PLANT PATHOLOGY, B.S.

Plant pathology is the study of plants and their pathogens, the process of disease, and how plant health and disease are influenced by factors such as the weather, nonpathogenic microorganisms, and plant nutrition. It encompasses fundamental biology as well as applied agricultural sciences.

Plant pathology involves the study of plants and pathogens at the genetic, biochemical, physiological, cellular, population, and community levels, and how the knowledge derived is integrated and put into agricultural practice. Prerequisite to effective research, teaching, and extension in plant pathology is a breadth of interdisciplinary interest and knowledge, in a department and in its individual members, reaching from ecology to microbiology, from meteorology to applied mathematics, and from molecular biology to communication skills.

Plant pathology is a field that thrives in, and makes its greatest contribution to, comprehensive institutions like the University of Wisconsin–Madison where the proximity and complementarity of basic sciences and the other applied agricultural sciences are exceptionally strong.

Undergraduates in plant pathology can choose between two tracks. The plant–microbe biology track has courses in basic math and sciences, including biology, chemistry, and physics, along with upper-level courses in plant pathology, biochemistry, and microbiology. This track is geared toward students who have an interest in receiving a broad education in the basic sciences or plan to pursue a graduate or professional degree. The plant health and industry track includes some courses in basic math and sciences, as well as additional courses in agriculture and economics/management and upper-level courses in plant pathology, entomology and other agricultural sciences. This track is designed for students who intend to work in industry after receiving their undergraduate degree. More information about careers in plant pathology is available from the department.

This major is earned through the bachelor of science degree program.

HOW TO GET IN

To declare this major, students must be admitted to UW–Madison and the College of Agricultural and Life Sciences (CALS). For information about becoming a CALS first-year or transfer student, see Entering the College (http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#enterthecollegetext).

Students who attend Student Orientation, Advising, and Registration (SOAR) with the College of Agricultural and Life Sciences have the option to declare this major at SOAR. Students may otherwise declare after they have begun their undergraduate studies. For more information, contact the advisor listed under the Advising and Careers tab.

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext) section of the Guide.

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
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</thead>
</table>
| General Education | • Breath—Humanities/Literature/Arts: 6 credits
| | • Breath—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
| | • Breath—Social Studies: 3 credits
| | • Communication Part A & Part B *
| | • Ethnic Studies *
| | • Quantitative Reasoning Part A & Part B *

* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

COLLEGE OF AGRICULTURAL AND LIFE SCIENCES REQUIREMENTS

In addition to the University General Education Requirements, all undergraduate students in CALS must satisfy a set of college and major requirements. Specific requirements for all majors in the college and other information on academic matters can be obtained from the Office of Academic Affairs (http://www.cals.wisc.edu/academics). College of Agricultural and Life Sciences, 116 Agricultural Hall, 1450 Linden Drive, Madison, WI 53706; 608-262-3003. Academic departments and advisors also have information on requirements. Courses may not double count within university requirements (General Education and Breadth) or within college requirements (First-Year Seminar, International Studies and Science), but courses counted toward university requirements may also be used to satisfy a college and/or a major requirement; similarly, courses counted toward college requirements may also be used to satisfy a university and/or a major requirement.

COLLEGE REQUIREMENTS FOR ALL CALS B.S. DEGREE PROGRAMS

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Work: Students must maintain a minimum cumulative grade point average of 2.000 to remain in good standing and be eligible for graduation.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Residency: Students must complete 30 degree credits in residence at UW–Madison after earning 86 credits toward their undergraduate degree.

First Year Seminar (http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#requirementstext) 1

International Studies (http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#requirementstext) 3

Physical Science Fundamentals 4-5

CHEM 103 General Chemistry I or CHEM 108 Chemistry in Our World or CHEM 109 Advanced General Chemistry

Biological Science 5

Additional Science (Biological, Physical, or Natural) 3

Science Breadth (Biological, Physical, Natural, or Social) 3

CALS Capstone Learning Experience: included in the requirements for each CALS major (see "Major Requirements") (http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#requirementstext)

### MAJOR REQUIREMENTS

Courses may not double count within the major (unless specifically noted otherwise), but courses counted toward the major requirements may also be used to satisfy a university requirement and/or a college requirement. A minimum of 15 credits must be completed in the major that are not used elsewhere.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core Mathematics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following (or may be satisfied by placement exam): 5-6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 112 &amp; MATH 113 Algebra and Trigonometry</td>
<td></td>
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<tr>
<td></td>
<td>MATH 114 Algebra and Trigonometry</td>
<td></td>
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<tr>
<td></td>
<td>MATH 171 Calculus with Algebra and Trigonometry I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Core Chemistry</td>
<td></td>
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<tr>
<td></td>
<td>Select one of the following: 5-9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHEM 103 General Chemistry I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&amp; CHEM 104 General Chemistry II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHEM 109 Advanced General Chemistry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Introductory Biology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following options: 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Option 1 (preferred):</td>
<td></td>
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<tr>
<td></td>
<td>BIOLOGY/BOTANY/ZOOLOGY 151 &amp; BIOLOGY/BOTANY/ZOOLOGY 152 Introductory Biology and Introductory Biology</td>
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<tr>
<td></td>
<td>Option 2:</td>
<td></td>
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<tr>
<td></td>
<td>ZOOLOGY/BIOLOGY 101 &amp; ZOOLOGY/BIOLOGY 102 &amp; BOTANY/BIOLOGY 130 Animal Biology and Animal Biology Laboratory and General Botany</td>
<td></td>
</tr>
</tbody>
</table>

### Core Mathematics

Select one of the following:

- MATH 112 Algebra and Trigonometry
- MATH 113 Algebra
- MATH 114 Algebra and Trigonometry
- MATH 171 Calculus with Algebra and Trigonometry I

### Core Chemistry

Select one of the following:

- CHEM 103 General Chemistry I
- & CHEM 104 General Chemistry II
- CHEM 109 Advanced General Chemistry

### Introductory Biology

Select one of the following options:

- Option 1 (preferred):
  - BIOLOGY/BOTANY/ZOOLOGY 151 Introductory Biology and Introductory Biology
- Option 2:
  - ZOOLOGY/BIOLOGY 101 Animal Biology and Animal Biology Laboratory
  - & ZOOLOGY/BIOLOGY 102 & BOTANY/BIOLOGY 130

### Tracks

#### PLANT–MICROBE BIOLOGY TRACK

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Additional Mathematics and Statistics</td>
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<tr>
<td></td>
<td>Select one of the following: 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 211 Calculus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 217 Calculus with Algebra and Trigonometry II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 221 Calculus and Analytic Geometry 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following: 3-4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 222 Calculus and Analytic Geometry 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STAT 301 Introduction to Statistical Methods</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STAT 371 Introductory Applied Statistics for the Life Sciences</td>
<td></td>
</tr>
</tbody>
</table>

### Additional Chemistry

Select one of the following options:

- CHEM 343 Introductory Organic Chemistry
- & CHEM 344 Introductory Organic Chemistry Laboratory
- & CHEM 345 Intermediate Organic Chemistry Laboratory
- CHEM 341 Elementary Organic Chemistry
- & CHEM 342 Elementary Organic Chemistry Laboratory

### Biology

Select one of the following options:

- Option 3:
  - BIOCORE 381 Evolution, Ecology, and Genetics
  - & BIOCORE 382 Evolution, Ecology, and Genetics Laboratory
  - & BIOCORE 383 Genetics Laboratory
  - & BIOCORE 384 Cellular Biology and Cellular Biology Laboratory

Core Physics

Select one of the following: 4-5

- PHYSICS 103 General Physics
- PHYSICS 201 General Physics
- PHYSICS 207 General Physics

### Plant Pathology Core

- PL PATH 300 Introduction to Plant Pathology 4
- PL PATH/BOTANY Fungi 4
- PL PATH 332 Another Plant Path course above 300 1 3
- PL PATH 590 Capstone in Plant Pathology 3

### Track

Select one of the following: 29-39

- Plant-Microbe Biology Track
- Plant Health and Industry Track

**Total Credits: 67-83**

Option 1:

- MICROBIO 303 Biology of Microorganisms
- & MICROBIO 304 and Biology of Microorganisms Laboratory
- GENETICS 466 Principles of Genetics

Option 2:

- Select two of the following:
  - BIOCORE 485 Organismal Biology
  - BIOCORE 486 Organismal Biology Laboratory
  - BIOCORE 587 Biological Interactions

**Additional Physics**

Select one of the following: 4-5

- PHYSICS 104 General Physics
- PHYSICS 202 General Physics
- PHYSICS 208 General Physics

**Plant Physiology**

- BOTANY 500 Plant Physiology 3-4

**Plant-Microbe Electives**

Select 5 credits from the following: 5

- BIOCHEM 501 Introduction to Biochemistry
- BOTANY 300 Plant Anatomy
- BOTANY 400 Plant Systematics
  - or BOTANY 401 Vascular Flora of Wisconsin
- BOTANY/ F&W ECOL/ ZOOLOGY 460 General Ecology
- ENTOM/ ZOOLOGY 302 Introduction to Entomology
- Any PL PATH course above 300

**Total Credits** 29-39

1 MATH 171 is a prerequisite for MATH 217.
2 MATH 221 Calculus and Analytic Geometry I/MATH 217 Calculus with Algebra and Trigonometry II is a prerequisite for MATH 222 Calculus and Analytic Geometry 2

**PLANT HEALTH AND INDUSTRY TRACK**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENETICS 466</td>
<td>Principles of Genetics</td>
<td>3</td>
</tr>
<tr>
<td>PL PATH 559</td>
<td>Diseases of Economic Plants</td>
<td>3-4</td>
</tr>
<tr>
<td>or BOTANY 500</td>
<td>Plant Physiology</td>
<td></td>
</tr>
<tr>
<td>AGRONOMY 100</td>
<td>Principles and Practices in Crop Production</td>
<td></td>
</tr>
<tr>
<td>AGRONOMY 300</td>
<td>Cropping Systems</td>
<td></td>
</tr>
<tr>
<td>AGRONOMY 302</td>
<td>Forage Management and Utilization</td>
<td></td>
</tr>
<tr>
<td>AGRONOMY/ HORT 328</td>
<td>Integrated Weed Management</td>
<td></td>
</tr>
<tr>
<td>BOTANY</td>
<td>Introductory Ecology</td>
<td></td>
</tr>
<tr>
<td>BOTANY/ ENVIR ST/ZOOLOGY 260</td>
<td>Plant Anatomy</td>
<td></td>
</tr>
<tr>
<td>BOTANY 300</td>
<td>General Anatomy</td>
<td></td>
</tr>
<tr>
<td>BOTANY/ F&amp;W ECOL/ ZOOLOGY 460</td>
<td>General Ecology</td>
<td></td>
</tr>
<tr>
<td>BOTANY 500</td>
<td>Plant Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM 501</td>
<td>Introduction to Biochemistry</td>
<td></td>
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<tr>
<td>BSE 216</td>
<td>Irrigation Systems - Design and Use</td>
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<tr>
<td>C&amp;E SOC/ SOC 140</td>
<td>Introduction to Community and Environmental Sociology</td>
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<tr>
<td>C&amp;E SOC/ SOC 222</td>
<td>Food, Culture, and Society</td>
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<tr>
<td>C&amp;E SOC/ HIST SCI 230</td>
<td>Agriculture and Social Change in Western History</td>
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<tr>
<td>C&amp;E SOC/ AMER IND/ SOC 578</td>
<td>Poverty and Place</td>
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<tr>
<td>ENTOM/ ENVIR ST 201</td>
<td>Insects and Human Culture-a Survey Course in Entomology</td>
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<tr>
<td>ENTOM/ ZOOLOGY 302</td>
<td>Introduction to Entomology</td>
<td></td>
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<tr>
<td>ENTOM 342</td>
<td>Insect Ecology</td>
<td></td>
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<tr>
<td>F&amp;W ECOL 100</td>
<td>Introduction to Forestry</td>
<td></td>
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<tr>
<td>F&amp;W ECOL/ ZOOLOGY 335</td>
<td>Human/Animal Relationships: Biological and Philosophical Issues</td>
<td></td>
</tr>
<tr>
<td>F&amp;W ECOL/ ZOOLOGY 360</td>
<td>Extinction of Species</td>
<td></td>
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<tr>
<td>F&amp;W ECOL 550</td>
<td>Forest Ecology</td>
<td></td>
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<tr>
<td>HORT 120</td>
<td>Survey of Horticulture</td>
<td></td>
</tr>
<tr>
<td>HORT/ PL PATH 261</td>
<td>Sustainable Turfgrass Use and Management</td>
<td></td>
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<tr>
<td>HORT/ LAND ARC 263</td>
<td>Landscape Plants I</td>
<td></td>
</tr>
<tr>
<td>HORT 320</td>
<td>Environment of Horticultural Plants</td>
<td></td>
</tr>
<tr>
<td>HORT 345</td>
<td>Fruit Crop Production</td>
<td></td>
</tr>
<tr>
<td>MICROBIO 101</td>
<td>General Microbiology</td>
<td></td>
</tr>
<tr>
<td>MICROBIO 102</td>
<td>General Microbiology Laboratory</td>
<td></td>
</tr>
<tr>
<td>MICROBIO 303</td>
<td>Biology of Microorganisms</td>
<td></td>
</tr>
<tr>
<td>MICROBIO 304</td>
<td>Biology of Microorganisms Laboratory</td>
<td></td>
</tr>
<tr>
<td>NUTR SCI 132</td>
<td>Nutrition Today</td>
<td></td>
</tr>
<tr>
<td>NUTR SCI/AN SCI/ DY SCI 311</td>
<td>Comparative Animal Nutrition</td>
<td></td>
</tr>
<tr>
<td>NUTR SCI 332</td>
<td>Human Nutritional Needs</td>
<td></td>
</tr>
</tbody>
</table>
UNIVERSITY DEGREE REQUIREMENTS

Requirements Detail

Total Degree
To receive a bachelor’s degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.

Residency
Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. “In residence” means on the UW–Madison campus with an undergraduate degree classification. “In residence” credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.

Quality of Work
Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.

LEARNING OUTCOMES

1. Define and explain major concepts in the biological sciences including Plant Pathology.
2. Appropriately use biological instrumentation and laboratory techniques.
3. Explain and apply the scientific method including designing and conducting experiments and testing hypotheses.
4. Recognize the relationship between structure and function at all levels: molecular, cellular, organismal, and ecological.
5. Demonstrate a style appropriate for communicating scientific results in written and oral form.
6. Integrate math, physical sciences, and technology to answer biological questions using the scientific method.

FOUR-YEAR PLAN

FOUR-YEAR PLAN
SAMPLE PLANT PATHOLOGY FOUR-YEAR PLAN—PLANT HEALTH AND INDUSTRY TRACK

Freshman

Fall          Credits Spring        Credits
MATH 112 or 113 (or 3 MATH 113 or 114 (or 3-5
STATS, COMP SCI)   STATS, COMP SCI)
CHEM 103 or 109    4-5 CHEM 104       5
First Year Seminar 1 Plant Health or Econ/          0-11
Acct/Mgmt

Gen Ed
0-11 Gen Ed       0-8

Total Credits 16-49
Sophomore

Fall | Credits | Spring | Credits
--- | --- | --- | ---
ZOOLOGY/BIOLOGY/BOTANY 151 or 101 | 5 | ZOOLOGY/BIOLOGY/BOTANY 152 or BOTANY 130 | 5
PHYSICS 103, 201, or 207 | 4-5 | PL PATH/BOTANY 332 | 4
Plant Health or Econ/ Acct/Mgmt | 0-9 | Plant Health or Econ/ Acct/Mgmt | 0-9
Gen Ed \(^1\) | 0-8 | Gen Ed \(^1\) | 0-8
Total Credits 18-53

Junior

Fall | Credits | Spring | Credits
--- | --- | --- | ---
PL PATH 300 | 4 | GENETICS 466 | 3
Plant Health or Econ/ Acct/Mgmt | 0-14 | PL PATH > 300 | 0-4
Gen Ed \(^1\) | 0-14 | Plant Health or Econ/ Acct/Mgmt | 0-15
Gen Ed \(^1\) | 0-14 | Plant Health or Econ/ Acct/Mgmt | 0-15
PL PATH 558\(^2\) | 3
Gen Ed \(^1\) | 0-15
Total Credits 10-72

Summer | Credits
--- | ---
PL PATH 559\(^2\) | 3
Total Credits 3

Senior

Fall | Credits | Spring | Credits
--- | --- | --- | ---
Plant Health or Econ/ Acct/Mgmt | 0-18 | Capstone Experience | 3
PL PATH > 300 | 0-4 | Plant Health or Econ/ Acct/Mgmt | 0-15
Gen Ed \(^1\) | 0-18 | Gen Ed \(^1\) | 0-15
Total Credits 3-73

Summer | Credits
--- | ---
PL PATH 559\(^2\) | 3
Total Credits 3

1 Gen-Ed requirements include communications, ethnic studies, humanities, social science, or international studies. See Requirements tab for more details.

2 Students can take either PL PATH 558 in the odd spring or PL PATH 559 in the odd summer

Note: Possible places where students may cut down on courses:
COMM-A placement test, COMM-B taken as ZOOLOGY 152, QR-A placement test, AP/IB credits (biology, social sciences, humanities, language, chemistry, physics, math, statistics)

**ADVISING AND CAREERS**

**UNDERGRADUATE ADVISING IN PLANT PATHOLOGY**

Students in plant pathology are assigned two advisors, the staff advisor (Sara Rodock, rodock@wisc.edu, appointment link (http://calendar.wisc.edu/scheduling-assistant/public/profiles/eBLVAOve.html)) and one of our faculty advisors. Current faculty advisors include:

- Dr. Caitilyn Allen
- Dr. Jeri Barak (lead faculty advisor)
- Dr. Brian Hudelson
- Dr. Amanda Gevens
- Dr. Mehdi Kabbage
- Dr. Paul Koch
- Dr. Richard Lankau
- Dr. Patty McManus

Undergraduates in plant pathology are required to meet with their advisor before they can enroll for the upcoming term. A hold will be placed on student records until they meet with their advisor.

For more information about the Plant Pathology major or the department in general, please contact either the lead undergraduate advisor, Dr. Jeri Barak, or the student services coordinator, Sara Rodock. Students with questions regarding lab positions (both paid and unpaid) in plant pathology should contact Dr. Jeri Barak.

**CAREERS AND PROFESSIONAL DEVELOPMENT**

For more information on careers available to plant pathology students please visit our Internship & Job Resources (http://www.plantpath.wisc.edu/student-internships-jobs) page. For more information on other academic, co-curricular, financial aid, and career opportunities and services available to plant pathology students, please visit the CALS "Building Your Career" (http://www.cals.wisc.edu/academics/undergraduate-programs/careerservices/career-development) page. Students in the major are welcome to make an individual appointment with Sara Rodock, rodock@wisc.edu (appointment link for current UW–Madison students (https://calendar.wisc.edu/scheduling-assistant/public/profiles/eBLVAOve.html)) to discuss career related topics such as career exploration, search strategies, graduate school, and review of application materials (resume, CV, letters, etc.).

**PEOPLE**

**PROFESSORS**

- Ahlquist, Paul
- Allen, Caitilyn
- Bent, Andrew
- Clayton, Murray
- MacGuidwin, Ann
- McManus, Patricia (chair)
- Rouse, Douglas
ASSOCIATE PROFESSORS
Barak-Cunningham, Jeri
Gevens, Amanda

ASSISTANT PROFESSORS
Kabbage, Mehdi
Koch, Paul
Lankau, Richard
Rakotondrafara, Aurelie
Silva, Erin
Smith, Damon

FACULTY ASSOCIATE
Hudelson, Brian

WISCONSIN EXPERIENCE

Undergraduates majoring in plant pathology at UW–Madison will find an inclusive, welcoming community where professors know their students and are able to provide guidance based on students’ specific academic and career goals. There are numerous opportunities to conduct research with internationally prominent faculty and to take part in the Wisconsin Idea, whereby faculty and students extend the knowledge developed at the university to stakeholders in Wisconsin and beyond for the betterment of society.

Plant pathology offers paid research internships during summer term, as well as paid or credit-earning research opportunities year-round. Undergraduates get a firsthand view of how research is conducted and what it means to be a professional scientist.

By joining the Plant Pathology Undergraduate Club, majors get to know their fellow students outside the classroom. The department provides resources for students to meet experts who lead discussions on a range of topics including cutting-edge research and technology, career options, and how to apply and compete for jobs.