Nutritional Sciences, M.S.

Modern nutrition is a multidisciplinary, integrative science, and the Interdepartmental Graduate Program in Nutritional Sciences (IGPNS) has been developed to meet this diversity in approach and objective. Thus, students can focus their training in one of two emphasis groups for the Master's Degree:

1. Biochemical and Molecular Nutrition,
2. Human Nutrition

It is the program's goal to provide graduate students interested in nutrition with an opportunity to obtain specialized training in a specific research area and also to obtain a general background in the science and practice of nutrition. The program is sufficiently flexible to allow students with a wide variety of undergraduate degrees to meet the background prerequisites. The program draws on the strengths of faculty in a number of the university's colleges and academic departments to enhance the instructional and research experience.

The training objectives of the IGPNS are to provide students with an understanding of basic nutritional principles as they apply to both humans and animals, to provide them with current knowledge in a specific area of emphasis, to make them aware of the integrative and multidisciplinary nature of nutrition research, and to direct them toward a successful career through the thesis and publications.

Biochemical and Molecular Nutrition. This emphasis group focuses on the application of biochemical and physiological approaches to the understanding of nutrient function and metabolism in systems ranging from the whole animal to the molecular level.

Human Nutrition. This emphasis group takes a comprehensive view of human nutrition with emphasis on the maintenance and promotion of human health. It utilizes diverse research approaches to carry out studies on nutrient requirements, metabolism, and interactions. Research may involve physiological and biochemical studies, animal models and epidemiological, and educational or clinical interventions.

The graduate faculty have well-developed, competitively funded research programs and have been recognized for their activities by receiving national awards. They are active in national and international nutrition activities, and serve on editorial boards, as society officers, and as participants in numerous workshops and on advisory committees.

Admissions

Graduate admissions are a two-step process between academic degree programs and the Graduate School. Applicants must meet requirements of both the program(s) and the Graduate School. Once you have researched the graduate program(s) you are interested in, apply online (https://grad.wisc.edu/admissions).

Requirements | Detail
--- | ---
Fall Deadline | January 1
Spring Deadline | January 1

Summer Deadline

The program does not admit in the summer.

GRE (Graduate Record Examinations)

Not required.

English Proficiency Test

Every applicant whose native language is not English or whose undergraduate instruction was not in English must provide an English proficiency test score and meet the Graduate School minimum requirements (https://grad.wisc.edu/apply/requirements/#english-proficiency).

Other Test(s) (e.g., GMAT, MCAT) | n/a

Letters of Recommendation Required | 3

Candidates for graduate study in nutritional sciences should have a strong background in mathematics, chemistry, biological sciences, medical sciences, or social sciences.

Specific prerequisites for the graduate program include the following:

- 2 semesters of General Chemistry
- 2 semesters of Biological Sciences
- 1 semester of Organic Chemistry
- Biochemistry with an Organic Chemistry prerequisite
- 1 semester of Statistics or Calculus
- 1 semester of Physiology

Students who have not completed all the requirements may be admitted, but deficiencies should be made up during the first year of graduate study.

All applicants must have a minimum grade point average of at least 3.0 (on a 4.0 scale), as well as three references, and a personal statement. Acceptance requires approval by the Department of Nutritional Sciences and the Graduate School.

Funding

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (https://grad.wisc.edu/funding) is available from the Graduate School. Be sure to check with your program for individual policies and processes related to funding.

Program Resources

Assistantships and fellowships are available to support students. Information about financial assistance may be obtained from the department office.
REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/policiesandrequirementstext), in addition to the program requirements listed below.

MAJOR REQUIREMENTS

MODE OF INSTRUCTION

<table>
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<tr>
<th>Mode of Instruction Definitions</th>
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<tr>
<td><strong>Face to Face</strong></td>
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<td>Yes</td>
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</table>

Mode of Instruction Definitions

- **Evening/Weekend**: These programs are offered in an evening and/or weekend format to accommodate working schedules. Enjoy the advantages of on-campus courses and personal connections, while keeping your day job. For more information about the meeting schedule of a specific program, contact the program.
- **Online**: These programs are offered primarily online. Many available online programs can be completed almost entirely online with all online programs offering at least 50 percent or more of the program work online. Some online programs have an on-campus component that is often designed to accommodate working schedules. Take advantage of the convenience of online learning while participating in a rich, interactive learning environment. For more information about the online nature of a specific program, contact the program.
- **Hybrid**: These programs have innovative curricula that combine on-campus and online formats. Most hybrid programs are completed on-campus with a partial or completely online semester. For more information about the hybrid schedule of a specific program, contact the program.
- **Accelerated**: These on-campus programs are offered in an accelerated format that allows you to complete your program in a condensed time-frame. Enjoy the advantages of on-campus courses with minimal disruption to your career. For more information about the accelerated nature of a specific program, contact the program.

CURRICULAR REQUIREMENTS

Requirements Detail

- **Minimum Credit Requirement**: 30 credits
- **Minimum Residence Credit Requirement**: 16 credits
- **Minimum Graduate Coursework Requirement**: Half of degree coursework (15 credits out of 30 total credits) must be completed graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide (https://registrar.wisc.edu/course-guide/).
- **Overall Graduate GPA Requirement**: 3.00 GPA required.

Other Grade Requirements

- The Graduate School requires an average grade of B or better in all coursework (300 or above, not including research credits) taken as a graduate student unless conditions for probationary status require higher grades. Grades of Incomplete are considered to be unsatisfactory if they are not removed during the next enrolled semester.

Assessments and Examinations

- Students must complete either a research-based thesis or a literature-based report that passes scholarly review.

Language Requirements

- No language requirements.

REQUIRED COURSES

**Biochemical and Molecular Track**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NUTR SCI/BIOCHEM 619</td>
<td>Advanced Nutrition: Intermediary Metabolism of Macronutrients</td>
<td>3</td>
</tr>
<tr>
<td>NUTR SCI/BIOCHEM 621</td>
<td>Introduction to Nutritional Epidemiology</td>
<td>1</td>
</tr>
<tr>
<td>NUTR SCI/M&amp;ENVTOX 623</td>
<td>Advanced Nutrition: Minerals</td>
<td>1</td>
</tr>
<tr>
<td>NUTR SCI 625</td>
<td>Advanced Nutrition: Obesity and Diabetes</td>
<td>1</td>
</tr>
<tr>
<td>NUTR SCI/AN SCI 626</td>
<td>Experimental Diet Design</td>
<td>1</td>
</tr>
<tr>
<td>NUTR SCI 627</td>
<td>Advanced Nutrition: Vitamins</td>
<td>1</td>
</tr>
<tr>
<td>NUTR SCI 600</td>
<td>Introductory Seminar in Nutrition</td>
<td>1</td>
</tr>
<tr>
<td>BIOCHEM/NUTR SCI 901 or NUTR SCI 931 or NUTR SCI 881</td>
<td>Seminar-Nutrition and Metabolism (Advanced) or Seminar-Nutrition or Seminar-Topics in Human and Clinical Nutrition</td>
<td>1+</td>
</tr>
<tr>
<td>NUTR SCI 799</td>
<td>Practicum in Nutritional Sciences Teaching (or equivalent experience)</td>
<td>1-3</td>
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Select 4 credits of BIOCHEM from the following or equivalent:

- BIOCHEM 601 | Protein and Enzyme Structure and Function |
- BIOCHEM/GENETICS/MICROBIO 612 | Prokaryotic Molecular Biology |
- BIOCHEM/GENETICS/MD GENET 620 | Eukaryotic Molecular Biology |
- BIOCHEM 624 | Mechanisms of Enzyme Action |
- BIOCHEM 625 | Mechanisms of Action of Vitamins and Minerals |
- BIOCHEM/PHMCOL-M/ZOOLOGY 630 | Cellular Signal Transduction Mechanisms |
- BIOCHEM/CHEM 665 | Biophysical Chemistry |
- BIOCHEM/GENETICS 703 | Topics in Eukaryotic Regulation |
- BIOCHEM 711 | Sequence Analysis |
PRIOR COURSEWORK

Graduate Work from Other Institutions
With approval of the certification committee, students are allowed to count up to 14 credits of graduate coursework from other institutions. Coursework earned five or more years prior

to admission to a master's degree is not allowed to satisfy requirements.

UW–Madison Undergraduate
With approval of the certification committee, students may count up to 7 credits from a UW–Madison undergraduate degree, numbered 400 and above, toward the M.S. degree, provided that the course satisfies a requirement within the student’s core curriculum or IGPNS emphasis group. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

UW–Madison University Special
With approval of the certification committee, students are allowed to count no more than 14 credits of coursework taken as a UW–Madison Special student, provided the course satisfies a requirement within the student’s core curriculum or IGPNS emphasis group and is numbered 300 or above. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

PROCEDURES

The IGPNS requires a cumulative 3.0 GPA for all courses taken in the UW Graduate School. Grades in research (Nutri Sci 991) are not included in the calculation of the GPA. A student who does not maintain a 3.0 GPA can continue on probationary status for two semesters at the recommendation of the major professor. If, at that time, the student does not achieve a cumulative 3.0 GPA, they will be dropped from the program.

The Graduate School regularly reviews the record of any student who earned grades of BC, C, D, F, or Incomplete in a graduate course not included in the calculation of the GPA. A student who does not meet the UW Graduate School. Grades in research (Nutri Sci 991) are not included in the calculation of the GPA. A student who does not maintain a 3.0 GPA can continue on probationary status for two semesters at the recommendation of the major professor. If, at that time, the student does not achieve a cumulative 3.0 GPA, they will be dropped from the program.

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that coursework may not count toward Graduate School credit requirements.

OTHER
n/a

PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES

Take advantage of the Graduate School's professional development resources (https://grad.wisc.edu/pd) to build skills, thrive academically, and launch your career.

LEARNING OUTCOMES

1. Articulates, critiques, and elaborates the theories, research methods, and approaches to inquiry in nutritional sciences. Specific knowledge areas of focus include intermediary metabolism, functions and metabolism of vitamins and minerals, nutrition-related diseases such as obesity and diabetes, and fundamental principles of epidemiology and nutrition policy.
2. Identifies sources and assembles evidence pertaining to questions or challenges in nutritional sciences.
3. Selects and/or utilizes the most appropriate methodologies and practices.
4. Evaluates or synthesizes information pertaining to questions or challenges in nutritional sciences.
5. Communicates clearly in ways appropriate to the field of nutritional science. This includes the composition of primary research and review articles. Demonstrates competent communication in the form of oral and poster presentations.
6. Recognizes and applies principles of ethical and professional conduct.

PEOPLE

FACULTY

MEMBERS OF THE INTERDEPARTMENTAL GRADUATE PROGRAM IN NUTRITIONAL SCIENCES WITHIN THE DEPARTMENT

Eide, Dave (Department Chair), Professor of Nutritional Sciences; Ph.D., 1987. Nutritional genomics and molecular responses to changes in nutrient status

Eisenstein, Richard, Professor of Nutritional Sciences; Ph.D., 1985. Iron metabolism; posttranscriptional control of proteins required for the uptake, storage, and use of iron

Fan, Jing, Assistant Professor of Nutritional Sciences, Ph.D., 2014. Cancer metabolism; metabolic regulation in dynamic mammalian systems

Groblewski, Guy, Professor of Nutritional Sciences; Ph.D., 1991. Intracellular signal transduction and membrane/protein trafficking in gastrointestinal epithelial cells

Kuchina, Adam, Assistant Professor of Nutritional Sciences; Ph.D., 2017; Muscle and Protein Metabolism; Understanding how disease affects muscle and protein metabolism and muscle assessment techniques

Lai, Huichuan, Professor of Nutritional Sciences; Ph.D., R.D., 1994. Epidemiological studies linking nutrition and disease outcomes in pediatric populations

Ney, Denise, Professor of Nutritional Sciences; Ph.D., 1986. Nutritional management of phenylketonuria and gastrointestinal physiology

Ntambi, James, Steenbock Professor of Nutritional Sciences (also Biochemistry); Ph.D., 1985. Mechanisms of fat cell differentiation; regulation of gene expression by dietary and hormonal factors

Olson, Beth, Associate Professor. Ph.D. – Nutrition, University of California at Davis. Breastfeeding support and improving infant feeding practices

Parks, Brian, Assistant Professor of Nutritional Sciences, Ph.D., 2008. Systems genetics, Gene-diet interactions, and molecular mechanisms of obesity and diabetes

Schoeller, Dale, Faculty Emeritus; Ph.D., Biochemical & Molecular Nutrition; Human Nutrition; Energy metabolism and human obesity, body composition, and stable isotope techniques for macronutrient metabolism

Sunde, Roger, Professor of Nutritional Sciences; Ph.D., 1980. Selenium deficiency as a model for nutrient regulation of gene expression; molecular mechanism of selenium regulation and homeostasis; biochemical functions of selenium

Tanumihardjo, Sherry, Professor of Nutritional Sciences; Ph.D., 1993. Vitamin A assessment methodology; carotenoid bioavailability; and international nutrition

Yen, Eric, Assistant Professor of Nutritional Sciences; Ph.D. 2000. Intestine, assimilation of dietary fat, and energy balance

MEMBERS OF THE INTERDEPARTMENTAL GRADUATE PROGRAM IN NUTRITIONAL SCIENCES FROM OUTSIDE THE DEPARTMENT:

Anderson, Rozalyn, Assistant Professor, Ph.D., 2000. Nutrient sensitive regulatory pathways in aging and age-associated disease

Armentano, Louis, Professor of Dairy Science; Ph.D., 1982. Ruminant nutritional physiology and the role of ruminants in using by-products derived from processing plants for human use

Attie, Alan, Professor of Biochemistry; Ph.D., 1980. Cell biology of lipoprotein assembly; genetics of obesity and diabetes

Binkley, Neil, Associate Professor of Medicine, M.D. 1979. Vitamin K insufficiency and osteoporosis

Carey, Hannah, Professor of Veterinary Medicine; Ph.D., 1983. Gastrointestinal physiology; intestinal adaptation; mammalian hibernation and its application to biomedicine; cellular and physiological responses to stress
Clagett-Dame, Margaret, Professor of Biochemistry and Pharmaceutical Sciences; Ph.D., 1985. Vitamin A and nervous system development; therapeutic uses of retinoids and vitamin D analogs

Combs, David, Professor of Dairy Science; Ph.D., 1985. Ruminal digestion and metabolism of forages by dairy cattle; food intake regulation in ruminants

Crenshaw, Thomas, Professor of Animal Science; Ph.D. 1980. Skeletal tissue growth and assessment; statistical approaches to establishment of mineral and amino acid requirements; swine nutrition

Davis, Dawn, Assistant Professor of Pediatrics; M.D. 1985. Changes in pancreatic beta cell gene expression in response to obesity and in the setting of beta cell proliferation

Denu, John, Professor of Biomolecular Chemistry; Ph.D. 1993. Investigation of the proposed “Histone Code”; understanding the mechanisms of enzymes that reversibly modify proteins and the effects of these modifications on protein function

Engin, Feyza, Assistant Professor of Biomolecular Chemistry; Ph.D., 2007. Investigating the molecular mechanisms of organelle dysfunction and cellular stress responses in the pathogenesis of diabetes

Funk, Luke, Assistant Professor of Surgery. 2005 MD, Ph.D., FACS. Bariatric and metabolic surgery, esophageal and gastric disorders, abdominal wall hernias and gall bladder disorders

Goldman, Irwin, Professor of Horticulture; Ph.D. Vegetable breeding and genetics, human health attributes of vegetable crops and breeding of vegetables for culinary quality

Hayes, Colleen, Professor of Biochemistry; Ph.D., 1973. Vitamin D regulation of immune function and autoimmune disease; genetic and biochemical analysis of B-lymphocyte survival and apoptosis signaling

Hernandez, Laura, Assistant Professor of Dairy Science; Ph.D. 2008. Regulation of lactation and milk synthesis in relation to the autocrine, paracrine, endocrine and serotonin systems. Regulation of mammary gland calcium transport and maternal calcium homeostasis during lactation

Kanarek, Marty, Professor of Population Health Sciences and Environmental Studies; Ph.D., 1978. Environmental epidemiology; potential population health effects from consumption of fish contaminated with mercury, PCBs, and other chemicals

Karasov, William, Professor of Wildlife Ecology; Ph.D., 1981. Molecular mechanisms of intestinal enzyme adaptation, intestinal absorption, nutritional ecology of wild vertebrates

Kemnitz, Joseph, Professor of Cell and Regenerative Biology (also Director for Translational Technologies and Resources for Institute for Clinical and Translational Research); Ph.D., 1976. Regulation of energy balance; consequences of energy imbalances in early development and aging; nonhuman primate models

Kimple, Michelle, Assistant Professor of Medicine; Ph.D. 2003. Pancreatic beta-cell response to nutrient and hormonal stimulation

Kling, Pamela, Associate Professor of Pediatrics; M.D. 1985. Erythropoiesis, iron metabolism and roles of erythropoietin in early development

Knoll, Laura, Associate Professor of Medical Microbiology & Immunology; Ph.D. 1994. Using -omics technology to study host/ pathogen interactions and metabolism of the intracellular parasite Toxoplasma gondii

Kudsk, Kenneth, Professor of Surgery; M.D., 1975. Effect of route and type of nutrition on surgical outcome; mucosal immunity and response to infection

Lamming, Dudley, Assistant Professor of Endocrinology, Diabetes, and Metabolism; Ph.D., 2008. Protein regulation of cellular processes that affect growth, metabolism, and aging

Mares, Julie, Professor of Ophthalmology; Ph.D., 1987. Epidemiological study of relationships between diet and age-related eye disease

Malecki, Kristen, Assistant Professor of Population Health Sciences, Ph.D. 2005. Epidemiological study of relationships between environment and health; system-science approaches to addressing health disparities, translational community base environmental health research

Merrins, Matthew, Assistant Professor of Medicine; Ph.D., 2008. Ability of pancreatic islet beta cells to trigger cell proliferation and release of insulin during periods of increased insulin demands

Pagliarini, Dave, Director of Metabolism, Morgridge Institute for Research; Associate Professor of Biochemistry; Ph.D., UC- San Diego. Integrating large-scale molecular profiling with mechanistic biochemistry to systematically annotate the functions of mitochondrial proteins


Reed, Jess, Professor of Animal Sciences; Ph.D. 1983. Flavonoids and other phytochemicals in animal and human health and nutrition

Reeder, Scott, Professor. MD. Ph.D. Abdominal adiposity, liver fat, liver iron overload and other features of diffuse liver disease, quantification of perfusion in liver tumors, hemodynamics of portal hypertension, and the use of new contrast agents in liver and biliary diseases

Schaefer, Daniel, Professor of Animal Sciences; Ph.D., 1979. Growth of beef cattle in grazing and feedlot systems

Simon, Philipp, Professor of Horticulture; Ph.D., 1977. Biochemical genetics and breeding of carrots, alliums, and cucumber; genetic improvement of vegetable culinary and nutritional value

Trentham-Dietz, Amy, Professor of Cancer Epidemiology. Ph.D. 1997. Modifiable lifestyle factors including obesity, physical activity, and environmental factors to better understand breast cancer etiology and reveal avenues for prevention

Westmark, Cara, Assistant Professor of Neurology. Ph.D. Alzheimer’s disease and fragile X syndrome focuses on the synaptic function of amyloid beta protein precursor (APP) and amyloid-beta

White, Heather, Assistant Professor of Dairy Science; Ph.D. 2010. Nutritional Physiology – Focus on hepatic carbon flux specifically during the coordinated responses to the transition to lactation, nutrition, and stress in dairy cattle and during onset and progression of NAFLD and NASH in humans
SUPPORT STAFF

Graduate Coordinator: Katie Butzen MS.Ed., kbutzen@wisc.edu