

Opportunity Title: Collaborative Hypersonic And Missile Defense Research

Opportunity Reference Code: AFIT-2021-0074

Organization U.S. Department of Defense (DOD)

Reference Code AFIT-2021-0074

How to Apply

Click on *Apply* at the bottom of the opportunity to start your application.

Description The Air Force Institute of Technology is offering internships at Wright Patterson Air Force Base.

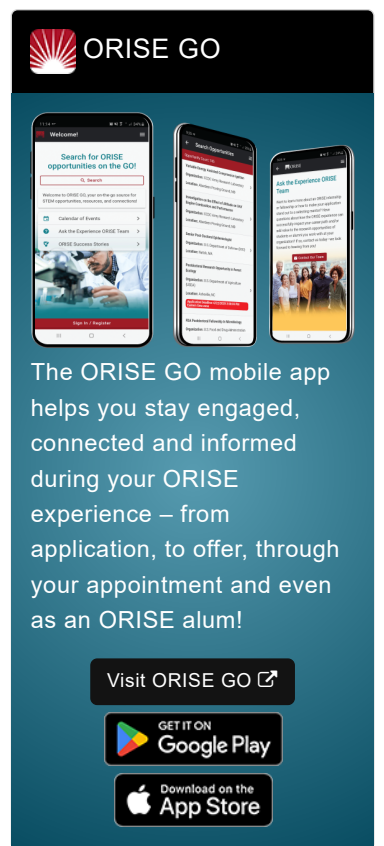
What will I be doing?

You will join a community of scientists and researchers in an effort to research missile defense.

In this project you will experience hands-on learning through collaboration with AFIT Graduate School of Engineering and Management Faculty in Hypersonic Vehicle development by configuring new geometries in CAD; modeling and simulating the vehicle response to aerodynamic, structural, and thermal loading conditions; and conducting physical experiments for validation. Computer packages such as ABAQUS, NASTRAN, CAPS, MatLab, DAKOTA, CFL3D, FUN3D, etc. will be utilized for data generation, post-processing and response interpretation. You will predict the vehicle response under multiple flight paths, maneuvers, and load conditions, and determine the vehicle's sustainability and resilience through the computation of stresses, deflections, and buckling resistance. You will compute the aerodynamic pressures using computational fluid dynamics (CFD) and will analyze for vehicle stability and resilience under extreme operating conditions (e.g., high temperature operating conditions, vehicle response to various heat transfer modes). You will define the associated uncertainties in mission, vehicle geometry, and material variabilities for computing the safety bands that are available for various vehicle geometries using the probabilistic analysis methods. You will develop optimized vehicle configurations for shape, size, and topology aspects of hypersonic mission, and consider aerodynamic, thermal, and structural performance requirements in a multidisciplinary optimization environment. You will study the newly developed configurations and consider manufacturability issues for high temperature materials that are being considered with their advanced properties. You will assist in conducting wind tunnel experiments for representative Mach numbers and vehicle maneuver conditions for validating the prototypes, then document the findings and periodically present the research works to other DoD Scientists and Engineers.


Why should I apply?


Under the guidance of a mentor, you will gain hands-on experience to




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complement your education and support your academic and professional goals. Along the way, you will engage in activities and research in several areas. These include, but are not limited to:

- Configuring new geometries in CAD
- Modeling and simulating the vehicle response to aerodynamic, structural, and thermal loading conditions
- Conducting physical experiments for validation
- Documenting findings and periodically presenting the research works to other DoD Scientists and Engineers

Where will I be located? Dayton, Ohio

What is the anticipated start date?

The Air Force Institute of Technology reviews and selects applicants on a rolling basis. 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 internships will be filled as qualified candidates are identified.

Appointment Length

An ORISE appointment period can be a short-term (less than 2 weeks), summer (10-12 weeks), or yearlong appointment. Faculty appointments are generally for 10-12 weeks during the summer, but appointments during the academic year are also available. Appointments may be extended depending on funding availability, project assignment, program rules, and availability of the participant.

What are the benefits?

Participants will receive a stipend to be determined by **AFIT**. Stipends are typically based on the 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 AFIT

The mission of the Air Force Institute of Technology (AFIT) is to help build America's airpower, by educating military and civilian Airmen to innovatively accomplish the Air Force's core missions, in support of joint operations, more effectively, efficiently, sustainably and affordably. We provide unique defense-focused, research-enabled, multi-disciplinary advanced academic education, as well as globally delivering career-long, action-based, functional professional continuing education, over a continuum of learning, on-command and on-demand. Our success is measured by the career-long

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contributions of our graduates, faculty and staff. AFIT accomplishes this mission through four schools: the Graduate School of Engineering and Management, the School of Systems and Logistics, the Civil Engineer School, and the School of Strategic Force Studies. To learn more about the research performed at AFIT, please visit www.afit.edu.

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 AFIT is seeking applicants with education backgrounds from BS to PhD.

Application Requirements

Components of the online application are as follows:

- Profile Information
- Educational and Employment History
- Essay Questions (goals, experiences, and skills relevant to the opportunity)
- Resume (PDF)
- Transcripts/Academic Records - For this opportunity, an unofficial 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](#).
- 1 Recommendation

Submitted documents must have all social security numbers, student identification numbers, and/or dates of birth removed (blanked out, blackened out, made illegible, etc.) prior to uploading into the application system.

If you have questions, send an email to AIRFORCE@orise.orau.gov. Please list the reference code of this opportunity (AFIT-2021-0074) in the subject line of the email.

All documents must be in English or include an official English translation.

Eligibility Requirements













- **Citizenship:** LPR or U.S. Citizen
- **Degree:** Bachelor's Degree, Master's Degree, or Doctoral Degree

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received within the last 60 months or currently pursuing.

- **Discipline(s):**

- **Chemistry and Materials Sciences** ([12](#) )
- **Communications and Graphics Design** ([2](#) )
- **Computer, Information, and Data Sciences** ([16](#) )
- **Earth and Geosciences** ([21](#) )
- **Engineering** ([27](#) )
- **Environmental and Marine Sciences** ([14](#) )
- **Life Health and Medical Sciences** ([45](#) )
- **Mathematics and Statistics** ([10](#) )
- **Other Non-Science & Engineering** ([2](#) )
- **Physics** ([16](#) )
- **Science & Engineering-related** ([1](#) )
- **Social and Behavioral Sciences** ([27](#) )