



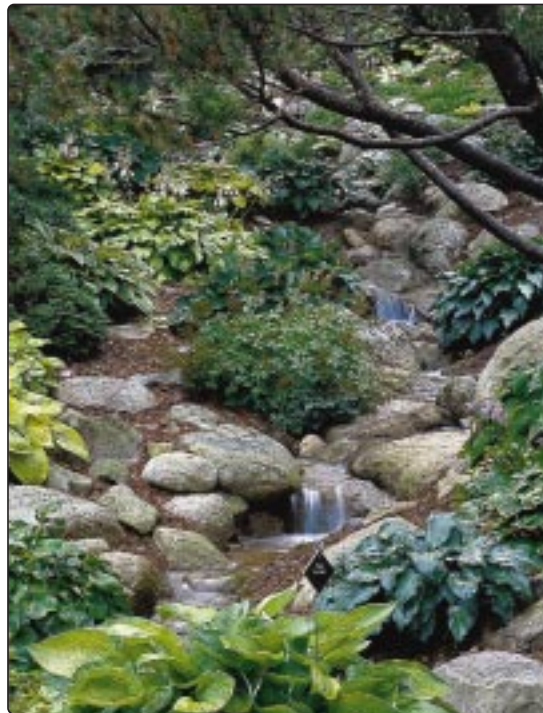
Michigan State University

Michigan Agricultural Experiment Station

1999

ANNUAL REPORT

# Michigan Agricultural Experiment Station 1999 ANNUAL REPORT



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Michigan State University  
East Lansing, MI 48824-1039  
517-355-0123  
maesdir@msu.edu  
<http://www.maes.msu.edu>**

Report prepared under the direction of J. Ian Gray, director of the Michigan Agricultural Experiment Station, and Debbie McCaffrey, administrative assistant.

Design by Christine Altese; editing and production by Jamie DePolo, MAES information officer, ANR Communications.

All illustrative photos by Kurt Stepnitz, MSU photographer, except as noted.  
All chairperson photos by Harley Seeley, MSU photographer.

# 1999 *A year of challenge, opportunity and change*

In 1999, the Michigan Agricultural Experiment Station at Michigan State University continued its commitment to agricultural and natural resources research to meet the needs of the people of Michigan.

✦ Budget issues are always challenging, but the MAES's reliance on strategic planning allowed for a productive year.

✦ To complete its administrative team, the MAES hired Janet Bokemeier, a noted rural sociologist, and Gary Lemme, a nationally recognized agronomist, as associate directors.

A sociology researcher at MSU since 1991, Bokemeier had been serving as half-time assistant director with special responsibility for the behavioral sciences since 1996. She is considered among the top rural sociologists in the nation in the study of the intersection of gender, work and family in rural America.

Lemme had been professor and head of the West Central Research and Outreach Center at the University of Minnesota since 1992. During that time he also coordinated the Minnesota Fusarium Head Blight Initiative, a cooperative initiative with the state's wheat and barley growers to develop research and outreach to address this disease.

The MAES now has the strength and diversity of interests to address the broad mission of the MAES. The MAES research agenda has expanded greatly in the past few years; the MAES is extremely fortunate to have a multidisciplinary team that can act quickly and decisively on a wide range of research issues.

✦ Project GREEN (Generating Research and Extension to meet Economic and Environmental Needs), a cooperative effort by plant-based commodities and businesses and MSU to address long-term research and extension needs in the Michigan plant industries, funded a number of projects in 1999, including education and research on pesticide/integrated pest management (IPM), disease control, marketing and economics of fruit and vegetables, field crops, Christmas trees, value-added products and ornamental plants and flowers. There was a good balance of research and outreach projects, and the MAES thanks the chairpersons, faculty members and industry representatives who served as project reviewers for their time and constructive reviews.

Plant agriculture and processing industries asked MSU for rapid, integrated work that developed and implemented improved management programs to increase profitability while reducing undesirable environmental impacts and improving food safety. To meet this request, Project GREEN funded the restructuring of several entities on campus in 1999. The Pesticide Research Center became the Center for Integrated Plant Systems (CIPS). Its mission is to develop, evaluate, integrate and extend knowledge about ecologically based integrated crop management (ICM) policies, strategies, tactics and tools. MSU Diagnostic Services was created from three

agricultural diagnostic services — the Plant and Pest Diagnostic Clinic, the Arthropod Diagnostic Clinic and the Nematode Diagnostic Services Laboratory. The range of services has been expanded and Diagnostic Services lab space has been renovated. The MSU Agricultural Weather Office (MSUAWO) now is jointly sponsored by the MAES, MSU Extension, the MSU Department of Geography and the Michigan Department of Agriculture Climatology Division. Selections on its Web site <<http://www.agweather.geo.msu.edu>> are provided by MSUAWO and the National Weather Service. Access to National Weather Service data and products is made possible through an agreement with UNIDATA/University Corporation for Atmospheric Research in Boulder, Colo.

Project GREEN has a Web site that provides the latest information on projects and services. The address is <<http://www.green.msu.edu>>.

✦ Tuberculosis in Michigan's deer and cattle populations became a source of great concern in 1999. MSU is working with state partners — including the Department of Natural Resources, the Department of Agriculture and the Department of Community Health — to establish research and educational programs to help address the issues surrounding this problem.

✦ The Families and Communities Together (FACT) Coalition was created when the Coalition for Children, Youth and Families and Communities (CYFC) was restructured and refocused. FACT is a multidisciplinary coalition of MAES researchers, MSU faculty members, MSU Extension staff members from on campus and around the state, and professionals from community organizations such as government agencies and foundations. It is funded by the MAES, MSU Extension and the Office of the Provost. The purpose of the FACT Coalition is to facilitate research and outreach efforts that meet the needs of Michigan families, foster innovative collaboration between MSU and communities, and support and develop the capacity of communities to serve their citizens.

✦ The Upper Peninsula Experiment Station, in Chatham, celebrated its 100th anniversary Aug. 6–7, 1999, with special field days on current crop and animal production and open houses at the station. The station was created in 1899 with a donation of 160 acres from the Lake Superior and Ishpeming Railroad and a \$5,000 grant from the Michigan Legislature. Today, the station's focus is forages and alternative crops. The dairy and beef herds are used to evaluate various forages or forage systems for those that are best suited to the Upper Peninsula.



Dr. J. Ian Gray

✦ In college and departmental personnel matters in 1999, J. Ian Gray, associate vice provost and director of the MAES, was named interim vice provost. He took over the vice provost duties of Fred Poston, who left the office of vice provost and dean of the College of Agriculture and Natural Resources after being named interim vice president for finance and operations and treasurer. (Poston was subsequently appointed to this position permanently.) William Taylor, chairperson of the Department of Fisheries and Wildlife, was named acting dean of the College of Agriculture and Natural Resources. Tom Coon, MAES fisheries and wildlife researcher, was named acting chairperson of the Department of Fisheries and Wildlife.

Kenneth Corey, dean of the College of Social Science, was named senior research adviser to the vice president for research and graduate studies, as well as a professor in the Department of Geography. Philip R. Smith, associate dean of the College of Social Science, was named acting dean.

C. Gerald Haarer, director of the Land Management Office (LMO) for 20 years, retired. Chuck Reid, associate director of the LMO, was named acting director. The MAES will miss Jerry's commonsense approach to management and is delighted that Chuck is the acting director.

The Department of Agriculture and Natural Resources Education and Communication Systems (ANRECS) was formed from the merger of three units: the Department of Agricultural and Extension Education, Outreach Communications and ANR Computer Services. Kirk Heinze, acting chairperson of the Department of Agriculture and Extension Education, was named acting chairperson of ANRECS. The department is searching for a permanent chairperson.

Gus de Zoeten, chairperson of the Department of Botany and Plant Pathology, stepped down from that position. Ray Hammerschmidt, MAES scientist, was named acting chairperson.

Boyd Ellis, chairperson of the Department of Crop and Soil Sciences, retired. Taylor Johnston was named acting chairperson.

Richard Groop was named chairperson of the Department of Geography after Rene Hinojosa stepped down. Groop remains director of the Center for Remote Sensing and Geographic Information Science.

Edward Mather was named acting director of the National Center for Food Safety and Toxicology after Robert Hollingworth stepped down to return to the faculty.

Thomas Conner was named chairperson of the Department of Sociology after Christopher Vanderpool stepped down and returned to the faculty. Vanderpool also has an appointment in the National Center for Food Safety and Toxicology.

The Department of Pathology was restructured and all MAES faculty members now have appointments in the

Department of Veterinary Pathology. Willie Reed is the interim chairperson of the department.

Larry Olson, who was facilitator of the Plant Coalition, returned to the faculty of the Department of Entomology and is on special assignment as Cooperative State Research, Education and Extension Service interim national program leader for pesticide applicator training in Washington, D.C.

The MAES thanks all department chairpersons and unit heads for their commitment and dedication to the MAES mission.

✦ The Cooperative State Research, Education and Extension Service (CSREES) completed its review of the MSU departments of Food Science and Human Nutrition, Animal Science and Botany and Plant Pathology in late 1998. All reviews were satisfactory. The Department of Crop and Soil Sciences will be reviewed in 2000. The reviews are important as we prepare departments to meet the challenges of the next decade. They also are used for faculty position planning.

✦ The MAES continues to enjoy a productive and strong working relationship with many commodity and processor groups and government agencies. In 1999, the MAES was pleased to help sponsor the first nursery and landscape field day at the Horticulture Teaching and Research Center on campus. The success of MAES programs is based on the closeness of these relationships.

✦ A two-day grant-writing workshop sponsored by the MAES and the Office of the Vice President for Research and Graduate Studies and coordinated by Frank D'Itri, MAES researcher, attracted more than 60 participants, even though the initial plan was to limit attendance to 50. The authors of the four best draft proposals each received \$2,000 grants.

✦ The new millennium will offer new opportunities and challenges for the citizens of Michigan. By gathering input from our stakeholders, the MAES will be poised to assist the state in meeting these agricultural, natural resources, and social and behavioral science needs in 2000 and beyond.

J. Ian Gray, Director  
Michigan Agricultural Experiment Station

## *Michigan Agricultural Experiment Station*

As of 10-1-99

**J. Ian Gray**, Interim Vice Provost and Director

**Janet L. Bokemeier**, Associate Director

**Gary D. Lemme**, Associate Director

**Doreen K. Woodward**, Assistant Director

**Debbie McCaffrey**, Administrative Assistant

**Linda Haubert**, Support Staff

**Martha Lovejoy**, Support Staff

**Nan Judy**, Support Staff

**Isidra Pérez**, Support Staff



Photo by Bruce Fox



## *MAES Affiliated Deans*

As of 10-1-99

**William W. Taylor**, Acting Dean

College of Agriculture and Natural Resources

**Julia R. Miller**, Dean

College of Human Ecology

**George E. Leroi**, Dean

College of Natural Science

**Philip R. Smith**, Acting Dean

College of Social Science

**Lonnie J. King**, Dean

College of Veterinary Medicine

# MAES Unit Administrators

*(Units receiving base funding)*

As of 10-1-99

**Kirk L. Heinze**, Acting Chairperson  
ANR Education and Communication Systems

**Larry G. Hamm**, Chairperson  
Agricultural Economics

**Ajit K. Srivastava**, Chairperson  
Agricultural Engineering

**Maynard G. Hogberg**, Chairperson  
Animal Science

**William L. Smith**, Chairperson  
Biochemistry

**Raymond K. Hammerschmidt**, Acting Chairperson  
Botany and Plant Pathology

**Taylor J. Johnston**, Acting Chairperson  
Crop and Soil Sciences

**Stanley L. Flegler**, Acting Director  
Center for Electron Optics

**Edward J. Grafius**, Chairperson  
Entomology

**Marjorie J. Kostelnik**, Chairperson  
Family and Child Ecology

**Thomas G. Coon**, Acting Chairperson  
Fisheries and Wildlife

**Mark A. Uebersax**, Chairperson  
Food Science and Human Nutrition

**Daniel E. Keathley**, Chairperson  
Forestry

**Richard E. Groop**, Chairperson  
Geography

**Wayne H. Loescher**, Chairperson  
Horticulture

**Dana G. Stewart**, Chairperson  
Human Environment and Design

**Mark E. Whalon**, Acting Director  
Center for Integrated Plant Systems

**Michael J. Klug**, Director  
Kellogg Biological Station

**Charles J. Reid**, Acting Director  
Land Management

**Frederik J. Derksen**, Chairperson  
Large Animal Clinical Sciences

**Jerry B. Dodgson**, Chairperson  
Microbiology

**Edward C. Mather**, Acting Director  
National Food Safety and Toxicology Center

**Bruce R. Harte**, Director  
School of Packaging

**Joseph D. Fridgen**, Chairperson  
Park, Recreation and Tourism Resources

**William S. Spielman**, Chairperson  
Physiology

**Kenneth Keegstra**, Director  
MSU-DOE Plant Research Laboratory

**Richard E. Groop**, Director  
Center for Remote Sensing

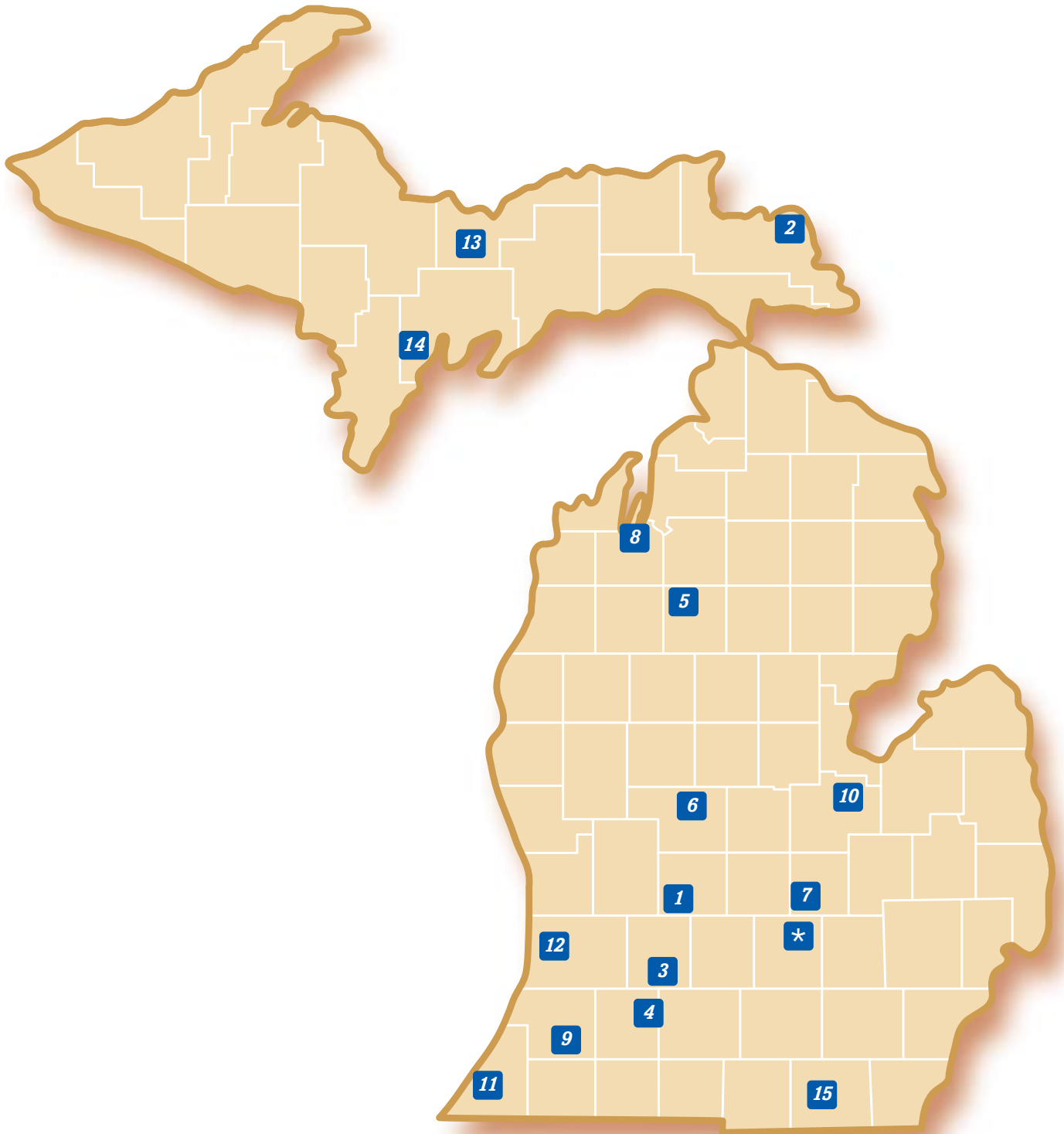
**Cynthia C. Fridgen**, Chairperson  
Resource Development

**Thomas L. Conner**, Chairperson  
Sociology

**Willie M. Reed**, Interim Chairperson  
Veterinary Pathology

**Jon F. Bartholic**, Director  
Institute for Water Research

# Michigan Agricultural Experiment Station Outlying Stations —10-1-99



**1. CLARKSVILLE HORTICULTURAL EXPERIMENT STATION**

*Established 1974*  
 9302 Portland Road  
 Clarksville, MI 48815  
 Phone: 616-693-2193  
 FAX: 616-693-2317  
 Gerald Skeltis  
*Farm Manager*  
 Phil Schwallier  
*Coordinator*

**2. DUNBAR FOREST EXPERIMENT STATION**

*Established 1925*  
 12839 S. Scenic Drive  
 Rt. 1, Box 179  
 Sault Ste. Marie, MI 49783  
 Phone: 906-632-3932 or  
 906-786-1575  
 Ray Miller  
*Nonresident Forester*

**3. W. K. KELLOGG BIOLOGICAL STATION**

*Established 1928*  
 3700 E. Gull Lake Drive  
 Hickory Corners, MI 49060  
 FAX: 616-671-2351  
 Bernie Knezek 517-353-4569  
*Director, Agricultural Programs*  
 Mike Klug 616-671-2341  
*Director, Programs and Development*

**4. W. K. KELLOGG EXPERIMENTAL FOREST**

*Established 1932*  
 7060 N. 42nd Street  
 Augusta, MI 49012  
 Phone: 616-731-4597  
 FAX: 616-731-4597  
 Greg Kowalewski  
*Resident Forester*

**5. LAKE CITY EXPERIMENT STATION**

*Established 1928*  
 5401 W. Jennings Road  
 Lake City, MI 49651  
 Phone: 231-839-4608  
 FAX: 231-839-8663  
 Doug Nielsen  
*Farm Manager*

**6. MONTCALM RESEARCH FARM**

*Established 1966*  
 4747 McBrides Road  
 Lakeview, MI 48850  
 Phone: 517-365-3473  
 Richard Crawford  
*Research Technician*

**7. MUCK SOILS RESEARCH FARM**

*Established 1941*  
 Rt. 3  
 9370 E. Herbison Road  
 Laingsburg, MI 48848  
 Phone: 517-641-4062  
 Ron Gnagey  
*Farm Manager*

**8. NORTHWEST MICHIGAN HORTICULTURAL RESEARCH STATION**

*Established 1979*  
 6686 S. Center Highway  
 Traverse City, MI 49684  
 Phone: 231-946-1510  
 FAX: 231-946-1404  
 James Nugent  
*Coordinator*  
 Bill Klein  
*Farm Manager*

**9. FRED RUSS FOREST EXPERIMENT STATION**

*Established 1942*  
 20673 Marcellus Highway  
 Decatur, MI 49045  
 Phone: 616-782-5652 or  
 616-731-4597  
 Greg Kowalewski  
*Nonresident Forester*

**10. SAGINAW VALLEY BEET AND BEAN RESEARCH FARM**

*Established 1971*  
 3066 S. Thomas Road  
 Saginaw, MI 48603  
 Phone: 517-781-1160  
 FAX: 517-781-5282  
 Paul Horny  
*Farm Manager*

**11. SOUTHWEST MICHIGAN RESEARCH AND EXTENSION CENTER**

*Established 1987*  
 1791 Hillandale Road  
 Benton Harbor, MI 49022  
 Phone: 616-944-1477  
 FAX: 616-944-3106  
 James Ertman  
*Farm Manager*  
 Thomas Zabadal  
*Coordinator*

**12. TREVOR NICHOLS RESEARCH COMPLEX**

*Established 1967*  
 6237 124th Avenue  
 Fennville, MI 49408  
 Phone: 616-561-5040  
 FAX: 616-561-5314  
 Matthew Daly  
*Farm Manager*

**13. UPPER PENINSULA EXPERIMENT STATION**

*Established 1899*  
 P.O. Box 168  
 E3774 University Drive  
 Chatham, MI 49816  
 Phone: 906-439-5114  
 FAX: 906-439-5698  
 Paul Naasz  
*Operations Supervisor*

**14. UPPER PENINSULA TREE IMPROVEMENT CENTER**

*Established 1986*  
 6005 J Road  
 Escanaba, MI 49829  
 Phone: 906-786-1575  
 FAX: 906-786-9370  
 Ray Miller  
*Resident Forester*

**15. MSU MERILLAT EQUINE CENTER**

*Established 1997*  
 2828 Wolf Creek Highway  
 Adrian, MI 49221  
 Phone: 517-265-6779  
 FAX: 517-263-9294  
 Shorty Parks  
*Farm Manager*

**\* EAST LANSING FIELD RESEARCH FACILITIES**

*Established 1888*  
 109 Agriculture Hall  
 East Lansing, MI 48824-1039  
 Phone: 517-355-3272  
 FAX: 517-353-5406  
 Charles J. Reid  
*Acting Director, Land Management*



# Alphabetical List of MAES Scientists

As of 10-1-99

Faculty members with dual MAES appointments are listed in both of the departments in which they serve.

NAME	DEPARTMENT	NAME	DEPARTMENT
Adams, Gerard C.	Botany and Plant Pathology	Burton, Jeanne L.	Animal Science
Allen, Michael	Animal Science	Burton, Zachary F.	Biochemistry
Allison, Richard F.	Botany and Plant Pathology	Busch, Lawrence M.	Sociology
Aronoff, Marilyn	Sociology	Bush, Guy L.	Kellogg Biological Station
Aulerich, Richard J.	Animal Science	Buskirk, Daniel	Animal Science
Ayers, George S.	Entomology	Cameron, Arthur C.	Horticulture
Bagdasarian, Michael	Microbiology	Campa, Henry III	Fisheries and Wildlife
Baird, James H.	Crop and Soil Sciences	Carlson, William H.	Horticulture
Baker, John C.	Large Animal Clinical Sciences	Cash, Jerry N.	Food Science and Human Nutrition
Bakker-Arkema, Fred W.	Agricultural Engineering	Champness, Wendy C.	Microbiology
Balander, Richard J.	Animal Science	Cheney, Laura L.	Agricultural Economics
Banks, Bobby D.	Animal Science	Chenoweth, Wanda L.	Food Science and Human Nutrition
Bates, Ronald O.	Animal Science	Chou, Karen	Animal Science
Batie, Sandra S. <sup>1</sup>	Agricultural Economics	Christenson, Donald R.	Crop and Soil Sciences
Beaudry, Randolph M.	Horticulture	Clarke, Robert	Packaging
Beckwith, JoAnn	Resource Development	Coe, Paul H.	Animal Science
Beede, David <sup>5</sup>	Animal Science	Coon, Thomas G.	Fisheries and Wildlife
Behe, Bridget K.	Horticulture	Copeland, Lawrence O.	Crop and Soil Sciences
Bell, Thomas G.	Veterinary Pathology	Coussens, Paul M.	Animal Science
Bence, James R. <sup>6</sup>	Fisheries and Wildlife	Crawford, Eric W.	Agricultural Economics
Benning, Christoph	Biochemistry	Cregg, Bert M.	Horticulture
Bennink, Maurice R.	Food Science and Human Nutrition	Crum, James L.	Crop and Soil Sciences
Benson, Margaret	Animal Science	Dazzo, Frank B.	Microbiology
Berglund, Kris A.	Agricultural Engineering	Dazzo, Frank B.	Crop and Soil Sciences
Bickert, William G.	Agricultural Engineering	de Bruijn, Frans J.	Plant Research Laboratory
Biernbaum, John A.	Horticulture	de Bruijn, Frans J.	Microbiology
Bingen, R. James	Resource Development	Dersch, Eckhart	Resource Development
Bird, George W.	Entomology	de Zoeten, Gustaaf A.	Botany and Plant Pathology
Black, J. Roy	Agricultural Economics	Dickmann, Donald I.	Forestry
Bond, Jenny T.	Food Science and Human Nutrition	DiFonzo, Christina D.	Entomology
Booren, Alden M.	Food Science and Human Nutrition	DiFonzo, Christina D.	Center for Integrated Plant Systems
Bourquin, Leslie D.	Food Science and Human Nutrition	Dilley, David R.	Horticulture
Boyd, Stephen A.	Crop and Soil Sciences	D'Itri, Frank M.	Institute of Water Research
Bremigan, Mary T. <sup>6</sup>	Fisheries and Wildlife	Dong, Ke	Entomology
Breznak, John A.	Microbiology	Douches, David S.	Crop and Soil Sciences
Bristow, Catherine	Entomology	Doumit, Matthew E.	Animal Science
Bronstein, Daniel A.	Resource Development	Doumit, Matthew E.	Food Science and Human Nutrition
Brook, Roger C.	Agricultural Engineering	Downes, Theron W.	Packaging
Bucholtz, Herbert F.	Animal Science	Dukelow, W. Richard	Animal Science
Bughrara, Suleiman S. <sup>7</sup>	Crop and Soil Sciences	Dukelow, W. Richard	Physiology
Bursian, Steven	Animal Science	Edens, Thomas C.	Resource Development

NAME	DEPARTMENT
Edens, Thomas C.	Entomology
Edson, Charles E. <sup>7</sup>	Horticulture
Eicher, Carl K.	Agricultural Economics
Ellis, Boyd G.	Crop and Soil Sciences
Epperson, Bryan K.	Forestry
Ernst, Catherine W.	Animal Science
Erskine, Ronald J.	Large Animal Clinical Sciences
Ferris, Theodore A.	Animal Science
Flore, James A.	Horticulture
Fogwell, Ralph L.	Animal Science
Foster, Eunice F.	Crop and Soil Sciences
Fraker, Pamela J.	Food Science and Human Nutrition
Fraker, Pamela J.	Biochemistry
Freed, Russell D.	Crop and Soil Sciences
Fried, Jeremy S.	Forestry
Fulbright, Dennis W.	Botany and Plant Pathology
Gage, Douglas A.	Biochemistry
Gage, Stuart H.	Entomology
Garling, Donald L.	Fisheries and Wildlife
Gerrish, John B.	Agricultural Engineering
Giacin, Jack R.	Packaging
Giesy, John P.	National Food Safety and Toxicology Center
Gomez-Duran, Charles O.	Large Animal Clinical Sciences
Grooms, Daniel L.	Large Animal Clinical Sciences
Grumet, Rebecca	Horticulture
Gut, Larry	Entomology
Guyer, Daniel E.	Agricultural Engineering
Hammerschmidt, Raymond	Botany and Plant Pathology
Hancock, James F.	Horticulture
Hanson, Eric J.	Horticulture
Hanson, Steven D.	Agricultural Economics
Harkema, Jack	Veterinary Pathology
Harris, Craig K.	Sociology
Harsh, Stephen B.	Agricultural Economics
Hart, James B., Jr.	Forestry
Hart, L. Patrick	Botany and Plant Pathology
Harwood, Richard R. <sup>2</sup>	Crop and Soil Sciences
Hausbeck, Mary K.	Botany and Plant Pathology
Hausinger, Robert P.	Microbiology
Hausinger, Robert P.	Biochemistry
Hayes, Daniel B. <sup>6</sup>	Fisheries and Wildlife
He, Sheng-Yang	Botany and Plant Pathology
Heins, Royal D.	Horticulture
Heinze, Kirk L.	ANR Education and Communication Systems
Herd, Thomas H.	Large Animal Clinical Sciences



NAME	DEPARTMENT
Hernandez, Ruben J.	Packaging
Herner, Robert C.	Horticulture
Hill, Gretchen M.	Animal Science
Hoehn, John P.	Agricultural Economics
Hoerr, Sharon M.	Food Science and Human Nutrition
Holecek, Donald F.	Park, Recreation and Tourism Resources
Holland, Margo S.	Veterinary Pathology
Holland, Robert E.	Large Animal Clinical Sciences
Hollingsworth, Rawle I.	Biochemistry
Hollingsworth, Robert M.	Entomology
Hord, Norman	Food Science and Human Nutrition
Howe, Gregg A.	Plant Research Laboratory
Howell, Gordon S.	Horticulture
Huang, Zhiyong	Entomology
Iezzoni, Amy F.	Horticulture
Imig, David R.	Family and Child Ecology
Ireland, James J.	Animal Science
Isaacs, Rufus <sup>7</sup>	Entomology
Jacobs, Lee W.	Crop and Soil Sciences
Jarosz, Andrew M.	Botany and Plant Pathology
Johnson, Nan E.	Sociology
Jones, Alan L.	Botany and Plant Pathology
Jones, Michael L. <sup>6</sup>	Fisheries and Wildlife
Jump, Donald B.	Physiology
Kaguni, Jon M.	Biochemistry
Kakela, Peter J.	Resource Development
Kamdem, Donatien-Pascal	Forestry
Kaneene, John B.	Large Animal Clinical Sciences
Kaplowitz, Michael C.	Resource Development
Keefe, Dennis R.	Family and Child Ecology
Keith, Joanne G.	Family and Child Ecology
Kells, James J., Jr.	Crop and Soil Sciences
Kelly, James D.	Crop and Soil Sciences
Kielbaso, Julian J.	Forestry

NAME	DEPARTMENT	NAME	DEPARTMENT
Kirk, William W. <sup>7</sup>	Botany and Plant Pathology	Paul, Eldor A.	Crop and Soil Sciences
Klug, Michael J.	Microbiology	Penner, Donald	Crop and Soil Sciences
Knezek, Bernard D.	Crop and Soil Sciences	Perry, Ronald L.	Horticulture
Kobe, Richard K.	Forestry	Person, Howard L.	Agricultural Engineering
Kroos, Lee R.	Biochemistry	Pestka, James J.	Food Science and Human Nutrition
Landis, Douglas A.	Entomology	Peterson, H. Christopher	Agricultural Economics
Lee, Julian J. L.	Packaging	Peyton, R. Benny	Fisheries and Wildlife
Leefers, Larry A.	Forestry	Pierce, Francis J.	Crop and Soil Sciences
Leep, Richard H.	Crop and Soil Sciences	Poff, Ken	Botany and Plant Pathology
Lenski, Richard E. <sup>3</sup>	Crop and Soil Sciences	Potter-Witter, Karen L.	Forestry
Li, Weiming <sup>6</sup>	Fisheries and Wildlife	Prather, L. Alan	Botany and Plant Pathology
Linz, John E.	Food Science and Human Nutrition	Preiss, Jack	Biochemistry
Liu, Jianguo <sup>6</sup>	Fisheries and Wildlife	Prince, Harold H.	Fisheries and Wildlife
Lloyd, James W.	Agricultural Economics	Propst, Dennis B.	Park, Recreation and Tourism Resources
Loudon, Theodore L.	Agricultural Engineering	Pursley, James R.	Animal Science
Lownds, Norman K.	Horticulture	Pysarchik, Dawn I.	Human Environment and Design
Lupi Jr., Frank <sup>6</sup>	Fisheries and Wildlife	Raikhel, Alexander S.	Entomology
Lupi Jr., Frank <sup>6</sup>	Agricultural Economics	Ramm, Carl W.	Forestry
Maes, Roger K.	Microbiology	Raper, Kellie K.	Agricultural Economics
Mao, Ivan Ling	Animal Science	Reddy, C. Adinarayana	Microbiology
Marks, Bradley P.	Agricultural Engineering	Renner, Karen A.	Crop and Soil Sciences
Maurer, Brian A. <sup>6</sup>	Fisheries and Wildlife	Ricks, Donald J.	Agricultural Economics
McCullough, Deborah G.	Entomology	Ritchie, Harlan D.	Animal Science
McDonough, Maureen H.	Forestry	Ritchie, Joe T. <sup>4</sup>	Crop and Soil Sciences
Melakeberhan, Haddish	Entomology	Roberson, Kevin D.	Animal Science
Merritt, Richard W.	Entomology	Robertson, G. Philip	Crop and Soil Sciences
Millenbah, Kelly F.	Fisheries and Wildlife	Robinson, Norman E.	Large Animal Clinical Sciences
Miller, James R.	Entomology	Robison, Lindon J.	Agricultural Economics
Mokma, Delbert L.	Crop and Soil Sciences	Rogers, John N. III	Crop and Soil Sciences
Myers, Robert S.	Agricultural Economics	Romsos, Dale R.	Food Science and Human Nutrition
Nair, Muraleedharan G.	Horticulture	Rook, Joseph S.	Large Animal Clinical Sciences
Nelson, Charles M.	Park, Recreation and Tourism Resources	Rosenbaum, Rene P.	Resource Development
Ng, Perry K. W.	Food Science and Human Nutrition	Rowe, D. Bradley	Horticulture
Nielsen, Brian D.	Animal Science	Rozeboom, Dale	Animal Science
Norris, Patricia E.	Resource Development	Rudy, Alan P.	Sociology
Norris, Patricia E.	Agricultural Economics	Rugh, Clayton L.	Crop and Soil Sciences
Northcott, William J.	Agricultural Engineering	Rust, Steven	Animal Science
Oehmke, James F.	Agricultural Economics	Ryser, Elliott T.	Food Science and Human Nutrition
Ofoli, Robert Y.	Food Science and Human Nutrition	Ryser, Elliott T.	Animal Science
Ohlogge, John B.	Botany and Plant Pathology	Safir, Gene R.	Botany and Plant Pathology
Olsen, Larry	Entomology	Sang, Tao	Botany and Plant Pathology
Orth, Michael	Animal Science	Schiemberg, Lawrence R.	Family and Child Ecology
Osburn, Wesley N.	Food Science and Human Nutrition	Schilder, Annemiek C.	Botany and Plant Pathology
Osburn, Wesley N.	Animal Science	Schindler, Melvin S.	Biochemistry
Padgett, George A.	Veterinary Pathology	Schmid, A. Allan	Agricultural Economics
Patterson, Jon S.	Veterinary Pathology	Schmidt, Thomas M.	Microbiology

NAME	DEPARTMENT
Schroeder, Joseph J.	Food Science and Human Nutrition
Schultink, Gerhardus	Resource Development
Schutzki, Robert E.	Horticulture
Schwab, Gerald D.	Agricultural Economics
Schweikhardt, David B.	Agricultural Economics
Scriber, J. Mark	Entomology
Scribner, Kim T. <sup>6</sup>	Fisheries and Wildlife
Sears, Barbara B.	Botany and Plant Pathology
Sears, Phillip M.	Large Animal Clinical Sciences
Segerlind, Larry J.	Agricultural Engineering
Singh, Sher Paul	Packaging
Sink, Kenneth C.	Horticulture
Slocum, Ann C.	Human Environment and Design
Smith, Denise M.	Food Science and Human Nutrition
Smith, George W.	Animal Science
Smitley, David R.	Entomology
Smucker, A.J.M.	Crop and Soil Sciences
Song, Won O.	Food Science and Human Nutrition
Sontag, M. Suzanne	Human Environment and Design
Soranno, Patricia A.	Fisheries and Wildlife
Staatz, John S.	Agricultural Economics
Steffe, James F.	Food Science and Human Nutrition
Steffe, James F.	Agricultural Engineering
Stehr, Frederick W.	Entomology
Sternquist, Brenda J.	Human Environment and Design
Strasburg, Gale M.	Food Science and Human Nutrition
Straw, Barbara E.	Large Animal Clinical Sciences
Stynes, Daniel J.	Park, Recreation and Tourism Resources
Surbrook, Truman C.	Agricultural Engineering
Suvedi, Murari	ANR Education and Communication Systems
Swinton, Scott M.	Agricultural Economics
Tempelman, Robert	Animal Science
Teppen, Brian J.	Crop and Soil Sciences
Thelen, Kurt D.	Crop and Soil Sciences
Thiem, Suzanne	Entomology
Thomashow, Michael F.	Crop and Soil Sciences
Thomashow, Michael F.	Microbiology
Tiedje, James M.	Microbiology
Tiedje, James M.	Crop and Soil Sciences
Trail, Frances	Botany and Plant Pathology
Triezenberg, Steven J.	Biochemistry
Trottier, Nathalie	Animal Science
Tucker, H. Allen	Animal Science
Ustunol, Zeynep	Food Science and Human Nutrition
VandeHaar, Michael	Animal Science

NAME	DEPARTMENT
Vanderpool, Christopher K.	Sociology
Vander Stoep, Gail A.	Park, Recreation and Tourism Resources
Van Ee, Gary R.	Agricultural Engineering
van Nocker, Steven R.	Horticulture
van Ravenswaay, Eileen O.	Agricultural Economics
Vargas, Joseph M., Jr.	Botany and Plant Pathology
Velicer, Leland F.	Microbiology
von Bernuth, Robert D.	Agricultural Engineering
Walker, Edward D.	Entomology
Walker, Rosemary A.	Family and Child Ecology
Walters, Michael B. <sup>6</sup>	Forestry
Walton, Jonathan D.	Plant Research Laboratory
Wang, John L.	Biochemistry
Ward, Richard W.	Crop and Soil Sciences
Warncke, Darryl D.	Crop and Soil Sciences
Watson, J. Throck	Biochemistry
Weatherspoon, Dave D.	Agricultural Economics
Weber, Michael T.	Agricultural Economics
Weber, Miriam S.	Animal Science
Whims, Fred R.	ANR Education and Communication Systems
Whipple, Judith M.	Agricultural Economics
Widders, Irvin E.	Horticulture
Winterstein, Scott R.	Fisheries and Wildlife
Witter, Scott G.	Resource Development
Wolf, Christopher A.	Agricultural Economics
Yokoyama, Melvin T.	Animal Science
Zabadal, Thomas J.	Horticulture
Zabik, Mary E.	Food Science and Human Nutrition
Zabik, Matthew J.	National Food Safety and Toxicology Center
Zabik, Matthew J.	Entomology
Zacharewski, Timothy R.	National Food Safety and Toxicology Center
Zandstra, Bernard H.	Horticulture
Zanella, Adroaldo	Animal Science
Zile, Maija H.	Food Science and Human Nutrition

<sup>1</sup> Elton Smith Endowed Chair

<sup>2</sup> C.S. Mott Distinguished Professor of Sustainable Agriculture

<sup>3</sup> Hannah Professor for Microbial Ecology and Plant Sciences

<sup>4</sup> Nowlin Professor for Water Research (50 percent of the appointment is paid by the endowment)

<sup>5</sup> Clinton Meadows Chair

<sup>6</sup> Partnerships for Ecosystem Research and Management (PERM) positions with salary funded by the Michigan Department of Natural Resources

<sup>7</sup> GREEN (Generating Research and Extension to meet Economic and Environmental Needs) appointed faculty

# MAES Scientists and Projects by Department

The names listed here represent faculty members who have an MAES appointment and are in the tenure stream as of 10-1-99. Faculty members with dual MAES appointments are listed in both of the departments in which they serve.

SCIENTISTS	PROJECTS
MAES = Michigan Agricultural Experiment Station	Projects listed are as of 10-1-99.
MSUE = Michigan State University Extension	*Signifies Regional Research Project
Joint = Joint appointment in an MAES-affiliated College or Department	
12 = Professor	
13 = Associate Professor	
14 = Assistant Professor	

## ANR Education and Communication Systems

Phone: 355-6580



Kirk L. Heinze, Acting Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Heinze, Kirk L.	13	0.20	0.00	0.80	Marketing Communication
Suvedi, Murari	13	0.25	0.50	0.25	Program Evaluation
Whims, Fred R.	12	0.12	0.40	0.48	Extension Education/Rural Education
<b>TOTALS:</b>		<b>0.57</b>	<b>0.90</b>	<b>1.53</b>	

### PROJECTS

MICL03316	Assessing Retailer/Consumer Perceptions and Use of Michigan-Produced Commodities	Heinze, K.
MICL03372	Evaluation of Area of Expertise (AOE) Team Approach to Applied Research and Extension in Michigan	Suvedi, M.

## Agricultural Economics

Phone: 355-4563



Larry G. Hamm, Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Batie, Sandra S. <sup>1</sup>	12	0.60	0.20	0.20	Food and Agriculture Policy
Black, J. Roy	12	0.80	0.00	0.20	Farm Management
Cheney, Laura L.	14	0.50	0.50	0.00	Livestock Industry Management
Crawford, Eric W.	12	0.40	0.35	0.25	International Development
Eicher, Carl K.	12	0.50	0.00	0.50	International Development
Hanson, Steven D.	13	0.80	0.00	0.20	Agricultural Finance
Harsh, Stephen B.	12	0.20	0.65	0.15	Farm Management

# Agricultural Economics (continued)

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Hoehn, John P.	12	0.70	0.00	0.30	Natural Resources & Environmental Economics
Lloyd, James W.	12	0.20	0.00	0.80	Livestock Production/Health Management/Food Safety
Lupi Jr., Frank <sup>6</sup>	14	0.15	0.42	0.43	Fisheries & Wildlife Economics
Myers, Robert S.	12	0.80	0.00	0.20	International Trade & Price Analysis
Norris, Patricia E.	13	0.12	0.30	0.58	Land Use Management/Public Resource Economics
Oehmke, James F.	13	0.75	0.00	0.25	Price Analysis & Research Policy
Peterson, H. Christopher	13	0.40	0.00	0.60	Food and Agribusiness Management
Raper, Kellie K.	14	0.75	0.00	0.25	Livestock Industry Marketing Economist
Ricks, Donald J.	12	0.20	0.70	0.10	Food System Marketing
Robison, Lindon J.	12	0.65	0.00	0.35	Production Economics
Schmid, A. Allan	12	0.60	0.00	0.40	Land Economics/Public Policy
Schwab, Gerald D.	12	0.20	0.50	0.30	Farm Management
Schweikhardt, David B.	13	0.25	0.40	0.35	Food, Agricultural & Trade Policy
Staatz, John S.	12	0.25	0.00	0.75	International Development
Swinton, Scott M.	13	0.70	0.00	0.30	Production Economics
van Ravenswaay, Eileen O.	12	0.75	0.00	0.25	Environmental Economics & Public Policy
Weatherspoon, Dave D.	14	0.40	0.00	0.60	Food & Agribusiness Management
Weber, Michael T.	12	0.80	0.00	0.20	International Development
Whipple, Judith M.	13	0.30	0.20	0.50	Food & Agribusiness Management
Wolf, Christopher A.	14	0.50	0.50	0.00	Dairy Firm Management Economics
<b>TOTALS:</b>		<b>13.27</b>	<b>4.72</b>	<b>9.01</b>	
<i>Adjustment for PERM Positions</i>		<i>-0.15</i>	<i>-0.42</i>	<i>-0.43</i>	
<b>ADJUSTED TOTALS</b>		<b>13.12</b>	<b>4.30</b>	<b>8.58</b>	

## PROJECTS

MICL01518*	Benefits and Costs of Resource Policies Affecting Public and Private Land	Hoehn, J.
MICL01519*	Private Strategies, Public Policies and Food System Performance	van Ravenswaay, E.
MICL01530*	Fruit and Vegetable Supply-Chain Management, Innovations and Competitiveness	Ricks, D.
MICL01625	Financial Decision Making and Investment in Agriculture	Hanson, S.
MICL01635	Collective Action in Agriculture, Natural Resources and Rural Development	Schmid, A.
MICL01642*	Impacts of Structural Change in the Dairy Industry	Wolf, C.
MICL01666*	Impact Analyses and Decision Strategies for Agricultural Research	Oehmke, J.
MICL01732	Political Economy of National and International Agricultural Policies and Policy Decision Processes	Schweikhardt, D.
MICL01744	Agricultural Economics Research on International Agricultural Development and Environmental Issues	Eicher, C.
MICL01770	Economic Analysis of Public Policies Affecting the Performance of Michigan Agriculture	Batie, S.
MICL01788	Economic Analysis of Tactical and Operational Decisions on Farms and Design/Development of Information Systems	Harsh, S.
MICL01790	Structural Adjustments in Michigan's Pork and Beef Sectors	Black, J.
MICL01815	The Political Economy of U.S. Agricultural Research, Commodity and Trade Policy	Oehmke, J.
MICL01844	Risk Analysis and Management in U.S. Agriculture	Myers, R.
MICL01850	The Role of Information and Market Transactions in Land Use Policy	Norris, P.
MICL01865	Role of Information and Transactions Costs in Coordination of Global Food Systems	Staatz, J.

## Agricultural Economics (continued)

MICL01889	Social Capital, Terms of Trade and the Internalization of Externalities	Robison, L.
MICL01891*	Financing Agriculture and Rural America: Issues of Policy, Structure and Technical Change	Hanson, S.
MICL01905	Agricultural Production Economics and Environmental Risk Management	Swinton, S.
MICL01925	Agribusiness Competitiveness: Strategies for Vertical Coordination and Customer Responsiveness	Peterson, H.
MICL03333	Improved Marketing and Competitiveness for Michigan Fruit Industries	Ricks, D.
MICL03356	Economics of Vertical Coordination and Intensive Production in Michigan's Livestock Industries	Martin, L.
MICL03381	Strategic Management in Agribusiness Using Key Performance Indicators	Lloyd, J.
MICL03384	Assessing the Economic Structure, Performance, Visibility and Competitiveness of the Michigan Dairy Industry	Wolf, C.
MICL03385	The Impact of Efficient Consumer Response on Michigan Food Manufacturers and Retailers	Whipple, J.
MICL03387	Agricultural Economics Research on International Agricultural Development and the Environment	Weber, M.
MICL08201	Enhancing Rural Economies Through Comprehensive Extension, Research and Partnering Approaches	Moser, C.

## Agricultural Engineering

Phone: 355-4720



Ajit K. Srivastava,  
Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Bakker-Arkema, Fred W.	12	0.65	0.00	0.35	Grain Dry Storage
Berglund, Kris A.	12	0.49	0.00	0.51	Biotechnology/Food Engineering
Bickert, William G.	12	0.20	0.80	0.00	Livestock Facilities/Environment
Brook, Roger C.	12	0.25	0.75	0.00	Postharvest Handling, Storage, Drying
Gerrish, John B.	12	0.40	0.00	0.60	Electronics/Odor Control
Guyer, Daniel E.	13	0.25	0.75	0.00	Fruit/Vegetable Storage/Handling
Loudon, Theodore L.	12	0.30	0.70	0.00	Irrigation/Waste Water Treatment
Marks, Bradley P.	13	0.60	0.00	0.40	Biosystems Engineer
Northcott, William J.	14	0.40	0.00	0.60	Natural Resources Engineer
Person, Howard L.	13	0.30	0.70	0.00	Agricultural Structures/Livestock/Waste Treatment
Segerlind, Larry J.	12	0.35	0.00	0.65	Finite Element Analysis/Structures
Steffe, James F.	12	0.35	0.00	0.65	Food Engineering/Rheology
Surbrook, Truman C.	12	0.25	0.00	0.75	Electrical Technology /Stray Voltage
Van Ee, Gary R.	12	0.65	0.00	0.35	Chemical Application/Power & Machinery
von Bernuth, Robert D.	12	0.36	0.26	0.38	Manure Management
<b>TOTALS:</b>		<b>5.80</b>	<b>3.96</b>	<b>5.24</b>	

### PROJECTS

MICL01245*	Improvement of Thermal Processes for Foods	Steffe, J.
MICL01581	Value-Added Quality Control Techniques in the Postharvest Stages of Fruit and Vegetable Products	Guyer, D.
MICL01676*	Technology and Principles for Assessing and Retaining Postharvest Quality of Fruits and Vegetables	Guyer, D.
MICL01767	Development of Chemical Application Technology for Agribusiness	Van Ee, G.

# Agricultural Engineering (continued)

MICL01777	Engineering for Food Quality and Safety	Brook, R.
MICL01784	Marketing and Delivery of Quality Cereals and Oilseeds	Bakker-Arkema, F.
MICL01787	Improvement of Small-Scale Decentralized and Onsite Wastewater Treatment and Disposal	Loudon, T.
MICL01794	Analysis and Characterization of Biosystems	Gerrish, J.
MICL01799	Designing Dairy Facilities to Enhance Management and to Meet Animals' Needs	Bickert, W.
MICL01862	Neutral-To-Earth Voltage Reduction on Livestock Farms	Surbrook, T.
MICL01883	Facilitating Beneficial Use of Livestock Manure	Person, H.
MICL01888*	Animal Manure and Waste Utilization, Treatment and Nuisance Avoidance for a Sustainable Agriculture	von Bernuth, R.
MICL01914	Irrigation and Waste Management Research in a Systems Context	von Bernuth, R.
MICL01930	Computational Methods in Biosystems Engineering	Seegerind, L.
MICL01935	Laser Spectroscopy for Analysis of Crystallization Processes	Berglund, K.
MICL07642	Bioprocessing for Utilization of Agricultural Raw Materials	Berglund, K.
MICL08180	Rheology and Protein Chemistry of "Undeveloped" Dough	Steffe, J.



Photo by Ann Grimes

## Animal Science

Phone: 355-8383

Maynard G. Hogberg,  
Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Allen, Michael	12	0.50	0.50	0.00	Forage Nutrition
Aulerich, Richard J.	12	0.75	0.25	0.00	Fur-bearing Animals/Nutrition/ Toxicology
Balander, Richard J.	13	0.40	0.00	0.60	Avian Physiology/Reproduction
Banks, Bobby D.	12	0.25	0.00	0.75	Animal Genetics
Bates, Ronald O.	14	0.20	0.80	0.00	Swine Genetics/Management
Beede, David <sup>5</sup>	12	0.50	0.40	0.10	Dairy Nutrition/Dairy Management
Benson, Margaret	12	0.20	0.50	0.30	Ruminant Nutrition/Sheep
Bucholtz, Herbert F.	12	0.15	0.70	0.15	Dairy Nutrition/Management
Bursian, Steven	12	0.85	0.00	0.15	Avian Physiology/Toxicology
Burton, Jeanne L.	14	0.80	0.00	0.20	Molecular Genetics/Dairy Cattle
Buskirk, Daniel	14	0.50	0.50	0.00	Ruminant Nutrition/Beef
Chou, Karen	13	0.80	0.00	0.20	Toxicology
Coe, Paul H.	13	0.20	0.00	0.80	Animal Health
Coussens, Paul M.	13	0.80	0.00	0.20	Molecular Biology
Doumit, Matthew E.	14	0.25	0.00	0.75	Meat Science/Muscle Biology
Dukelow, W. Richard	12	0.25	0.00	0.75	Reproductive Physiology



# Animal Science (continued)

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Ernst, Catherine W.	14	0.80	0.00	0.20	Meat Animal Genetics
Ferris, Theodore A.	12	0.20	0.80	0.00	Dairy Genetics
Fogwell, Ralph L.	12	0.30	0.50	0.20	Physiology
Hill, Gretchen M.	13	0.75	0.00	0.25	Swine Nutrition
Ireland, James J.	12	0.95	0.00	0.05	Physiology
Mao, Ivan Ling	12	0.95	0.00	0.05	Dairy Genetics
Nielsen, Brian D.	14	0.60	0.00	0.40	Equine Exercise Physiology
Orth, Michael	14	0.80	0.00	0.20	Turkey Nutrition/Growth Biology
Osburn, Wesley N.	14	0.25	0.00	0.75	Meat Science
Pursley, James R.	14	0.20	0.80	0.00	Reproductive Management
Ritchie, Harlan D.	12	0.10	0.90	0.00	Beef Cattle Nutrition/Management
Roberson, Kevin D.	14	0.35	0.65	0.00	Poultry Nutrition/Management
Rozeboom, Dale	13	0.15	0.60	0.25	Swine Nutrition/Management
Rust, Steven	12	0.50	0.50	0.00	Beef Feedlot Nutrition
Ryser, Elliott T.	14	0.17	0.00	0.83	Dairy Manufacturing/Microbiology
Smith, George W.	14	0.75	0.00	0.25	Reproductive Physiology
Tempelman, Robert	14	0.50	0.00	0.50	Statistics
Trottier, Nathalie	14	0.75	0.00	0.25	Swine Nutrition/Management
Tucker, H. Allen	12	0.80	0.00	0.20	Physiology/Lactation
VandeHaar, Michael	13	0.65	0.00	0.35	Dairy Nutrition
Weber, Miriam S.	14	0.30	0.00	0.70	Dairy Management
Yokoyama, Melvin T.	12	0.85	0.00	0.15	Animal Nutrition/Microbiology
Zanella, Adroaldo	14	0.75	0.00	0.25	Ethology/Stress Physiology
<b>TOTALS:</b>		<b>19.82</b>	<b>8.40</b>	<b>10.78</b>	

## PROJECTS

MICL01039	Fur Animal Studies (Mink)	Aulerich, R.
MICL01156*	Management Systems for Improved Decision Making and Profitability of Dairy Herds	Beede, D.
MICL01178	New Breeding Strategies to Maximize the Efficiency of Dairy Cattle Improvement	Mao, I.
MICL01182*	Molecular Mechanisms Regulating Skeletal Muscle Growth and Differentiation	Doumit, M.
MICL01196*	Methods to Increase Reproductive Efficiency in Cattle	Pursley, J.
MICL01521*	Metabolic Relationships in Supply of Nutrients for Lactating Cows	VandeHaar, M.
MICL01573	The Role of Inhibin in Bovine Reproduction	Ireland, J.
MICL01604	Increasing Efficiency of Protein Production in Dairy Cattle	VandeHaar, M.
MICL01622	Environmental Chemical Influences on Reproduction	Chou, K.
MICL01643	Microbial Ecology of Rumen, Gastrointestinal Tract, Ensiled Feeds and Livestock	Yokoyama, M.
MICL01652*	Environmental and Economic Impacts of Nutrient Management on Dairy Forage Systems	Allen, M.
MICL01691*	Genetic Improvement of Cattle Using Molecular Genetic Information	Burton, J.
MICL01727	The Fate and Biological Effects of Xenobiotics in Animals	Bursian, S.
MICL01800	Optimizing Nutrition and Management of Dry, Peripartum and Early Lactation Dairy Cows	Beede, D.
MICL01802	Optimizing the Nutritional Utilization of Forages by Dairy Cattle	Allen, M.
MICL01803	Nutritional, Management and Other Applied Studies Using Poultry and Other Avian Species	Balander, R.
MICL01818*	Biophysical Models for Poultry Production Systems	Rahn, A.
MICL01822	Advanced Biometrical Techniques for Genetic Inference in Livestock Populations	Tempelman, R.
MICL01823	Methods to Enhance Decision Making by Dairy Producers and Artificial Insemination of Bull Studs	Ferris, T.
MICL01836	Genetic Basis of Parturition-Induced Immunosuppression and Mastitis Susceptibility in Dairy Cows	Burton, J.

## Animal Science (continued)

MICL01852	Understanding Growth Plate Cartilage Turnover in Meat Producing Birds	Orth, M.
MICL01853	Assessment of Behavioral and Physiological Responses of Animals to Difficult Situations	Zanella, A.
MICL01854	Optimizing Protein and Amino Acid Utilization of Growing Pigs and Gestating and Lactating Sows	Trottier, N.
MICL01861	Management of Athletic Horses to Reduce Musculoskeletal Injuries and Improve Performance	Nielsen, B.
MICL01873*	Positional and Functional Identification of Economically Important Genes in the Pig	Ernst, C.
MICL01875	Using Milk Yield to Schedule Insemination in Dairy Cows	Fogwell, R.
MICL01877	Genetic Management and Control of Growth Carcass Merit and Quality	Bates, R.
MICL01879	Pre- and Postharvest Processing Strategies to Improve the Value of Muscle Food Products	Osburn, W.
MICL01880	Regulation of Skeletal Muscle Growth and Meat Quality	Doumit, M.
MICL01885*	Integration of Quantitative and Molecular Technologies for Genetic Improvement of Pigs	Bates, R.
MICL01890	Mechanisms of Ovulation in Dairy Cattle	Smith, G.
MICL01913	Impact of Growth and Lactation on the Nutritional Needs and Economic Viability of the Sheep Flock	Benson, M.
MICL01928*	Reproductive Performance in Domestic Ruminants	Smith, G.
MICL01929	Identification and Evaluation of Genes Controlling Economically Important Traits in Pigs and Cattle	Ernst, C.
MICL01931	Molecular Mechanisms of Animal Disease I: PRRSV	Coussens, P.
MICL01943	Nutritional and Managerial Strategies to Minimize Phosphorus Excretion from Poultry	Roberson, K.
MICL03340	Nutrition and Feeding Management for Michigan Dairy Herds	Bucholtz, H.
MICL03360	Feeding and Management Regimes for Efficient Utilization of Michigan Feedstuffs by Beef Cattle	Buskirk, D.
MICL03366	Utilization of Genetic Resources for the Improvement of Livestock Populations	Banks, B.
MICL03374	Maximum Utilization of Michigan Grown Feedstuffs for Growing-Finishing Cattle	Rust, S.
MICL06883	The Use of <i>Propionibacterium</i> for Prevention of Lactic Acidosis	Rust, S.
MICL06889	Identification of PCR-RFLPs in Glucocorticoid Receptor Genes of Pedigreed Cattle	Burton, J.
MICL06892	Neuroendocrine Regulation of the Stress Response in Cattle	Smith, G.
MICL06896	Glucosamine's Role in the Regulation of Metalloproteinases in Equine Cartilage	Orth, M.
MICL06898	Identification of Differentially Expressed Genes Regulated by Zinc Supplementation of Weaned Pigs	Ernst, C.
MICL08211	Role of Matrix Metalloproteinases in Ovulation	Smith, G.
MICL08229	Identification of Single-Nucleotide Polymorphisms in Pig Sequence-Tagged Sites	Ernst, C.

## Biochemistry

Phone: 353-0804



William L. Smith, Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Benning, Christoph	14	0.67	0.00	0.33	Plant Biochemistry
Burton, Zachary F.	13	0.20	0.00	0.80	Molecular Biology
Fraker, Pamela J.	12	0.30	0.00	0.70	Immunology
Gage, Douglas A.	14	0.56	0.00	0.44	Plant Biochemistry
Hausinger, Robert P.	12	0.25	0.00	0.75	Enzymology
Hollingsworth, Rawle I.	12	0.25	0.00	0.75	Renewable Resource Chemistry
Kaguni, Jon M.	12	0.58	0.00	0.42	Molecular Biology
Kroos, Lee R.	12	0.56	0.00	0.44	Molecular Biology
Preiss, Jack	12	0.25	0.00	0.75	Starch Biochemistry

# Biochemistry (continued)

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Schindler, Melvin S.	12	0.35	0.00	0.65	Cell Biology
Triezenberg, Steven J.	12	0.20	0.00	0.80	Molecular Biology
Wang, John L.	12	0.20	0.00	0.80	Cell Biology
Watson, J. Throck	12	0.50	0.00	0.50	Analytical Biochemistry
<b>TOTALS:</b>		<b>4.87</b>	<b>0.00</b>	<b>8.13</b>	

## PROJECTS

MICL01290*	Regulation of Photosynthetic Processes	Preiss, J.
MICL01598	Gene Regulation During Development of Soil Bacteria	Kroos, L.
MICL01601	DNA Replication and its Regulation in <i>Escherichia coli</i>	Kaguni, J.
MICL01608	Activation of Gene Expression by a Herpes Simplex Virion Protein	Triezenberg, S.
MICL01610	Functions of Transcription Factor IIF	Burton, Z.
MICL01614	Interaction of <i>Rhizobium</i> with Soybean Cells	Wang, J.
MICL01781	Mechanism of Aluminum Toxicity-Optical Trap Measurements of Cytoskeletal Dysfunction in Living Cells	Schindler, M.
MICL01816	Biosynthesis of the Plant Osmoprotectant Dimethylsulfoniopropionate (DMSP)	Gage, D.
MICL01924	Dietary Zinc — Its Effects on the Immune Response	Fraker, P.
MICL01940	Regulation of Metabolism in Developing Seeds of <i>Arabidopsis</i>	Benning, C.
MICL08219	Role of Oxylipins in the Regulation of Plant Defense	Howe, G.
MICL08225	Genetic Engineering of Amylosaccharidases for Agricultural Bioprocessing	Zeikus, J.

# Botany and Plant Pathology

Phone: 355-4683



Raymond K. Hammerschmidt, Acting Chair

## FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Adams, Gerard C.	13	0.55	0.27	0.18	Plant Pathology/Mycology
Allison, Richard F.	13	0.75	0.00	0.25	Plant Molecular Virology
de Zoeten, Gustaaf A.	12	0.72	0.02	0.26	Plant Pomology/Virology
Fulbright, Dennis W.	12	0.83	0.00	0.17	Plant Pathology/Plant Pathogen Genetics
Hammerschmidt, Raymond	12	0.83	0.00	0.17	Plant Pathology/Biochemistry/Physiology/Plant Disease Resistance
Hart, L. Patrick	12	0.40	0.50	0.10	Plant Pathology/Field Crops
Hausbeck, Mary K.	13	0.29	0.61	0.10	Plant Pathology/Ornamentals, Vegetables & Greenhouse Crops
He, Sheng-Yang	14	0.25	0.00	0.75	Molecular Biology/Plant-Pathogen Interactions

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Jarosz, Andrew M.	13	0.75	0.00	0.25	Plant Pathology/Pathogen Epidemiology
Jones, Alan L.	12	0.50	0.40	0.10	Plant Pathology/Fruit Tree Crops
Kirk, William W. <sup>7</sup>	14	0.45	0.45	0.10	Plant Pathology/Vegetables/ Potatoes/Perennial Herbaceous Plants
Ohlrogge, John B.	12	0.84	0.00	0.16	Plant Physiology/Biochemistry/ Molecular Biology/Plant Lipid Synthesis
Poff, Ken	12	0.25	0.00	0.75	Plant Physiology
Prather, L. Alan	14	0.25	0.00	0.75	Plant Systematics
Safir, Gene R.	12	0.90	0.00	0.10	Plant Pathology/Mycorrhizal Fungi
Sang, Tao	14	0.25	0.00	0.75	Plant Systematics and Molecular Evolution
Schilder, Annemiek C.	14	0.45	0.45	0.10	Plant Pathology/Small Fruits
Sears, Barbara B.	12	0.25	0.00	0.75	Molecular Biology and Plant Organelle Genetics
Trail, Frances	14	0.27	0.00	0.73	Host Pathogen Interactions
Vargas, Joseph M., Jr.	12	0.26	0.49	0.25	Plant Pathology/Diseases/Sod and Turf
<b>TOTALS:</b>		<b>10.04</b>	<b>3.19</b>	<b>6.77</b>	
<i>Adjustment for GREEN Positions</i>		<i>-0.45</i>	<i>-0.45</i>	<i>-0.10</i>	
<b>ADJUSTED TOTALS</b>		<b>9.59</b>	<b>2.74</b>	<b>6.67</b>	

## PROJECTS

MICL01206*	Biocontrol of Soil-Borne Plant Pathogens	Safir, G.
MICL01259*	<i>Fusarium</i> Mycotoxins in Cereal Grains	Hart, L.
MICL01499	Control and Utilization of VA Mycorrhizal Root Colonization	Safir, G.
MICL01533	Genetic Engineering of Oilseed Crops	Ohlrogge, J.
MICL01562	Physiology of Resistance and Induced Resistance to Disease in Potato	Hammerschmidt, R.
MICL01662	Avirulent Fungal and Bacterial Plant Pathogens: Their Role and Fate in Plant Disease Epidemics	Fulbright, D.
MICL01673	Biology and Control of Pathogens of Field Crops	Hart, L.
MICL01679	<i>Plastome mutator</i> of <i>Oenothera</i> : A Nuclear Gene That Causes Chloroplast DNA Mutations	Sears, B.
MICL01756*	Multidisciplinary Evaluation of New Apple Cultivars	Jones, A.
MICL01808	Recombination Between Viral RNA and Transgenic Plant Transcripts	Allison, R.
MICL01827	Complementation of Movement Function Between Genetic Components of Pea Enation Mosaic Virus	de Zoeten, G.
MICL01832	Management of Turfgrass Diseases	Vargas, J.
MICL01843	Cryptic Plant Pathogenic Fungi: Biology of Latent Pathogens in Symptomless Trees	Adams, G.
MICL01896	Phylogeny of the Rice Genus, <i>Oryza</i> , and Evolution of Rice Disease Resistance Genes	Sang, T.
MICL01907	Development and Dispersal of Inoculum for the Wheat Head Scab Fungus, <i>Gibberella zeae</i>	Trail, F.
MICL01910	Molecular Biology of Plant-Bacterial Interactions	He, S.
MICL01912	Pathogen Population Biology as a Tool in Developing Disease Control Strategies	Jarosz, A.
MICL01922	Plant Evolution and Conservation: The Role of Flower Form and Function	Prather, L.
MICL01938	The Relationship Between Phototropism and the Positioning of Leaves and Flowers	Poff, K.
MICL03183	Diseases of Tree Fruit Crops and Their Control	Jones, A.
MICL03377	Diseases of Upland and Muck Vegetables and Transplants, Greenhouse Ornamentals and Their Control	Hausbeck, M.
MICL07636	Controlling Fire Blight Disease of Apple Trees FY99	Jones, A.
MICL08203	Factors Affecting Recombination Frequency Between Plant Viruses and Viral Transgenes	Allison, R.
MICL08212	Production of Industrially Useful Monoenoic Fatty Acids in Transgenic Plants	Ohlrogge, J.
MICL08216	Production of Acetylated Glycerides in Transgenic Oil Crops	Pollard, M.

# Chemical Engineering

Phone: 355-5135

## PROJECTS

MICL07621	Bioprocessing for Utilization of Agricultural Raw Materials	Berglund, K.
MICL08193	Multiphase Biocatalysis Using Reversible Aphrons	Worden, R.
MICL08215	Condensed-Phase Catalytic Hydrogenation of Crop-Derived Organic Acids	Miller, D.

# Chemistry

Phone: 355-9715

## PROJECTS

MICL08160	Environmentally Compatible Synthesis of Value-Added Chemicals from D-Glucose	Frost, J.
MICL08208	Environmentally Compatible Synthesis of Value-Added Chemicals from D-Glucose	Frost, J.
MICL08214	Charge Separation and Stabilization in Chloroplast Photosystem II	Babcock, G.

# Crop and Soil Sciences

Phone: 355-0271



Photo by Bruce Fox



Taylor J. Johnston,  
Acting Chair

## FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Baird, James H.	14	0.70	0.00	0.30	Turfgrass Management
Boyd, Stephen A.	12	0.75	0.00	0.25	Environmental Soil Chemistry
Bughrara, Suleiman S. <sup>7</sup>	14	0.75	0.25	0.00	Turfgrass Breeding and Genetics
Christenson, Donald R.	12	0.50	0.50	0.00	Soil Fertility/Management
Copeland, Lawrence O.	12	0.15	0.75	0.10	Seed/Grain Technology
Crum, James L.	12	0.25	0.00	0.75	Soil Class/Genesis/Turfgrass
Ellis, Boyd G.	12	0.50	0.00	0.50	Soil Chemistry
Dazzo, Frank B.	12	0.10	0.00	0.90	Microbial Ecology
Douches, David S.	13	0.90	0.00	0.10	Potato Breeding/Genetics
Foster, Eunice F.	12	0.15	0.00	0.85	Crop Physiology
Freed, Russell D.	12	0.50	0.00	0.50	International Agronomy/Plant Breeding

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Harwood, Richard R. <sup>2</sup>	12	0.60	0.20	0.20	Sustainable Agriculture
Jacobs, Lee W.	12	0.50	0.50	0.00	Environmental Waste Management
Kells, James J., Jr.	12	0.25	0.60	0.15	Weed Science
Kelly, James D.	12	0.75	0.00	0.25	Dry Bean Breeding
Knezek, Bernard D.	12	0.50	0.00	0.50	Micronutrient/Waste Utilization
Leep, Richard H.	12	0.35	0.50	0.15	Soil Fertility/Forage Management
Lenski, Richard E. <sup>3</sup>	12	0.40	0.00	0.60	Microbial Ecology and Evolutionary Biology
Mokma, Delbert L.	12	0.50	0.15	0.35	Soil Classification/Genesis
Paul, Eldor A.	12	0.62	0.14	0.24	Soil Microbiology
Penner, Donald	12	0.80	0.00	0.20	Crop/Weed/Physiology
Pierce, Francis J.	12	0.70	0.00	0.30	Soil Management Systems
Renner, Karen A.	12	0.50	0.50	0.00	Weed Science
Ritchie, Joe T. <sup>4</sup>	12	0.00	0.50	0.00	Soil Physics/Plant Stress
Robertson, G. Philip	12	0.38	0.00	0.62	Ecosystem Ecology
Rogers, John N. III.	13	0.25	0.00	0.75	Turfgrass Management
Rugh, Clayton L.	14	0.25	0.00	0.75	Phytoremediation, Molecular and Cellular Genetics
Smucker, A.J.M.	12	0.75	0.00	0.25	Soil Biophysics
Teppen, Brian J.	14	0.75	0.00	0.25	Surface Soil Chemistry
Thelen, Kurt D.	14	0.40	0.60	0.00	Cropping Systems Agronomist
Thomashow, Michael F.	12	0.76	0.00	0.24	Plant and Microbial Molecular Genetics
Tiedje, James M.	12	0.60	0.00	0.40	Soil Microbiology/Microbial Ecology
Ward, Richard W.	13	0.75	0.00	0.25	Wheat Breeding
Warncke, Darryl D.	12	0.50	0.50	0.00	Greenhouse/Vegetable Soil Fertility
<b>TOTALS:</b>		<b>17.11</b>	<b>5.69</b>	<b>10.70</b>	
<i>Adjustment for GREEN Positions</i>		<i>-0.75</i>	<i>-0.25</i>	<i>0.00</i>	
<b>ADJUSTED TOTALS</b>		<b>16.36</b>	<b>5.44</b>	<b>10.70</b>	

## PROJECTS

MICL00319	Classification, Genesis and Evaluation of Michigan Soils	Mokma, D.
MICL00569	Breeding and Testing Small Grain Cultivars for Michigan	Freed, R.
MICL00908	Fundamental Factors in Cultural and Chemical Weed Control, Weed Competition and Weed Life Cycles	Renner, K.
MICL01462*	Management of Eroded Soils for Enhancement of Productivity and Environmental Quality	Mokma, D.
MICL01471*	Chemistry and Bioavailability of Waste Constituents in Soils	Jacobs, L.
MICL01568	Plant Biotechnology: Molecular Approaches to Improve Environmental Stress Tolerance	Thomashow, M.
MICL01574	Movement and Degradation of Organic Contaminants in Soils	Boyd, S.
MICL01617*	Biological and Ecological Basis for Weed Management Decision Support Systems to Reduce Herbicide Use	Kells, J.
MICL01654	Genetic Improvement of Beans ( <i>Phaseolus vulgaris</i> L.) For Yield, Pest Resistance and Food Value	Kelly, J.
MICL01685	Crop Rotation Effects on Soil Microbial Activity, Nutrient Use Efficiency and Productivity	Harwood, R.
MICL01761	Weed Management as a Component of Field Crop Production Systems	Kells, J.
MICL01768	Management and Production of Grasses, Legumes and Their Mixtures for Sustainable Forage Crops and Pasture	Leep, R.
MICL01772*	Characterizing Nitrogen Mineralization and Availability in Crop Systems to Protect Water Resources	Jacobs, L.
MICL01779	The Physiology and Biochemistry of Herbicide Action, Selectivity and Degradation	Penner, D.
MICL01780	Impact Absorption, Traction and Wear Tolerance Investigation on Turf and Soil Surfaces	Rogers, J.

## Crop and Soil Sciences (continued)

MICL01782	Application of Organic and Other Waste Residuals to Agricultural Soils as a Waste Management Option	Jacobs, L.
MICL01796	Soil and Site-Specific Management for Conservation in Agricultural Systems	Pierce, F.
MICL01797	Soil Microbiology and Biochemistry in Agroecosystems	Paul, E.
MICL01806	Breeding and Genetics for the Improvement of Potato ( <i>Solanum tuberosum</i> L.)	Douches, D.
MICL01807	Properties of High Sand Content Soils for Turfgrass Uses	Crum, J.
MICL01821	Microbial Ecology of Soil and Biodegradation	Tiedje, J.
MICL01830	Wheat Breeding and Genetics	Ward, R.
MICL01837	Cultivation and Topdressing Effects on Turf and Soil	Rieke, P.
MICL01855	The Role of Mutation in Bacterial Evolution	Lenski, R.
MICL01858	Systems of Cropping	Christenson, D.
MICL01866	Simulation and Measurement of the Water, Nitrogen and Phosphorus Dynamics in Field Crop Production	Ritchie, J.
MICL01867	Parsimonious Biometrical Models Applicable in Agriculture and Natural Resources	Schabenberger, O.
MICL01872	Nitrogen Loss in Row Crop Agriculture	Robertson, G.
MICL01884	Soil Biophysical Mechanisms of Soil Aggregation	Smucker, A.
MICL01909	Turfgrass Physiology and Site-Specific Management	Baird, J.
MICL03122	Development and Correlation of Soil Test Procedures With Crop Yields and Plant Nutrient Contents	Warncke, D.
MICL03260	Forage Management Studies in Northern Michigan	Leep, R.
MICL03302	Management of Organic Soils for Crop Production	Warncke, D.
MICL03324	Drought Resistance in Common Bean	Foster, E.
MICL03359	Variety Release: Canola and Wheat Management	Copeland, L.
MICL07620	Sustainable Agriculture: Management Systems for Integrating Soil, Plants and Animals	Harwood, R.
MICL07640	Sustainable Agriculture: Ecological Integration of Soil, Plants and Animals	Harwood, R.
MICL08194	Root and Soil Carbon Contributions to the Stability and Function of Soil Aggregates	Smucker, A.
MICL08220	Pesticide-Clay Mineral Interactions in Aqueous Systems	Boyd, S.
MICL08224	Mechanism of CBF Gene Regulation by Low Temperature	Thomashow, M.

## Entomology

Phone: 355-4665



Edward J. Grafius,  
Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Ayers, George S.	12	0.25	0.00	0.75	IPM/Apiculture
Bird, George W.	12	0.20	0.65	0.15	Agricultural Nematology
Bristow, Catherine	13	0.30	0.00	0.70	Insect Ecology
DiFonzo, Christina D.	14	0.10	0.25	0.65	Field Crop Entomology/Pesticide Education Coordinator
Dong, Ke	14	0.25	0.00	0.75	Insect Toxicology
Edens, Thomas C.	12	0.20	0.00	0.80	Resource Economics and Policy
Gage, Stuart H.	12	0.48	0.12	0.40	Environmental Systems/Entomological Surveys
Gut, Larry	14	0.25	0.65	0.10	Tree Fruit Insects
Hollingworth, Robert M.	12	0.15	0.10	0.75	Pesticide Toxicology/Action Insecticide Resistance/IR 4 Program
Huang, Zhiyong	14	0.21	0.53	0.26	Apiculture

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Isaacs, Rufus <sup>7</sup>	14	0.45	0.45	0.10	Small Fruit Insect Management
Landis, Douglas A.	13	0.66	0.18	0.16	Insect Ecology, Biological Control
McCullough, Deborah G.	13	0.30	0.50	0.20	Forest Entomology
Melakeberhan, Haddish	14	0.20	0.00	0.80	Plant-Nematode Interaction Physiology
Merritt, Richard W.	12	0.50	0.00	0.50	Aquatic Insect Ecology
Miller, James R.	12	0.42	0.00	0.58	Insect Behavior
Olsen, Larry	13	0.20	0.80	0.00	Agrimedecine/PIAP Program
Raikhel, Alexander S.	12	0.30	0.00	0.70	Insect Physiology
Scriber, J. Mark	12	0.43	0.07	0.50	Insect Ecology
Smitley, David R.	13	0.25	0.60	0.15	Landscape/Ornamental Insect Ecology
Stehr, Frederick W.	12	0.40	0.00	0.60	Insect Biocontrol Systems
Thiem, Suzanne	13	0.40	0.00	0.60	Insect Molecular Biology
Walker, Edward D.	13	0.33	0.33	0.34	Medical/Veterinary Entomology
Zabik, Matthew J.	12	0.10	0.00	0.90	Environmental Toxicology
<b>TOTALS:</b>		<b>7.33</b>	<b>5.23</b>	<b>11.44</b>	
<i>Adjustment for GREEN Positions</i>		<i>-0.45</i>	<i>-0.45</i>	<i>-0.10</i>	
<b>ADJUSTED TOTALS</b>		<b>6.88</b>	<b>4.78</b>	<b>11.34</b>	

**PROJECTS**

MICL01067*	Climate and Agricultural Landscape Productivity Analysis and Assessment in the North Central Region	Gage, S.
MICL01563*	Spatial Dynamics of Leafhopper Pests and Their Management on Alfalfa	DiFonzo, C.
MICL01584*	Biologically Based IPM Systems for Management of Plant-Parasitic Nematodes	Bird, G.
MICL01606	Biological Control and Integrated Management of Insects in Nurseries, Turf and the Urban Forest	Smitley, D.
MICL01640*	Ecology and Management of European Corn Borer and Other Stalk-Boring Lepidoptera	Landis, D.
MICL01644	Plant Chemical Defenses: Insect Detoxication and Ecological Factors Affecting Gene Flow and Host Selection/Hybrid Zone	Scriber, J.
MICL01663	Biology and Management of Insect Pests of Vegetable Crops	Grafius, E.
MICL01700	Ecology and Management of Forest Insects in Michigan	McCullough, D.
MICL01733	Mechanisms of Baculovirus Pathogenesis in Insects	Thiem, S.
MICL01734	Diet Choice and Foraging in Ants	Bristow, C.
MICL01742	Molecular Basis of Insect Reproduction	Raikhel, A.
MICL01745	The Center for Arthropod Diversity Study	Stehr, F.
MICL01783	Influence of Agricultural Landscape Structure on Biological Control of Pests by Insects	Landis, D.
MICL01792	Physiological Basis for Integrated Approach Towards Sustainable Management Of Plant Parasitic Nematodes	Melakeberhan, H.
MICL01813*	Genetic Variability in the Cyst and Root-Knot Nematodes	Melakeberhan, H.
MICL01814	Factors Regulating Insect Host-Plant Colonization	Miller, J.
MICL01826	Development of Bee Forage Systems	Ayers, G.
MICL01915	Large Scale Assessment of Insect Populations From an Ecosystem Management Perspective	Gage, S.
MICL01936	Molecular Characterization of Knock-Down Resistance in the German Cockroach	Dong, K.
MICL01942	Shifts in Ant Communities in Response to Habitat and Management Regime	Bristow, C.
MICL03338	Ecology and Management of Arthropod Vector Populations and Vector-Borne Diseases	Walker, E.
MICL03361	Biology and Control of Biting Flies in Michigan	Merritt, R.
MICL03379	New Arthropod Pest Controls and Management Strategies for Michigan Tree Fruit Production Systems	Gut, L.
MICL07641	Safeguarding the Supply of Speciality Crops for the Consumer	Gut, L.



## Entomology (continued)

MICL08189	Managing Natural and Engineering Resistance in Potato to Colorado Potato Beetle	Grafius, E.
MICL08192	Influence of Perennial Habitats Including High-Value Woody Species on Natural Enemies of Crop Pests	Landis, D.
MICL08223	Mode of Action of <i>Nosema apis</i> , a Microsporidian Pathogen of Honey Bees	Huang, Z.
MICL08226	Can Refuges Moderate Disturbance and Enhance Biological Control in Annual Crops?	Landis, D.

## Family and Child Ecology

Phone: 355-7680



Marjorie J. Kostelnik,  
Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Imig, David R.	12	0.25	0.00	0.75	Family Ecology
Keefe, Dennis R.	14	0.50	0.00	0.50	Family Economics
Keith, Joanne G.	12	0.10	0.80	0.10	Human Development/Family
Schiamberg, Lawrence R.	12	0.28	0.00	0.72	Human Development/Family
Walker, Rosemary A.	12	0.50	0.00	0.50	Family Economics
<b>TOTALS:</b>		<b>1.63</b>	<b>0.80</b>	<b>2.57</b>	

### PROJECTS

MICL01523*	Family Business: Interaction in Work and Family Spheres	Walker, R.
MICL01786	Determinants of Small Family Business Outcomes	Walker, R.
MICL01841	Identification and Evaluation of Internal and External Assets in the Lives of Children and Adolescents	Keith, J.
MICL01897*	Rural Low-Income Families: Tracking Their Well-Being and Functioning in the Context of Welfare Reform	Keefe, D.
MICL01911	Moving and Aging-In-Place in the Retirement Planning of the Maturing Population	Schiamberg, L.
MICL03349	The Study of Family Social Capital in Rural Michigan Communities	Imig, D.
MICL03368	Family-Environment Transactions: Effects on Economic Well-Being and Michigan Families' Life Quality	Keefe, D.

## Fisheries and Wildlife

Phone: 355-4478



Thomas G. Coon,  
Acting Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Bence, James R. <sup>6</sup>	14	0.75	0.20	0.05	Fish Population Dynamics/Fish Ecology
Bremigan, Mary T. <sup>6</sup>	14	0.60	0.00	0.40	Fish Management
Campa, Henry III	13	0.50	0.00	0.50	Wildlife Habitat Ecology
Coon, Thomas G.	13	0.20	0.00	0.80	Fish Ecology/Stream Management
Garling, Donald L.	12	0.30	0.50	0.20	Aquaculture
Hayes, Daniel B. <sup>6</sup>	14	0.75	0.20	0.05	Stream Fisheries Biology
Jones, Michael L. <sup>6</sup>	13	0.75	0.20	0.05	Fisheries Stream Models
Li, Weiming <sup>6</sup>	14	0.75	0.20	0.05	Fish Physiology
Liu, Jianguo <sup>6</sup>	14	0.75	0.20	0.05	Wildlife Systems Models
Lupi Jr., Frank <sup>6</sup>	14	0.10	0.28	0.62	Natural Resource Economics

# Fisheries and Wildlife (continued)

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Maurer, Brian A. <sup>6</sup>	13	0.50	0.20	0.30	Landscape Ecology
Millenbah, Kelly F.	13	0.50	0.00	0.50	Restoration Ecology
Peyton, R. Benny	12	0.42	0.00	0.58	Human Dimensions
Prince, Harold H.	12	0.75	0.00	0.25	Waterfowl/Wetlands
Scribner, Kim T. <sup>6</sup>	14	0.75	0.20	0.05	Molecular Ecology
Soranno, Patricia A.	14	0.50	0.00	0.50	Limnology
Winterstein, Scott R.	13	0.50	0.00	0.50	Wildlife Biometry
<b>TOTALS:</b>		<b>9.37</b>	<b>2.18</b>	<b>5.45</b>	
<i>Adjustment for PERM Positions</i>		<i>-5.70</i>	<i>-1.68</i>	<i>-1.62</i>	
<b>ADJUSTED TOTALS</b>		<b>3.67</b>	<b>0.50</b>	<b>3.83</b>	

## PROJECTS

MICL01540	Ecology, Population Dynamics and Management of Michigan Great Lakes Fisheries Resources	Taylor, W.
MICL01646	Wildlife Responses to Habitat Management	Campa, H.
MICL01719	Management of Forests and Wildlife for Multiple Use Benefits	Campa, H.
MICL01740	Development of Commercial Fish Culture Techniques	Garling, D.
MICL01758	Relationship Between Habitat Characteristics and Fish Population Dynamics	Hayes, D.
MICL01759	Tools and Information for Improved Management of Great Lakes' Fisheries	Bence, J.
MICL01785	Systems Modeling of Wildlife Dynamics Across Heterogeneous Landscapes	Liu, J.
MICL01868	The Influence of Landscapes and Biological Communities on Freshwater Ecosystems	Soranno, P.
MICL01893	Uncertainty and the Management of Great Lakes Fisheries	Jones, M.
MICL01894	Intraspecific Chemical Communication of Fish	Li, W.
MICL01904	Classification of Aquatic Ecosystems for Management Across Ecological Gradients	Bremigan, M.
MICL01923	Habitat and Its Effects on the Ecology and Management of Fishes	Coon, T.
MICL03378	Wildlife Response to Ecological Restoration	Millenbah, K.
MICL03380	Modeling Wildlife Population Dynamics	Winterstein, S.
MICL03382	Composition of Waterfowl Harvest and Avian Use of Wetland Habitats in Michigan	Prince, H.
MICL03383	Genetic Diversity of Native and Introduced Fisheries in the Great Lakes	Scribner, K.
MICL03386	Human Dimensions of Managing Natural Resource Issues: Cultural Carrying Capacity of Deer in Michigan	Peyton, R.
MICL06891	Predictive Genealogical Model for Transmission of Tuberculosis in Free-Ranging Michigan Deer	Scribner, K.
MICL09006	Support for a National Coordinator for Aquaculture New Animal Drug Applications	Batterson, T.
MICL10007	Regional Aquaculture Center	Batterson, T.
MICL10008	Regional Aquaculture Center	Batterson, T.
MICL10009	Regional Aquaculture Center	Batterson, T.
MICL10010	Regional Aquaculture Center	Batterson, T.
MICL10011	Regional Aquaculture Center	Batterson, T.

# Food Science and Human Nutrition

Phone: 355-8474



Mark A. Uebersax,  
Chair

## FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Bennink, Maurice R.	12	0.50	0.00	0.50	Nutritional Biochemistry
Bond, Jenny T.	12	0.20	0.00	0.80	Prenatal/Postnatal Nutrition
Booren, Alden M.	12	0.15	0.75	0.10	Meat/Poultry/Fish
Bourquin, Leslie D.	14	0.25	0.75	0.00	Food Safety
Cash, Jerry N.	12	0.25	0.75	0.00	Fruit/Vegetable Products
Chenoweth, Wanda L.	12	0.25	0.00	0.75	Clinical Nutrition
Doumit, Matthew E.	14	0.25	0.00	0.75	Meat Quality
Fraker, Pamela J.	12	0.20	0.00	0.80	Cellular Immunology
Hoerr, Sharon M.	12	0.40	0.00	0.60	Community Nutrition
Hord, Norman	14	0.25	0.00	0.75	Nutritional Epidemiology
Linz, John E.	12	0.50	0.00	0.50	Food Microbiology
Ng, Perry K. W.	13	0.50	0.00	0.50	Cereal Science
Ofoli, Robert Y.	13	0.49	0.00	0.51	Colloid/Interface Science
Osburn, Wesley N.	14	0.15	0.00	0.85	Meat/Poultry Production
Pestka, James J.	12	0.62	0.00	0.38	Food Microbiology
Romsos, Dale R.	12	0.50	0.00	0.50	Lipid Metabolism
Ryser, Elliott T.	14	0.53	0.00	0.47	Dairy Foods
Schroeder, Joseph J.	14	0.50	0.00	0.50	Nutritional Biochemistry/Bioactive Lipids
Smith, Denise M.	12	0.67	0.00	0.33	Poultry/Egg Products
Song, Won O.	12	0.23	0.00	0.77	Nutritional Assessment
Steffe, James F.	12	0.25	0.00	0.75	Food Engineering/Rheology
Strasburg, Gale M.	13	0.65	0.00	0.35	Muscle Biochemistry
Ustunol, Zeynep	13	0.72	0.00	0.28	Dairy Foods
Zabik, Mary E.	12	0.19	0.00	0.81	Foods
Zile, Maija H.	12	0.50	0.00	0.50	Nutrition
<b>TOTALS:</b>		<b>9.70</b>	<b>2.25</b>	<b>13.05</b>	

## PROJECTS

MICL01323	Improving Process Efficiency, Product Quality, and Nutrient Composition of Fruit and Vegetable Products	Uebersax, M.
MICL01413	Metabolism and Function of Vitamin A	Zile, M.
MICL01444*	Role of N-3/N-6 Polyunsaturated Fatty Acids in Health Maintenance	Romsos, D.
MICL01448	Microbial Food-Borne Disease	Pestka, J.
MICL01478*	Genetic Improvement of Beans ( <i>Phaseolus vulgaris</i> L.) For Yield, Pest Resistance and Food Value	Uebersax, M.
MICL01599	Regulation of Calcium in Muscle Sarcoplasm	Strasburg, G.
MICL01623	Comparative Aspects of Nutrition and Lipid Metabolism	Romsos, D.
MICL01632	Improving the Quality and Safety of Value-Added Meat and Poultry Products	Smith, D.
MICL01664	Development, Quality and Safety of Value-Added Dairy and Dairy-Based Products	Ustunol, Z.
MICL01665	Nutritional Assessment in Population-Based Epidemiological Studies	Song, W.
MICL01694*	Nutrient Bioavailability: A Key to Human Nutrition	Chenoweth, W.
MICL01699	Molecular Structure of Soft Wheat Proteins in Relation to End-Use Quality	Ng, P.
MICL01706	Interactions of Biological Macromolecules at the Liquid-Liquid Interface	Ofoli, R.
MICL01715*	Improve Food Safety Through Discovery and Control of Natural and Induced Toxicants and Antitoxicants	Pestka, J.

# Food Science and Human Nutrition (continued)

MICL01762	Relationship of Diet and Cancer	Bennink, M.
MICL01764	Quality and Safety of Processed Foods	Gray, J.
MICL01791	Processing and Quality Evaluation of Fruits and Vegetables	Cash, J.
MICL01795	Modulation of Colon and Breast Cancer Cell Growth by Sphingolipids	Schroeder, J.
MICL01804*	Using Stages of Change Model to Promote Consumption of Grains, Vegetables and Fruits by Young Adults	Hoerr, S.
MICL01856	Aflatoxin B1 Biosynthesis in <i>Aspergillus</i>	Linz, J.
MICL01878	Reducing Dietary Risk for Chronic Disease via a Behavioral Approach in High Risk Populations	Hoerr, S.
MICL01887*	Enhancing Food Safety Through Control of Food-Borne Disease Agents	Linz, J.
MICL01895	Influence of Diet and Phytochemicals on Colon Carcinogenesis	Bourquin, L.
MICL01902	Interactions of Minerals With Other Dietary Components: Effect on Bioavailability	Chenoweth, W.
MICL01920*	Marketing and Delivery of Quality Cereals and Oilseeds	Ng, P.
MICL01932	Microbial Safety of Foods	Ryser, E.
MICL01937	Processing Treatments Influencing Functional Properties and Utilization of Muscle Foods	Booren, A.
MICL03363	Food Industry Institute	Hegarty, P.
MICL03370	Food Safety Issues for Michigan Consumers	Zabik, M.
MICL03371	Targeting Michigan Groups at Nutritional Health/Risk: Identifying Needs, Intervention Strategies and Outcomes	Bond, J.
MICL06885	Apoptosis and Sphingolipids in Fumonisin-Induced Kidney Cell Death	Schroeder, J.
MICL08191	Metabolism and Function of Retinoic Acid in Quail Embryogenesis	Zile, M.
MICL08195	Biochemical Characterization of Pale, Soft, Exudative Turkey	Strasburg, G.
MICL08196	Recombinant Antibodies for Natural Toxicants	Pestka, J.

## Forestry

Phone: 355-0091



Daniel E. Keathley,  
Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Dickmann, Donald I.	12	0.70	0.00	0.30	Fire Ecology/Silviculture
Epperson, Bryan K.	13	0.70	0.00	0.30	Forest Genetics
Fried, Jeremy S.	13	0.60	0.00	0.40	Forest Management
Hart, James B., Jr.	13	0.50	0.00	0.50	Forest Soils
Kamdem, Donatien-Pascal	13	0.70	0.00	0.30	Wood Science
Kielbaso, Julian J.	12	0.15	0.25	0.60	Urban Forestry
Kobe, Richard K.	14	0.70	0.00	0.30	Forest Ecology
Leefers, Larry A.	13	0.50	0.00	0.50	Forest Economics
McDonough, Maureen H.	12	0.15	0.50	0.35	Forest Sociology
Potter-Witter, Karen L.	13	0.20	0.65	0.15	Forest Economics
Ramm, Carl W.	13	0.60	0.00	0.40	Forest Biometrics
Walters, Michael B <sup>6</sup>	14	0.75	0.20	0.05	Forest Ecology
<b>TOTALS:</b>		<b>6.25</b>	<b>1.60</b>	<b>4.15</b>	
<i>Adjustment for PERM Positions</i>		<i>-0.75</i>	<i>-0.20</i>	<i>-0.05</i>	
<b>ADJUSTED TOTALS</b>		<b>5.50</b>	<b>1.40</b>	<b>4.10</b>	

## Forestry (continued)

MICL01693*	The National Atmospheric Deposition Program (NADP)	Kobe, R.
MICL01773	Testing Lake States TWIGS: Five- and Ten-Year Growth Projections for Upland Hardwoods	Ramm, C.
MICL01774	Managing the Genetic Diversity of Michigan Pines	Epperson, B.
MICL01805	Bioremediation of Condensate Produced During Conditioning of Veneer Logs	Kamdern, D.
MICL01811	Incorporating Risk, Natural Resources Accounting and Hedonic Valuation in Forestry Decisions	Leefers, L.
MICL01812	Municipal Tree Management	Kielbaso, J.
MICL01845	Long-Term Diameter, Basal Area and Ordered Categorical Responses of Oak and Hardwood Forests	Hart, J.
MICL01869	Forest Management for the Regeneration of Hardwoods and Conifers	Lantagne, D.
MICL01871	Modeling Landscape-Level Variation in Forest Community Dynamics	Kobe, R.
MICL01899	Justice in Public Participation and Natural Resource Decision Making	McDonough, M.
MICL07615	Advanced Technology Applications to Eastern Hardwood Utilization	Kamdern, D.
MICL07623	Advanced Technology Applications to Eastern Hardwood Utilization	Kamdern, D.
MICL07631	Advanced Technology Applications to Eastern Hardwood Utilization	Kamdern, D.

## Geography

Phone: 355-4649

### PROJECTS

MICL03373	Impacts of Weather and Climate on Michigan Agriculture	Andresen, J.
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## Horticulture

Phone: 355-5191



Wayne H. Loescher,  
Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Beaudry, Randolph M.	13	0.50	0.50	0.00	Postharvest Fruit Physiology
Behe, Bridget K.	13	0.25	0.00	0.75	Horticulture Marketing
Biernbaum, John A.	12	0.20	0.00	0.80	Plant Physiology/Floriculture
Cameron, Arthur C.	12	0.70	0.00	0.30	Plant Physiology/Landscape Horticulture
Carlson, William H.	12	0.35	0.50	0.15	Floriculture/Physiology and Bedding
Cregg, Bert M.	14	0.50	0.50	0.00	Plant Physiology/Woody Ornamentals
Dilley, David R.	12	0.80	0.00	0.20	Postharvest Physiology/Pomology

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Edson, Charles E. <sup>7</sup>	13	0.25	0.00	0.75	Integrated Crop Management
Flore, James A.	12	0.65	0.00	0.35	Plant Physiology/Pomology
Grumet, Rebecca	12	0.90	0.00	0.10	Vegetable Breeding/Genetics
Hancock, James F.	12	0.90	0.00	0.10	Small Fruit Breeding/Genetics
Hanson, Eric J.	12	0.35	0.65	0.00	Pomology Small Fruits
Heins, Royal D.	12	0.75	0.00	0.25	Plant Physiology/Floriculture
Herner, Robert C.	12	0.35	0.00	0.65	Postharvest Physiology/Vegetable Crop
Howell, Gordon S.	12	0.80	0.00	0.20	Plant Physiology/Viticulture/Enology
Iezzoni, Amy F.	12	0.80	0.00	0.20	Fruit Breeding/Genetics
Lownds, Norman K.	14	0.25	0.00	0.75	Landscape Horticulture/Stress Physiology
Nair, Muraleedharan G.	12	0.90	0.00	0.10	Natural Products/Chemistry
Perry, Ronald L.	12	0.50	0.50	0.00	Pomology/Rootstocks
Rowe, D. Bradley	14	0.25	0.00	0.75	Landscape Horticulture
Schutzki, Robert E.	13	0.10	0.00	0.90	Landscape Horticulture
Sink, Kenneth C.	12	0.75	0.00	0.25	Genetics/Plant Breeding
van Nocker, Steven R.	14	0.75	0.00	0.25	Reproductive Development/Genetics
Widders, Irvin E.	12	0.67	0.00	0.33	Vegetable Physiology
Zabadal, Thomas J.	13	0.50	0.50	0.00	Viticulture
Zandstra, Bernard H.	12	0.25	0.75	0.00	Vegetable Crops
<b>TOTALS:</b>		<b>13.97</b>	<b>3.90</b>	<b>8.13</b>	
<i>Adjustment for GREEN Positions</i>		<i>-0.25</i>	<i>0.00</i>	<i>-0.75</i>	
<b>ADJUSTED TOTALS</b>		<b>13.72</b>	<b>3.90</b>	<b>7.38</b>	

## PROJECTS

MICL01155*	Postharvest Physiology of Fruits	Dilley, D.
MICL01222*	Plant Germ Plasm and Information Management and Utilization	Iezzoni, A.
MICL01272	Physiology of Carbon Balance in Fruit Crops: Abiotic and Biotic Thresholds	Flore, J.
MICL01305*	Rootstock and Interstem Effects on Pome and Stone Fruit Trees	Perry, R.
MICL01325	Weed Control in Vegetable Crop Management Systems	Zandstra, B.
MICL01428	Sour Cherry and Peach Breeding and Genetics	Iezzoni, A.
MICL01468	Role of Ion Flux and Compartmentation in the Transduction of Environmentally Elicited Signals	Widders, I.
MICL01607	Physiological Adaptation and Cultural Manipulation of Plant Systems	Schutzki, R.
MICL01680	Biologically Active Natural Products and Value-Added Products From Plants and Microbes for Agricultural and Pharmaceutical Use	Nair, M.
MICL01684	Modified Atmosphere Packaging of Horticultural Produce	Cameron, A.
MICL01697*	Decision Support for Design and Control of Plant Growth Systems	Heins, R.
MICL01731	Genetic and Biotechnology Studies for Selected Horticultural Crops	Sink, K.
MICL01778	Environmental and Physiological Variables Effect on Growth, Quality, and Marketability of Garden Crop	Carlson, W.
MICL01810	Genetic Improvement of Strawberries and Blueberries	Hancock, J.
MICL01824	Physiological and Environmental Factors Influencing Growth and Development of Flower Crops	Heins, R.
MICL01839	Efficient Use of Fertilizers in Fruit Production	Hanson, E.
MICL01846	Tomato Ripening Mutants	Herner, R.
MICL01848	Enhancement of Control Over Quality Loss in Horticultural Commodities Following Harvest	Beaudry, R.
MICL01901	Marketability and Performance of Selected Horticultural Products and Services	Behe, B.
MICL01908	Utilization of Chlorophyll Fluorescence in Propagation by Stem Cuttings	Rowe, D.
MICL01927*	Freeze Damage and Protection of Horticultural Species	Howell, G.

## Horticulture (continued)

MICL01933	Greenhouse Organic Crop Production for Small Farms	Biernbaum, J.
MICL01941	Repellents for Animals Derived From Plant Species	Ries, S.
MICL03218	Vine Culture and Physiology for Best Yield, Fruit Quality and Adaptation to Environmental Stresses	Howell, G.
MICL03305	Viticultural Practices for Mechanical Pruning and Crop Control of Concord and Niagara Grapevines	Zabadal, T.
MICL03375	Plant Science Education Outreach Through the MSU Horticultural Gardens	Lownds, N.
MICL03388	Molecular Biology of Plant Development Relating to the Needs of Michigan Horticulture	van Nocker, S.
MICL07622	Safeguarding the Supply of Specialty Crops for Consumers	Flore, J.
MICL07632	Safeguarding the Supply of Specialty Crops for Consumers	Hanson, E.
MICL08202	Relationship Between Genetic and Hormonal Control of Sex Expression in <i>Cucumis</i> Species	Grumet, R.
MICL09010	Epigenetic Mechanisms and Changes in Gene Expression Associated with Flowering	van Nocker, S.

## Human Environment and Design

Phone: 355-7712



Dana G. Stewart, Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Pysarchik, Dawn I.	13	0.31	0.00	0.69	Merchandising Management
Slocum, Ann C.	13	0.25	0.00	0.75	Apparel Design and Textiles
Sontag, M. Suzanne	12	0.25	0.00	0.75	Apparel Design and Textiles
Sternquist, Brenda J.	12	0.25	0.00	0.75	Merchandising Management
<b>TOTALS:</b>		<b>1.06</b>	<b>0.00</b>	<b>2.94</b>	

### PROJECTS

MICL01442*	Occupational Safety and Health Through the Use of Protective Clothing	Slocum, A.
MICL01775	Processed Foods in India: Consumer Demand and Distribution Systems	Pysarchik, D.
MICL01833	Emerging Free Markets: The Role of Federal vs. Municipal Approved Retail Joint Ventures	Sternquist, B.
MICL03357	Needs of the Michigan Textile/Apparel Industry: Characterization, Assessment and Response Strategies	Sontag, M.
MICL08209	The Food Retailing Industry in People's Republic of China: A Comparison of Behavioral Relationships	Sternquist, B.

## Integrated Plant Systems (Center for)

Phone: 353-9430



Mark E. Whalon, Acting Director

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
DiFonzo, Christina D.	14	0.10	0.40	0.50	Field Crop Entomology/Pesticide Education Coordinator
<b>TOTALS:</b>		<b>0.10</b>	<b>0.40</b>	<b>0.50</b>	

MICL03365	Biology and Management of Insects in Michigan Field Crops	DiFonzo, C.
MICL07616	An Integrated Crop Management System to Reduce Pesticide Use in Asparagus Production	Edson, C.
MICL07634	Michigan Commodity and Pest Management Profiles	Whalon, M.

# Julian Samora Research Institute

Phone: 432-1317

## PROJECTS

MICL08210 Latinos in the Rural Midwest: Community Development Implications

Chapa, J.

# Kellogg Biological Station

Phone: 616-671-5117



Michael J. Klug, Director

## FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Bush, Guy L.	12	0.10	0.00	0.90	Genetics
<b>TOTALS:</b>		<b>0.10</b>	<b>0.00</b>	<b>0.90</b>	

## PROJECTS

MICL08188 Closing Global Nitrous Oxide Cycle: Mechanistic Understanding Flux Partitioning  
Agricultural Landscapes

Robertson, G.



# Large Animal Clinical Sciences

Phone: 355-9593



Frederik J. Derksen,  
Chair

## FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Baker, John C.	12	0.20	0.00	0.80	Bovine Respiratory Diseases
Erskine, Ronald J.	13	0.25	0.33	0.42	Dairy Cattle Mastitis
Gomez-Duran, Charles O.	14	0.50	0.30	0.20	Swine Veterinary Medicine
Grooms, Daniel L.	14	0.50	0.50	0.00	Beef Disease Management
Herd, Thomas H.	12	0.25	0.00	0.75	Cattle Nutrition and Metabolic Diseases
Holland, Robert E.	12	0.34	0.00	0.66	Bovine Enteric Disease
Kaneene, John B.	12	0.14	0.00	0.86	Epidemiology/Disease Impact
Robinson, Norman E.	12	0.25	0.00	0.75	Respiratory Physiology
Rook, Joseph S.	12	0.40	0.40	0.20	Small Ruminant Animals
Sears, Phillip M.	12	0.35	0.35	0.30	Dairy Disease Management
Straw, Barbara E.	12	0.28	0.50	0.22	Swine Veterinary Medicine
<b>TOTALS:</b>		<b>3.46</b>	<b>2.38</b>	<b>5.16</b>	



## Large Animal Clinical Sciences (continued)

### PROJECTS

MICL01417*	Bovine Respiratory Disease: Risk Factors, Pathogens, Diagnosis and Management	Baker, J.
MICL01688*	Mastitis Resistance to Enhance Dairy Food Safety	Erskine, R.
MICL01708	Reducing Economic Losses and Food Safety Risks Related to Mastitis	Erskine, R.
MICL01801	Total Quality Management for Disease Control on Swine Farms	Straw, B.
MICL01819	Nutritional Assessment of Animals and Animal Populations by Laboratory Means	Herd, T.
MICL01820	Assessment and Control of Enteric Pathogens Among Neonatal Calves	Holland, R.
MICL01898*	A National Agricultural Program to Approve Animal Drugs for Minor Species and Uses	Holland, R.
MICL01916	Diagnosis and Prevention of Bovine Viral Diarrhea Virus (BVDV)	Grooms, D.
MICL01917	Bovine Respiratory Disease: Risk Factors, Immunology, Pathogenesis and Control	Baker, J.
MICL01934	Control of Swine Respiratory Disease: Alternatives to the Use of Prophylactic Antibiotics	Duran, C.
MICL03354	Implementing Food Safety Through Total Quality Management On Michigan Dairy Farms	Sears, P.
MICL03355	Perinatal Lamb Mortality and Production Issues Associated with Pasture Lambing Systems in Michigan	Rook, J.
MICL06886	Mucus Secretion in Horse Airways	Robinson, N.
MICL06887	Characterization of a Novel Equine Cartilage Matrix Metalloprotease	Caron, J.
MICL06893	Purification of Bovine Anti-Coliform Antibodies for Passive Immunization Against Coliform Mastitis	Erskine, R.
MICL06894	Development of a Live Attenuated Vaccine Against <i>Haemophilus parasuis</i>	Duran, C.
MICL06895	Epidemiology and Mechanisms of Resistance to Fluoroquinolones in Selected Bovine Bacterial Isolates	Kaneene, J.
MICL07610	Minor Use Animal Drug Program: North Central Region	Holland, R.
MICL07630	Minor Use Animal Drug Program: North Central Region	Holland, R.
MICL07637	Minor Use Animal Drug Program: North Central Region	Holland, R.
MICL08227	Mucus Secretion and Clearability in Equine COPD	Robinson, N.

## Michigan Agricultural Experiment Station

Phone: 355-0123

### PROJECTS

MICL03369	Families, Children and Their Communities: Promoting Behavioral and Social Science Approaches	Bokemeier, J.
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## Microbiology

Phone: 355-6463



Jerry B. Dodgson, Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Bagdasarian, Michael	12	0.39	0.00	0.61	Molecular Biology
Breznak, John A.	12	0.30	0.00	0.70	Microbial Ecology
Champness, Wendy C.	13	0.50	0.00	0.50	Microbial Genetics
Dazzo, Frank B.	12	0.80	0.00	0.20	Microbial Ecology
de Bruijn, Frans J.	12	0.38	0.00	0.62	Molecular Biology
Hausinger, Robert P.	12	0.40	0.00	0.60	Microbial Physiology
Klug, Michael J.	12	0.25	0.00	0.75	Microbial Ecology
Maes, Roger K.	12	0.03	0.00	0.97	Virology

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Reddy, C. Adinarayana	12	0.46	0.00	0.54	Microbial Physiology/Ecology
Schmidt, Thomas M.	14	0.40	0.00	0.60	Microbial Ecology
Thomashow, Michael F.	12	0.14	0.00	0.86	Plant and Microbial Molecular Genetics
Tiedje, James M.	12	0.15	0.00	0.85	Soil Microbiology
Velicer, Leland F.	12	0.30	0.00	0.70	Virology
<b>TOTALS:</b>		<b>4.50</b>	<b>0.00</b>	<b>8.50</b>	

## PROJECTS

MICL01154*	Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety	Maes, R.
MICL01314	The Beneficial <i>Rhizobium</i> -Rice Association	Dazzo, F.
MICL01557	Molecular Genetic Regulation of Streptomyces Antibiotics	Champness, W.
MICL01593*	Advanced Technologies for the Genetic Improvement of Poultry	Dodgson, J.
MICL01628	Analysis of the Genes of Marek's Disease Herpesvirus and the Proteins They Encode	Velicer, L.
MICL01629	Lignin Degradation by Basidiomycete Fungi and Applications	Reddy, C.
MICL01681	Molecular Basis of Symbiotic Plant-Microbe Interactions	de Bruijn, F.
MICL01728*	National Animal Genome Research Project	Dodgson, J.
MICL01757	Understanding the Distribution of Microbial Populations in Soils	Schmidt, T.
MICL01834	Molecular Mechanisms Involved in the Secretion of Pathogenicity Factors Through Bacterial Membranes	Bagdasarian, M.
MICL01857	Physiology and Phylogenetic Diversity of Termite Gut Symbionts	Breznak, J.
MICL01918	Enzymology of Alpha-Ketoglutarate-Dependent Dioxygenases	Hausinger, R.
MICL06890	Recombinant Vaccines for Enhanced Antiviral (Cellular) Immunity	Bagdasarian, M.
MICL08199	Chicken Genome Mapping Using AFLP and Anchor STS Markers	Dodgson, J.
MICL08213	Structural and Mechanistic Analyses of Urease and Allantoinase	Hausinger, R.
MICL08217	Development of Heat-Labile Enterotoxin (LT) as Carrier of Foreign Antigen Epitopes	Bagdasarian, M.
MICL08218	<i>In vivo</i> Expressed Genes of <i>Actinobacillus pleuropneumoniae</i>	Mulks, M.
MICL08222	Role of Protein Phosphatase 2C in <i>Lotus japonicus</i> Root Nodule Development	de Bruijn, F.

## MSU Extension

Phone: 355-2308

## PROJECTS

MICL07628	Management of the North Central Regional Pesticide Impact Assessment Program (NCPIAP) for FY98	Olsen, L.
MICL07633	Management of the North Central Region Pesticide Impact Assessment Program (NCPIAP) for FY99	Olsen, L.
MICL07638	Michigan's CSREES NAPIAP Program — 1999	Olsen, L.
MICL09007	Overseas Technical Cooperation Impact Study: Evaluation of Impact of Overseas Assignments	Andrews, M.

# National Food Safety and Toxicology Center

Phone: 432-3100



Edward C. Mather, Acting Director

## FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Giesy, John P.	12	0.25	0.00	0.75	Aquatic Toxicology
Zabik, Matthew J.	12	0.84	0.00	0.16	Chemical Fate/Residue Analysis
Zacharewski, Timothy R.	14	0.20	0.00	0.80	Biochemical Toxicology
<b>TOTALS:</b>		<b>1.29</b>	<b>0.00</b>	<b>1.71</b>	

## PROJECTS

MICL01730*	A National Agricultural Program to Clear Pest Control Agents for Minor Uses	Hollingworth, R.
MICL01849	Environmental Dynamics of Xenobiotics in the Environment and Analytical Methods Development	Zabik, M.
MICL01906	Identification and Assessment of Endocrine Disruptors	Zacharewski, T.
MICL01919	Fates and Effects of Potential Endocrine Modulating Compounds in the Environment	Giesy, J.
MICL03364	Improved Microbial Food Safety Through Risk Assessment, Management, Communication and Analysis	Mather, E.
MICL03367	Microbial and Chemical Safety of the U.S. Food Supply	Hollingworth, R.
MICL07613	NC Region IR-4 Leader Lab Program to Clear Pest Control Agents for Minor Uses	Hollingworth, R.
MICL07629	Minor Use Animal Drug Program: Headquarters	Hollingworth, R.
MICL07635	NC Region IR-4 Leader Lab Program to Clear Pest Control Agents for Minor Uses	Hollingworth, R.

## Packaging

Phone: 355-9580



Bruce R. Harte, Director

## FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Clarke, Robert	14	0.50	0.00	0.50	Manufacturing Operations
Downes, Theron W.	12	0.20	0.00	0.80	Packaged Food Quality
Giacin, Jack R.	12	0.59	0.00	0.41	Package Product Interaction
Hernandez, Ruben J.	13	0.25	0.00	0.75	Package Product Interaction
Lee, Julian J. L.	13	0.20	0.00	0.80	CAP/MAP and Protective Packaging
Singh, Sher Paul	13	0.20	0.00	0.80	Distribution/Transportation/Environmental Measuring/Packaging Dynamics
<b>TOTALS:</b>		<b>1.94</b>	<b>0.00</b>	<b>4.06</b>	

## PROJECTS

MICL01520	Transport Properties of Polymer Films as Related to Quality and Storage Stability of Packaged Products	Giacin, J.
MICL01735	New Reusable Containers for the Fresh Produce and Meat Packaging	Singh, S.
MICL01828	Improving the Quality of Products and Distribution Productivity Through Packaging Innovation	Twede, D.
MICL01831	Design of Plastic Packages for Preserving the Quality and Safety of Food Products	Hernandez, R.
MICL01840	Controlled Atmosphere and Modified Atmosphere Packaging of Fresh Produce	Lee, J.
MICL01921	Automatic Data Capture for Packaging Line Forces That Impact Operations	Clarke, R.

# Park, Recreation and Tourism Resources

Phone: 353-5190



Photo by Bruce Fox



Joseph D. Fridgen, Chair

**FACULTY**

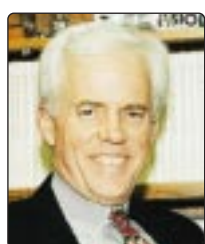
	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Holecek, Donald F.	12	0.75	0.25	0.00	Resource Economics/Tourism
Nelson, Charles M.	13	0.25	0.00	0.75	Natural Resource Management
Propst, Dennis B.	13	0.50	0.00	0.50	Psychology/Planning/Economics
Stynes, Daniel J.	12	0.50	0.00	0.50	System Analysis/Research Methods/Economics
Vander Stoep, Gail A.	13	0.25	0.25	0.50	Communications/Human Dimensions
<b>TOTALS:</b>		<b>2.25</b>	<b>0.50</b>	<b>2.25</b>	

**PROJECTS**

MICL01766	Social Science and Communications in Outdoor Recreation Resource Management	Vander Stoep, G.
MICL01903	Extent and Role of Participation and Choice in Outdoor Recreation Planning and Management	Propst, D.
MICL03280	Travel, Tourism and Recreation Resource Center	Holecek, D.
MICL03362	Economic Impacts of Recreational Tourism	Stynes, D.
MICL09008	Development of Nationally Representative Visitor Spending Profiles	Propst, D.
MICL09009	Corps of Engineers Marina User/Dock Owner Expenditure Study	Propst, D.

# Physiology

Phone: 355-6475



William S. Spielman, Chair

**FACULTY**

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Dukelow, W. Richard	12	0.40	0.00	0.60	Reproductive Physiology
Jump, Donald B.	12	0.50	0.00	0.50	Molecular Endocrinology
<b>TOTALS:</b>		<b>0.90</b>	<b>0.00</b>	<b>1.10</b>	

**PROJECTS**

MICL01892	Dietary Fat Regulation of Hepatic Gene Expression	Jump, D.
MICL08205	Dietary Fat Regulation of Hepatic Glycolytic Gene Expression	Jump, D.

## Plant Research Lab (MSU-DOE)

Phone: 353-2270



Kenneth Keegstra,  
Director

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
de Bruijn, Frans J.	12	0.38	0.00	0.62	Molecular Biology
Howe, Gregg A.	14	0.23	0.00	0.77	Plant/Insect Defense
Walton, Jonathan D.	12	0.23	0.00	0.77	Plant Pathology
<b>TOTALS:</b>		<b>0.84</b>	<b>0.00</b>	<b>2.16</b>	

### PROJECTS

MICL01886	Mechanisms of Fungal Pathogenicity	Walton, J.
MICL01900	Molecular Genetics of Plant Defense Against Insects	Howe, G.
MICL03376	Interdiscipling Research and Training in the Plant Sciences	Keegstra, K.
MICL08178	Control of mRNA Stability in Dicotyledonous Plants	Green, P.
MICL08197	Photoperiodic Control of Gibberellin Metabolism in Long-Day Rosette Plants	Zeevaart, J.
MICL08221	Effects of Engineered Plant Respiration on Growth/Yield and Low Temperature Response	McIntosh, L.
MICL08230	Co-Evolution of Phytotoxin Production and Auto-Immunity in a Pathogenic Fungus	Walton, J.
MICL08233	<i>Pseudomonas syringae</i> pv. Tomato Hrp-Controlled Extracellular Proteins	He, S.

## Remote Sensing (Center for)

Phone: 353-7195



Richard E. Groop, Director

### PROJECTS

MICL01835	Applications of Spatial Information Technologies to Management of Agriculture and Natural Resources	Groop, R.
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# Resource Development

Phone: 355-3421



Cynthia C. Fridgen, Chair

## FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Beckwith, JoAnn	14	0.25	0.25	0.50	Environmental Planning and Management
Bingen, R. James	13	0.40	0.00	0.60	International Development
Bronstein, Daniel A.	12	0.40	0.00	0.60	Environmental Policy and Law
Dersch, Eckhart	12	0.25	0.50	0.25	Natural Resources Management
Edens, Thomas C.	12	0.55	0.00	0.45	Resource Economics and Policy
Kakela, Peter J.	12	0.70	0.00	0.30	Natural Resources Management
Kaplowitz, Michael C.	14	0.25	0.15	0.60	Land Use Law
Norris, Patricia E.	13	0.08	0.20	0.72	Land Use
Rosenbaum, Rene P.	13	0.40	0.00	0.60	Community Economic Development
Schultink, Gerhardus	12	0.50	0.00	0.50	Natural Resources Management
Witter, Scott G.	13	0.30	0.00	0.70	Natural Resources Management
<b>TOTALS:</b>		<b>4.08</b>	<b>1.10</b>	<b>5.82</b>	

## PROJECTS

MICL01536	Comparative Indicators for Rural Development, Environmental Planning and Public Policy Formulation.	Schultink, G.
MICL01789	Land Transformation in the Rural-Urban Interface	Edens, T.
MICL01817	Watershed Management in the Rural/Urban Fringe	Witter, S.
MICL01851	Water Resource Protection at the Interface of the Hydrologic Cycle and Cultural Influences	Dersch, E.
MICL01859	Farm, Rural and Environmental Groups in Agricultural Research and Development Policy	Bingen, R.
MICL01860	Pesticide Policy Studies	Bingen, R.
MICL01870	Use of Impact Assessment in Policy Formulation	Bronstein, D.
MICL03352	Mineral Lands Development, Energy Requirements and Environmental Impacts	Kakela, P.
MICL03358	Economic Issues of Latinos in Rural Settings and Their Impact on Michigan Agriculture	Rosenbaum, R.

# Sociology

Phone: 355-6632



Thomas L. Conner, Chair

## FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Aronoff, Marilyn	13	0.25	0.00	0.75	Rural Communities/Environment
Busch, Lawrence M.	12	0.47	0.00	0.53	Agriscience Structure/Agricultural Research Policy
Harris, Craig K.	13	0.50	0.00	0.50	Sociology of Agriculture
Johnson, Nan E.	12	0.50	0.00	0.50	Demography
Rudy, Alan P.	14	0.30	0.00	0.70	Sociology of Agriculture
Vanderpool, Christopher K.	12	0.20	0.20	0.60	Environmental and Food Safety
<b>TOTALS:</b>		<b>2.22</b>	<b>0.20</b>	<b>3.58</b>	

## Sociology (continued)

### PROJECTS

MICL01612	Strategic Analysis of Technical Change in Commodity Subsectors	Busch, L.
MICL01751*	Rural Labor Markets in the Global Economy	Bokemeier, J.
MICL01829*	Rural Restructuring: Causes and Consequences of Globalized Agricultural and Natural Resource Systems	Harris, C.
MICL01842*	Commodities, Consumers and Communities: Local Food Systems in a Globalizing Environment	Busch, L.
MICL01864	Rural Family Ties and Well-Being: Social Capital, Community Context and Household Strategies	Bokemeier, J.
MICL01874	Social Processes in Disability and Death for Nonmetro Americans: A Longitudinal Study	Johnson, N.
MICL01926	The Management of Risk in Agrifood and Natural Resource System	Harris, C.
MICL01939	Community Responses to Hazardous Waste Crises: Alternatives to Increased Public Involvement	Aronoff, M.
MICL08206	Social Reduction of Disability for Nonmetro Elders: A Longitudinal Study	Johnson, N.

## Veterinary Pathology

Phone: 432-4680



Willie M. Reed, Interim  
Chair

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
Bell, Thomas G.	12	0.25	0.00	0.75	Comparative Pathology/Platelet Function
Harkema, Jack	12	0.31	0.00	0.69	Toxicology
Holland, Margo S.	14	0.30	0.00	0.70	Molecular Pathology
Padgett, George A.	12	0.25	0.00	0.75	Comparative Veterinary Pathology
Patterson, Jon S.	13	0.25	0.00	0.75	Veterinary Pathology/Infectious Disease/Animals
<b>TOTALS:</b>		<b>1.36</b>	<b>0.00</b>	<b>3.64</b>	

### PROJECTS

MICL01720	Immunohistochemical Diagnosis of Infectious Diseases	Patterson, J.
MICL01776	Effects of Endotoxin and Other Organic Dust Constituents on Airway Mucous Cells	Harkema, J.
MICL01847	Osteochondrosis: Development of Procedures to Control or Mitigate the Effects of This Disease	Padgett, G.
MICL01882	Molecular Aspects of Marek's Disease Virus Oncogenicity	Holland, M.
MICL06882	Hemorrhagic Disorder in Noncyclopathic Type II Bovine Virus Diarrhea Viral Infection	Bell, T.



## *Water Research (Institute of)*

Phone: 353-3742



Jon F. Bartholic, Director

### FACULTY

	RANK	MAES	MSUE	JOINT	AREA OF INTEREST
D'Itri, Frank M.	12	0.10	0.00	0.90	Environmental Recycling
<b>TOTALS:</b>		<b>0.10</b>	<b>0.00</b>	<b>0.90</b>	

### PROJECTS

MICL01838 Development of a Knowledge-Based Decision-Support System for Integrated Landscape/Watershed Planning

Bartholic, J.

### Faculty Appointments

	MAES	MSUE	JOINT
<b>GRAND TOTALS</b>	<b>135.43</b>	<b>43.95</b>	<b>137.12</b>

<sup>1</sup>Elton Smith Endowed Chair

<sup>2</sup>C.S. Mott Distinguished Professor of Sustainable Agriculture

<sup>3</sup>Hannah Professor for Microbial Ecology and Plant Sciences

<sup>4</sup>Nowlin Professor for Water Research (50 percent of the appointment is paid by the endowment)

<sup>5</sup>Clinton Meadows Chair

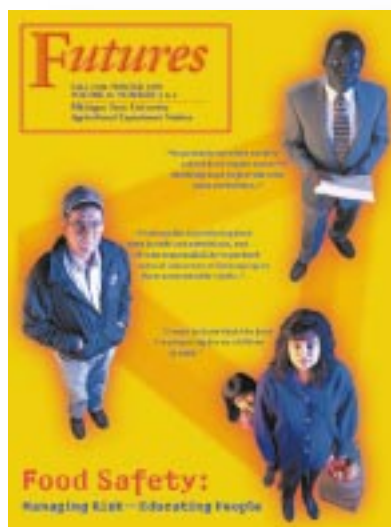
<sup>6</sup>Partnerships for Ecosystem Research and Management (PERM) positions with salary funded by the Michigan Department of Natural Resources

<sup>7</sup>GREEN (Generating Research and Extension to meet Economic and Environmental Needs) appointed faculty



*Futures* is the quarterly magazine of the Michigan Agricultural Experiment Station (though in 1999, Vol. 16, Nos. 3 and 4 were combined into one issue; likewise and Vol. 17, Nos. 1, 2 and 3). If you live in the United States and would like to receive *Futures* free of charge, write to: *Futures* Editor, 310 Agriculture Hall, MSU, East Lansing, MI 48824-1039, call 517-432-1555, or e-mail [depolo@msu.edu](mailto:depolo@msu.edu). *Futures* is also available for viewing on the MAES Web site at <http://www.maes.msu.edu>.

## Fall 1998/Winter 1999 Vol. 16, Nos. 3 and 4 Food safety: Managing Risk — Educating People



Food safety once again made headlines in Michigan at the end of 1998. News stories reported that the U.S. Centers for Disease Control and Prevention were blaming *Listeria*-contaminated hot dogs and lunchmeat from a processing plant in Zeeland for the deaths of 12 people and sickness of 79 others. Then the U.S. Department of Agriculture ordered Southfield-based Thorn Apple Valley,

Inc., to recall 30 million pounds of hot dogs and lunchmeat. No illnesses or deaths were attributed to the products, but the plant was cited for unsanitary conditions. Then Detroit-based Hygrades, also owned by Sara Lee, took 72,000 packages of hot dogs made at its Detroit plant out of stores after the Michigan Department of Agriculture found *Listeria* bacteria in sandwich spread made from the hotdogs.

Because *Listeria* is tasteless and odorless, is found virtually everywhere in the environment — in soil, dust, water, sewage — and, unlike most bacteria, can continue to multiply in colder temperatures, these outbreaks were frightening and confounding to all involved. The methods used to inspect the food supply were publicly questioned. How could this happen in what everyone agrees is the world's safest food supply?

Several times over the past five years, *Futures* has focused on food safety and the myriad questions attached to this broad, many-headed Hydra of a problem. On the surface, the issue seems relatively simple: everyone — consumers, producers and researchers — wants a safe and plentiful food supply. So if we all agree, why is there so much confusion and controversy surrounding the subject?

Untangling the web of food safety issues requires one to consider all the social, cultural, economic and environmental aspects of producing food — not a small task. We revisit the idea of food safety in this issue of *Futures* to update readers on the latest MAES research in the area, as well as to discuss some of the broader issues that influence policies regarding food safety and research.

The concept of risk plays an important role in understanding food safety. MSU is home to the National Food Safety and Toxicology Center (NFSTC), which recently hosted a

conference on risk analysis for people working on food safety at all levels. Several MAES researchers affiliated with the NFSTC are using risk assessment as a framework to study risks associated with food. Closely related to risk assessment is the idea of risk management — figuring out ways to minimize risk at specific points in the food system. Scientists agree that this is most effective when several links of the food chain, from producer to consumer, are targeted simultaneously.

In 1996, the Food Quality Protection Act (FQPA) was passed unanimously by Congress and signed into law by President Clinton. The FQPA makes dramatic changes in the way the Environmental Protection Agency sets tolerances for pesticide residues on food crops and will likely affect the availability of pesticides for both food and non-food uses. To date, implementation of the FQPA has been slow, but many growers are fearful they may lose the use of certain pesticides that have been essential to producing high-quality crops in amounts that are profitable. Consumers are concerned that, while the implementation process inches along, they and their children are being exposed to levels of pesticides that may be unsafe. MAES scientists are working to help growers, consumers and industry representatives sort through the legislation and the issues surrounding it.

In 1994, the North American Free Trade Agreement (NAFTA) was implemented in the United States. NAFTA contains provisions for sanitary (human and animal health) and phytosanitary (plant health) measures that are modeled on those in the General Agreement on Tariffs and Trade (GATT). These measures, though intended to ensure the safety of the global food supply, can be used to restrict trade when countries implement them for protectionist purposes. Despite pages of agreements and articles, the line between food safety and free trade can be blurry and indistinct. Countries disagree over the validity of safety assertions, especially when lower priced imports threaten to damage a country's domestic producers. As trade agreements between countries have increased, non-tariff barriers such as food safety regulations have become more important. MAES researchers are working with Michigan growers, processors and exporters to help them understand NAFTA and GATT provisions and keep Michigan products flowing to other countries.

Food safety research is an important area of emphasis for the Michigan Agricultural Experiment Station. *Futures* will continue to examine the topic as new research results are reported and new issues emerge to ensure that Michigan people have access to the latest information.

## Spring/Summer/Fall 1999 Vol. 17, Nos. 1, 2 and 3 Lawn and Garden Research



It's impossible to imagine life in Michigan without lawns, trees, flowers and shrubs. Even in the steel and concrete corridors of Detroit, Grand Rapids, Flint and Lansing, diligent homeowners lovingly tend their yards and gardens, no matter how small. Apartment dwellers decorate balconies and fill window boxes with colorful pots of impatiens and geraniums. The pink

and white blossoms of flowering crabapple trees and the fins of tulip leaves peeking out from the soil announce spring with a beautiful flourish. Tourists drive hundreds of miles to more rural areas to gaze at the royal reds and golds of fall leaves or to be inspired by one of the state's public gardens.

Though it may seem unlikely for a state so far north, Michigan is the third largest wholesale horticulture retailer in the country, behind perennial front-runners California and Florida. Michigan commercial growers estimated the wholesale value of their crop in 1998 at \$235 million, up 11 percent from 1997. Michigan leads the nation in value of sales for 10 floriculture crops and is ranked second in national sales in five more. The state's greenhouse space increased 15 percent in the past year; only California and Florida have more total greenhouse cover.

Michigan also boasts the third largest number of golf courses in the country, many of them world-class.

At Michigan State University, Michigan Agricultural Experiment Station-funded scientists are working across a range of disciplines to assist the floriculture, nursery, landscape, turfgrass and horticulture industries in finding solutions to the problems and issues they face. Working in tandem with representatives of each commodity, the researchers are uniquely positioned to provide information that is relevant and quickly accessible to the people who most need it.

In this issue of *Futures*, we profile just a small fraction of the work going on in lawn and garden research to help keep the industry in top form.

At the request of growers in the state, a trio of horticulture scientists has been working since 1993 to develop step-by-step flowering prescriptions for certain perennials. The researchers

have determined the exact time for each production step so growers can work backward from a designated date when the plants are due in stores. For example, if lavender needs to be in flower and in stores on June 1, growers now know that they can produce a flowering lavender plant in seven weeks by manipulating temperature and the amount of light the plant receives.

MSU is home to the Robert Hancock Turf Center, a research facility where turfgrass scientists study everything about turf, from testing new grass varieties to controlling insects, weeds and diseases, and minimizing the impact of turf maintenance on the environment. The center also hosts annual field days for the Michigan Turfgrass Foundation, the Golf Association of Michigan and Turf Producers International so industry professionals can meet with researchers face to face.

The Michigan Turfgrass Environmental Stewardship Program, the first program of its kind in the country, is a partnership between MSU, the Michigan Turfgrass Foundation, the Golf Association of Michigan, the Michigan Department of Agriculture and the Michigan Department of Environmental Quality. The program allows golf course superintendents to evaluate their management practices and offers information and education on the latest ideas, research and regulations.

Because ornamental, nursery and landscape businesses sell living organisms and services related to those living things, not reams of paper or boxes of paperclips, they have to market themselves differently than a computer retailer or a grocery store. To assist these businesses in reaching out to consumers and to keep them on the cutting edge of research and technology, the MAES has assembled a cadre of scientists specializing in marketing, management and propagation who are working with industry representatives to identify and solve problems.

The research going on in ornamental horticulture, nursery and landscape horticulture, floriculture and turfgrass in the Michigan Agricultural Experiment Station mirrors the diversity of these industries. We hope you find these updates informative.

# MAES Contributors

July 1, 1998 to June 30, 1999

3M Canada Company	Cherry Growers, Inc.
AASCO	Cherry Marketing Institute, Inc.
AMVAC Chemical Corporation	Chiquita Brands
Abbott Laboratories	Clackamas Greenhouses, Inc.
AgrEvo USA Company	Clark Companies
AgraQuest, Inc.	Clark County Sanitation District
AgriPro Seeds, Inc.	Cleary Chemical Corporation
Agri-Business Consultants, Inc.	Clorox Company
Agrium, Inc.	Coca-Cola Company
American Agricultural Economics Association	Coloma Frozen Foods, Inc.
American Agricultural Services, Inc.	Consortium for Plant Biotechnology Research
American Cyanamid Company	Conwed Plastics
American Fisheries Society of Michigan	Cornell University
American Floral Endowment	Countrymark Cooperative, Inc.
American Jersey Cattle Association	DeKalb Swine Breeders, Inc.
Amway Corporation	DeWinter's, Inc.
Andersons, Inc.	Dominion BioSciences, Inc.
Auxein Corporation	Dow AgroSciences
BASF Corporation	Dow Chemical Company
Ball Horticultural Company	DuPont Agricultural Products
Bayer Corporation	Eastman Kodak Company
Bio-Cide International, Inc.	Ecogen, Inc.
Bordine Nursery, Ltd.	Egerton University
Branch-Smith, Inc.	Elf Atochem North America, Inc.
C. Raker & Sons, Inc.	Eli Lilly & Company
Cargill Hybrid Seeds	Elsevier Science Ltd.
Celery Research, Inc.	Entek Corporation
Center Greenhouse, Inc.	Evenflo Company, Inc.
Center for Tropical and Subtropical Aquaculture	FFI Corporation
Centro Internacional de Agricultura Tropical	FMC Corporation
Chelsea Milling Company	Federal Express

- Fine Lawn Research, Inc.
- Florida Tomato Committee
- Food Marketing Institute
- Foundation for Agronomic Research, Inc.
- Four Star Greenhouse, Inc.
- Frito-Lay, Inc.
- Fur Commission USA
- General Mills, Inc.
- Genesis Ag, Ltd.
- Geoflow, Inc.
- Gerber Products Company
- Glass Corner Greenhouses, Inc.
- Golden Plain Farms
- Golf Course Superintendents Association of America
- Gowan Company
- Grand Rapids Nursery & Landscape Association, Inc.
- Great Lakes Fisheries Commission
- Great Lakes Hybrids, Inc.
- Great Lakes IPM, Inc.
- Great Lakes Protection Fund
- Green Leaf Enterprises, Inc.
- Griffin, L.L.C.
- Gustafson, Inc.
- Harris Moran Seed Company
- Haskell Veterinary Clinic
- Henkel Corporation
- Henry Mast Greenhouses, Inc.
- Hilltop Nurseries, L.L.C.
- Horticultural Research Institute Endowment Fund
- Huron Mountain Wildlife Foundation
- IMC Kalium Canada, Ltd.
- IMC Kalium, Ltd.
- Ingham County
- Inter-American Foundation
- International Center for Agricultural Research in the Dry Areas
- International Crops Research Institute for the Semi-Arid Tropics
- International Dwarf Fruit Tree Association
- International Life Sciences Institute, Research Foundation
- International Turf Producers Foundation
- Iowa State University
- JEFO Nutrition, Inc.



Photo by Bruce Fox

Jack Brown Produce, Inc.

Jorgensen Farm Elevator

Joseph H. Hill Memorial Foundation, Inc.

KALSEC

Kalamazoo Valley Plant Growers Co-op

Kansas State University

Kaufmann, John E.

Kellogg Company

Kellogg's Corporate Citizenship Fund

King Milling Company

Knappen Milling Company

Kraft Foods, Inc.

Kropf Orchards & Storage, Inc.

Land O'Lakes, Inc.

Lansmont Corporation

Lesco, Inc.

M&M Mars

MBG Marketing

MBI International

Marks and Spencer PIC

Martin Marietta Aggregates

Metropolitan Detroit Flower Growers' Association

Micandy Garden Greenhouses, Inc.

Michigan Agricultural Commodities, Inc.

Michigan Apple Research Committee

Michigan Asparagus Research, Inc.

Michigan Bean Commission PRAB

Michigan Beekeepers Association

Michigan Chapter of the Wildlife Society

Michigan Corn Growers Association

Michigan Corn Marketing Committee

Michigan Crop Improvement Association, Inc.

Michigan Department of Agriculture

Michigan Department of Environmental Quality

Michigan Department of Natural Resources

Michigan Farm Bureau

Michigan Jobs Commission

Michigan Onion Committee

Michigan Peach Sponsors

Michigan Pear Research Association



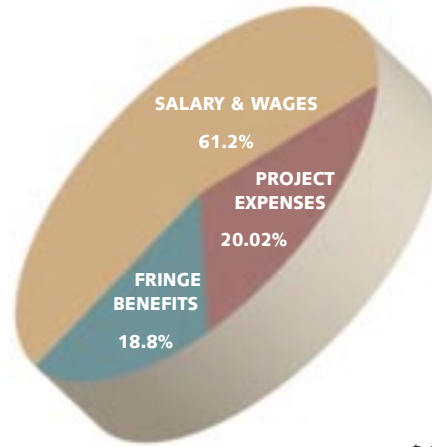
Michigan Potato Industry Commission	Nutri-Quest, Inc
Michigan Soybean Promotion Committee	Nutrition Physiology Corporation
Michigan State Horticultural Society	O.J. Noer Research Foundation, Inc.
Michigan State Millers' Association	Ohio Floriculture Foundation
Michigan Turfgrass Foundation	Ontario Berry Growers Association
Michigan Vegetable Council, Inc.	Paul Ecke Ranch
Michigan Virtual University	Pfizer, Inc.
Mid-America Food Processors Association	Phoebe W. Haas Charitable Trust
Midwest Advanced Food Manufacturing Alliance	Pickle Packers International, Inc.
Mink Farmers Research Foundation	Pickle Seed Research Fund
Molbak's, Inc.	Pillsbury Company
Monitor Sugar Company	Post Gardens of Battle Creek, Inc.
Monsanto Company	Pursell Technologies, Inc.
Mycogen Corporation	QVC, Inc.
Mycotech Corporation	RESOURCE21, L.L.C.
National Aeronautics & Space Administration	Rhône-Poulenc Ag Company
National Association of Animal Breeders	Rockefeller Foundation
National Biological Control Institute	Rohm & Haas Company
National Honey Board	Rutgers University
National Institutes of Health	SC Johnson Wax
National Park Service	Saatzucht Steinach GmbH
National Pork Producers Council	Saginaw County Mosquito Abatement Commission
National Science Foundation	Samuel Roberts Noble Foundation, Inc.
National Turfgrass Federation, Inc.	Scotts Company
National University of LaPlata	SePRO Corporation
NatureMark	Seminis Vegetable Seeds, Inc.
NCI-Frederick Cancer Research and Development Center	Serono Laboratories, Inc.
Neal Mast & Son Greenhouses, Inc.	Snack Food Association
North Central Soybean Research Programs	Sonnyside Flowers
Novartis Crop Protection, Inc.	Sostram Corporation
	Southern Illinois University

Southwestern Michigan Long Beards	University of California-Davis
Spalding & Evenflo Companies, Inc.	University of Florida
Stacy's Greenhouses	University of Illinois
Star of the West Milling Company	University of Michigan
Summerdale, Inc.	University of Nebraska
Sybron Chemicals, Inc.	University of Washington
Terra Industries, Inc.	VAMTech, L.L.C.
Titleist and Foot-Joy Worldwide	Valent U.S.A. Corporation
Todd, George K. Sr.	Viskase Corporation
Tomen Agro, Inc.	W.K. Kellogg Foundation
Toro Company	Walters Gardens, Inc.
Tropicana Products, Inc.	Washington State Tree Fruit Research Commission
Troy Biosciences, Inc.	Western Michigan Greenhouse Association
TruGreen ChemLawn	Westvaco Corporation
Twixwood Nursery	Whitmire Micro-Gen Research Laboratories, Inc.
U.S. Agency for International Development	Wilfarm L.L.C.
U.S. Borax, Inc.	William Beaumont Hospital
U.S. Department of Agriculture	Wisconsin Department of Natural Resources
U.S. Department of Commerce	Witco Corporation
U.S. Department of Energy	Woodward-Clyde Federal Services
U.S. Department of the Interior	World Travel & Tourism
U.S. Environmental Protection Agency	Xerox Corporation
U.S.D.A. Agricultural Research Service	Zeneca, Inc.
U.S.D.A. Cooperative State Research, Education & Extension Service	
U.S.D.A. Forest Service	
Uniroyal Chemical Company, Inc.	
United Duroc Swine Registry	
United Industries Corporation	
United Soybean Board	
University of Arkansas	

# Financial Report

July 1, 1998 to June 30, 1999

## DISTRIBUTION OF APPROPRIATED FUNDS



<b>INCOME:</b>		<b><u>\$66,075,402</u></b>
<b>Federal Appropriations</b>	.....	<b>\$.5,090,973</b>
Hatch	\$ 3,877,510	
McIntire-Stennis	\$ 206,354	
Hatch RRF	\$ 929,643	
Hatch Animal and Disease, Section 1433	\$ 77,466	
<b>State Appropriations</b>	.....	<b>\$.30,268,300</b>
<b>TOTAL APPROPRIATIONS:</b>	.....	<b>\$.35,359,273</b>
<b>Grants — Federal, State and Private</b>	.....	<b>\$.30,716,129</b>
 <b>EXPENSES:</b>		 <b><u>\$66,075,402</u></b>
Salaries	\$21,632,657	
Fringe Benefits	\$ 6,659,820	
Project Expenses	\$ 7,066,796	
Grants — Federal, State and Private*	\$30,716,129	

## Personnel

(Full-time Equivalents Funded From Appropriated Funds)

<b>Research Staff**</b>		<b>156.27</b>
Professors	76.62	
Associate Professors	28.72	
Assistant Professors	24.11	
Research Associates and Specialists	26.82	
 <b>Support Staff</b>		 <b>156.30</b>
Administrative Professionals	75.53	
Supervisors	25.12	
Clerical	45.82	
Technicians	9.83	

\* Grants are reported using most recent three-year average  
 \*\* Does not include department chairpersons/unit administrators





**MICHIGAN AGRICULTURAL EXPERIMENT STATION**

**J. Ian Gray, Director**

109 Agriculture Hall

Michigan State University

East Lansing, Michigan 48824-1039



**SR-118, April 2000**

The Michigan State University Agricultural Experiment Station is an equal opportunity employer and complies with Title VI of the Civil Rights Act of 1964 and Title XI of the Education Amendments of 1972.