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# UPITT WARRIOR
# HUMAN PERFORMANCE RESEARCH

**Neuromuscular Research Laboratory**
**University of Pittsburgh**
Department of Sports Medicine and Nutrition
School of Health and Rehabilitation Sciences

## Department of Defense Injury Prevention and Performance Optimization Research

Researchers at the University of Pittsburgh are expanding research activities aiming to study strategies to mitigate musculoskeletal injuries and optimize physical readiness of our most elite military personnel who are conducting dangerous missions in the global war on terror. Ongoing research since 2006 includes studying injury prevention and human performance with the US Department of Defense, including two research projects with Naval Special Warfare and the US Army 101st Airborne Division (Air Assault). Additional research to begin this fall will include work with the US Army Special Operations Command, US Air Force Special Operations Command, and a third Naval Special Warfare study.

## Continuation and Expansion of Naval Special Warfare Projects

Since 2007 the University of Pittsburgh has supported Naval Special Warfare's (NSW) Tactical Athlete Program by studying injury prevention and physical readiness in the Operators of NSW Group 2 in Little Creek, VA (page 2). Over the past year this effort was expanded to NSW Group 4, Special Boat Team-22, in Stennis, MS (page 2) to address the cultural-specificity of the Special Warfare Combatant-craft Crewman. This research is focused on the development and refinement of NSW's Tactical Athlete Program in collaboration with their human performance, medical, and training personnel.

The University of Pittsburgh received a $5.6M grant in FY2011 to continue its work with NSW Group 2 and Group 4, Special Boat Team -22. This award will also support expansion of research with SEAL Qualification Training (SQT) and Crewman Qualification Training (CQT) at the Naval Special Warfare Center at Coronado, CA (page 3). This new NSW initiative will include collection of baseline data on SEAL and SWCC Operators which can be utilized for training development as well as examining prospective biomechanical, musculoskeletal, and physiological risk factors for injury over the course of Operators' career.

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Continuing and expanded research with NSW is supported by the Office of Naval Research Grant #N00141110929.

## Dr. Lephart Gives Brief to NATO

*Dr. Lephart traveled to Brussels in September to give a presentation to NATO officials regarding injury prevention and performance optimization research pertaining to a military population. He conveyed the importance and need for research efforts that focus on the reduction of avoidable musculoskeletal injuries, human performance, and tactical readiness in Special Operations Forces.*

*"The 101st Airborne Division (Air Assault) Injury Prevention and Performance Enhancement Research Initiative, administered by the University of Pittsburgh, continues to positively impact the physical readiness of our Soldiers... Soldiers across the Army deserve, now more than ever, the health benefits afforded by stat of the art medical research."*

**John F. Campbell, Major General, U.S. Army, Commanding**

## Naval Special Warfare Group 2

**Little Creek, VA—**
This research was designed to scientifically address the current injury prevalence to Naval Special Warfare Group 2 (NSWG2) Operators and identify modifiable contributors to injury and optimal physical readiness. A total of 302 Operators were enrolled in phases 1 and 2 of this research project and underwent a comprehensive human performance assessment for injury prevention and optimal physical readiness to evaluate biomechanical, musculoskeletal, physiological, and nutritional characteristics relative to injury and performance.
The data were provided to NSWG2's Tactical Athlete Program (TAP) personnel for modification to current training. Forthcoming research will validate the effectiveness of the TAP program to improve the previously identified suboptimal characteristics captured during phases 1 and 2 of research. Additional aims will identify specific risk factors for unintentional musculoskeletal injuries and interval testing/surveillance to assess long-term operational drain, reference following injury and effectiveness of TAP to improve physical readiness. This work was supported by the Office of Naval Research, Grant #N000140711 90/N000140810412/N000141110929.

## Special Warfare Group 4—Special Boat Team 22

**Stennis Space Center, MS—**
Modeled after our research with Naval Special Warfare Group 2, this project will identify injury risk factors that are culturally-specific to the Special Warfare Combatant-craft Crewmen (SWCC)- an elite combat unit of Naval Special Warfare which specializes in the operation of rapid mobility in shallow water. The Human Performance Research Laboratory at Special Boat Team 22 was installed in December 2010. Phases 1 and 2 of the research initiative are currently underway with an anticipated enrollment of 150 Operators through July 2012.
This work was supported by the Office of Naval Research, Grant #N000141010912/N000141110929.

## 101st Airborne Division (Air Assault)

**Fort Campbell, KY—**
The University of Pittsburgh is completing its fifth year of research to support the 101st Airborne Division (Air Assault). The objective of this research is to Mitigate unintentional musculoskeletal injuries and optimize physical readiness and tactical performance.
Phase 1– identified the scope and magnitude of unintentional musculoskeletal injury;
Phase 2– identified suboptimal physical and physiological characteristics from 1000 test sessions; Phase 3– designed and validated the Eagle Tactical Athlete Program to modify suboptimal laboratory, performance, and Soldier-specific tasks; and Phase 4– currently ongoing to implement ETAP into Division PT and to assess injury mitigation in garrison and theater (1315 Soldiers enrolled in Instructor Certification School, 26,300 Soldiers exposed to ETAP).
Additional research for 2012 will identify risk factors for unintentional musculoskeletal injury and Aviator-specific characteristics to augment ETAP.
This work was supported by the US Army Medical Research and Materiel Command (Research grant USAMRMC/TATRC #W81XWH-11-2-0020). Opinions, interpretations, conclusions, and recommendations are those of the author and not necessarily endorsed by the US Army.

## Naval Special Warfare Center (NSWC) - SQT/CQT

**Coronado, CA—** SEAL Qualification Training (SQT)/Crewman Qualification Training (CQT) is the final phase of training to become a SEAL/SWCC and the data captured at this time point will represent the physical/physiological capabilities of Operators as they enter the Force. Little data exist to identify the physical and physiological baseline for SEALS/SWCC entering the Force and impact on long-term injury or physical readiness.

The overall objective of this research focus will:

— Identify suboptimal characteristics and risk factors for injury in SEALS/SWCC prior to Group/Team assignment

— Establish baseline data for Force-wide interval testing to assess career decrement and injury prevalence, reference following injury, and effectiveness of TAP to improve physical readiness

— Assess tactical readiness

This aspect of the research project will take advantage of the three University of Pittsburgh research centers established across Naval Special Warfare, with Coronado, CA being utilized for baseline testing of Operators Laboratory and tactical testing will be performed on 300 SEAL/SWCC Operators upon completion of SQT/CQT to identify baseline data for integration into interval testing at Little Creek, VA and Stennis, MS and establish risk factors for SQT/CQT graduates.

This work is supported by ONR Award #N00141110929.

## Personnel Spotlight: Coronado, CA

**Scott Conger, PhD**

Scott is an Assistant Professor in Sports Medicine and Nutrition working on the Naval Special Warfare Research Initiative. He received his PhD in Exercise Physiology in 2011 and his Master's degree in Human Performance and Sport Studies in 2001 from the University of Tennessee. He has held appointments as the laboratory manager of Exercise laboratories at both the University of Arkansas and the University of Michigan.

**Matthew Darnell, MS, RD, SCCC**

Matt is an Instructor in Sports Medicine and Nutrition working on the Naval Special Warfare Research Initiative. Matt completed his Bachelors and Masters degrees in Clinical Dietetics and Nutrition at the University of Pittsburgh. Matt is a Registered Dietitian and Strength and Conditioning Coach Certified through the Collegiate Strength and Conditioning Coaches Association.

**Ryan Wedge, MPT, BS**

Ryan is a Research Associate working on the Naval Special Warfare Research Initiative. He completed his Bachelor of Science degree in Physical Therapy and his Master of Physical Therapy at Quinnipac University in Hamden, CT. He has previously worked as a sports medicine clinician in South Portland, ME at Saco Bay Physical Therapy.

**Darcie Yount, MEd**

Darcie is a Research Associate working on the Naval Special Warfare Initiative. She completed her Bachelor of Science degree in Kinesiology and her Master's degree in Biomechanics, both at Auburn University in Auburn, AL. She also completed a student research internship at the American Sports Medicine Institute in Birmingham, AL.

*"UPITT's research is in direct support of our NSW Tactical Athlete Program, which has been established to help prevent Operator injuries, maximize performance and combat readiness, and enhance career longevity and quality of life following service."*

**CAPT Scott R. Jonson, MSC, USN,**
**Deputy Force Medical Officer,**
**US Naval Special Warfare Command**

## United States Army Special Operations Command

**Fort Bragg, NC—**
Modeled after our work with Naval Special Warfare, the US Army Special Operations Command (USASOC) project will support development of USASOC's Tactical Human Optimization, Rapid Rehabilitation, and Reconditioning (THOR3) program to identify the priorities necessary for improvement and change in the current physical training program. The data from this study will be used to develop a predictive model to identify Special Forces Soldiers who are predisposed to musculoskeletal injury based on task and demand analyses, biomechanical, musculoskeletal, physiological, and injury prevalence data. The Human Performance Research Laboratory at Fort Bragg is scheduled for installation in January 2012.

This work was supported by the US Army Medical Research and Materiel Command (Research grant USAMRMC/TATRC #W81XWH-11-2-0020).

Opinions, interpretations, conclusions, and recommendations are those of the author and not necessarily endorsed by the US Army.

## Collaboration with the Defense Advanced Research Projects Agency

The Defense Advanced Research Projects Agency (DARPA) has a mission to pursue and exploit fundamental science and innovation for National Defense. The NMRL will assist DARPA in the development and direction of research related to injury prevention. The NMRL has received a grant from DARPA to work on the development and direction of research related to the Warrior Web and its application for injury prevention in the military. The primary investigator for this project is faculty member Timothy C. Sell, PhD, PT.

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Opinions, interpretations, conclusions, and recommendations are those of the author and not necessarily endorsed by DARPA.

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