RESEARCH FOCUS

- Human integrative physiology – cardiovascular, cerebrovascular, autonomic
- Early detection of hemorrhagic injuries in trauma and other clinical settings
- Characterizing individuals with high vs. low tolerance to blood loss
- Development and testing of sensor technologies to improve early detection of hemorrhage
- Exploring potential therapies to improve cardiovascular and cerebrovascular responsiveness to tissue hypoperfusion, including resistance breathing, oscillatory perfusion therapy, and occlusive exercise

RESEARCH EXPERTISE

- Human integrative physiology testing, including regulatory requirements (IRB, clinical trials)
- Lower body negative pressure (LBNP) to simulate hemorrhage in humans
- Non-invasive assessments of cardiovascular and cerebrovascular function
- Invasive measurements include blood sampling, and microneurography for assessment of sympathetic nerve activity
- Signal processing for assessment of hemodynamic variability (transfer function analysis, wavelet analysis)
- Past and current experience with a variety of granting agencies, including the Department of Defense, American Heart Association, National Institutes of Health, and private foundations

TECHNIQUES

- Lower Body Negative Pressure (LBNP) (simulated hemorrhage)
- End-tidal Forcing (control arterial blood gases)
- Ultrasound (cerebral & peripheral blood flow)
- Arterial pressure (continuous, non-invasive)
- Near Infrared Spectroscopy (NIRS) (cerebral and muscle oxygenation)
- Maximal & sub-maximal exercise testing (aerobic & resistance); spirometry, capnography, indirect calorimetry

RESEARCH GROUP

- 2 PhD students
- 1 MS student
- 2 medical students

Caroline A. Rickards, PhD
Associate Professor, Department of Physiology & Anatomy
Director, Cerebral & Cardiovascular Physiology Laboratory
caroline.rickards@unthsc.edu