

**Opportunity Title:** Design and Ballistics Testing of Additively Manufactured Structures

**Opportunity Reference Code:** AFIT-2019-0015R

**Organization** U.S. Department of Defense (DOD)

**Reference Code** AFIT-2019-0015R

**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(s)

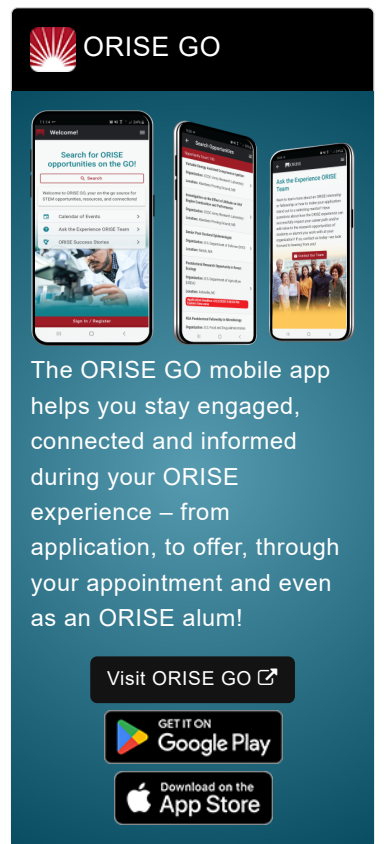
Submitted documents must have all social security numbers, student identification numbers, and/or dates of birth removed (blanked out, blackened out, made illegible, etc.) prior to uploading into the application system.

If you have questions, send an email to [AIRFORCE@orise.orau.gov](mailto: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** Air Force Institute of Technology (AFIT) is located on Wright - Patterson Air Force Base in Ohio. AFIT's mission 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](http://www.afit.edu).


The Additive Manufacturing Lab (AML) at AFIT researches all aspects of polymer and metal additive manufacturing (AM), also known as 3D printing. Unlike more traditional manufacturing techniques, AM can produce materials with nearly any geometry, allowing for new approaches to weight savings and material optimization. Learning how to employ these AM




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techniques as well as learning how to use the printing machines themselves will provide a valuable skill set applicable to many aerospace research applications.

One of the many areas where AM materials hold promise is in aircraft structures where dead weight has a significant penalty on performance, endurance, and fuel consumption (cost). We are currently investigating the ballistic properties of AM structures to determine if aircraft armor of lower overall weight can be employed while still providing adequate protection to aircrews. During this project, we will design armor samples of different internal geometries, print the samples in-house at the AML, test the samples in our ballistics test range, and finally determine the ability of the AM armor sample to absorb ballistic impacts.

The Additive Manufacturing Lab (AML) at AFIT is a nationally recognized facility employing state-of-the-art hardware, software, and techniques. The participant will gain knowledge and experience in rapid prototyping: employing computer-aided design software to generate specific geometry structures, additively manufacturing the samples, measuring the properties of the AM samples, and subjecting the samples to ballistic testing. The ballistics range used in this investigation is a fully certified and instrumented facility. Under the guidance of a mentor, the participant will have opportunities to participate in an R&D program relevant to current US Air Force needs, learn several cutting edge technologies, and present their research at technical conferences and in scholarly archival journals.

#### **Appointment Length**

This appointment is a twelve month research appointment, with the possibility to be renewed for additional research periods. 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** The candidate should have a bachelor's degree or be enrolled in a

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bachelor's program in any STEM discipline. The candidate should have strong writing and public speaking skills, attention to detail, and desire to conduct research.

- Eligibility**

**Requirements**
- **Citizenship:** U.S. Citizen Only
  - **Degree:** Associate's 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](#) 👁)