# WRC Capabilities Brief



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Maximizing Readiness Through Improved Health and Performance

The Auburn University Warrior Research Center (WRC) is a specialized research and technology center with the mission of improving force readiness.

AU WRC acts as a catalyst for change, bringing together researchers, Military and tactical personnel, government, and commercial partners with the goal of improving equipment, health, performance and wellness of our Service Members, tactical responders, Veterans and Families

# Who is the Tactical Athlete?





















# What<br/>Does the<br/>WRC<br/>Study?













# Environmental Factors

# Environmental Questions







- How can we keep them safe?
- How well do Tactical Athletes perform in the heat/cold?
- What is the best way to cool/warm them?
- Is there a work/rest ratio? Will they use it?
- How does clothing and equipment impact heat/cold performance / safety?
- How does acclimatization work? Can we test for it?
- Can current cooling methods make things worse?
  - How does the heat/cold impact performance?
- How does the environment impact decision making and response time?













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Load Carriage and Head Supported Mass













- Standard load for Soldiers and Marines in Iraq and Afghanistan was 60-120 lbs
- Firefighters 20 100+ lbs
- Police carriage weight 25-30 lbs
- Helmets create neck/shoulder issues for all tactical athletes
- Neck, shoulder and back pain are common
- Equipment not designed for females or smaller males



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# Performance Optimization

- How do environmental factors impact physical and cognitive performance?
- What is the current wellness of our tactical athletes?
  - How can we help them improve given the job, resource and time constraints?
- What are the best ways to start ROTC Cadets off right in their careers?
- How does
   equipment/clothing impact
   performance in the
   heat/cold?





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## Injury Prevention, Treatment, Rehabilitation





- How can we predict injury?
  - Can we prevent them?
- How can we speed RTD?
  - Without increase repeat injury?
- If we see issues sooner, can we RTD faster?

### > YES !!!

 How can we personalize interventions instead of one size fits all?



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# **Additional Resources**

### School of Kinesiology Capabilities

Muscle, Vascular and Cardiovascular Physiology and Biochemistry Neuromechanics and Motor Control Nutrition and fueling research Sport and Injury Biomechanics and Movement Thermal and Infrared Imaging Molecular and Applied Sciences Dual Energy X-Ray Absorptiometry (DXA) Peripheral Quantitative Computed Tomography (pQCT) Environmental Chamber (12'x12'; -40C to 160C; 10-80 % RH) Exercise Motivation and Adherence, sports psychology and mindfulness Human and Animal models Wet lab, blood biomarkers, muscle biopsy, mitochondria, in-house capabilities (2026 - AU School of Kinesiology School of Physical Therapy)

### AU Collaborators

Magnetic Resonance Imaging Center (MRI); 3T and 7T capabilities and coil development engineering support
Genomics and Sequencing, NMR and Mass Spectrometry
VCOM Medical School; Schools of Pharmacy and Nursing
College of Veterinary Medicine, research, canine detection and sports performance
College of Nursing
Nutrition
College of Engineering
Department of Aviation
AU Athletics and Sports Medicine
ROTC
AU Huntsville Research Center



































