HUMAN HEALTH AND NUTRITIONAL SCIENCES

The Human Health and Nutritional Sciences Graduate Program offers MSc degrees by thesis, MSc degrees by course work and project, and PhD degrees in the three fields listed below.

- **Biomechanics**
- **Nutrition, Exercise and Metabolism**
- **Nutritional and Nutraceutical Sciences**

The focus of these programs is on physical activity and diet as powerful lifestyle determinants of human health. The interaction between genetics and environmental factors determines human health and lifestyle is a major component of our environment.

Our graduate programs offer advanced experiential learning experiences in the broad areas of nutritional and nutraceutical sciences, general and exercise physiology and biomechanics within the focus of lifestyle, genetics and human health. Within these broad fields, the Department of Human Health Sciences addresses the issues at the level of the individual, not community or populations. The research efforts are focused on understanding the basic underlying biological aspects of health, which are further applied to understanding aging, neurological/sensory disorders and osteoarthritis, and chronic diseases such as cancer, cardiovascular disease, obesity, and type II diabetes.

See the department website (http://www.uoguelph.ca/hhns/Graduate/Graduate.html) for additional information.

Administrative Staff

Chair
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Graduate Faculty

This list may include Regular Graduate Faculty, Associated Graduate Faculty and/or Graduate Faculty from other universities.

Marica Bakovic
B.Sc., M.Sc. Belgrade, PhD Alberta - Professor
Graduate Faculty

Leah Bent
B.Sc., M.Sc. Guelph, PhD British Columbia - Professor
Graduate Faculty

Danielle Bentley
BSc B.PHE MSc Queen's, PhD Toronto - Associate Professor
Graduate Faculty

William J. Bettger
B.Sc., PhD Missouri - Associate Professor
Graduate Faculty

Stephen H. M. Brown
BHK, MHK Windsor, PhD Waterloo - Associate Professor
Graduate Faculty

Keith Brunt
B.Sc. Saskatchewan, M.Sc., PhD Queen's - Associate Professor, Pharmacology, Dalhousie University
Associated Graduate Faculty

Jamie Burr
BA Western, M.Sc., PhD York - Associate Professor
Graduate Faculty

Clara E. Cho
B.Sc., PhD Toronto - Assistant Professor
Graduate Faculty

Andrea L. Clark
B.Sc. Loughborough, PhD Calgary - Assistant Professor
Graduate Faculty

Ashleigh Domingo
H.B.Sc. Toronto, M.Sc. British Columbia, PhD Waterloo - Assistant Professor
Graduate Faculty

Alison M. Duncan
B.A.Sc. Guelph, M.Sc. Toronto, PhD Minnesota - Professor
Graduate Faculty

David J. Dyck
B.Sc., M.Sc., PhD Guelph - Professor
Graduate Faculty

Mazyar Fallah
BA Johns Hopkins, MA, PhD Princeton - Professor and Dean, College of Biological Sciences
Graduate Faculty

Graham P. Holloway
BA McMaster, M.Sc. Waterloo, PhD Guelph - Associate Professor and Associate Dean (Research and Graduate Studies), College of Biological Sciences
Graduate Faculty

Lorraine C. Jadeski
B.Sc. Guelph, M.Sc. Waterloo, PhD Western - Associate Professor
Graduate Faculty

Justine Keathley
BSc MSc PhD Western - Assistant Professor
Graduate Faculty

David W. L. Ma
B.Sc., PhD Alberta - Professor

Graduate Faculty

Michael McBurney
B.Sc. Carleton, M.Sc., PhD Cornell - Nutrition Consultant
Associated Graduate Faculty

Philip J. Millar
B.Sc., M.Sc., PhD McMaster - Associate Professor
Graduate Faculty

Jennifer Monk
B.Sc. PhD University of Guelph - Assistant Professor
Graduate Faculty

Jennifer M. Monk
B.Sc., PhD Guelph - Assistant Professor
Graduate Faculty

Coral L. Murrant
B.Sc., PhD Guelph - Professor and Chair
Graduate Faculty

David M. Mutch
B.Sc. Queen's, PhD Lausanne - Professor
Graduate Faculty

Genevieve S. Newton
B.Sc. Laurentian, DC Chicago, M.Sc., PhD Guelph - Scientific Director, FRINGE, Online Education for Medical Professionals
Associated Graduate Faculty

Geoffrey A. Power
BKin, M.Sc. Memorial, PhD Western - Associate Professor
Graduate Faculty

Dan Ramdath
B.Sc. Toronto, M.Sc., PhD West Indies - Manager/Clinical Research Scientist (Human Nutrition), Guelph Food Research Centre, Agriculture and Agri-Food Canada
Associated Graduate Faculty

Kerry L. Ritchie
B.Sc., PhD Guelph - Associate Professor
Graduate Faculty

Lindsay E. Robinson
B.Sc. Acadia, PhD Alberta - Associate Professor
Graduate Faculty

Jeremy A. Simpson
B.Sc., Guelph, PhD Queen's - Associate Professor
Graduate Faculty

Lawrence Spriet
B.Sc. Waterloo, M.Sc. York, PhD McMaster - Professor Emeritus
Associated Graduate Faculty

John Z. Srbely
B.Sc. Laurentian, DC Canadian Memorial Chiropractic College, PhD Guelph - Associate Professor
Graduate Faculty

Michael Tymko
B.H.Sc. Mount Royal, M.Sc., PhD British Columbia - Assistant Professor
Graduate Faculty

Luc van Loon
M.Sc., PhD Maastricht - Professor, Maastricht University
Associated Graduate Faculty

Amanda J. Wright
B.Sc., PhD Guelph - Associate Professor
Graduate Faculty

David C. Wright
BPE Calgary, M.Sc. Arizona State, PhD Ball State - Professor, University of British Columbia
Associated Graduate Faculty

John L. Zettel
BS Waterloo, M.Sc., PhD Toronto - Associate Professor
Graduate Faculty

MSc Program

Admission Requirements

To be considered, applicants must meet the requirements of a four-year honours science degree with a minimum 75% average during the final two years or 4 semesters of undergraduate study. Applicants should have completed a course in statistics. Each applicant must obtain the support of a faculty member willing to serve as their advisor.

Admission may be granted in September, January or May. Completed applications should be uploaded at least one full semester (four months) before the expected date of admission. Applications from international students should be uploaded at least eight months prior to the expected date of admission.

All components of the application, including transcript(s), graduate certificate(s), grading scale(s), language test results, assessment forms, a statement of interest and the name of the faculty advisor must be uploaded no later than two months after an application is submitted through the OUAC portal. Applications that are incomplete after this time period will be closed.

Admission Process

Graduate student applications to programs in the College of Biological Science are handled by the Office of the Associate Dean, Research (ADR). Before submitting an application, applicants are strongly encouraged to review the information found on the CBS-ADR website to learn more about the application process (https://www.uoguelph.ca/cbs/academics/graduate/programs).

Complete application submission instructions may also be found on the Office of Graduate Studies (https://graduatestudies.uoguelph.ca/future/applying-guelph) webpage or in the Graduate Calendar (https://calendar.uoguelph.ca/graduate-calendar/general-regulations/admission/application-admission/).

Learning Outcomes

1. Critically evaluate ideas
2. Identify knowledge gaps, propose creative solutions
3. Accurately interpret scientific literature.
4. Place current ideas within a historical perspective.
5. Accurately and effectively communicate ideas in oral form
6. Accurately and effectively communicate ideas in written form
7. Use alternative/contemporary platforms for communication

8. Apply scientific method to formulate important questions and design studies
9. Generate data
10. Appreciate methodological limitations, positive/negative controls
11. Accurately interpret data/statistical interpretations
12. Make defensible conclusions
13. Work in a team
14. Apply leadership skills
15. Manage time appropriately.
16. Work independently
17. Integrate a broad foundation in life sciences.
18. Demonstrate knowledge of the impact of human movement, physical activity
    and exercise/human nutrition, nutri-pharmacology and nutri-toxicology/
    health and disease on health and performance.
19. Understand the interactions of nutrition and exercise on the metabolic
    control of health and disease.
20. Understand the pivotal role of individual genomic and epigenetic responses in disease, disease progression and lifestyle modifications (nutrition and exercise).

Program Requirements

The Department offers programs of study leading to an MSc by thesis and an MSc by course work and project. Students enrol in one of these two study options. Within the MSc thesis study option, students must complete a minimum of 1.5 graduate credits and defend an acceptable thesis, which comprises an account of the student's research. Within the MSc course work study option, students must complete a minimum of 4.0 graduate credits, which includes credits for research experience.

Thesis

Students must complete and defend an acceptable thesis, which comprises a scientifically defensible account of the student's research on a particular, well-defined research problem or hypothesis. Such research should begin with the practical expectation that it could be completed and the thesis defended in not more than 5 semesters. Paramount to the notion of acceptability of the thesis is its quality with respect to problem identification, the approach used to address the problem, and the evaluation of the results.

In addition they must successfully complete courses totalling not fewer than 1.5 graduate credits. The graduate credits of course work will consist of:

a. at least one of:

Code	Title	Credits
HHNS*6040	Research Fronts in Nutritional and Nutraceutical Sciences	0.50
HHNS*6500	Cardiovascular and Respiratory Physiology	0.50
HHNS*6700	Nutrition, Exercise and Metabolism	0.50
HHNS*6800	Research Frontiers in Integrative Biomechanics and Neurophysiology	0.50

b. at least 1.0 credits of electives as determined with the Advisory Committee

Course Work and Major Research Project (MRP)

Students who apply with an identified advisor, once admitted, will work individually under the supervision of an advisor. Students must complete a minimum of 4.0 graduate credits, which must include HHNS*6010. Each research experience credit culminates in formal scientific presentations (written paper and/or oral presentation and/or scientific poster). A minimum of 1.50 research experience credits is required. Students complete the minimum program 4.0 credits within 3 semesters and may have the opportunity to extend their project into a 4th semester.

Students who apply without an identified advisor, once admitted, will work in teams with large, health-related data sets. Students must complete a minimum of 4.0 graduate credits, which include credits for research experience and a major research project. Each research experience credit culminates in formal scientific presentations (written paper and/or oral presentation and/or scientific poster). Within the 3-semester program, the 4.0 graduate credits must include HHNS*6910 and HHNS*6920.

Students must complete at least 4.0 graduate credits as follows:

Code	Title	Credits
Core Courses		
HHNS*6320	Advances in Human Health and Nutritional Sciences Research	0.50
HHNS*6930	Research Project	0.50
Two of:		
HHNS*6010	Fundamentals of Scientific Practice in Human Health and Nutritional Sciences	0.50
HHNS*6910	Basic Research Techniques and Processes	0.50
HHNS*6920	Applied Research Techniques and Processes	0.50
At least one of:		
HHNS*6040	Research Fronts in Nutritional and Nutraceutical Sciences	0.50
HHNS*6500	Cardiovascular and Respiratory Physiology	0.50
HHNS*6700	Nutrition, Exercise and Metabolism	0.50
HHNS*6800	Research Frontiers in Integrative Biomechanics and Neurophysiology	0.50
Electives [1]		
HHNS*6130	Advanced Skeletal Muscle Metabolism in Humans	0.50
HHNS*6400	Functional Foods and Nutraceuticals	0.50
HHNS*6410	Applied Functional Foods and Nutraceuticals	1.00
HHNS*6440	Nutrition, Gene Expression and Cell Signalling	0.50
HHNS*6610	Health Science Translation and Innovation	0.50
HHNS*6710	Advanced Topics in Nutrition and Exercise	0.50
HHNS*6810	Research Methods in Integrative Biomechanics and Neurophysiology I	0.50

[1] Students may make up the remainder of their required 4.00 credits from courses in this sub-list, courses from the preceding lists, or other courses chosen in consultation with the Graduate Program Coordinator.

PhD Program

Admission Requirements

Applicants must have a recognized Master's degree in a related field obtained with a minimum academic standing of 80% in their postgraduate studies, and the endorsement of a potential thesis advisor. Applicants should have completed a course in statistics. Under exceptional circumstances admission directly to a PhD program with an appropriate honours degree alone, or transfer from MSc to PhD program without completing the MSc thesis requirements, is also possible.

Admission may be granted in September, January or May. Completed applications should be uploaded at least one full semester (four months) before the expected date of admission. Applications from international students should be uploaded at least eight months prior to the expected date of admission.

Each applicant must obtain the support of a faculty member willing to serve as their advisor.

All components of the application, including transcript(s), graduate certificate(s), grading scale(s), language test results, assessment forms, a statement of interest and the name of the faculty advisor must be uploaded no later than two months after an application is submitted through the OUAC portal. Applications that are incomplete after this time period will be closed.

Admission Process

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Complete application instructions may also be found on the Office of Graduate Studies (http://www.uoguelph.ca/graduatestudies/apply) webpage or in the Graduate Calendar (https://calendar.uoguelph.ca/graduate-calendar/general-regulations/admission/application-admission/).

Program Requirements

The major part of a student's time will be devoted to research in fulfilment of the dissertation requirement. Course work would be established through discussion with the student's Advisory Committee.

PhD students will become candidates for the PhD degree upon completion of a qualifying examination, which must be conducted not later than the fifth semester of the PhD program. The examination will be primarily research focused.

Thesis Requirements

Submission and defence of an acceptable dissertation complete the requirements for a PhD. An acceptable dissertation comprises a report of the candidate's research on a particular and well-defined research problem or hypothesis. It should represent a significant contribution to knowledge in that field. Emphasis is placed on the quality of the work judged by the expression of mature scholarship and critical judgment in the dissertation. Dissertation approval implies that it could be published in reputable, refereed journals in its field.

Collaborative Specializations

Neuroscience

The Department of Human Health Sciences participates in the MSc/PhD collaborative specialization in neuroscience. Please consult the Neuroscience (https://calendar.uoguelph.ca/graduate-calendar/collaborative-specializations/neuroscience/) listing for a detailed description of the MSc/PhD collaborative specialization.

One Health

The Department of Human Health Sciences participates in the collaborative specialization in One Health. Master's and Doctoral students wishing to undertake thesis research or their major research paper/project with an emphasis on one health are eligible to apply to register concurrently in Human Health and Nutritional Sciences and the collaborative specialization. Students should consult the One Health listing for more information.

Regenerative Medicine

The Department of Human Health Sciences participates in the collaborative specialization in Regenerative Medicine. MSc and Doctoral students wishing to undertake thesis research or their major research paper/project with an emphasis on regenerative medicine are eligible to apply to register concurrently in Human Health and Nutritional Sciences and the collaborative specialization. Students should consult the Regenerative Medicine (https://calendar.uoguelph.ca/graduate-calendar/collaborative-specializations/regenerative-medicine/) listing for more information.

Toxicology

The Department of Human Health Sciences participates in the master's/doctoral collaborative specialization in toxicology. The research and teaching expertise of these faculty include aspects of toxicology; they may serve as advisors for master's and doctoral students in Toxicology. Students choosing this option must meet the requirements of the Toxicology collaborative specialization, as well as those of their home department. Please consult the Toxicology (https://calendar.uoguelph.ca/graduate-calendar/collaborative-specializations/toxicology/) listing for a detailed description of the master's/doctoral collaborative specialization.

Courses

HHNS*6000 Students Promoting Awareness of Research Knowledge Summer, Fall, and Winter [0.25]
This course will explore research communication through practical experience. The course will be part of the SPARK program in which students write, edit and coordinate a variety of news publications that highlight University of Guelph research activities for a wide range of audiences.
Restriction(s): Restricted to HHNS MSc coursework/MRP students.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6010 Fundamentals of Scientific Practice in Human Health and Nutritional Sciences Summer Only [0.50]
This course provides a forum for students to examine core components of the scientific process. Emphasis is placed on multiple experimental approaches to seek totality of evidence to advance knowledge. The responsible conduct of science is reinforced by critically engaging with foundational concepts of scientific practice.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6040 Research Fronts in Nutritional and Nutraceutical Sciences Fall Only [0.50]
Building on an information base in nutrition, biochemistry and physiology, the course comprises selected research topics pertaining to the importance of nutrition as a determinant of health throughout the life span. Distinction will be drawn between the metabolic basis of nutrient essentiality and the health protectant effects of nutraceuticals.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6130 Advanced Skeletal Muscle Metabolism in Humans Winter Only [0.50]
This course examines how the energy provision pathways in human skeletal muscle and associated organs meet the energy demands of the muscle cell during a variety of metabolically demanding situations.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6320 Advances in Human Health and Nutritional Sciences Research Summer, Fall, and Winter [0.50]
This course provides the student with an opportunity to study a topic of choice and involves literature research on a chosen topic. The course may stand alone (MSc thesis and PhD students) or provide the background information for an experimental approach to the topic (MSc course work and project students).
Restriction(s): Instructor consent required.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6400 Functional Foods and Nutraceuticals Fall Only [0.50]
This course considers the relation of nutraceuticals, functional foods, designer foods, medical foods and food additives to foods and drugs. The course emphasizes the development and commercialization of nutraceuticals.
Restriction(s): Restricted to Human Health & Nutritional Sciences students.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6410 Applied Functional Foods and Nutraceuticals Winter Only [1.00]
This course prepares students to develop an innovative product or service from conceptualization to market entry considering regulatory, product development, safety/efficacy and market readiness issues. The course applies and integrates the concepts defined in HHNS*6400
Prerequisite(s): HHNS*6400 - Minimum grade 065.
Restriction(s): Restricted to Human Health & Nutritional Sciences students.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6440 Nutrition, Gene Expression and Cell Signalling Winter Only [0.50]
This course emphasizes the role nutrients play as modulators of gene expression at the molecular level. The mechanisms by which nutrients modulate gene expression through specific cell signalling cascades are examined.
Offering(s): Annually
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6500 Cardiovascular and Respiratory Physiology Fall Only [0.50]
This course will use both review articles and the primary literature to build a broad base of understanding of the cardiovascular and respiratory systems as well as explore current research in specific areas in this knowledge paradigm. Further, this course will build research skills through by strengthening critical analysis skills and both oral and written communication skills through learning about the cardiovascular and respiratory system and how they integrate.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6610 Health Science Translation and Innovation Winter Only [0.50]
This course explores the process of transforming health science research into practical applications, products, and solutions that address real-world challenges. This interdisciplinary course equips students with the skills to bridge the gap between discovery and implementation, combining principles of research, innovation, commercialization, and stakeholder engagement. Students learn how to navigate the pathways of science-driven innovation, including knowledge transfer, technology development, and entrepreneurial strategies, preparing them to drive impactful change in fields such as healthcare, sustainability, and technology.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6700 Nutrition, Exercise and Metabolism Fall Only [0.50]
A discussion of recent concepts in the relationships among nutrition, exercise and metabolism. Information from the molecular to the whole-body level will be presented with a focus on understanding nutrition and exercise in the human. Emphasis is placed on the development and testing of experimental hypotheses in these areas of research.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6710 Advanced Topics in Nutrition and Exercise Winter Only [0.50]
Advanced topics are presented to establish an in-depth understanding of current investigations in nutrition, exercise and metabolism with a focus on the cellular and tissue level. The focus of this course is to develop the student's ability to independently analyze original research investigations, while understanding how they relate to real-world disease scenarios.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6800 Research Frontiers in Integrative Biomechanics and Neurophysiology Fall Only [0.50]
This course will provide students with a breadth of knowledge and understanding across the research frontiers pursued by the integrative biomechanics and neurophysiology group. Students will be given opportunity to practice and improve oral and written communication skills and provide constructive feedback to their peers. Additionally, this class will engage students in dialogue around topics pertinent to designing and conducting successful experiments such as hypothesis generation and ethical and practical considerations.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6810 Research Methods in Integrative Biomechanics and Neurophysiology I Fall Only [0.50]
This course develops a comprehensive understanding of methods and analysis related to research in biomechanics & neuroscience. Critical evaluation and application of basic signal to noise processing and electromyography is a priority. The course uses labs, assignments, and critical review of primary literature articles to develop a strong research foundation. Scientific writing and oral communication skills are emphasized via written reports and presentations, and numeracy throughout the course in data and lab assignments.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6820 Research Methods in Integrative Biomechanics and Neurophysiology II Winter Only [0.50]
This course develops a comprehensive understanding of methods and analysis related to research in biomechanics & neuroscience. Critical evaluation and application of 3D kinematics and programming/modelling is a priority. The course uses labs, assignments, and critical review of primary literature articles to develop a strong research foundation. Scientific writing and oral communication skills are emphasized via written reports and presentations, and numeracy throughout the course in data and lab assignments.
Prerequisite(s): HHNS*6810
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6910 Basic Research Techniques and Processes Summer, Fall, and Winter [0.50]
Working with a faculty advisor, students will gain experience in basic aspects of scientific research. This will be accomplished through experience of one or more components of the scientific method in a laboratory setting. Objective outcomes will be evaluated and will include documentation of the experience in a written report.
Restriction(s): Restricted to HHNS MSc coursework/project students.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6920 Applied Research Techniques and Processes Summer, Fall, and Winter [0.50]
Under the supervision of a faculty advisor, students will gain practical experience in discipline-specific aspects of research. This will be accomplished through experience in a pre-arranged practicum in an applied setting. Objective outcomes will be evaluated and will include documentation of the experience in a written report.
Restriction(s): Restricted to HHNS MSc coursework/MRP students.
Department(s): Department of Human Health Sciences
Location(s): Guelph

HHNS*6930 Research Project Summer, Fall, and Winter [0.50]
Under the supervision of a faculty advisor and building on knowledge gained from Basic or Applied Research Techniques and Processes, students will carry out a specific research project to its completion. Results will be documented in a written report and communicated through a scientific poster.
Prerequisite(s): HHNS*6910 or HHNS*6920
Restriction(s): Restricted to HHNS MSc coursework/MRP students.
Department(s): Department of Human Health Sciences
Location(s): Guelph