

Opportunity Title: AFRL - Mitochondrial Health & Organ-Level Effects Internship

Opportunity Reference Code: AFRL-711HPW-2021-0019R

Organization U.S. Department of Defense (DOD)

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

Description What will I be doing?

As an ORISE participant, you will join a community of scientists and researchers in an effort to gain knowledge in areas related to the Air Force Research Laboratory's (AFRL) mission.

Airmen constantly endure an evolving spectrum of operational stress scenarios that are vital to the continued success and achievement of the Air Force mission directives. The overarching aim of this research is to improve rapid assessment of operationally relevant exposure to stress by delineating structural and functional dynamics of mitochondria. Mitochondria, a sub-cellular organelle with its own genome, produces the energy required for life and generates signals that enable organisms to adapt to high levels of stress. Mitochondrial dysregulation primarily affects neurological, endocrine, and immune systems that play an important role in optimizing performance, decision-making, and premature fatigue. Therefore, it is important to evaluate structural and functional dynamics of mitochondria through microscopic imaging & biochemical analysis.

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. Along the way, you will engage in activities and research in several areas. These include, but are not limited to:

- Simulating airmen stress scenarios using cultured human cells and validate the link between stress scenarios and mechanistic analyses.
- Developing a biometric analysis based on measuring mitochondrial structure/function in response to combat and operational stress.
 - This will consist of (1) electron microscopy to analyze size, shape, and ultrastructure of the mitochondria and (2) biochemical & molecular analysis inclusive of gene, protein, and cellular metabolism in order to systematically build a mechanistic roadmap from healthy to stress induced injury.
- Bridging the gap between cellular metabolic health and Airmen organ-level effects after stress-induced injury by investigating mitochondria signaling.
- Developing in silico simulations or algorithms using artificial intelligence to provide predictive health effects.

Where will I be located?

Wright State University in Dayton, Ohio

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 internships will be filled as qualified candidates are identified.

What is the appointment length?



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An ORISE appointment period can be a short-term (less than 2 weeks), summer (10-12 weeks), or yearlong appointment. Appointments may be extended depending 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 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

[AFRL](#) leads the discovery, development and integration of affordable warfighting technologies for America's air, space and cyberspace forces. AFRL is a full-spectrum laboratory, responsible for planning and executing the Air Force's science and technology program. AFRL leads a worldwide government, industry and academic partnership in the discovery, development and delivery of a wide range of revolutionary technologies. The laboratory provides leading edge warfighting capabilities keeping our air, space and cyberspace forces the world's best. The 711 Human Performance Wing advances human performance in air, space and cyberspace through research, education and consultation, accomplished through the synergies created by the wing's two distinct but complementary entities: Airman Systems Directorate and U.S. Air Force School of Aerospace Medicine.

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](#).

Key Words

Biochemistry, Bioinformatics, Biophysics, Toxicology, Bio-organic Chemistry

Qualifications The qualified candidate should currently be pursuing or recently have received a bachelor's or master's degree in aerosol engineering, chemistry, bioengineering, chemical engineering. Degree must have been received within five years of the appointment start date.

Application Requirements

A complete application consists of:

- Zintellect Profile
- Educational and Employment History

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- 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.](#)
- One Recommendation

If you have questions, send an email to AIRFORCE@orise.orau.gov. Please list the reference code of this opportunity [AFRL-711HPW-2021-0019R] in the subject line of the email.

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- Eligibility Requirements**
- **Citizenship:** U.S. Citizen Only
 - **Degree:** Bachelor's Degree or Master's 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** ([17](#))
 - **Earth and Geosciences** ([21](#))
 - **Engineering** ([27](#))
 - **Environmental and Marine Sciences** ([14](#))
 - **Life Health and Medical Sciences** ([46](#))
 - **Mathematics and Statistics** ([10](#))
 - **Physics** ([16](#))
 - **Science & Engineering-related** ([1](#))
 - **Social and Behavioral Sciences** ([28](#))