Members of the Department of Plant Pathology and Microbiology direct the Master of Science and Doctor of Philosophy degrees in plant pathology, plant-microbiology, plant-microbial genetics and physiology. Students interact with dynamic faculty members to perform cutting edge research on all aspects of plant health and plant disease, including on the molecular basis of pathogenicity and the microbial and plant factors that affect virulence. Students perform their research on and off campus as required.

A competent command of the English language is required. For complete information on the options available, prospective students should contact the Department of Plant Pathology and Microbiology.

The Department offers a Master of Science and Doctorate in Plant Pathology and Microbiology.

**Plant Pathology**

Plant pathology is the science of plant diseases, their nature, causal agents and interrelated phenomena. The major objectives concern the scientific training of professional phytopathologists. Emphasis is placed on the fundamental and practical concepts associated with plant health and disease and pathology and the conceptual schemes of fungal, bacterial, viral, nematological, mycoplasmal and physiogenic diseases. In addition, facilities are available for research in most phases including physiology of parasitism, host-parasite relationships, genetics of host resistance, genetics of pathogen variation and variability, genetics of host-pathogen-hyperparasite populations, ecology of soil-borne pathogens, etiology and epidemiology of plant diseases, nematology, virology, phytotherapeutics and clinical phytopathology.

**Faculty**

Dickman, Martin B, Professor
Plant Pathology & Microbiology
PHD, University of Hawaii, 1986

Ebbole, Daniel J, Professor
Plant Pathology & Microbiology
PHD, Purdue University, 1988

Gonzalez, Carlos F, Professor
Plant Pathology & Microbiology
PHD, University of Nebraska, 1978

Gross, Dennis C, Professor
Plant Pathology & Microbiology
PHD, University of California, Davis, 1976

Ireland-Stoddard, Kati L, Instructional Assistant Professor
Plant Pathology & Microbiology
PHD, University of North Texas, 2012

Kenerley, Charles M, Professor
Plant Pathology & Microbiology
PHD, North Carolina State University, 1983

Kolomiets, Mikhailo V, Professor
Plant Pathology & Microbiology
PHD, Iowa State University, 1998

Magill, Clint W, Professor
Plant Pathology & Microbiology
PHD, Cornell University, 1969

Pierson, Leland S, Professor
Plant Pathology & Microbiology
PHD, Washington State University, 1986

Scholthof, Herman B, Professor
Plant Pathology & Microbiology
PHD, University of Kentucky, 1990

Scholthof, Karenbeth G, Professor
Plant Pathology & Microbiology
PHD, University of Kentucky, 1989

Shan, Libo, Professor
Plant Pathology & Microbiology
PHD, Kansas State University, 2003

Shaw, Brian D, Professor
Plant Pathology & Microbiology
PHD, Cornell University, 2000

Shim, Won-Bo, Professor
Plant Pathology & Microbiology
PHD, Purdue University, 2000

Wilkinson, Heather H, Professor
Plant Pathology & Microbiology
PHD, State University of New York at Binghamton, 1996

Yuan, Shuhua, Professor
Plant Pathology & Microbiology
PHD, University of Tennessee, 2007

**Masters**

- Master of Science in Plant Pathology (http://catalog.tamu.edu/graduate-colleges-schools-interdisciplinary/agriculture-life-sciences/plant-pathology-microbiology/ms)

**Doctoral**

- Doctor of Philosophy in Plant Pathology (http://catalog.tamu.edu/graduate-colleges-schools-interdisciplinary/agriculture-life-sciences/plant-pathology-microbiology/phd)

**Courses**

**PLPA 601 Fundamentals of Plant Pathology**

Credits 3. 3 Lecture Hours.

Increase the understanding of the underlying mechanisms in the disease process; apply that understanding to reduce losses caused by disease; nature of disease causing agents; the outcomes of the interaction between plants and pathogens.

**Prerequisite:** Graduate classification.
PLPA 603 Plant Disease Management  
Credits 3. 3 Lecture Hours.  
Online course designed to provide a strong foundation in the principles and practices of management of plant diseases; analysis of disease cycles and epidemiological parameters to develop and evaluate efficient control strategies and forecasting models.  
**Prerequisites:** PLPA 301 or equivalent, approval of instructor.

PLPA 604 Plant Bacterial Diseases  
Credit 1. 1 Lecture Hour.  
Bacterial diseases of fruit and vegetable crops, field crops and ornamental plants; structure and function of plant pathogenic bacteria; dissemination of bacterial pathogens and methods of control.  
**Prerequisite:** PLPA 301 or PLPA 601.

PLPA 605 Molecular Plant Virology  
Credit 1. 1 Lecture Hour.  
Focus on biology and molecular genetics of plant viruses; historical information and recent developments discussed to illustrate how viruses establish an infection; control measures presented; uses as tools in biotechnology.  
**Prerequisite:** PLPA 301 or PLPA 601.

PLPA 606 Fungal Biology  
Credit 1. 1 Lecture Hour.  
Morphological and molecular systematic survey of kingdom of Fungi; emphasis on modern concepts and disease control.  
**Prerequisite:** PLPA 301 or PLPA 601.

PLPA 607 Pathogen Strategies  
Credit 1. 1 Lecture Hour.  
Molecular mechanisms that pathogens use to overcome innate immunity of the host plant; molecular events associated with the disease cycles of pathogens; pathogen-host-coevolution; pathogen virulence factors; pathogen countermeasures to plant defense mechanisms.  
**Prerequisites:** PLPA 301 or PLPA 601.

PLPA 608 Pathogen Perception and Signaling  
Credit 1. 1 Lecture Hour.  
Molecular and biochemical basis of pathogen recognition; pathogen signaling initiation and transduction in hosts.  
**Prerequisite:** PLPA 301 or PLPA 601.

PLPA 609 Defense Hormone Signals  
Credit 1. 1 Lecture Hour.  
Molecular and biochemical mechanisms of plant hormone-mediated defense responses to pathogen invasion; major classes of defense-related proteins, phytolexins and antibacterial secondary metabolites and signal transduction pathways.  
**Prerequisite:** PLPA 301 or PLPA 601.

PLPA 610 Host Plant Resistance  
Credits 3. 3 Lecture Hours.  
Host plant resistance programs from the standpoint of the plant breeder, plant pathologist and entomologist; team taught with each discipline represented; roundtable discussions of assigned readings and lectures.  
**Prerequisite:** Approval of instructor.  
**Cross Listing:** SCSC 610 and ENTO 610.

PLPA 611 Advanced Plant Pathology  
Credits 3. 3 Lecture Hours.  
Principles and concepts of plant pathogenesis, plant disease epidemiology, and plant disease management at the level of the whole plant and in plant populations; impact and control of significant plant diseases.  
**Prerequisites:** PLPA 301 or equivalent; approval of instructor.

PLPA 613 Advanced Plant Pathology Laboratory  
Credit 1. 3 Lab Hours.  
A laboratory course designed to demonstrate key components of the host-pathogen interaction and modern diagnostic and research techniques. Concurrent enrollment in PLPA 611 recommended.  
**Prerequisite:** PLPA 301 or approval of instructor.

PLPA 614 Pathogens, the Environment, and Society  
Credits 3. 3 Lecture Hours.  
Survey the impact of microorganisms on development of modern culture and society; emphasize role pathogens have played in history of mankind; influence of changing environment on emerging diseases.  
**Prerequisite:** Graduate classification.

PLPA 616 Methods in Molecular Biology of Plant-Microbe Interactions  
Credits 2. 2 Lecture Hours.  
Concepts and techniques used in molecular plant pathology to study the interactions between hosts and pathogens; focus on understanding the rationale for implementing certain procedures and the theoretical concepts underlying the methodology.  
**Prerequisite:** Graduate classification.

PLPA 617 Molecular Plant Pathogen Interactions  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Critical review of the current literature on molecular and biochemical mechanisms of plant responses to pathogen invasion; overview of disease resistance genes, major classes of defense-related proteins, antimicrobial compounds and signal-transduction pathways.  
**Prerequisite:** Graduate classification in any life sciences departments.

PLPA 618 Bacterial Plant Diseases  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Bacterial diseases of fruit and vegetable crops, field crops and ornamental plants; nature of the disease, dissemination of the pathogen and methods of control.  
**Prerequisite:** Approval of instructor.

PLPA 619 Plant-Associated Microorganisms  
Credits 3. 3 Lecture Hours.  
Basic concepts and current topics in plant-microbe interactions including the diversity of plant-associated microorganisms; the plant as a microbial environment; endophytes; microbial roles in plant nutrition and fitness; uses of microorganisms for improved plant health and sustainable agriculture; microbial roles in food safety and future challenges; discussion of current literature.  
**Prerequisites:** Basic plant biology or plant ecology is recommended; microbiology is helpful, but not required. Cross listed with HORT 619 and MEPS 619.

PLPA 620 Plant Virology  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Overview of plant virology with emphasis on molecular biology of host-virus interactions; topics will include virus replication, gene expression, movement, symptoms, transmission and control; current literature and techniques important to virology presented.  
**Prerequisite:** Approval of instructor.

PLPA 623 Diseases of Field Crops  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Fundamental and practical aspects of more important and representative diseases of field crops; plant disease problems peculiar to extensive cultivation methods.  
**Prerequisites:** PLPA 301 and PLPA 303.
PLPA 626 Diagnosis of Plant Diseases
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Techniques employed in field diagnosis of plant diseases; histological and microbiological studies to verify initial diagnosis.
Prerequisite: PLPA 625 or approval of instructor.

PLPA 630 Fungi: Physiology and Genetics
Credits 2. 2 Lecture Hours.
Exploration of genetic networks, and genome evolution; physiology of fungal development and plant pathogenesis.
Prerequisites: Graduate classification or approval of instructor and concurrent enrollment in PLPA 631.

PLPA 631 Fungi Laboratory
Credit 1. 3 Lab Hours.
Demonstration of key modern concepts in the Kingdom Fungi; experiments with current research methodologies using fungi.
Prerequisites: Graduate classification or approval of instructor and concurrent enrollment in PLPA 630 and/or PLPA 632.

PLPA 632 Fungi Cell Biology and Taxonomy
Credits 2. 2 Lecture Hours.
Fungi: Cell Biology and Taxonomy. Morphological and molecular phylogenetic survey of the Kingdom Fungi; cell biology of fungal form and function.
Prerequisites: Graduate classification or approval of instructor and concurrent enrollment in PLPA 631.

PLPA 634 Turfgrass Pathology
Credits 3. 3 Lecture Hours.
Recognizing turfgrass problems and understanding biological mechanisms in the disease process; principles of disease management strategies.

PLPA 657 Biotechnology for Biofuels and Bioproducts
Credits 3. 3 Lecture Hours.
Biotechnology issues in developing bioenergy as a renewable energy source; emphasis on the three generations of bioenergy and enabling technologies; special topics include recent advances in bioenergy research, government policy, and industrial development.
Prerequisite: Graduate classification.

PLPA 665 Viral Vectors and Gene Therapy
Credits 3. 3 Lecture Hours.
Describes various viral vector systems, their development, their use as research tools, and their use in biotechnology and gene therapy; consists of a mixture of short lectures and discussion of papers from the literature.
Prerequisites: VTMI 663/MPIM 663, VTMI 647, PLPA 616, or PLPA 620 or approval of instructor.
Cross Listing: MPIM 665 and VTMI 665.

PLPA 681 Seminar
Credit 1. 1 Lecture Hour.
Reports and discussions of topics of current interest in plant pathology; review of literature on selected subjects.

PLPA 684 Professional Internship
Credits 1 to 4. 1 to 4 Other Hours.
Work-study program for on-the-job training. The student’s major professor and job training supervisor will grade the individual.
Prerequisite: Graduate classification in Department of Plant Pathology and Microbiology.

PLPA 685 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual problems or research not pertaining to thesis or dissertation.
Prerequisites: PLPA 301 and PLPA 303; approval of instructor.

PLPA 689 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Special topics in an identified area of plant pathology. May be repeated for credit.
Prerequisite: Approval of instructor.

PLPA 690 Theory of Research
Credit 1. 1 Lecture Hour.
Design and development of research theory, inquiry and methodology in various subfields of plant pathology and microbiology; includes examination of modern trends and advances, the analysis of research approaches, and the evaluation and interpretation of data using examples from current research literature. May be repeated for credit.
Prerequisite: Approval of instructor.

PLPA 691 Research
Credits 1 to 23. 1 to 23 Other Hours.
Original investigations in support of thesis or dissertation.