

Sustainable Agriculture Systems Minor

Guidelines for Graduate Students

UNIVERSITY OF MINNESOTA
COLLEGE OF FOOD, AGRICULTURAL AND NATURAL RESOURCE SCIENCES

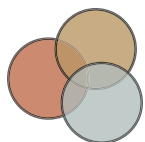
Society is seeking new approaches to food and fiber production that maintain the quality of the environment and the health and well being of the consumers, producers, and rural communities, now and in the future. The University of Minnesota recognizes this goal and offers a minor in Sustainable Agriculture that incorporates both interdisciplinary coursework and internship experiences. Through the program, students gain knowledge and experience in diverse areas and awareness of holistic approaches that are necessary to understand and develop sustainable systems.

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- Forms
- ✓ Intent to Enroll page 25
 - ✓ Internship Proposal Cover Sheet page 26
 - ✓ Proof of Health Insurance page 27



Program Office

For further information, contact the Minor Coordinator or the Student Program Coordinator. This handbook and additional information are available on the MISA website: www.misa.umn.edu under Student Programs.

Mailing Addresses:

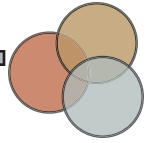
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The Admission Process

The minor in Sustainable Agriculture Systems is open to students enrolled in any program within the Graduate School at the University of Minnesota. This program will complement existing graduate major programs such as those in ecology, conservation biology, natural resources, sociology, geography, political science and public affairs, as well as those in the College of Food, Agricultural and Natural Resource Sciences.

Contact the Director of Graduate Studies or the Program Coordinator for the graduate minor in Sustainable Agriculture Systems for an "Intent to Enroll" form. Students are admitted each semester. Soon after enrolling in the minor program, the student should identify a graduate faculty member in the minor program who will serve as the student's minor advisor. The minor advisor will make recommendations on courses for the minor and be closely involved in the student's internship. This person may have expertise in the area the student wishes to conduct an internship, although this is not a requirement for selecting a minor advisor.



Curriculum

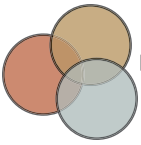
The program provides a curriculum with strong emphasis on systemic approaches to analyzing current agricultural production systems in the U.S., as well as environmental, economic, and social conditions that influence changes in agriculture. Courses designed specifically for this program integrate biology, ecology, agriculture, sociology, history, philosophy and economics. Students completing the requirements for the program receive a minor in Sustainable Agriculture Systems applicable to master's (M.S. and M.A.) and doctoral programs.

Sustainable Agriculture seeks to balance three long term goals: Quality of life, Environment and Economics.

Student interaction with individuals and groups actively involved with food production practices, policies and education, is an integral part of the program. The Colloquium in Sustainable Agriculture provides a forum for students, faculty, and members of the agriculture community to discuss issues of importance. An internship is a required part of the program. The internship gives students an opportunity to: gain practical experience in an area that complements their studies; broaden their understanding of food production; and develop learning and thinking skills that will serve them in a variety of settings. The internship tends to be very flexible in nature and can be completed as the student's schedule allows (See page X of this packet for more information).

Minor Requirements

- To obtain the minor, Masters and Ph.D. students must choose a graduate faculty member from the minor program to serve on their committee. This faculty member will help identify relevant courses to include in the student's program.
- When submitting Degree Program form to the Graduate School, the signature of the Director of Graduate Studies (DGS) for the minor program is required.
- Coursework must include 6 semester credits for an M.S. or M.A. program; 12 semester credits for a Ph.D. program. All students are required to take the Colloquium in Sustainable Agriculture (SAGR 8010) and Field Experience in Sustainable Agriculture (SAGR 8020) to obtain credit for their internship experience. Students in the Ph.D. program must take all 3 core courses. Additional credit requirements for the minor for both Masters' and Ph.D. students can be met with elective courses. A list of possible elective courses is provided here but should not be considered exhaustive. It is recommended that students select courses that will broaden their knowledge of agriculture and issues related to sustainable agriculture. These courses are correct as of Spring 2014. Students should check One Stop Course Schedule or call the respective departments to determine fall/spring semester offering schedule of each course.



Core Courses (Required for Masters and PhD Students)

SAGR 8010. Colloquium in Sustainable Agriculture. (2 cr)

Study the social, economic, political and environmental aspects of a sustainable agriculture through discussions with experts in the field. Specific topics can include: the history of agriculture and the family farm, government farm policy, the importance of biodiversity for healthy landscapes, rural communities, quality of life, community supported agriculture, organic agriculture, landscape health and non-profit organizations. Teaching approaches will include student, faculty and producer-led discussions. The course will include on-farm visits.

SAGR 8020. Field Experience in Sustainable Agriculture. (1-4 cr)

Three to fourteen-week internship with producers or organizations working with sustainable agriculture issues. Students analyze these issues in a final written project and oral seminar. Prereq-Coursework in biological or social sciences that provides intro to ag practices or issues; S-N or Aud, fall, spring, summer, every year)

Core Courses (Required for PhD Students / Elective for Masters Students)

AGRO 5321. Ecology of Agricultural Systems. (3 cr)

Agroecology as the scientific investigation of agricultural systems. Formal methodologies of systems inquiry are developed and applied to problems in agricultural ecosystems (cross listed with ENT 5321).

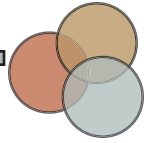
Electives

AFEE 4221 Rural Leadership Development 3 credits

Understanding the role, function, and features of leadership in rural communities; importance of personal involvement, personal leadership qualities, and vision for individuals and rural community organizations.

AGRO 4401 Plant Genetics and Breeding 4 credits

This course is designed for undergraduate or Master of Agriculture students. The emphasis will be on plant genetics and breeding and requires no prior genetics course (although a biology course is required). Students taking the course should be interested in using the products of plant breeding rather than being a professional plant breeder. The purpose of this course is to cultivate an appreciation for the fundamental principles of plant genetics and genetic processes and the procedures plant breeders use to create new varieties. Topics range from molecular aspects of genetics, Mendelian genetics, biotechnology, and genomics to variety development, seed multiplication, and intellectual property issues. Class material on Web CT/ Web Vista.



Electives

AGRO 4605 - Strategies for Agricultural Production and Management 3 credits

Information/tools necessary to make informed land management decisions in ever-evolving economic, policy, climate environments. Evaluate hows, whats, whys of crop management by solving real-world problems that agricultural professionals face. State-of-the-art production/management practices for major agricultural crops in Minnesota. Lectures feature agricultural professionals/experts. Lab component provides hands-on experience with modern equipment/data interpretation.

AGRO 5999 Agroecosystem Analysis (Summer Field Course) 3 credits

This is a field-based "immersion" course that introduces students to the concept of the agroecosystem and their analysis with an underlying emphasis on sustainability. Students visit a number of farms of various types in Minnesota, Iowa and Nebraska, as well as other historic and cultural sites of significance to this region. There is considerable time for discussion with the farmers and students prepare oral and written analyses based on their observations and conclusions.

Agro/Apec/Fscn 4103 World Food Problems 3 credits

Multidisciplinary look at problems and possible solutions affecting food production, storage, and utilization in developing countries. Presentations/discussions introduce conflicting views on population, technology, and ethical and cultural values of people in various parts of the world.

AMIN 3312 American Indian Environmental Issues and Ecological Perspectives (ENV) 3 credits

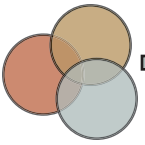
American Indian environmental issues in U.S./Canada. Analysis of social, political, economic, legal forces/institutions. Colonial histories/tribal sovereignty.

AMIN 3314 Natural Resource Management & the Environmental Policy in Indian Country 3 credits

American Indian natural resource management issues in U.S./Canada. Analysis of land tenure practices (pre-/post-European arrival), federal management programs, tribal natural resource governance/policy. Co-management initiatives between federal/state/tribal agencies.

APEC 4461 Horticultural Marketing 3 credits

Horticultural Marketing supports the following SLOs: Can locate and evaluate information on primary and secondary data used in horticultural marketing; Have mastered a body of knowledge by learning the marketing techniques and practices of horticultural products; And can communicate effectively through group discussions and group projects. This course examines several major areas in horticultural marketing. First, we will introduce the difference between horticultural products and commercial commodities; Second, we analyze the functions performed by the horticultural marketing system. We analyze the marketing behavior of horticultural businesses (farms, wholesalers, garden centers?), cover the core marketing components that should be used by every small horticultural business; Finally, the basic approaches of consumer research (survey techniques, non-hypothetical experimental approaches, etc.) will be introduced. Students will apply these research approaches to develop marketing plans for horticultural businesses.



Electives

APEC 5451 Food marketing Economics 3 credits

The course covers the development of a marketing plan/strategy for food products, including developing a target market based on consumer trends and segmentation. The food industry at the retail (foodstore and foodservice) and wholesale levels, plus supply chain management are studied, including the impact of e-commerce both at the consumer and business levels. Current ethical and public policy issues confronting the food industry are examined and considered from various perspectives. Students pursue individual and group projects. Three special projects account for 50% of the grade. They require written reports of about 5 pages and class presentations. The first involves developing a marketing plan for a food product and the second a case study of a marketing decision by a local food business. The last project involves a debate of food and nutrition policy issues by the class. There are several industry speakers. The course fulfills both writing intensive and citizenship and public ethics requirements.

APEC 5651 Economics of Natural Resources and Environmental Policy 3 credits

Economic analyses, including project evaluation of current natural resource/environmental issues. Emphasizes intertemporal use of natural resources, natural resource scarcity/adequacy, environmental quality, and mechanisms for pollution control and their implications for public policy.

APEC 5711 U.S. Agricultural and Environmental Policy 3 credits

This course provides an overview of global challenges to the survival and sustainability of the environment. The introductory first part of the course introduces the magnitude of these challenges in physical, ecological and human terms. The second part offers a set of economic tools relevant to analysis of these issues: the discount rate, property rights, basic game theory. The third part applies these concepts to a variety of international environmental problems.

APEC 5811 Cooperative Organization 3 credits

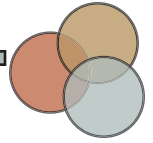
Application of economic analysis to cooperative form of organization. Producer/consumer cooperatives used to examine economic issues such as changing market organization, financing, management incentives, taxation, and antitrust regulations. Cooperatives as a tool for economic development.

APEC 5891 Advanced Topics in Farm and Agribusiness Management 1-4 credits

Special topics or individual work suited to the needs of particular groups of students

APS 4072 What Does It Means to Be Green? 3 credits

Explore the role and potential of organic agriculture in providing healthy food at both local and global levels. A unique aspect of this course is the lead instructor: He is a farmer with 15 years of experience and has a PhD in Plant Biology. The course will emphasize the specific practices used on small to medium size fruit and vegetable farms as examples of how cultural systems interact with nature in the practice of agriculture. The classes will be a mix of lecture and discussion and is intended to be both information intensive and thought provoking. Student projects will serve to provide opportunity for greater depth in a specific area. The interests of students will influence the final syllabus. One farm visit field trip is required



Electives

APS 5101 Polyculture Design 3 credits

Polyculture design is the design science of assembling plants into ecologically balanced systems. Natural polycultures are self-supporting plant communities in forests, wetlands, and prairies. Investigate ecological functions and services that are important components for sustainable horticultural design. Learn to apply the ecological landscape design language and technique while using the permaculture design process to create ecologically functional plant communities. Crucial discussions will assess the solutions in horticultural design for adapting to accelerated climate disruption, and follow nature's momentum as a guide to sustainable production systems. Lab sessions will demonstrate, and you will develop, the skills and foresight needed to assess, research, concept, design, and present polycultures in a sequential and professional process.

BBE 5203 Environmental Impacts of Food Production 3 credits

Crop production intensity, animal raising options, food processing waste alternatives, pest control.

BBE 5212 Safety and Environmental Health Issues in Plant and Animal Production and Processing
3 credits

Safety/health issues in food production, processing and horticultural work environments using public health, injury control, and health promotion frameworks: regulation, engineering, education. Traumatic injury, occupational illness, ergonomics, pesticide health effects, biotechnology, air contaminants.

BBE 5523 Ecological Engineering Design 3 credits

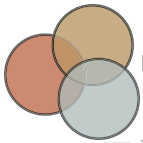
Application of ecological engineering to design of remediation systems. Artificial ecosystems, ecosystem/wetland restoration, constructed wetlands, biological engineering for slope stability, waste treatment using biological systems. Restoring ecological service of watersheds.

CHIC 5374 Migrant Farmworkers in the United States: Families, Work, and Advocacy (CIV) 3 credits

Socioeconomic/political forces that impact migrant farmworkers. Laws, legislation, and policies, effects on everyday life. Strategies of unions and advocacy groups. Role/power of consumer. How we produce, distribute, and consume food. Moral/ethical dilemma of consuming cheap food.

EEB 4068 Plant Physiological Ecology 3 credits

This lecture and laboratory course will consider how plants function in an ecological context that includes, for example, variation in the abiotic environment, symbioses with fungi and other organisms, competition with neighbors, and herbivore pressure. We examine how the stresses encountered in ecological settings impact the major physiological processes of plants, including photosynthesis, respiration, water uptake and transport, and nutrient uptake and assimilation. We will explore how plants survive in deserts, rainforests, in the Arctic circle, and here in the Minnesota prairie through lectures, discussion of primary literature, in class labs, and a field trip to the Cedar Creek Ecosystem Science Reserve. Lectures and readings will present theoretical advances in physiological ecology, and labs will teach both classic and cutting-edge techniques aimed at understanding how plants function, respond to stress, and compete for and allocate resources in the face of constantly changing environments. Laboratory techniques will prepare students for empirical research in plant physiological ecology. These techniques will include measurement of relative humidity, temperature, vapor pressure deficit and boundary layer conductance; soil moisture; gas exchange; chlorophyll fluorescence; wood and leaf anatomy; water potential; sapflow; and plant hydraulic architecture and water transport. The course includes an interactive website.



Electives

EEB 4609 Ecosystem Ecology 3 credits

Regulation of energy and elements cycling through ecosystems. Dependence of cycles on kinds/numbers of species within ecosystems. Effects of human-induced global changes on functioning of ecosystems.

EEB/FR 5146 Science and Policy of Global Environmental Change 3 credits

Intro to critical issues underpinning global change and its biological implications. Current scientific literature on evidence for global change and potential effects on a wide range of biological processes. Economic/political impact on global change.

ENT 4021 Honey Bees and Insect Societies 3 credits

Natural history, identification, and behavior of honey bees and other social insects. Evolution of social behavior, pheromones and communication, organization and division of labor, social parasitism. Lab with honey bee management and maintenance of other social bees for pollination.

ENT 4022 Bee Management 1 credits

Field course for students interested in honey bee management and the conservation and maintenance of other bee pollinators. Work with live bee colonies and participate in field research problems related to honey bee behavior and management.

ENT 5241 Ecological Risk Assessment 3 credits

Evaluating current/potential impact of physical, chemical, biological agents on ecosystems. Identifying ecological stressors, assessing level of exposure, measuring ecological responses, communicating/managing risks. Class participation, two reaction papers, final exam, small-group project.

ENT 5341 Biological Control of Insects and Weeds 3-4 credits

Biological control of arthropod pests and weeds. Analysis of relevant ecological theory and case studies; biological control agents. Lab includes natural enemy identification, short experiments, and computer exercises.

ESPM 3011 Ethics in Natural Resources 3 credits

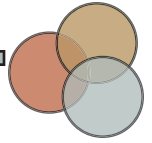
Normative/professional ethics, and leadership considerations, applicable to managing natural resources and the environment. Readings, discussion.

ESPM 3108 Ecology of Managed Systems (ENV) 3 credits

Ecology of ecosystems that are primarily composed of managed plant communities, such as managed forests, field-crop agroecosystems, rangelands and nature reserves, parks, and urban open-spaces. Concepts of ecology and ecosystem management.

ESPM 3241W/5241 Natural Resource and Environmental Policy 3 credits

Political processes in management of the environment. How disagreements are addressed by different stakeholders, private-sector interests, government agencies, institutions, communities, and nonprofit organizations.



Electives

ESPM 3245 Sustainable Land Use Planning and Policy (ENV) 3 credits

Policies affecting land use planning at local, state, and federal levels. Ecosystem and landscape scale planning. Collaborative and community-based approaches to planning for ecological, social, and economic sustainability. Class project applies interdisciplinary perspectives on planning and policy, including information gathering techniques, conservation planning tools, and evaluation of planning options.

ESPM 3603 / 5603 Environmental Life Cycle Analysis 3 credits

Concepts/issues relating to inventory, subsequent analysis of production systems. Production system from holistic point of view, using term commonly used in industrial ecology: "metabolic system."

ESPM 5202 Environmental Conflict Management, Leadership, and Planning 3 credits

Negotiation of natural resource management issues. Use of collaborative planning. Case study approach to conflict management, strategic planning, and building leadership qualities. Emphasizes analytical concepts, techniques, and skills.

ESPM 5603 - Environmental Life Cycle Analysis 3 credits

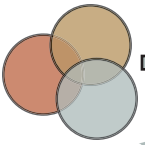
Concepts, major issues relating to inventory and subsequent analysis of production systems. Production system from holistic point of view, using term commonly used in industrial ecology: "the metabolic system."

FR 5104 Forest Ecology 4 credits

Ecology, the study of the interactions of organisms and their environment, forms the essential foundation of the management and conservation of the world's ecosystems. This course examines basic ecological principles through the lens of forest ecosystems, exploring the theory and practice of ecology at various levels of organization from individuals to populations, communities and ecosystems. At each level we examine past and current theoretical advances and use case studies to evaluate the impacts of increasing human domination of global systems on forested ecosystems. The course covers diverse topics including global climate change; individual and population growth; community assembly; invasive species; biodiversity; and alteration of water, carbon and nutrient cycles. During two class periods per week we explore forest ecology through a combination of lecture, group learning and problem solving, and discussion. Labs include group research projects and trips to local natural areas, urban forests, and the north shore of Lake Superior. Lab sessions are designed to complement and reinforce material covered in regular class periods. At the graduate level, students work in a graduate cooperative learning group during class periods, design an interactive learning activity and participate in an weekly literature discussion group.

FSCN 2001 Healthy Foods, Healthy Lives: A Food System Approach to Cooking 3 credits

Skills/resources for food choices based on nutritional, environmental, local/global societal implications. Ethical/civic themes that guide food choices. Discussion/writing on how environmental, cultural, social, health issues impact personal food choices.



Electives

FSCN 3301 Food Choices: Healing the Earth, Healing Ourselves 3 credits

Link between our food/diet, agricultural practices, and health of planet. Food security. Cultural/personal context of food choices. Ways that food is produced, especially industrial monoculture. Food choices and the earth's bio diversity. Land use, water use, pollution, energy needs, climate change. Alternatives: organic/sustainable, fair trade. Economic policies/choices. Global tradeoffs.

FW 8452 Conservation Biology 3 credits

Conservation biology is a mission-oriented science that focuses on how to protect and restore biological diversity. In this course, we will review the ecological concepts constituting the scientific basis for biological conservation. However, since most of the threats to biodiversity originate from human actions, understanding human behavior and the social, political and economic systems in which people act is an essential component for those interested in conserving biodiversity. Consequently, we will review ideas and methods from the social sciences relevant for biological conservation. This course is the first-semester of a year-long sequence for conservation biology graduate students. Graduate students from other programs are more than welcome to enroll.

FW 8465 Fish Habitats and Restoration 3 credits

Mechanisms underlying physiology/behavior that shape fish community structure in specific north temperate habitats. Techniques and planning procedures for restoring lakes/streams.

GCC 3001 - Grand Challenge: Can We Feed the World Without Destroying It? (ENV) 3 credits

In this course, we will seek solutions to the challenge of achieving global food security and sustainability. Ultimately, we will seek to answer the question, "Can we feed the world without destroying it?" The course begins with lectures and skills workshops, followed by a series of interactive panels with guest experts. We will also prepare group projects that are focused on finding innovative solutions to this grand challenge. We will learn about the fundamental changes occurring in the global food system, the environment, and our civilization as a whole. We will explore the role of science and technology in informed decision making, how to approach inherently interdisciplinary problems, how to identify solutions that are truly sustainable in the long term, and how to inform the public of our findings.

GEOG 5565 Geographical Analysis of Human-Environment Systems 3 credits

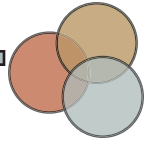
Applications of geographic information systems and other spatial analysis tools to analysis of environmental systems patterns, dynamics, and interactions. Focuses on global to landscape databases developed to analyze atmospheric,

GWSS 3290 Topics: Biology, Health, and Environmental Studies: Enviro/ Feminism 3 credits

Concepts of environmental biology, changing conditions of life on earth, creating a sustainable future. Connection between feminism and environmental justice. Disproportionate impact of environmental crises on women, children, and economically disadvantaged communities.

HORT 3131/5131 Student Organic Farm Planning, Growing and Marketing 3 credits

Students plan/implement cropping/marketing strategies for organic produce/flowers from Student Organic Farm on St. Paul campus.



Electives

HORT 4601 - Aquaponics: Integrated fish and plant food systems 4 credits
Advanced training/experience at intersection of biology, engineering, economics, policy, culture, environment. Emphasis on experiential learning (i.e., system design/maintenance, community engagement).

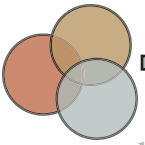
HORT 4850 - Pollinator Protection in Managed Landscapes 3 credits
Importance of pollinators in agricultural/other natural landscapes. Risks to pollinators. Ways risks can be reduced, minimized, or overcome. Ways public policy has impacted pollinators/how future policy decisions will affect pollinator protection efforts.

HORT 5031 Organic Viticulture and Fruit Production 3 credits
Fall Semester of odd years. Instructor: Hoover, Luby. Description: Principles of fruit production emphasizing temperate fruit crops. Integrated management of fruit cropping systems, including site selection, cultural management practices, taxonomic classification, physiological and environmental control of plant development. Integration of writing into understanding various fruit cropping systems.

HORT 5032 Organic Vegetable Production 3 credits
Integrated management of vegetable cropping. Site selection/environment, seed/stand establishment, cultural management, commodity use, handling. Types of vegetable cultivars. Breeding, physiological/environmental control.

HORT 5071 Restoration and Reclamation Ecology 3 credits
Ecological and physiological concepts are explored as a basis for regenerating grasslands, wetlands, forests and other landscapes. The extent to which restorations have succeeded or failed is often a reflection of the state of our understanding of ecological processes. Half of the course introduces students to the ecological and physiological concepts relevant to land restoration and reclamation. Readings from the primary literature are used to illustrate how restoration and reclamation efforts apply an ecological and/or physiological concept. Students discuss the extent to which land restoration and reclamation. Readings from the primary literature are used to illustrate how restoration and reclamation efforts apply an ecological and/or physiological concept. Students discuss the extent to which land restoration has depended on scientific predictions vs. trial and error to develop cultural practices. The other half of the course provides students with an in-depth view of the restoration of specific kinds of ecological communities. For each ecommunity, students are provided with information on the history of restoratoin, the impetus for restorations (cultural, political), and the range of restoratoin practices and desired outcomes, and major limitations to success. Field visits are scheduled for the first half of the course.

ID 3564 HECUA Off-Campus Study Program: Environment and Agriculture: Sustainable Food Systems (ENV) 4 credits
Connection between the environment and agriculture. Firsthand experience of food systems. Environmental, economic, political, social, and cultural issues that define modern farming. Seminars, field study trips, extended visits to sustainable Minnesota farms.



Electives

ID 3565 HECUA Off-Campus Study Program: Environment and Agriculture: Sustainable Food Systems Internship 2 credits

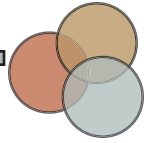
Students devote summer to practice of sustainable farming.

LA 5204 Metropolitan Landscape Ecology 3 credits

Our goal for the semester will be to develop your understanding about the theories and principles of holistic landscape ecology, and how this knowledge can help you understand more about people, nature, and environmental stewardship in metropolitan landscapes. In this class, metropolitan landscapes include not only urban and suburban areas but also the rural areas that provide natural resources for people, like food, water, energy, and recreation. During the semester, we will explore these questions about the relationship among people, nature, and landscape sustainability: (1) How has the relationship between humans and nature evolved in relation to non-local phenomenon like globalization, urbanization, and industrialization? (2) How are ecosystem dynamics in cities and metropolitan regions different from other ecosystems? (3) What is a sustainable landscape, and does it look different and function differently than conventional landscapes? (4) When considering the potential impacts of climate change, is it realistic to restore an urban ecosystem or agroecosystem to a historic reference ecosystem or an analog? (5) How can we increase ecological and place literacy of people through education so that they are more likely to accept and adopt alternative landscape patterns and practices? (6) Can alternative landscapes, like brownfields, greenways, green walls, green roofs, vertical farms, carbon farms, biofuel farms, and community gardens, help to recouple people's contact with nature by reinterpreting human-nature systems? During the semester, we will answer these questions using the lens of holistic landscape ecology and examine why it is a useful framework for organizing theories, concepts, and ideas about human-nature relationships in metropolitan regions. This approach will help you to understand more about the ecology of place, such as how people's actions influence the distribution and abundance of organisms in landscapes as well as the people's actions affect ecological flows across landscapes (e.g., water, air, animals, pollutants, and climate). It will help you understand why the appearance and beauty of a landscape matters in environmental stewardship, and why the ecology of landscape intervention influences broad and fine scale spatial patterns and human experiences. In addition, holistic landscape ecology complements important trends like sustainability science, ecological urbanism, and landscape urbanism, and we investigate and discuss these connections during the course.

LS 5100 Sustainability and Sustainable Enterprise 2-3 credits

Ethical and Legal Issues in Arts Policy and Law Leadership calls on an individual to be able to stand with confidence on moral and legal grounds in the day to day operations and conduct of a business. By combining theory and practice, this course will explore the basis for human conduct and the source of moral and ethical behavior; examine standards, rules and laws that legislate conduct; and distinguish those situations when seeking legal guidance/advice is the only responsible option. Arts and cultural management issues arising from intellectual, real and personnel property rights; employment; earned-income ventures; and the myriad of issues that come with contributed income - conflict of interest, self-inurement, and exemption from federal and state income tax - will also be on the agenda.



Electives

MGMT 5019 Business, Natural Environment, and Global Economy 2 credits

This course addresses business strategies that affect the natural environment. Few disagree that the natural environment affects corporate management, that it potentially alters profit and loss statements. While many see it as a threat, others believe it presents business with an opportunity. This course addresses the following questions: ? How can environmental challenges be transformed from threats to opportunities? ? How can business produce ?win-win? outcomes that are good for both business and the environment? ? When and under what conditions can the impacts of ?greening? be positive for the firm and for society? The purpose of the course is to provide hands-on experience in trying to achieve win-win environmental solutions. Based on experience gained in this course you should be better prepared to align the social benefits of sustainability with the practical business needs of profitable growth.

PA 5721 Energy and Environmental Policy 3 credits

Impact of energy production/consumption choices on environmental quality, sustainable development, and other economic/social goals. Emphasizes public policy choices for energy/environment, linkages between them.

SOC 4305 Society and the Environment: A Growing Conflict 3 credits

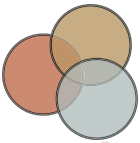
Societal causes and cures of ecological problems such as global warming, species extinction, and resource exhaustion.

SOIL 4511 Field Study of Soils 2 credits

This is a field course that requires students to learn how to write soil profile descriptions. Students visit numerous roadcuts and determine the morphological characteristics of the soils observed. Final field exam determines the course grade. Field exam is open book. Class meetings end first week of November. Week long trip to another state for further soil investigation is possible.

SOIL 5611 Soil Biology and Fertility 3 credits

Soil microbial populations and biodiversity. Soil microorganisms. Biogeochemical cycles. Macro and micronutrient fertilization, and element function in plants and microbes. Composts, sludge and manures in fertilization. Plant microbe associations: nitrogen fixation, mycorrhizal fungi, and biological control of root pathogens. Pollution and bioremediation.



Internship Program

The internship program was conceived by students, faculty and community representatives. Internships are designed to encourage and facilitate experiences in which students work with diverse issues related to the long-term viability of agriculture. The program also aims to help students develop decision-making skills by observing how solutions to complex problems in agriculture are arrived at and implemented. Through course requirements and interactions with faculty and other students, the program provides a setting for students to reflect on and analyze their internship, thereby enhancing the educational value of that experience.

Experiential learning is an important aspect of the minor in Sustainable Agriculture at the University of Minnesota.

The goals of the internship program are to provide opportunities for students to:

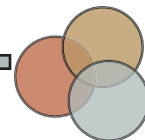
- Increase their understanding of the goals and concepts of sustainable agriculture and become aware of issues affecting the sustainability of agricultural production,
- Become familiar with decision making approaches used by individuals and organizations,
- Interact with members of the agricultural community and form working relationships with some of these individuals or groups, and / or
- Perform work on a farm, or within a organization, public agency, or agriculture-related business, that will contribute to the development of sustainable food systems.

The internship is a three to fourteen week supervised off-campus experience that is required for all graduate students working toward the minor in Sustainable Agriculture Systems. The internship is conducted in addition to a research or thesis project in the student’s major field of study. During the internship, students will work to complete specific objectives that are agreed upon by the student, the internship host, and a faculty member from the minor program. Students will receive credit for their internship by registering for SAGR 8020, Field Experience in Sustainable Agriculture, and completing academic requirements.

Internship Opportunities

Through the internship, students gain experience with alternative farming systems, producer and community education, community development, alternative marketing, and procedures of change including policy making and implementation. To gain a broad understanding of agriculture, we encourage students to undertake internships that will provide experiences and exposure to issues they are unlikely to acquire through their own graduate research or course work. Hosts are asked to provide interns with opportunities to engage in representative activities, to allow interns to observe decision making activities on an individual or group level, and to consider the intern as a valuable contributor to their endeavors. Internships can be arranged with farmers, grassroots organizations, public agencies, or agricultural businesses. See Arranging and Internship for more information on available internship hosts.

An internship in sustainable agriculture involves work that is directly related to agriculture in which environmental, social, and economic impacts of agricultural practices or policies are considered.



Internship Opportunities continued

Arranging an Internship

Students should be enrolled in the minor prior to making arrangements for an internship. Internships can be conducted at any time of the year. Factors such as the student's course work and research or teaching obligations and the availability of internships of interest to the student will determine the timing. Before exploring internship possibilities, the student should schedule a meeting with their chosen minor advisor to discuss ideas and internship topics. There are a wide variety of potential internship hosts listed on the MISA website www.misa.umn.edu. Follow the links to Student Programs and Internship Opportunities. The website provides a brief description of potential internship hosts, a general description of the kinds of work an intern will do with each host, and the name and phone number of the contact person. The student should contact this person to find out more about specific internship projects that are available. In addition to this initial conversation, hosts may request an interview or resume from prospective interns. Students are not limited to the list on the MISA website, additional internship hosts and sites may be sought out to create an internship that meet the needs and desires of the student. After identifying a host and defining the internship, the student should prepare a draft of an Internship Learning Agreement Proposal jointly with their advisor and host.

Internship Credits:

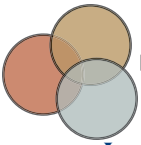
The actual time requirement of internships will vary depending on the needs of the project and the time available to the student. Credit will be adjusted according to the time allotted to completion of the internship project. Semester credits for an internship will range from 1-4 credits. Number of hours worked on an internship varies considerably depending on the type of host and project. Here are examples of internship programs and credit assignments:

Internship Credit Table (examples)	Total Hours	Credits
10 hours per week X 14 week semester	140	1
Winter Break 8 hours X 22 days	176	2
Full time 2 months during Summer Break	480	3
Full time 3 months during Summer Break	720	4

Students should regard internships as contract projects that are unique and negotiated. Educational goals, academic requirements, work responsibilities, time requirements, and stipends or other benefits provided by the intern host, should be defined in the Internship Learning Agreement Proposal. By signing and submitting the proposal, the student agrees to the described conditions of the internship.

Academic Credit:

All students enrolled in the minor must conduct an internship and register for the course SAGR 8020, Field Experience in Sustainable Agriculture. This is a variable credit (1 to 4) course.



Internship Opportunities continued Funding Your Internship

A number of internship hosts will offer stipends or hourly wages to interns. For hosts that do not offer funding to students a couple of options are available:

1. SARE's (Sustainable Agriculture Research and Education) Graduate Student Grant Program is an option for graduate students interested in pursuing issues in sustainable agriculture. <http://www.northcentralsare.org/Grants/Our-Grant-Programs/Graduate-Student-Grant-Program>
2. CERES Trust's Graduate Student Organic Research Grant Program provides funding to graduate students interested in pursuing organic research. <http://cerestrust.org/organic-research-by-graduate-students/request-for-applications-graduate-students/>
3. The Institute on the Environment has mini-grants available for Students interested in pursuing collaboration across disciplines, units and campuses at the University of Minnesota. <http://environment.umn.edu/research/minigrants.html>
4. With enough advanced notice a selected internship site can often apply for internship funding through CAP (Community Assistantship Program) at CURA (The Center for Urban and Regional Affairs). <http://www.cura.umn.edu/CAP>

Internship Learning Agreement Proposal Guidelines

After you have identified an internship project, you need to prepare a two to four page Learning Agreement Proposal jointly with your advisor and internship host. Upon completion, a copy of the proposal should be distributed to each of the following people"

- Student's minor advisor
- Intern Host
- Director of Graduate Studies for the minor (Craig Sheaffer)
- Program Coordinator (Courtney Tchida)

Please use the following headings and subheadings given below when preparing your proposal. Include typed copies of the following forms with your proposal: Proposal cover sheet and Proof of health Insurance Coverage. These forms are included in this handbook and downloadable versions are also available on the MISA website (<http://www.misa.umn.edu/StudentPrograms/Internships/InformationforStudents/InternshipForms/index.htm>).



Components of the Proposal

1. Project Overview:

Your internship may be part of a larger project conducted by your host; describe the overall project briefly and how your internship activities relate to it. If you are working with a producer, describe the farm operation and any special project you will be conducting.

2. Educational intent

- Goals - List two or three learning goals that you have for your internship (the goals should be fairly broad in scope).
- Objectives - List one or two objectives for each goal.
- Strategies / Work Responsibilities - List the strategies you intend to use to accomplish your objectives. These should relate directly to the work you will be performing for your internship. Describe any final product that your intern host expects upon completion of the internship.

3. Academic Requirements

Describe the work you will complete in SAGR 8020, Field Experience in Sustainable Agriculture. State the number of credits for which you will register (1 to 4). See the Academic Credit section for further details.

4. Work Specifications

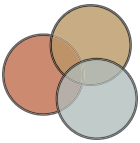
Give the beginning and ending dates of the internship, and work schedule (days/hours). Describe any benefits, such as stipend, living accommodations, travel expenses, etc. that the intern host will provide. Describe any other special conditions that the intern host has requested.

Requirements for SAGR 8020

- A written project such as a term paper, decision case study, feasibility report, or other project may fulfill this requirement. The student and minor advisor prior to beginning work on the internship should determine the specific nature of the written project. We encourage you to do a written project that is in some way useful in disseminating your information. Examples of this type of project include: an article written for a local newsletter, or a case study presentation that can be used in a class.
- An oral presentation/discussion of the internship during a session of the What's Up in Sustainable Agriculture (WUSA) seminar series, or another public format is required. The presentation should be made during the semester the student is registered for SAGR 8020, Field Experience in Sustainable Agriculture or the following semester if possible.

Suggested (in addition to the above requirements):

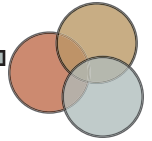
- A journal or log in which the student describes his/her activities and observations on a weekly basis and reflects on four questions, which the student has identified at the start of the internship, pertaining to the goals of the internship project and sustainable agriculture.



Procedures for Completing an Internship Worksheet of the Internship Timeline

Completion Date	Student	Advisor	Host
	<ul style="list-style-type: none"> • Enroll in program by submitting 'Intent to Enroll' form.* • Identify Advisor from list of graduate faculty • Meet with advisor to discuss internship ideas. • Research Internship options. Information available at http://www.misa.umn.edu/StudentPrograms/Internships/InternshipOpportunities/index.htm 		
	<ul style="list-style-type: none"> • Contact internship host to discuss internship ideas. • Develop Internship Learning Agreement (jointly with Advisor) and submit final version to Program Coordinator with Proposal cover sheet, and Proof of Health Insurance forms.* • Determine appropriate number of course credits using Internship Credit table (jointly with Advisor). 	<ul style="list-style-type: none"> • Discuss internship ideas with student. • Develop Internship Learning Agreement Proposal (jointly with student and host). • Determine appropriate number of course credits (using internship credit table jointly with student and host). 	
	<ul style="list-style-type: none"> • Complete Internship • Give Oral presentation • Submit Final written report 	<ul style="list-style-type: none"> • Check in with student during the internship • Complete evaluation (in conjunction with the host) 	<ul style="list-style-type: none"> • Host intern • Complete evaluation (in conjunction with the advisor).

* The Intent to Enroll Form, Proposal Cover Sheet, and Proof of Health Insurance Coverage Forms can be obtained from the Program Office (413 Hayes Hall), the MISA website (<http://www.misa.umn.edu/StudentPrograms/Internships/InformationforStudents/InternshipForms/index.htm>), and they are also at the end of this packet.



Graduate Faculty

More than thirty University of Minnesota faculty members serve as advisors to students in the Sustainable Agricultural Systems minor degree program. These professors come from a variety of disciplines; including bioproducts and bio-systems engineering, agronomy, applied economics, entomology, food science and nutrition, forest resources, horticulture, medicine, plant pathology, soil, water and climate science, sociology, landscape architecture and veterinary medicine.

David Andow, Professor, Department of Entomology

Phone: 612-624-5323

E-mail: dandow@umn.edu

Online Profile: <http://www.entomology.umn.edu/People/GradFaculty/Andow/>

Research and Teaching Related to Sustainable Agriculture: Natural pest control, internal and external benefits and risks of ecological agriculture.

Courses taught: ENT 5040 Insect Ecology, ENT 5041 Insect Population Dynamics, ISG 5010 Environmental Risk Analysis and ENT / PLPA 3333 Insects, Microbes and Plants.

Todd Arnold, Professor, Department of Fisheries, Wildlife & Conservation Biology

Phone: 612-624-2220

Email: arnol065@umn.edu

Online Profile: <http://fwcb.cfans.umn.edu/personnel/faculty/arnold/index.htm>

Research and Teaching Related to Sustainable Agriculture: Wildlife use of agricultural landscapes; impacts of grazing, haying, and cropping systems on reproductive success of wildlife (especially birds).

Courses Taught: SUST 3003 Sustainable People, Sustainable Planet and FW 5051 Analysis of Populations.

James Bradeen, Professor, Department of Plant Pathology

Phone: 612-625-9736

Email: brade005@umn.edu

Online Profile: <http://ppg.cfans.umn.edu/personnel/personnel.htm>

Research and Teaching Related to Sustainable Agriculture: Research interests include use of crop wild relatives as sources of resistance genes for crop improvement and the genomics of disease resistance; Teaching emphasizes translation of knowledge of the molecular basis of plant-microbe interactions into approaches for crop disease management.

Courses taught: PLPA 5300 Current Topics in Molecular Plant Pathology, PLPA 5103/8103 Molecular Plant-Microbe Interactions and PLPA 8200 Plant Pathology Seminar.

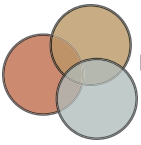
David D. Biesboer, Program Director, Itasca Biological Station/Lab (Department of Plant Biology)

Phone: 612-625-1799

E-mail: biesboer@umn.edu

Online Profile: <http://www.cbs.umn.edu/explore/departments/plantbio/faculty-research/faculty-directory/davidbiesboer>

Research and Outreach Education Related to Sustainable Agriculture: The use of competitive native grass species for control of noxious weeds along highway right-of-ways as alternatives to pesticide usage. The use of native, short-stature, warm season grasses adapted to dry, high saline, compacted soils as low maintenance cover along roadsides. Modeling of eco-toxicological chemicals produced by the transportation industry and methods for decreasing their input into the environment.



Graduate Faculty

Valentine Cadieux, Research Associate, Department of Sociology

Phone:

Email: cadieux@umn.edu

Online Profile: <http://www.tc.umn.edu/~cadieux/>

Research and Teaching Related to Sustainable Agriculture: Cultural Geography of Land Use Change and the Politics of Planning Processes at the urban-rural interface, particularly concentrating on intersections of urbanization, nature conservation, and agriculture activism. Interests include: alternative agri-food movements, the concepts of place, landscape and nature, and epistemological issues involved in the interplay between political ecology and other disciplinary studies of nature-society relations.

Courses Taught: SOC 4090 / PSYCH 5960 Environmental Decision Making: Focus on Food Systems.

Jeffrey Coulter, Associate Professor, Department of Agronomy and Plant Genetics

Phone:

Email: coult077@umn.edu

Online Profile: <http://agronomy.cfans.umn.edu/People/FacultyDirectory/CoulterJeffreyA/>

Research and Outreach Education Related to Sustainable Agriculture: Extension education and research to help farmers and agricultural professionals increase the productivity and profitability of corn production while improving nutrient cycling and protecting soil and water resources.

Dean Current, Research Associate, Department of Forest Resources

Phone: 612-624-4299

Email: curre002@umn.edu

Online Profile: <http://www.forestry.umn.edu/People/Current/>

Research and Teaching Related to Sustainable Agriculture: Landscape level integrated natural resource and agricultural management; improved agricultural management including introduction of perennial cropping systems to address water quality issues and sustainability of agricultural landscapes; and agroforestry.

Courses Taught: ESPM 5251 Natural Resources in Sustainable International Development and ESPM 3204 Sustainable Community Based Natural Resource Management.

Mae Davenport, Associate Professor, Department of Forest Resources

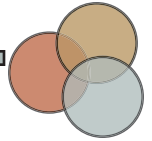
Phone: 612-624-2721

Email: mdaven@umn.edu

Online Profile: <http://www.forestry.umn.edu/People/Davenport/>

Research and Teaching Related to Sustainable Agriculture: The human dimensions of natural resource management, specifically sustainable land use planning; community-based ecosystem management; recreation planning; and human beliefs, attitudes and behaviors associated with landscape change.

Courses taught: ESPM 3245 Sustainable Land Use Planning and Policy.



Graduate Faculty

John Deen, Professor, Department of Veterinary Population Medicine

Phone: 612-625-7784

E-mail: deenx003@umn.edu

Online Profile: <http://www.cvm.umn.edu/vpm/faculty/johndeen/home.html>

Research and Outreach Education Related to Sustainable Agriculture: Identifying the affective states of animals and improving their welfare and international development, particularly in the development of sustainable animal agriculture models.

Ruth Dill-Macky, Professor, Department of Plant Pathology

Phone: 612-625-2227

E-mail: ruthdm@umn.edu

Online Profile: <http://plpa.cfans.umn.edu/People/Faculty/RuthDillMacky/>

Research and Teaching Related to Sustainable Agriculture: Plant Disease Control.

Courses taught: PLPA 2001 Introductory Plant Pathology.

Kathy Draeger, Adjunct Assistant Professor, Department of Agronomy and Plant Genetics and Statewide Director of the U of M Regional Partnerships

Phone: 612-625-3148

Email: draeg001@umn.edu

Online Profile: <http://agronomy.cfans.umn.edu/People/FacultyDirectory/DraegerKathrynJ/index.htm>

Research and Outreach Education Related to Sustainable Agriculture: Statewide Director of the U of M Regional Partnerships, setting the agenda for sustainable development, and recreating a local food system.

Axel Garcia y Garcia, Assistant Professor, Department of Agronomy & Plant Genetics

Phone: 507-752-5080

Email: axel@umn.edu

Online Profile: <http://swroc.cfans.umn.edu/People/People/index.htm>

Research and Outreach Education Related to Sustainable Agriculture: Water use and efficiency of crops/ cropping systems and climate/weather risks to crops. Other research areas of interest are nitrogen use and efficiency and precision farming.

Julie Grossman, Assistant Professor, Department of Horticulture

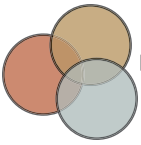
Phone: 612-625-8597

Email: jgross@umn.edu

Online Profile: <http://grossmanlab.cfans.umn.edu/>

Research and Teaching Related to Sustainable Agriculture: Managing plant-soil-microbe relationships in organic systems to enhance soil fertility and develop sustainable food production systems. Current Faculty Adviser for Cornercopia Student Organic Farm.

Courses Taught: Hort 3131 Student Organic Farm Planning, Growing, and Marketing and FdSy 4101 Holistic Approaches to Improving Food Systems Sustainability.



Graduate Faculty

Craig Hassel, Associate Professor, Department of Food Science and Nutrition

Phone: 612-624-7288

Email: chassel@umn.edu

Online Profile: <http://fscn.cfans.umn.edu/people/faculty/craighassel/>

Research and Teaching Related to Sustainable Agriculture: Food and health with cultural communities whose narratives describe health of people and land as intimately inter-related. The craft of cross-cultural engagement (CCE) is founded upon long-term relationships and commitments to trust, mutual respect and protecting the integrity of all forms of human knowledge. My work offers insight into ways that mainstream institutions can become more culturally aware, sensitive and effective in their intercultural work.

Courses taught: CFANS 1902 Ways of Knowing and Science, CSPH 5111 Ways of Thinking About Health and CSPH 5115 Cultural Awareness Knowledge and Health.

George Heimpel, Professor, Department of Entomology

Phone: 612-624-3480

Email: heimp001@umn.edu

Online Profile: <http://www.entomology.umn.edu/People/GradFaculty/Heimpel/index.htm>

Research and Teaching Related to Sustainable Agriculture: Host-parasitoid interactions and biological control, aspects of host specificity in parasitoids, indirect interactions in natural and agricultural systems, sex determination in parasitoid wasps, evolution of parasitoid reproductive strategies, and ecosystem services (biological control) associated with biofuel cropping systems.

Courses taught: ENT 4231 Insect Behavior and ENT 5341 Biological Control.

Brad Heins, Assistant Professor, West Central Research and Outreach Center

Phone: 320-589-1711

Email: hein0106@umn.edu

Online Profile: <http://www.ansci.umn.edu/People/Faculty/Heins/>

Research and Outreach Education Related to Sustainable Agriculture: Organic Dairy Production.

Jason Hill, Assistant Professor, Department of Bioproducts and Biosystems Engineering

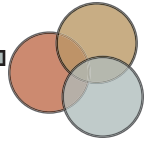
Phone: 612-624-2692

Email: hill0408@umn.edu

Online Profile: <http://hill.cfans.umn.edu/>

Research and Teaching Related to Sustainable Agriculture: Areas of interest include the consequences of energy, agriculture, and natural resource use from a life-cycle perspective with particular focus on technological, environmental, economic, and social aspects of sustainable bioenergy production from traditional and next-generation feedstocks.

Courses taught: ESPM/MGMT 3603/5603 Environmental Life Cycle Analysis, ESPM 3607 Natural Resource Consumption and Sustainability, BBE 3201 Sustainability of Food Systems: A Life Cycle Perspective and GCC 3001 Grand Challenge: Can We Feed the World Without Destroying It?



Graduate Faculty

Stan Hokanson, Professor, Department of Horticultural Science

Phone: 612-624-1203

Email: hokan017@umn.edu

Online Profile: http://www.horticulture.umn.edu/Who_sWho/Faculty/StanHokanson/

Research and Teaching Related to Sustainable Agriculture: Plant breeding for cold hardiness

Courses taught: HORT 1015 Woody and Herbaceous Plants and HORT 4015 Flowering Woody Trees and Shrubs.

Emily Hoover, Professor, Horticultural Science,

Phone: 612-624-6220

E-mail: hoove001@umn.edu

Online Profile: http://www.horticulture.umn.edu/Who_sWho/Faculty/EmilyHoover/

Research and Teaching Related to Sustainable Agriculture: Sustainable fruit production practices particularly focused on methods for developing small ecological footprints for fruit crops.

Courses taught: HORT 5031 Fruit Production and Viticulture for Local and Organic Markets.

Bill Hutchinson, Professor, Department of Entomology

Phone: 612-624-3278

Email: hutch002@umn.edu

Online Profile: <http://www.entomology.umn.edu/People/GradFaculty/Hutchison/index.htm>

Research and Teaching Related to Sustainable Agriculture: Understanding the role of insect population dynamics as a basis for managing pest populations, and the use of host plant resistance and insecticide alternatives as compatible strategies to support sustainable agriculture.

Courses Taught: CFANS 3001 Pests and Crop Protection.

Nicholas Jordan, Professor, Department of Agronomy and Plant Genetics

Phone: 612-625-3754

E-mail: jorda020@umn.edu

Online Profile: <http://agronomy.cfans.umn.edu/People/FacultyDirectory/JordanNicholasR/index.htm>

Research and Teaching Related to Sustainable Agriculture: Agroecology, focusing on management of functional biodiversity in agroecosystems, plant-soil biota interactions, and innovation processes in sustainable agriculture.

Courses taught: AGRO 5321 Ecology of Agricultural Systems.

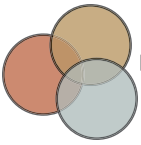
Gregg Johnson, Associate Professor, Southern Research and Outreach Center

Phone: 507-827-5617

Email: johns510@umn.edu

Online Profile: <http://sroc.cfans.umn.edu/People/Faculty/GreggJohnson/>

Research and Outreach Education Related to Sustainable Agriculture : My research is focused on designing biomass cropping systems that provide a reliable and consistent source of feedstock for the emerging bioeconomy. Furthermore, I believe these systems must be designed to provide multiple economic and environmental benefits that ultimately add value to the rural landscape.



Graduate Faculty

Robert P. King, Professor, Department of Applied Economics

Phone: 612-625-1273

E-mail: rking@umn.edu

Online Profile: <http://www.apec.umn.edu/people/FacultyDirectory/RobertKing/>

Research and Teaching Related to Sustainable Agriculture: Economics of transition to organic production, Local food supply chains, Values based food supply chains, Food access and food security for low income households and Food system indicators.

Courses Taught: APEC 3002 Managerial Economics, APEC 3202 An Introduction to the Food System: Analysis, Management, and Design, and APEC 8902 Graduate Seminar.

Mindy Kurzer, Professor, Department of Food Science & Nutrition

Phone: 612-624-9789

Email: mkurzer@umn.edu

Online Profile: <https://fscn.cfans.umn.edu/faculty-staff/mindy-s-kurzer>

Research and Teaching Related to Sustainable Agriculture: Director of the Healthy Foods, Healthy Lives Institute. Food and Health.

Courses Taught: FScN 2001 A Food System Approach to Cooking, and FScN 2002 Cooking on a student's budget.

Tom Michaels, Professor, Department of Horticultural Science

Phone: 612-624-7711

Email: michaels@umn.edu

Online Profile: http://www.horticulture.umn.edu/Who_sWho/Faculty/TomMichaels/

Research and Teaching Related to Sustainable Agriculture: Breeding dry beans for organic production systems and the hydroponic salad table project.

Course Taught: HORT 1014 Edible Landscapes, HORT 3131/5131 Student Organic Farm Planning, Growing and Marketing, APS 5101 Polyculture Design and FDSY 2101 Plant Production Systems. Current Faculty Adviser for Cornercopia Student Organic Farm.

Roger D. Moon, Professor, Department of Entomology

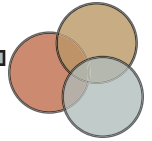
Phone: 612-624-2209

E-mail: rdmoon@umn.edu

Online Profile: <http://www.entomology.umn.edu/People/GradFaculty/Moon/>

Research and Teaching Related to Sustainable Agriculture: Animal health, comfort and productivity, as affected by flies and other ectoparasites. Current projects involve cultural management options for organic dairies that can reduce abundance of biting and nonbiting filth flies.

Courses taught: ENT 4281 Veterinary Entomology, ENT 5045 Insect Population Dynamics and AGRO 5121 Applied Experimental Design.



Graduate Faculty

David Mulla, Professor, Department of Soil, Water and Climate

Phone: 612-625-6721

Email: mulla003@umn.edu

Online Profile: <http://www.swac.umn.edu/People/Faculty/DavidMulla/index.htm>

Research and Teaching Related to Sustainable Agriculture: The measurement, modeling, and management of uncertainty and risk for non-point source pollution of surface and groundwater; the characterization and estimation of field-scale variability for precision farming; the evaluation of alternative farm management strategies for improved soil quality and sustainability and evaluation of policies for soil and water resources. Courses taught: ES 3131 Environmental Physics.

Helene Murray, Director, Minnesota Institute for Sustainable Agriculture and Adjunct Faculty, Department of Agronomy and Plant Genetics

Phone: 612-625-0220

E-mail: hmurray@umn.edu

Online Profile: <http://agronomy.cfans.umn.edu/People/FacultyDirectory/MurrayHelene/>

Research and Teaching Related to Sustainable Agriculture: Participatory research, systems research, cases studies and local food systems.

Courses Taught: SAGR 4888/8010 Issues in Sustainable Agriculture / Colloquium in Sustainable Agriculture.

Laura Musacchio, Associate Professor, Department of Landscape Architecture

Phone: 612-626-0810

Email: musac003@umn.edu

Online Profile: <http://landarch.design.umn.edu/people/musacchio.html>

Research and Teaching Related to Sustainable Agriculture: Urban agriculture, urban ecosystem services, biodiversity, greening cities, sustainable landscapes, and resilience thinking.

Courses Taught: LA 5205 Regreening Minds, Cities, and Regions and LA 5204 Metropolitan Landscape Ecology.

Kristen Nelson, Professor, Department of Forest Resources

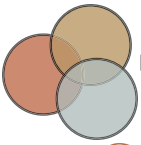
Phone: 612-624-1277

Email: nelso468@umn.edu

Online Profile: <http://www.forestry.umn.edu/People/Nelson/>

Research and Teaching Related to Sustainable Agriculture: Urban food networks, social networks and production transitions to sustainable practices and the landscape effects.

Farmer motivations for change Courses taught: ESPM 3271 Environmental Policy, Law, and Human Behavior, ESPM 3202W/5202 Environmental Conflict Management, Leadership, and Planning, ESPM 4041W ESPM 4601 Soils and Pollution, and Hort 4601 Aquaponics: Integrated fish and plant food systems.



Graduate Faculty

Kent Olson, Professor, Department of Applied Economics

Phone: 612-625-7723

E-mail: kdolson@umn.edu

Online Profile: <http://www.apec.umn.edu/people/FacultyDirectory/KentOlson/>

Research and Teaching Related to Sustainable Agriculture: Analysis of organic and other alternative crop management strategies, and alternative policies for sustainable agriculture. Courses taught: APEC 3811 Principles of Farm Management and APEC 4103 World Food Problems.

Angela Orshinsky, Assistant Professor, Department of Plant Pathology

Phone: 612-625-9274

Email: aoershins@umn.edu

Online Profile: <http://hortpathology.cfans.umn.edu/home/people/>

Research and Outreach Education Related to Sustainable Agriculture: Extension education and research focused on developing molecular diagnostic procedures for plant pathogens, assessing plant host species and cultivars for resistance responses, and cultural practices to reduce disease severity.

Chris Phillips, Assistant Professor, Department of Entomology

Phone: 218-327-4490

Email: cphilips@umn.edu

Online Profile: <http://www.entomology.umn.edu/faculty-staff/chris-philips>

Research and Outreach Education Related to Sustainable Agriculture: Sustainable integrated management of arthropod pest, pollinator and beneficial species of fruit and vegetable crops in diverse production systems.

Paul Porter, Professor, Department of Agronomy and Plant Genetics

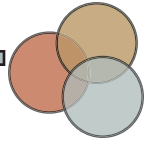
Phone: 612-625-6719

Email: pporter@umn.edu

Online Profile: <http://agronomy.cfans.umn.edu/People/FacultyDirectory/PorterPaulM/>

Research and Teaching Related to Sustainable Agriculture: Rye as a cover crop, Sustainable agriculture and Subsistence agriculture. Agroecosystem analysis.

Courses Taught: AGRO 4103 World Food Problems, AGRO 3305 Agroecosystems of the World, AGRO 4605 Strategies for Agricultural Production and Management and AGRO 5999 Agroecosystems Analysis Field Course.



Graduate Faculty

Mary Rogers, Assistant Professor, Department of Horticulture

Phone: 612-624-8871

Email: roge0168@umn.edu

Online Profile: <http://horticulture.umn.edu/directory/faculty/maryrogers>

Research and Teaching Related to Sustainable Agriculture: Organic insect pest management and ecological strategies to improve horticultural crop production. Member of the Sustainable Agriculture Education Association and the U of M Food Systems Consortium. Current Faculty Adviser for Cornercopia Student Organic Farm.

Courses Taught: HORT 2031: Organic Horticulture and Sustainable Food Systems; HORT 5032: Organic Vegetable Production; HORT 3480: Topics in Sustainable Horticulture: Food Justice in the Twin Cities and HORT 1901: Growing Food and Building Community: Urban Farming in the Twin Cities.

Craig Sheaffer, Professor, Department of Agronomy and Plant Genetics

Phone: 612-625-7224

E-mail: sheaf001@umn.edu

Online Profile: <http://agronomy.cfans.umn.edu/People/FacultyDirectory/SheafferCraigC/>

Research and Teaching Related to Sustainable Agriculture: Organic cropping systems.

Courses taught: AGRO 1103 Crops, Environment and Society, AGRO 4888 / SAGR 8010 Issues in Sustainable Agriculture / Sustainable Agriculture Colloquium.

Chery Smith, Professor, Department of Food Science and Nutrition.

Phone: 612-624-2217

E-mail: csmith@umn.edu

Online Profile: <http://fscn.cfans.umn.edu/people/Faculty/AlphabeticalList/cherysmith/>

Research and Teaching Related to Sustainable Agriculture: I am interested in how environment, age, socioeconomic status, culture, and food insecurity influence the nutritional status, dietary behavior, and health of selected populations (Native Americans, Hmong, African Americans, homeless individuals, veterans, and Sherpas). I am also particularly interested in the hunger-obesity paradox in the US. I have also been looking at food access by Minnesotans living in food deserts (places with limited food resources). Lastly, I am interested in the anthropology of foods.

Courses taught: FSCN 4614 Community Nutrition, FSCN 3615 Socio-Cultural Aspects of Food, Nutrition, and Health and NUTR 8620 Advanced Nutritional Anthropology.

Ulrike Sorge, Assistant Professor, Department of Veterinary Population Medicine

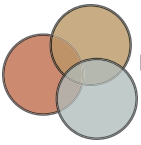
Phone: 612-624-3428

Email: sorge@umn.edu

Online Profile: <http://www.cvm.umn.edu/vpm/faculty/ulrikesorge/home.html>

Research and Teaching Related to Sustainable Agriculture: Dairy production medicine with a particular focus on animal welfare and health through preventive or curative management practices of organic dairy farms and the impact of human-animal interactions (stockmanship).

Courses Taught: Veterinary courses on bovine health, epidemiology and dairy herd management.



Graduate Faculty

Marla Spivak, Professor, Department of Entomology

Phone: 612-624-4798

E-mail: spiva001@umn.edu

Online Profile: <http://www.entomology.umn.edu/People/GradFaculty/Spivak/>

Research and Teaching Related to Sustainable Agriculture: Pollinator habitat, Pollination, and Bee health.

Courses taught: ENT 4021 Honey Bees and Insect Societies and ENT 4022 Bee Management and HORT 4850 Pollinator Protection in Managed Landscapes.

Jeff Stroock, Professor, SW Research and Outreach Center

Phone: 507-752-5064

Email: jstroock@umn.edu

Online Profile: <http://www.swac.umn.edu/People/Faculty/JeffStroock/index.htm>

Research and Outreach Education Related to Sustainable Agriculture: Agricultural water management and conservation; Nutrient management (N, P, S); and Cropping system impacts and interactions among soil properties, the water balance and nitrogen and carbon cycling.

Kate Venable MD, Assistant Professor, Department of Medicine

Phone: 612-625-2415

Email: kvenable@umn.edu

Online Profile: http://www.umphysicians.org/providers/UMP_CONTENT_392172.html

Research and Teaching Related to Sustainable Agriculture: Child, Adolescent and Family Nutrition, Adolescent Obesity, Nutrition for Internists, Why doctors should care about food and Healthy Food Education. Currently a faculty adviser to the Nutrition, Education and Health Awareness Student Interest Group.

M. Scott Wells, Assistant Professor, Department of Agronomy & Plant Genetics

Phone: 612-625-3747

Email: mswells@umn.edu

Online Profile: <http://www.extension.umn.edu/agriculture/forages/team/>

Research and Outreach Education Related to Sustainable Agriculture: Sustainable intensification of both perennial and annual cropping systems; integrating cover crops into corn and soybean systems; developing cover crop technologies and determining the varied ecosystem services provided to the subsequent crops and local environment; and investigating intensive management strategies that focus on improving alfalfa yield and persistence along with increased utilization.

Donald Wyse, Professor, Department of Agronomy and Plant Genetics

Phone: 612-625-7064

Email: wysex001@umn.edu

Online Profile: <http://agronomy.cfans.umn.edu/People/FacultyDirectory/WyseDonaldL/>

Research and Teaching Related to Sustainable Agriculture: Perennial weed control for grass and legume seed production groundwater quality.

Courses Taught: AGRO 4505 Biology, Ecology, and Management of Invasive Plants.



Sustainable Agriculture Systems Graduate Minor Intent to Enroll

Please return to:

Campus Address— 413 Hayes Hall

Mailing Address— Sustainable Agriculture Minor

411 Borlaug Hall, University of Minnesota, 1991 Buford Circle, St. Paul, MN 55108

Student's Name: _____

Address: _____

City, State, Zip: _____ Phone: _____

E-mail address: _____

Student ID#: _____

Degree Pursuing: _____ Major: _____

Major Advisor: _____ Dept: _____

Minor Advisor: _____ Dept: _____

Anticipated date for completing degree: _____

Signature: _____ Date: _____



Sustainable Agriculture Systems Graduate Minor Proposal Cover Sheet Internship in Sustainable Agriculture

Please return to:

Campus Address— 413 Hayes Hall

Mailing Address— Sustainable Agriculture Minor

411 Borlaug Hall, University of Minnesota, 1991 Buford Circle, St. Paul, MN 55108

Student's Name: _____

Address: _____

City, State, Zip code: _____

E-mail address: _____ Phone: _____

Student ID #: _____

Minor Advisor: _____

Intern Host: _____

Address: _____

City, State, Zip code: _____

Email address: _____ Phone: _____

Supervisor: _____

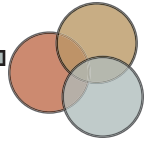
Start/Finish Dates: _____

Student Signature: _____ Date: _____

Intern Host Signature: _____ Date: _____

Minor Adviser Signature: _____ Date: _____

Approved: _____ Date: _____



Sustainable Agriculture Systems Graduate Minor Proof of Student Health Insurance Coverage

Please return to:

Campus Address— 413 Hayes Hall

Mailing Address— Sustainable Agriculture Minor

411 Borlaug Hall, University of Minnesota, 1991 Buford Circle, St. Paul, MN 55108

To insure that students enrolled in the minor in Sustainable Agriculture have adequate medical coverage during the period they are conducting internships, verification of health insurance is required. Health insurance purchased through the University of Minnesota or a comparable plan should provide coverage in the case of accidental injury to the individual.

This form must be completed by the student and returned to the Program Coordinator for the Sustainable Agriculture Systems minor before initiating on-site activities of the internship.

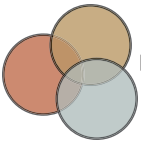
I verify that _____ (name of student), is covered by the following health insurance:

Name of insurance provider: _____

Policy number: _____

Dates of coverage: _____

Signature of student: _____ Date: _____



Minnesota Institute for Sustainable Agriculture

Mailing Address:

411 Borlaug Hall
1991 Buford Circle
St. Paul, MN 55108
Phone: 612-625-8235
Email: misamail@umn.edu

Or Stop By Our Office:

415 Hayes Hall, St. Paul Campus

MISA's purpose is to bring together the agricultural community and the University community in a cooperative effort to develop and promote sustainable agriculture in Minnesota and beyond.

MISA's goals are to:

Increase the University's response to the needs of the sustainable agriculture community and increase practitioner's influence on the university.
Promote sustainable agriculture thinking within the University so that the concepts permeate teaching, research and extension.
Work with rural communities in discovering and implementing the values of sustainability.

Check out the MISA Web site at www.misa.umn.edu for the latest:

- Calendar of Events
- Announcements
- Publications
- Resources
- Sustainable Agriculture Newsletter
- And More!

Be a part of the Sustainable Agriculture Community at the University of Minnesota

- Join the Sustag Listserv , subscription information is available under the subscribe tab at the MISA website www.misa.umn.edu. The Listserv will keep you up to date on all the happenings in the sustainable agriculture community.
- Attend our weekly What's Up in Sustainable Agriculture (WUSA) seminar series. WUSA is an informal group of students, staff, and faculty that meets weekly during the school year for a brown bag lunch to talk about sustainable agriculture with other professionals in the field. If you are interested, feel free to bring your lunch and stop by any of our meetings. Check the MISA web site Calendar for the topics, dates and times. For more information contact the MISA office, 612-625-8235 or misamail@umn.edu.