Opportunity Title: Machine Learning Research Internship at Air Force Research Laboratory (AFRL)
Opportunity Reference Code: AFRL-711HPW-2023-0012

Organization	U.S. Department of Defense (DOD)
Reference Code	AFRL-711HPW-2023-0012
How to Apply	Click on *Apply* at the bottom of the opportunity to start your application.

Description

The Air Force Research Laboratory (AFRL) is offering a research opportunity in the area of Machine Learning for students currently pursuing a Bachelor's degree.

What will I be doing?

The study of partial differential equations (PDEs) for modeling the physical laws of nature is essential across a broad range of physics and engineering problems. As most PDEs cannot be solved analytically, accurate numerical methods are required for approximating solutions. Traditional approaches rely on discretizing continuous space into finite elements and therefore must strike a balance between computational cost and accuracy of solutions. In this research project, deep neural networks and machine learning algorithms will be investigated as an alternative approach for accurately solving complex multi-physics models where current computational methods become too costly. Significant open problems include:

1. The combination of multiple deep networks to represent physics models from different regimes, for example, a highly scattering regime (Diffusion Approximation) and a low scattering regime (Radiative Transport Equation).
2. The development of an uncertainty quantification framework for such deep learning surrogate models for multi-physics engineering problems.
3. The implementation of efficient and robust software to solve these complex engineering problems using modern machine learning techniques.

Why should I apply?

Under the guidance of a mentor, you will gain hands-on experience to complement your education and support your academic and professional goals while expanding your understanding of topics related to machine learning, numerical solving of PDEs, simulating laser-tissue interaction, and the pace of scientific research. Along the way, you will engage in activities such as reviewing relevant literature, testing machine learning models, generating data, documenting results, and proposing avenues of further research.

Where will I be located?

Charlotte, North Carolina

What is the anticipated start date?

Exact start dates will be determined at the time of selection and in coordination with the selected candidate. Applications are reviewed on an ongoing basis and fellowships will be filled as qualified candidates are identified.

What is the appointment length?

This appointment is a twelve-month research appointment at a part-time level of participation, with the possibility to be renewed for additional research periods. Appointments may be extended depending on funding availability, project
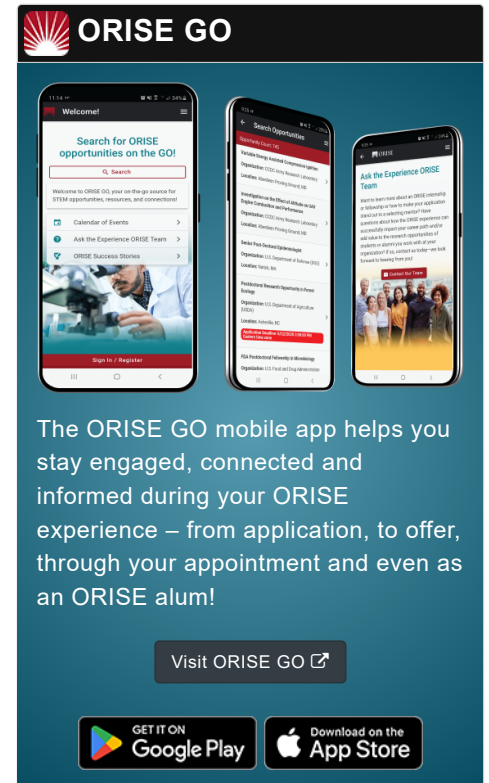
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assignment, program rules, and availability of the participant.

What are the benefits?

You will receive a stipend to be determined by AFRL. 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 AFRL

The 711th Human Performance Wing (711 HPW), headquartered at Wright-Patterson
Air Force Base in Ohio, is the first human-centric warfare wing to consolidate human
performance research, education, and consultation under a single organization.
Established under the Air Force Research Laboratory (AFRL), the 711 HPW is
comprised of the Airman Systems Directorate (RH) and the United States Air Force
School of Aerospace Medicine (USAFSAM). For more information about the Air Force
Research Laboratory, 711 Human Performance Wing, Airman Systems Directorate,
Airman Biosciences Division, please visit https://afresearchlab.com/.

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   The qualified candidate will be currently pursing a Bachelor's degree.

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 - Please upload a copy of a transcript for your
  current or most recent degree program that meets the disciplinary
  qualifications of the opportunity. 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. We encourage you to contact
  your recommender 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 AIRFORCE@orise.orau.gov. Please list the reference code of this opportunity [AFRL-711HPW-2023-0011] 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:** Currently pursuing a Bachelor's Degree.
- **Academic Level(s):** Undergraduate Students.
- **Discipline(s):**
  - **Communications and Graphics Design** (1 👁)
  - **Computer, Information, and Data Sciences** (2 👁)
  - **Mathematics and Statistics** (2 👁)