
  - **Earth and Geosciences** (21)
  - **Engineering** (27)
  - **Environmental and Marine Sciences** (14)
  - **Life Health and Medical Sciences** (46)
  - **Mathematics and Statistics** (10)
  - **Other Non-Science & Engineering** (13)
  - **Physics** (16)
  - **Science & Engineering-related** (1)
  - **Social and Behavioral Sciences** (29)

Affirmation

I certify that I am currently pursuing a graduate degree in a science, technology, engineering, or mathematics field at an accredited university.

I understand that any falsification will render me ineligible for participation and, if found after participation has begun, may require me to reimburse any funds received