



Human Physiology

The mission of Gonzaga's Department of Human Physiology is to develop ethical, critical thinkers, and scientists who possess the creativity, intelligence, and initiative necessary to be a responsible member of scientific and clinical professions. The Bachelor of Science (B.S.) degree in Human Physiology requires students develop significant content knowledge, analytical thinking skills, knowledge of scientific principles and research, and an ability to communicate their knowledge to others. These capacities prepare students for pursuing a graduate career at other institutions in the physiological sciences or clinically related professions such as medicine and allied health science.

THE PROGRAM

Human physiology is the science of the mechanical, physical, and biochemical functions of humans: their organ systems, organs, and the cells of which they are composed. The basic, foundational principle for the study of human physiology is the maintenance of homeostasis through the operation of complex control systems. These systems encompass all levels of the hierarchy of human structure and function (i.e. cells, tissues, organs, organ systems, and the organism). Each course in the curriculum emphasizes an integrated study of humans across this hierarchy of structure and function. Consequently, a reductionist approach that separates the curriculum into specific courses such as "molecular physiology," "cell physiology," "histology," or "organ physiology," has been purposely avoided. Topics covered across the curriculum include:

- General Physiological Concepts - body organization, homeostasis, control systems, biochemistry, cell structure, cell function, histology, metabolism, membranes, and cellular communication
- Systems Physiology - neurophysiology, muscular physiology, cardiovascular physiology, respiratory physiology, renal physiology, fluid and acid-base physiology, digestive physiology, endocrinology, immunology, and reproductive physiology
- Integrative Physiology - exercise physiology, environmental physiology, physiology of aging, biomechanics, and nutrition

The Human Physiology major, along with selected electives from other departments across the University, provides students with preparation for graduate or professional study in a variety of fields. Human Physiology majors express interest in pursuing various health professions, such as:

- physiologist
- physical therapist
- physician
- physician's assistant
- occupational therapist
- exercise physiology and biomechanics research
- sports medicine
- pharmacist
- public health
- dentist
- chiropractor
- nursing

The program uniquely emphasizes the scientific basis and mechanisms of human function, adaptation, development and aging, health and disease, and performance.

STUDENT RESEARCH PROJECTS

As a part of independent studies and/or requirements for upper-division courses, majors complete research projects, some of which are accepted for publication and/or presentation at regional and national scientific meetings. The following are examples of student/faculty research that have been accepted for presentation or publication:

Anderson, S., Chamberlain, M., Musgrove, S., Partusch, A., Tice, K., & Thorp, D. Is Vo2 Suppressed During Non-Apneic Facial Submersion? Thematic poster American College of Sports Medicine Northwest Annual Conference, Tacoma, WA., April 2016.

Bell, D., Fijalka, A, Woodworth, K., & Higginson, B. Effects of various inclines on muscle activation while walking with a constant load. American College of Sports Medicine Northwest Annual Conference, Tacoma, WA., April 2016.

Bell, D., Dominguez, I., Fijalka, A., Wallace, B., Woodworth, K., Zimney, M., & McKenzie, J. Effects Of Self-Selected, Varying Tempo Music On Performance And Perceived Exertion In Collegiate Rowers. American College of Sports Medicine Northwest Annual Conference, Tacoma, WA., April 2016.

Chamberlain M., Anderson S., Clay S., Musgrove S., Sanburg J., & McCulloch R. The Effects of Suspension Exercise on Knee Stabilization in Females." American College of Sports Medicine Northwest Annual Conference, Tacoma, WA., April 2016.

Cummins, A., Clay, S., Coad, B., Nelson, K., Cariño, B., & Thorp, D. Studying While Exercising: The Effect Of Moderate Exercise On Long-Term Memory. American College of Sports Medicine Northwest Annual Conference, Tacoma, WA., April 2016.



Lindecker, P. and Higginson, B. Validation of inertial sensors for use in shooting event detection. American Society of Biomechanics Conference, Columbus, Ohio, 2015.

Fallon, S., A. Belcoe, C. Shawcross, A. May, C. Monteverde, & D.J. McCann. Ventilatory compensation to decreased inspired O2 during the Wingate test. Research Quarterly for Exercise and Sport. Dec. 2014.

Higginson, B., and Wheeler, J. Contributions of an integrated bolster system to dynamic load stability while wearing a backpack over body armor. American Society of Biomechanics Conference, Columbus, Ohio., 2015.

Higginson, B. and Wheeler, J. Ergonomic evaluation of a prototype quick-release body armor system. American Society of Biomechanics Conference, Columbus, Ohio, 2015.

Lowrimore, C. Mason, N., Brost, T., Ward, K., Balmelli, B., Sullivan, L., Phillips, A., & McCann, D. (2015) Comparison of cold-water immersion and compression on post-exercise muscle recovery, American College of Sports Medicine, Bend OR, 2015.

Newman, S., Hashimoto, K., Jarvie, R., Lane, K., Orr, M., Townsend, E., White, D., & McCann, D. (2015) Immediate effect of laughter on physiological stress responses in college-aged males, American College of Sports Medicine, Bend OR, 2015.



Partusch, A., Coad, B., Cummins, A., Nelson, K., & McCulloch, R. Effect of Isolated Hamstring Strengthening on Unanticipated Drop-landing Knee Kinematics in Females. American College of Sports Medicine Northwest Annual Conference, Tacoma, WA., April 2016.

Sander, S., Taisey, C., Sander, K., Cary, J., Hamer, Z., & Higginson, B. Does indirect self-myofascial release and static stretching have an additive effect on hip range of motion? American College of Sports Medicine Northwest Annual Conference, Tacoma, WA. April 2016.

Sander, K., Sander, S., Cherry, T., Wimer, V., Higgins, A., Lavigne, S., & McKenzie, J. Does Caffeine Have Ergogenic Effects On Wall Sit Duration In College-Aged Males? American College of Sports Medicine Northwest Annual Conference, Tacoma, WA., April 2016.

Wimer, V., Higgins, A., Cherry, T., LaVigne, S., & Higginson, B. The quantified measurement of backpack instability using improperly fit straps. American College of Sports Medicine Northwest Annual Conference, Tacoma, WA. April 2016.

Zimny K, Carino B, Tice B, Wallace, B & McCulloch R. Relative Muscle Contributions During a Simulated Single Arm Rock Climbing Hold Exercise. American College of Sports Medicine Northwest Annual Conference, Tacoma, WA., April 2016.



GRADUATE SCHOOLS

Biomedical Sciences

Creighton University

Biomechanics

University of Alberta-Calgary
University of Oregon
University of Western Australia
Cardiac Rehabilitation
University of Oregon

Chiropractic Medicine

Life Chiropractic College West
Palmer College of Chiropractic

Dental School

Oregon Health & Science University
University of British Columbia

Exercise Physiology

Baylor University
Boise State University
Central Washington University
Long Beach State University
Montana State University
Oregon State University
Northern Colorado University
San Diego State University
San Jose State University
Springfield College
University of Denver
University of Oregon
University of Utah
Western Washington University

Medical School

Creighton University
Georgetown University
Loma Linda University
Northwest Osteopathic Medical School
Medical College of Wisconsin
Oregon Health & Science University
Tulane University
University of Colorado

University of Nevada
University of Southern California
University of Vermont
University of Washington
Virginia Commonwealth University
Wake Forest University

Molecular Physiology

University of Vermont

Neurophysiology

University of California, Davis

Nuclear Medicine

Swedish Hospital (Seattle, WA)

Nursing

Johns Hopkins University
Linfield College
Seattle University
University of Pennsylvania
University of Utah

Nutrition

Bastyr University
Washington State University

Occupational Therapy

Belmont University
Colorado State University
Creighton University
Eastern Washington University
George Washington University
Idaho State University
Midwestern University
Nova Southeastern University
Oregon State University
Tufts University
Tulane University
University of Puget Sound
University of Southern California
University of Washington

Optometry

Ferris State University

Midwestern University
Pacific University
University of Michigan
University of Southern California
Western University of Health Sciences

Physical Therapy

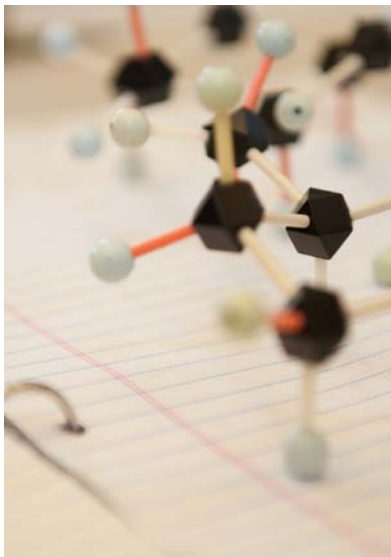
Chapman University
Columbia University
Creighton University
Duke University
Eastern Washington University
Emory University
George Washington University
Northwestern University
Old Dominion University
Pacific University
Regis University
Sacred Heart University
Samuel Merritt University
St. Catherine University
University of Illinois
University of Maryland
University of Minnesota
University of Montana
University of New England
University of Pittsburgh
University of Puget Sound
University of St. Augustine
University of Southern California
University of Utah
University of Washington
Washington University in St. Louis

Physician's Assistant

Midwestern University (Phoenix, AZ)
University of New Mexico

Public Health

George Washington University
Oregon State University
University of Washington



THE PEOPLE

Faculty in the Department of Human Physiology are active scholars and health/fitness specialists whose academic and professional expertise is invaluable to Human Physiology students.

FACULTY CONTACTS, RESEARCH INTERESTS, & PUBLICATIONS

Stephen B. Conant

M.S., Montana State University, Bozeman Lab Specialist and Instructor advanced technology as a mechanism for community building and collaboration in public health policy and public health research
conant@gonzaga.edu

ACSM - Northwest Chapter Immediate Past President, ACSM National Health and Science Policy Committee, ACSM-certified Health/Fitness Specialist®, National Strength & Conditioning Association-Certified Strength & Conditioning Specialist.

Patrick L. Crosswhite

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Assistant Professor
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Publications in peer-reviewed

journals: Clinical Investigations (2016), Hypertension (2010, 2013, 2014), J. Hypertension (2010), Molecular Medicine (2014).

Brian K. Higginson

Ph.D., Oregon State University
Associate Professor
biomechanics, ergonomics, and energetics of load carriage; kinematic and muscle adaptation during prolonged exercise (cross-country skiing and cycling); and physiological and biomechanical determinants of shooting performance in competitive shooters
higginson@gonzaga.edu

Publications in peer-reviewed journals:

Current Sports Medicine Reports (2009, 2008), Journal of Experimental Biology (2007), Journal of Applied Physiology (2005), European Journal of

Applied Physiology (2004, 2001), Sport Biomechanics (2004), Journal of Exercise Physiology (2003). Other peer-reviewed publications: Proceedings of the ACSM-NW Annual Conference (2013), Congress Proceedings of the 2nd International Congress on Science and Nordic Skiing (2012).

Daniel J. McCann

Ph.D., University of California, Davis
Dept. Chair
Professor
metabolism, exercise physiology, dimensional analysis, and environmental physiology
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Publications in peer-reviewed journals:

Current Sports Medicine Reports (2008), International Journal of Sports Medicine (2004), Medicine & Science in Sports & Exercise (2003, 2002, 1997, 1995), Sports Medicine & Rehabilitation (2001). Other peer-reviewed publications: Proceedings of the ACSM-Northwest Annual Conference (2015, 2014, 2013, 2012, 2010, 2008).

Ryan S. McCulloch

Ph.D., University of North Carolina Chapel Hill; NC State University
Assistant Professor
biomechanics, orthopedics, prosthetics.
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Publications in peer-reviewed journals:

Arthritis (2014), Journal of Animal Science and Biotechnology (2012), Veterinary Surgery (2011), International Journal of Industrial Ergonomics (2009).

James McKenzie

Ph.D., Indiana University, Bloomington
Lecturer
exercise physiology, thermoregulation, environmental stress
mckenziej@gonzaga.edu

Publications in peer-reviewed journals:

Medicine and Science in Sports and Exercise (2005, 2006, 2007, 2009, 2012, 2014, 2015), Journal of Applied Physiology (2007).

David Thorp

Ph.D., University of Western Ontario
Associate Professor
the role of exercise training in intracellular signaling and improvement of myocardial tolerance to ischemia
thorp@gonzaga.edu

Publications in peer-reviewed journals:

Journal of Sport Science and Medicine (2012), Canadian Journal of Physiology and Pharmacology (2011), Cell Stress Chaperones (2009), American Journal of Physiology: Heart and Circulatory Physiology (2007, 2006), American Journal of Physiology: Integrative and Comparative Physiology (2007), Journal of Molecular Cardiology (2004), Experimental Physiology (2001). Other peer-reviewed publications: Proceedings of the ACSM-Northwest Annual Conference (2015, 2014, 2013, 2012), Applied Journal of Nutrition and Metabolism (2010, 2006), Journal of the Federation of American Societies for Experimental Biology (2005, 2003 (2), 2000), Medicine and Science in Sports and Exercise (2003, 2000, 1999), Proceedings of the Cell Stress Society International Congress (2003 (2)), Proceedings of the Canadian Federation of Biological Sciences (2002 (2)), Canadian Journal of Applied Physiology (2000).

