Opportunity Title: Mechanical Engineering - Computational Fluid Dynamics Modeling - Summer Internship
Opportunity Reference Code: ERDC-ITL-2023-0006

Organization U.S. Department of Defense (DOD)

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How to Apply Click on *Apply* now to start your application.

Description The Computational Analysis Branch (CAB) of ERDC ITL specializes in analytical, computational, and machine learning modeling of systems and processes on high performance computers.

Computational analysis research is valuable for ERDC ITL computational analysis branch. ERDC ITL developed an algorithm to build digital twin geometry for air filtration media. The digital twin geometry consists of filter mesh elements of nonwoven nanoscale fibers, currently produced by Ansys SpaceClaim software. In this project, the interns will build the digital geometry and perform computational fluid dynamics (CFD) and finite element analysis (FEA) using high performance computing.

Project: This project involves mechanical engineering. The researchers will design and build digital geometry, build digital meshes for the geometry, design computational experiments involving CFD and FEA, upload data files, and execute jobs on the high performance computer. The researchers will be developing journal files and scripting files to automate and simplify the computational analysis. Some of the research will be on local laptop and desktop computers, while the main computational analysis will be accomplished with the HPC. This research project is for interns with an interest in mechanical engineering, specifically computational fluid dynamics.

What will I be doing?

Under the guidance of a mentor, you will gain skills using commercial software packages for geometry development, meshing, computational analysis, and finite element analysis. This research is challenging because of the complexity of the geometry and digital meshes. Research includes

- Building complex digital twin geometry using python and Ansys SpaceClaim.
- Constructing computational meshes of the digital geometry using Ansys Mechanical and Ansys Fluent.
- Building journal files, workflow text files, and script files.
- Uploading data files to the high performance computer.
- Execution of the computational analysis on the high performance computer.
- Analyzing the results.
- Modification of the geometry, mesh, and execution as required.

Why should I apply?

This fellowship provides the opportunity to independently utilize your skills and engage with experts in innovative ideas to move the proposed research forward.

Where will I be located? Vicksburg, Mississippi

What is the anticipated start date?

June 2023 - Exact start dates will be determined at the time of selection and in coordination with the selected candidate.

What is the appointment length?

This appointment is a summer research appointment. Appointments may be extended depending

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on funding availability, project assignment, program rules, and availability of the participant.

What are the benefits?

You will receive a stipend to be determined by the sponsor. Stipends are typically based on a participant's academic standing, discipline, experience, and research facility location. Other benefits may include the following:

- Health Insurance Supplement (*Participants are eligible to purchase health insurance through ORISE)*
- Relocation Allowance
- Training and Travel Allowance

About ORISE

This program, administered by Oak Ridge Associated Universities (ORAU) through its contract with the U.S. Department of Energy (DOE) to manage the Oak Ridge Institute for Science and Education (ORISE), was established through an interagency agreement between DOE and DoD. Participants do not enter into an employee/employer relationship with ORISE, ORAU, DoD or any other office or agency. Instead, you will be affiliated with ORISE for the administration of the appointment through the ORISE appointment letter and Terms of Appointment. Proof of health insurance is required for participation in this program. Health insurance can be obtained through ORISE. For more information, visit the ORISE Research Participation Program at the U.S. Department of Defense.

Qualifications

Students with interest in mechanical engineering and computational fluid dynamics. The following skills are valuable for this research or can be learned on site if not familiar.

- CFD software (Ansys Fluent or any others)
- Meshing software (Fluent meshing, Ansys meshing, or any others)
- Finite element analysis software (Ansys mechanical, Abaqus, or any others)
- Python programming

Application Requirements

A complete application consists of:

- Zintellect Profile
- Educational and Employment History
- Essay Questions (goals, experiences, and skills relevant to the opportunity)
- Resume (PDF)
- Transcripts/Academic Records - For this opportunity, an official transcript or copy of the student academic records printed by the applicant or by academic advisors from internal institution systems may be submitted. Click here for detailed information about acceptable transcripts.
- One recommendation. Your application will be considered incomplete and will not be reviewed until one recommendation is submitted. We encourage you to contact your recommender(s) as soon as you start your application to ensure they are able to complete the recommendation form and to let them know to expect a message from Zintellect. Recommenders will be asked to rate your scientific capabilities, personal characteristics, and describe how they know you. You can always log back in to your Zintellect account and check the status of your application.

If you have questions, send an email to USACE@orise.orau.gov. Please list the reference code of

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this opportunity in the subject line of the email. Please understand that ORISE does not review applications or select applicants; selections are made by the sponsoring agency identified on this opportunity. All application materials should be submitted via the “Apply” button at the bottom of this opportunity listing. Please do not send application materials to the email address above.

Connect with ORISE...on the GO! Download the new ORISE GO mobile app in the Apple App Store or Google Play Store to help you stay engaged, connected, and informed during your ORISE experience and beyond!

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Bachelor's Degree, Master's Degree, or Doctoral Degree received within the last 60 months or currently pursuing.
- **Overall GPA:** 3.00
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (17 👁)
  - **Engineering** (27 👁)
  - **Mathematics and Statistics** (11 👁)
  - **Physics** (16 👁)
- **Age:** Must be 18 years of age