REPPERGER RESEARCH INTERN PROGRAM
RESEARCH PROJECT #: AFRL-RHB-25-03

Investigating the Impact of Cold Stress on Performance

PROJECT DESCRIPTION: As U.S military strategy evolves, missions in austere environments appear more likely. Of particular interest is the arctic region, which presents unique challenges. Extreme cold weather, rugged terrain, and evolving environmental conditions, such as increased frequency of wildfires, can negatively impact warfighter performance and mission success. The goal of this project is to quantify changes in human performance in extreme cold using a state-of-the-art research environmental chamber capable of simulating diverse environmental conditions. Human subjects will perform cognitive and emergency response tasks at ambient temperatures and in cold temperatures while wearing protective gear. Physiological monitoring devices will collect measurements including heart rate, respiratory rate, skin temperature, and core body temperature in real time. The mentor will be onsite with students during data collection to support the study and to guide students. Data generated by the student will be integrated into cold exposure predictive models for use in decision support tools.

LEARNING OBJECTIVE: Students will support data collection and analysis while gaining valuable human subject research experience. Additionally, students will develop critical thinking, experimental design, and scientific writing skills.

ACADEMIC LEVEL: Undergraduate; Masters; Doctoral

DISCIPLINE NEEDED:
- Biology (General)
- Psychology

RESEARCH LOCATION: Wright-Patterson Air Force Base, Dayton, Ohio

RESEARCH MENTOR: Christin M. Duran, Ph.D.
Chemical Engineering, Case Western Reserve University, 2015

Dr. Christin M Duran (Grabinski) has a PhD in chemical engineering, a professional certification in industrial hygiene, and over 18 years of research experience. During her tenure at AFRL, Dr. Duran has served as a principal investigator and lead of multiple multidisciplinary teams with expertise in a broad range of topics, including field exposure sampling, aerosol transport, sensor performance evaluation, microscopy, computational modeling, and biomarkers. She has earned multiple scientific achievement awards, including the AFRL Science and Engineering Early Career Award (2020), 711th HPW Annual Technology Management Award (2019), MHSRS Team Research Accomplishment Award (2019), and USAF School of Aerospace Medicine Annual Innovation Award (2018). Dr. Duran is an active member of the American Industrial Hygiene Association and is currently serving as the Secretary-Elect on the Real-time Detection Systems Subcommittee. Dr. Duran is a co-author on 23 peer-reviewed journal articles, 3 patents, 34 government reports, and 80 conference presentations.

RESEARCH MENTOR: Jennifer Schwanekamp-Kerr, Ph.D.
Molecular Genetics, Microbiology, and Biochemistry; University of Cincinnati, 2017

Dr. Jennifer Schwanekamp is a senior research scientist in the Human Effectiveness Directorate at the 711th Human Performance Wing, Air Force Research Laboratory. Her research focuses on Airmen/Guardian health protection and interventions aimed at preserving human performance through identifying strategies to protect health and prevent injury. This includes evaluating the effect of exposure hazards on human health and performance and identifying interventions to preserve performance. Dr. Schwanekamp specializes in exposure research working with human subjects.