

Opportunity Title: Collaborative Hypersonic And Missile Defense Research

Opportunity Reference Code: AFIT-2020-0016

Organization U.S. Department of Defense (DOD)

Reference Code AFIT-2020-0016

How to Apply 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

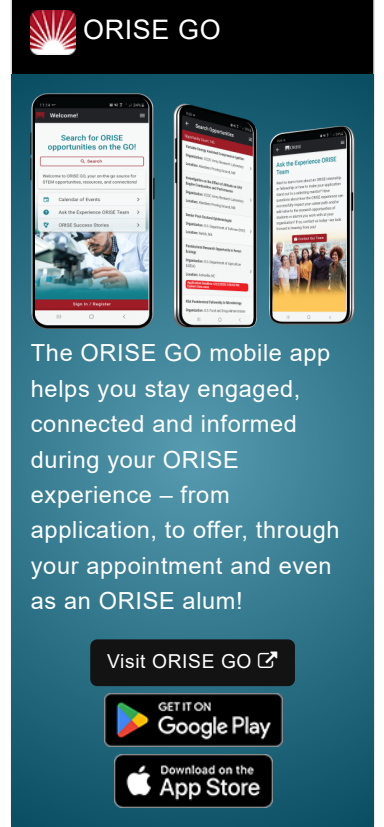
Submitted documents must have all social security numbers, student identification numbers, and/or dates of birth removed (blanked out, blackened out, made illegible, etc.) prior to uploading into the application system.

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

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


Description 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 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.

In this project the participants 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. Participants 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. Interns 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). Participants 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. They 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



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environment. Participants will study the newly developed configurations and consider manufacturability issues for high temperature materials that are being considered with their advanced properties. They 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.

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.

Participant Benefits

Participants will receive a stipend to be determined by **USAFIT**. 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

Nature of Appointment

The participant will not enter into an employee/employer relationship with ORISE, ORAU, DOD, or any other office or agency. Instead, the participant will be affiliated with ORISE for the administration of the appointment through the ORISE appointment letter and Terms of Appointment.

Qualifications AFIT is looking for applicants with education backgrounds from BS to PhD

- 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.
 - **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](#) )