

# Department of Plant Pathology and Plant-Microbe Biology

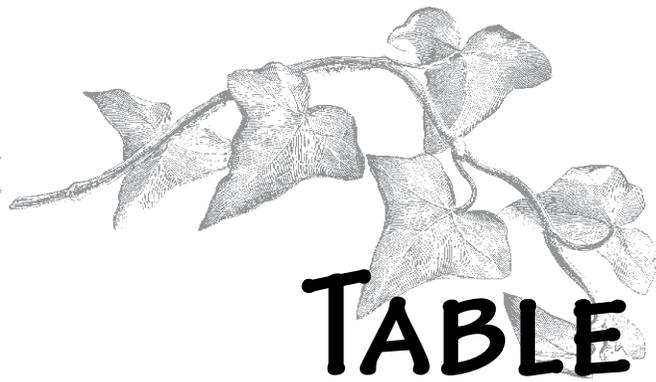


Cornell University



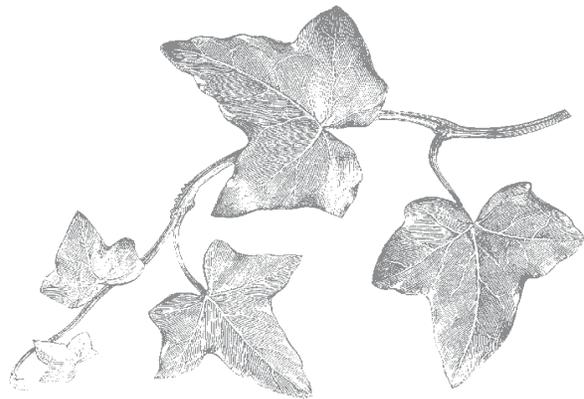
2009 Alumni Newsletter

Volume 51



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Send feedback and suggestions for future newsletters to [plantpathcornell@cornell.edu](mailto:plantpathcornell@cornell.edu)

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# GREETINGS

Fall 2009

## FROM THE CHAIR



George Hudler

Chair, Department of Plant Pathology and  
Plant-Microbe Biology

Greetings to all from the warm confines of the rock solid, Ivy-covered home we call the Plant Science Building! It's another beautiful autumn day, the deer are devouring the acorns dropped from the oaks along Tower Road, and the whistles of impatient coaches echo from the walls that surround now two sides of the athletic practice fields. The faculty and staff of our department (with the occasional gentle nudge from our senior editor, Dawn Dailey O'Brien) have prepared an array of brief notes to tell you what we've been up to, and with completion of this letter, we're ready to go to press. (At least, that's what my 'gentle nudge' said!)

As you will see from the contents of this year's edition of our Newsletter, we've been a busy group...in spite of the dismal economic news that is so pervasive in other media outlets. The University - thus, the department - may be feeling more pain than some of our colleagues because so much of what goes on at Cornell is funded with gifts and endowment income, both of which obviously tanked with the stock market crash. As we're told that we have turned the corner on the current recession, we're also reminded that the New York State budget deficit gets larger by the day and there is no visible light at the end of that fiscal tunnel...yet.

The University has responded to its financial problems with a Herculean effort to 'reimagine' itself. Faculty, staff and administrators have invested hundreds (maybe, thousands) of hours to reconsider the way we do literally everything. The hope is that superfluous administrative functions can be consolidated, redundancies in teaching and staff support can be eliminated, and other cost-saving measures can be identified *without loss of academic excellence*. The task is a formidable one and there is a lot of nail-biting going on as we await some definitive word with regard to task force reports and recommendations from the Provost's office. All of that should happen sometime in January.

Closer to home, one course of action that is receiving considerable attention is a pending merger with our sister department in Geneva. Under any circumstances, but most certainly in times of economic distress, maintenance of two departments with the same name is indefensible. We've been asked to fix that and have begun the delicate negotiations that will eventually allow us to function seamlessly as one harmonious team, albeit with some scenic mileage between the two campuses. The merger won't result in immediate savings, but the expectation is that we'll develop a new, unified strategic plan to cope with the significant number of retirements expected at both campuses in the next 5 years. That 'coping' will most surely include some faculty downsizing; we're just not sure how much and for which program areas.

In view of the many changes on the horizon, our spirit remains high and we're looking forward to another year. We've been winning our share of grant competitions and career awards, and the graduate students and post-docs are keeping us socially engaged with frequent department outings and in-house celebrations. As you turn the pages that follow, I hope you'll agree with me that Cornell Plant Pathology and Plant-Microbe Biology (PPPMB) remains at the head of its class. And if this isn't enough, then go to [pppmb.cals.cornell.edu](http://pppmb.cals.cornell.edu) to check out our web page. Feature stories are changed at least monthly and sometimes more often as we try to keep up with our very busy and productive faculty and students.

With sincere best wishes,



CORNELL UNIVERSITY  
DEPARTMENT OF PLANT PATHOLOGY  
AND  
PLANT-MICROBE BIOLOGY

# FACULTY

# NEWS

## Gary Bergstrom

Activities of the Bergstrom lab were covered in detail in the 2008 Newsletter and most of these are continuing. Katie Waxman coordinates the many lab and field activities of the field crops research group, and Stan Kawamoto continues part-time. Graduate students Julia Crane, Christine Layton, Michael Wunsch and Brian King (joint with Donna Gibson) each made great progress on their studies in 2009. Research associate Marshall Hayes joined the lab in October 2009 to work on fungal enzymes for conversion of lignocellulosic biomass for biofuel production (joint with Donna Gibson and Larry Walker labs). The research group was successful in receiving new grants from the New York Farm Viability Institute (management of switchgrass smut), the Northern New York Agricultural Development Program (management of brown root rot of alfalfa), and the Northeast IPM Center (alfalfa resistance to brown root rot). Highlights of Gary's extension program included a one-day intensive seminar on Wheat Management, numerous field day and winter meeting presentations, and work with the New York Corn Growers Association to organize a New York Crops Tour.

Gary traveled to Scandinavia in January 2009. He presented a seminar at the Norwegian Institute for Agricultural and Environmental Research (Bioforsk) and the Norwegian University of Life Sciences in Ås, and met with plant pathology colleagues there to discuss small grains pathology research. He was hosted by Dr. Guro Brodal and Professor Anne Marte Tronsmo. Bergstrom also



'Opponent' Gary Bergstrom congratulating 'Doctoral Candidate' Eva Blixt on successful defense of her thesis at the Swedish Agricultural University in Uppsala in January 2009.

visited the Swedish Agricultural University (SLU) in Uppsala where he was hosted by Professor Jonathan Yuen (Cornell Ph.D. '82) and Dr. Annika Djurle. [Djurle and Yuen later visited Cornell in June 2009]. Bergstrom presented a research

seminar and discussed research and outreach with colleagues at SLU and the Swedish Board of Agriculture. Bergstrom served as the invited 'opponent' at the doctoral thesis ('On *Phaeosphaeria nodorum* on Wheat') defense of Eva Blixt, a student of Yuen, Djurle, and Dr. Åke Olson at SLU. Also serving on the defense committee were Dr. Hans Pinnschmidt of Denmark, Professor Anne Marte Tronsmo of Norway, and Dr. Jiasui Zhan of Scotland. Dr. Blixt successfully defended her thesis and celebrated with a formal Swedish party in the 'gärna högtidsdräkt' tradition of white ties for gentlemen and traditional folk dresses for ladies. The party was held in the garden house of Carl Linnaeus, the father of taxonomy.

## Alan Collmer

The work in Alan Collmer's lab has continued to focus on the functional genomics of *Pseudomonas syringae*, with an emphasis on the type III secretion system. In a nutshell, we have identified just about all of the genes in the model strain *P. syringae* pv. *tomato* DC3000 that encode proteins that travel the type III pathway, and we are now systematically disassembling the system, looking for weaknesses to exploit for disease control. Another major activity involves the development and use in genome annotation of Gene Ontology terms that provide a universal language for processes in pathogenesis. This effort has been led by collaborators Candace Collmer (Wells College) and Magdalen Lindeberg (Cornell) and culminated in several review articles in special issues of *BMC Microbiology* and *Trends in Microbiology*. The major meeting trip for the lab this year was the IX International Congress on Molecular Plant-Microbe Interactions in Quebec City in July.

However, the really big events this year were graduations and departures. Brian Kvitko, a graduate student in the Field of Microbiology, completed his Ph.D. thesis "Construction of *Pseudomonas syringae* pv. *tomato* DC3000 polymutant strains to uncover functional groups in virulence" and then left in January to do postdoctoral work on human pathogens at Colorado State University. Joanne Morello completed her Ph.D. thesis on "Identification of extracellular components and early regulation steps in the type III secretion system of *Pseudomonas syringae*" in 2008 and then did postdoctoral work on the *P. syringae* project until leaving at the end of summer 2009 for a coveted AAAS Science & Technology Policy Fellowship in Washington, DC. Finally, Alistair Russell, an extremely talented undergraduate Microbiology major, who had been an important member of the lab for 3 years, left for graduate studies in pathogenic microbiology at the University of Washington, Seattle.

## Bill Fry

We were lucky to host two alumnae during this past year. Theresa Yun Lee was back on sabbatic from Korea. Theresa is currently working on *Plasmiodiophora brassicae* with a long term goal of developing microsatellite markers to assess genetic diversity of this organism. However, in addition to working on *P. brassicae*, Theresa was also involved in a population study of *Phytophthora capsici*. Fortunately, in this study we had a large collection and several microsatellite markers (developed in South Africa, see below). We were a component of a study involving Amara Camp, Chris Smart and Helene Dillard. Theresa returned to Korea in the late winter. It was great to see her once again in the department.

During the summer Adele McLeod took a mini-sabbatical from the University of Stellenbosch, in South Africa. It was in Adele's lab where Julia Meitz, a post doc with Adele, developed the markers. Adele was working on manuscripts but also aided our study of the 2009 late blight epidemic in northeastern USA. (Thanks Adele.)

Late blight became a household word with gardeners in much of the northeast this summer. The first warning was signaled on 23 June by Meg McGrath on Long Island. However, Keith Perry got everyone excited when he bought a tomato transplant

**Late blight became a household word**

at one of the major "box" stores in Ithaca on 24 June. This plant (and many, many others) was plastered with late blight lesions. Tom Zitter found infected transplants in all the major box stores in Ithaca, but not in those stores using locally produced transplants. Meg subsequently found infected transplants on Long Island. Thus, these infected transplants were not limited to Ithaca, but were distributed at about the same time in many states in the Northeast. Some store managers were told that they should get rid of the infected plants; unfortunately this caused some to put them "on sale". Thus, there was inoculum very widely distributed in mid-late June in many, many locations. The weather in the Northeast was very favorable to late blight in the summer 2009, so there was a significant epidemic – affecting home gardeners and organic producers first, but also causing a problem subsequently for conventional potato and tomato growers. Adele, Kevin Myers, and Paola Zuluaga were instrumental in characterizing these isolates using a series of markers. Their work confirmed the expected: the major strain of *Phytophthora infestans* on tomatoes and in home gardens this summer was a new strain that previously had not been "named". The strain found in home gardens and organic operations was identical to the strain detected in the box stores.

The lab continues studies on species of *Phytophthora* with emphasis on *P. infestans*. Lab personnel now consist of Kevin Myers, Paola Zuluaga, and Asia Zambrano, a visiting scientist from Venezuela. Asia is working with Paola on resistance in plants to *P. infestans*. We were fortunate to host a student from Colombia, Giovanna Danies Turano, who wanted to characterize the interaction between *P. infestans* and Cape Gooseberry. We were sorry to lose Guohong Cai who moved to Rutgers in January where he continues some work on *Phytophthora* viruses.

## Hudler Lab

Students and staff continue to focus considerable energy on *Phytophthora* diseases of European beech. Treatment of diseased trees with a phosphite fungicide applied as a bark drench seems to stop continued expansion of above-ground cankers, but knowledge of the amount of activity in root systems and in tissues other than bark in the stem remains elusive. Shawn Kenaley, a recent transplant from West Virginia University, directs the day-to-day operations and is particularly excited by a recent collaboration with the landscape management staff at the high profile Greenwood Cemetery in Brooklyn. This 500 acre site is home to nearly 200 mature European beech, many healthy but some with the disease. To have so many trees in one place and under the care of one person/organization is a rare opportunity to do some epidemiological work that has previously eluded the research team.

Kenaley and Hudler are also teaming up with Dr. Larry Smart (formerly at SUNY-ESF, now at the NYAES in Geneva) to learn more about diseases affecting willows grown as biofuel. Leaf rusts seem to pose the greatest threat to yields in surveys so far, but this rapidly expanding field promises to hold many surprises in the years ahead.

**this rapidly expanding field promises to hold many surprises**

Elsewhere in this newsletter, you will read about yet another new development on the tree health front; one that we were bursting at the seams to tell you about last year at this time but couldn't for fear of breaching the chain of communication among state and federal officials. That is/was discovery of oak wilt in a neighborhood in Scotia, NY near Albany. Concerned homeowners first raised the alarm, Cooperative Extension Educator Chris Logue suspected something more than a usual "decline", and Sandra Jensen expertly cultured the pathogen. Hudler and Kenaley followed up with additional lab and library research, and the find – the first in NY – was confirmed.

Finally, congratulations to Angela Nelson who completed the requirements for the Ph.D. in June, and soon thereafter gave birth to a new (her second) daughter. Angela will be staying in the Ithaca area with her family and, at least for the short run, will be teaching an online college-level course in ecology.

## Dick Korf

Dick Korf reports from his ample lab space in the new Plant Pathology Herbarium building off Game Farm Road that despite rotator cuff arthroscopic surgery to his right shoulder, debilitating him for 6 weeks in a sling (while he learned how to type emails left-handed) and another six months of physical therapy, this has been a more active research period for him than since the early 2000s. A late 2008 paper of his, mostly on a nomenclatural problem, appeared in an Argentinian journal as part of an 80<sup>th</sup> year Festschrift for their famous discomycete specialist, Irma Gamundi de Amos. A memorial statement for George Kent, co-authored with Wayne Sinclair and Jim Lorbeer, to appear in the annual university summary of faculty deaths turned out to be an exciting trip down memory lane for all of us, reworking each others ideas till we now don't know who wrote what.

The first publication in 2009 was the issuance of two more fascicles (each of 25 specimens) of *Discomycetes Exsiccatae*, half again as many as in the first 4 fascicles issued way back in 1955-1981. (Korf knew that he had many hundreds of discomycete specimens just “waiting” to be worked on, and a logical choice for research in retirement, where he could pick up one at a time; if satisfied with what he knew earlier and what has been published since, he could do it up, putting aside those with still too much to learn to feel they were ready for distribution worldwide to 13 other mycological herbaria). A paper with the collecting data for each specimen was published in the Jan-Mar volume of *Mycotaxon*, co-authored with our curator, Bob Dirig, who together with the help of a Herbarium volunteer, Doug Murray, accomplished the Herculean physical task of assembling, packeting, printing, labelling, mounting, and mailing of both fascicles. In that same volume Korf contributed a book review of *Indian Sarcoscyphaceous Fungi* by V.P. Tewari, now an emeritus professor of Benares Hindu University, who did his master’s thesis under Korf. Shortly thereafter an 8-page article by Hawaii-located mycologist, Prof. George Wong and Korf - something like 4 years in preparation - appeared in *Pacific Science*, the journal of first choice by many Pacific rim researchers on all scientific subjects. A recent paper entitled “Can we really afford an International Code of Nomenclature?” has been accepted for publication.

The final transfer of Korf’s personal herbarium, housed till recently in the office-lab of his successor, Kathie Hodge, to the new building has facilitated his further work on Discomycetes, which is what he most enjoys about his leisurely retirement. Visitors are always welcome to the Herbarium. Call Korf on his cell phone to make an appointment if you want to see him there, 607-280-5645. It backs up onto McGowan’s Woods, a famous small forest used extensively by mycologists and plant pathologists since the days of Atkinson, Whetzel, Fitzpatrick and their students because of its easy access from campus. Many species new to science were described from that one patch of still extant woods.

### Magdalen Lindeberg

Magdalen Lindeberg received funding in April 2009 from the Florida Department of Citrus for the proposal ‘Bioinformatic characterization and development of a central genome resources website for *Candidatus Liberibacter asiaticus*, the causal agent of citrus greening (Huanglongbing) disease’. Magdalen and Dr. Surya Saha, a post-doctoral associate supported by this grant, have begun work on characterization of regulatory elements, repeated motifs, and other aspects of genome architecture. This project puts to use analytical approaches developed in collaboration with the research groups of Alan Collmer and Dave Schneider (USDA-ARS) for *P. syringae* genome analysis, highlighting the importance of model systems such as *P. syringae* for development of broadly relevant analytical strategies. More information can be found at the Citrus Greening-HLB Genome Resources website (<http://www.citrusgreening.org>)

This project puts to use analytical approaches

### Rose Loria

The Loria lab has had a very busy year. Our most recent and exciting news is a new Agriculture and Food Research Initiative grant for functional genomics of the potato pathogen, *Streptomyces scabies*. We can now fully utilize our genome sequence to dissect the response of this important bacterium to the potato host during infection! Expect lots of great data on this new “model system”.

We can now fully utilize our genome sequence

The lab now consists of Madhumita Joshi, Dawn Bignell and Jose Huguet-Tapia, all postdoctoral scientists or research associates. Madhumita has made great progress on dissecting the defense response of plants to *S. scabies*; the “first chapter” of this story is being preparing for publication now. A manuscript on *S. scabies*’ ability to produce a coronatine-like compound has been accepted for publication in *MPMI*, with Dawn as the senior author. Jose is a newly minted Ph.D. from my program who will stay on to help us with our bioinformatic needs. His thesis work will be incorporated into several papers, one of which describes the *S. scabies* genome. Ryan Seipke left the lab for a postdoctoral position at the University of East Anglia, after a short stint as a postdoctoral scientist in the lab. Ryan now works with Matt Hutchings investigating lipoproteins and secondary metabolites in actinobacteria, including *S. scabies*. Ryan’s paper on hopanoids in *S. scabies* has just been published in the *Journal of Bacteriology*. Joanna Fyanns, a Ph.D. candidate at the University of Dundee, spent a productive two months in the lab learning how to inoculate plants with *S. scabies*, and follow infection microscopically. We collaborate with Joanna’s advisor, Tracy Palmer, on the role of secreted proteins in host-pathogen interactions. Our lab is working tirelessly to convert molecular microbiologists working on other streptomycetes into plant pathologists!

Dawn Bignell and Rose Loria spent two weeks in China, a first for both of them! In Chengdu they were hosted by Aiping Zheng, from the Rice Research Institute of Sichuan Agricultural University. Visits to the Hualong and Jiuzhaigou World Heritage Sites and the Panda Research Center in Chengdu were highlights of an event filled week. Shanghai was the site of the 15<sup>th</sup> International Society of Actinomycete Biology meeting, attended by a 1,000 scientist from around the world. Both Dawn and Rose made presentations at this meeting, and had the opportunity to experience the modern and bustling city of Shanghai.

Stay tuned for an expanded lab group and new tales of genome-based adventures in the next edition!

### Rebecca Nelson

Rebecca Nelson’s group works on disease resistance in maize. There are currently six graduate students in the lab – four from PPPMB and two from Plant Breeding and Genetics (Rebecca has a joint appointment in the two departments). The group’s work is focused on understanding the genetic basis of quantitative disease resistance to diverse fungal pathogens that attack maize. The lab’s interest spans basic and applied aspects of disease resistance. On the more basic side, the group has

mapped numerous genetic loci to very fine resolution, used a range of methods to ask how the genes affect pathogenesis, and is well on their way to cloning some of the genes. On the more applied side, there is a strong interest in disease management and improved resistance through marker-assisted breeding.

From February through June, Rebecca and her family were on sabbatical leave in Kenya. While in Nairobi, Rebecca was

**Rebecca and her family were on sabbatical leave in Kenya**

generously hosted at the BioSciences east and central Africa Hub at the International Livestock Research Institute's Nairobi campus (the ILRI-BecA Hub -- the Hub's director,

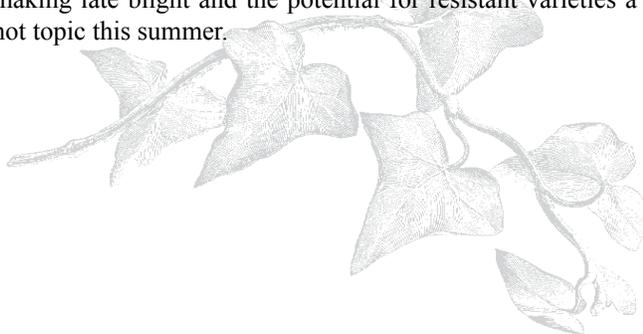
Dr. Segenet Kelemu, had done a post-doc in Cornell's Plant Pathology department in years past). At the ILRI-BecA Hub, Rebecca pursued interests as a scientist by helping to establish a research effort on aflatoxin. She is part of a collaborative team that involves the ILRI-BecA Hub, Michael Milgroom of PPPMB, graduate student Samuel Mutiga, and other faculty at Cornell and the University of Maryland, as well as scientists in the east African region.

At Cornell and at the IRLI-BecA Hub, Rebecca also carried on her duties as Scientific Director and regional Liaison Scientist for the McKnight Foundation's Collaborative Crop Research Program (CCRP). With a recent grant from the Bill & Melinda Gates Foundation, the CCRP has been expanded and several new calls for proposals have been in the works.

### Tom Zitter

Tom Zitter continues conducting field programs for disease control for cucurbits, tomatoes and potatoes. He has been working with Martha Mutschler in Plant Breeding to develop tomatoes adapted to the NE with resistance to late blight, early blight and Septoria leaf spot. Members of the department were again treated to transplants of the variety 'Mountain Magic', which is currently the only Cherry variety with genetic resistance for late blight. So while all other tomatoes in Tompkins County were lost to late blight, the 'Mountain Magic' variety and those with the same resistance in developing lines grown at Freeville thrived, even in our cool and damp season. The 'Mt Magic' hybrid was developed by former Ph. D. Cornellian Dr. Randy Gardner during his career at NCSU located in Fletcher, NC. Late blight was introduced into much of the NE on disease transplants sold at big box stores, making late blight and the potential for resistant varieties a hot topic this summer.

**'Mountain Magic', is currently the only Cherry variety with genetic resistance for late blight**



## Undergraduate Courses in Plant Pathology & Plant Microbe Biology at Cornell

Recently, PPPMB faculty have responded to the pleas for undergraduate courses in our field. These innovative new courses creatively meet the needs of undergraduates. Each has their own twist but together represent the faculty's dedication to introduce undergraduates to their worlds of study. Here are some of our new course offerings.

### Mushroom, Molds and Molecules (PLPA 2015) taught by Gillian Turgeon

Lectures and exams for this course are the same as those in PLPA 2010, Magical Mushrooms, Mischievous Molds. However, students in PLPA 2015 also participate in a weekly 50 minute discussion section that provides more in-depth exposure, to some of the issues raised in 2010 lecture. Experts emphasize that fungi produce myriads of molecules that are beneficial to other organisms



*Mushrooms, Molds & Molecules class poster*

(e.g., antibiotics, immunosuppressants, biocontrol agents) or to themselves (e.g., for development, reproduction, nutrient gathering, stress reduction), or detrimental to other organisms (e.g., toxins, poisons, allergens, hallucinogens).

### Medical and Veterinary Mycology (PLPA 3290/VETMI 3290) taught by Kathie Hodge

Medical and Veterinary Mycology focuses on fungi that cause diseases of people and animals. Some are fairly benign, like athlete's foot and tinea versicolor. Others are aggressive and deadly, like aspergillosis and coccidioidomycosis. We took a survey approach, covering major diseases, the epidemiology and biology of the pathogens, clinical presentation and approaches, and, for a subset of pathogens, immunology and genetics. We also covered antifungal drugs, mycotoxins, allergens, and other topics. The course was taught in lecture-only format this first year, but will soon expand to a 3 credit course including a demo lab/discussion section. Intro Bio is the only prerequisite, and almost all students were undergraduates.



*Poster session at Mann library for Medical and Veterinary Mycology class*

### First-Year Writing Seminar-Evolution:Evaluating the Public Debate (PLPA 1200) taught by Rose Loria

As a freshman writing seminar, the course goal is for students to develop writing skills that will enable them to write engaging, informative and persuasive documents, through skill development and practice of the writing process. Writers need something to write about and this course focuses on an important and relevant issue - the public debate over legitimacy of evolution as a central scientific theory. Though we live in a world infused with science and technology, most of the general public and a significant number of Cornell students are not sure that evolution is true. Evolution, the theory that organisms are connected by genealogy and change over time, is well supported and accepted as true by the scientific community. Nevertheless, there is an emotional debate outside scientific circles about the legitimacy of evolution as an explanation for the diversity of life on earth, and the existence of humans in particular.



### Microbes and Food: Contemporary Issues Affecting Humanity, (PLPA 4090) taught by Steven Beer

This course was conceived and designed SPECIFICALLY as a Senior Seminar for Biology and Society students and others wanting to round-out their knowledge and appreciation of contemporary issues relative to food and microbes. It assumes a basic knowledge of microbiology, comparable to that offered in Microbiology 2900. Students participating in this seminar will develop a detailed understanding of several issues that are of immediate relevance to modern society. Topics covered included the role of microbes in food production, genetically engineered organisms, solid and liquid waste treatment, food-borne pathogens, food production techniques for the expected 10 billion world population in 2050, food processing and preservation based on microbial action.



*Microbes and Food field trip to the Cornell Dairy Plant*

Despite the trepidation of trying something different the faculty members all enjoyed the challenge of teaching the new courses and getting out of their own comfort zones. Kathie Hodge said it was exciting to learn a new side of mycology and Rose Loria noted that doing something new helps her stay fresh and excited about her work.

In general it was rewarding for the faculty to teach PPPMB courses to undergraduates. Gillian Turgeon enjoyed finding ways to distill scientific research on fungi such that it was appealing to non-science and science majors. For the Evolution: Evaluating the Public Debate class, Rose noted “Working with Cornell freshman is exciting because of their intelligence, energy, and ability to think independently. The topic of evolution

has scientific, historical, and contemporary significance, allowing for wide ranging and stimulating scholarly discussions.”

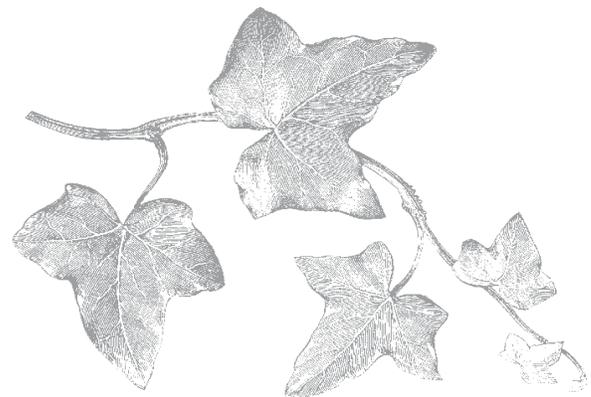
The faculty all had positive and sometimes glowing feedback from the students and found it gratifying to teach sometimes difficult concepts. Most of the students were clearly excited about the topics and were enthusiastic to learn. However, Gillian Turgeon echoes the sentiment of many teachers on campus when she noted how some students sat in the back texting on their cell phones and surfing on their computers.

The experiences of the faculty teaching undergraduates were not all the same however and there were some surprises. Rose Loria was impressed with the sophistication and breadth of experiences that some of the freshman have while Steve Beer was surprised how little prior knowledge mostly senior students in his class had about the topics covered in class. Another unexpected outcome was in Hodge’s class she noted that of 54 students, only 6 were male!

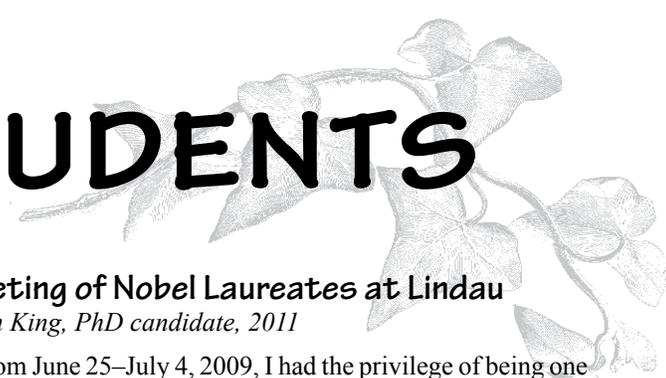
These courses involved more than just traditional course work of lectures and exams. As part of the Medical Mycology course the students worked in small groups on educational posters about topics in med/vet mycology. Then they had a big poster extravaganza in the Deans’ Room at Mann Library. Kathie said “The quality of the work was so high and I felt so proud of them all!” During the Microbes and Food class there were several 75-minute field trips to observe “Microbes in Action”, including the Cornell dairy plant, the Ludwig antibody production facility, Ithaca sewage treatment plant and the Ithaca beer brewery. Rose Loria steps out of the conventional classroom setting by teaching her freshman writing seminar at one of the North campus dorms.

The courses will continue to grow and improve in the years to come and Eric Nelson and Teresa Pawlowska have even more new offerings in the pipeline. Stay tuned!

**“Working with Cornell freshman is exciting because of their intelligence, energy, and ability to think independently.”**



# GRADUATE STUDENTS



## Welcome to Our New Graduate Students Fall 2009

Crocker, Ellen

B.A. Williams College, Williamston, MA 2006,  
major: Biology and History

**Research Experience:** Forest pathology and Ecology

**Interests:** Plant-pathogen roles in natural ecosystems,  
microbial mediation of invasive organisms.

**Chairperson:** Eric Nelson

Kathryn Fiedler

B.S. Dickinson College, Carlisle, PA 2007,  
major: Biology

M.S. University of Massachusetts Amherst, Amherst, MA  
2009, major: Plant & Soil Science

**Research Experience:** Forest succession, wetland  
biodiversity, Resveratrol regulation in *Vitis vinifera*, control  
options for grape powdery mildew

**Interests:** Botrytis and powdery mildew of *V. vinifera*,  
infection processes, alternative disease control

**Chairperson:** Robert Seem

Lisa Jones

B.S. Cornell University, Ithaca, NY 2001, major: Plant  
Biology

**Research Experience:** Identifying plant pathogens new to  
Florida and new hosts of existing plant pathogens for the  
Florida Department of Agriculture and Consumer Services  
including *Candidatus Liberibacter asiaticus*, *Phytophthora  
ramorum*, and phytoplasma diseases of palm trees.

**Interests:** Diagnosis and Detection strategies and technology

**Chairperson:** Christine Smart

Alexa Schmitz

B.A. Oberlin College, Oberlin, OH 2006, major:  
biochemistry. B.M. Oberlin Conservatory 2006, major  
violin performance

**Research Experience:** DNA aptamer selection; Ecology  
of arbuscular mycorrhiza; Type III secretion by *Shigella  
flexneri*.

**Interests:** Linking the molecular signaling of plant-microbe  
symbiosis to its ecology and evolution.

**Chairperson:** To be determined

Tien Tran

B.S. Nong Lam University, Ho Chi Minh City, Vietnam  
2005, major: Biotechnology

**Research experience:** Entomopathogenic fungi *Beauveria  
bassiana* and ITS-rDNA sequence

**Interests:** Plant-pathogen interaction; nematodes

**Chairperson:** Xiaohong Wang

## Meeting of Nobel Laureates at Lindau

Brian King, PhD candidate, 2011

From June 25–July 4, 2009, I had the privilege of being one of three Cornell graduate students and 77 U.S. students to participate in the 59<sup>th</sup> Meeting of Nobel Laureates at Lindau on Lake Constance in Germany. What are the Lindau Nobel Laureate Meetings? Since 1951, they are based in “the concept of bringing together Nobel Laureates and students/young scientists in a relaxed and informal atmosphere.” The U.S. delegation was sponsored by the U.S. Department of Energy, the National Science Foundation, the National Institutes of Health, Oak Ridge Associated Universities, and Mars Incorporated.

In 2009, the meeting was dedicated to chemistry, with a subtheme of global climate change and alternative energy solutions. For one week, 23 Nobel Laureates interacted with 600 young researchers from around the world. Among the laureates at the meeting were Osamu Shimomura, Martin Chalfie, and Roger Y. Tsien who shared the 2008 prize in chemistry “for the discovery and development of the green fluorescent protein, GFP.” Also at the meeting was Richard Ernst, who won the 1991 prize in chemistry “for his contributions to the development of the methodology of high resolution nuclear magnetic resonance (NMR) spectroscopy.” Sir Harold Kroto was at the meeting. He shared the 1996 prize “for their discovery of fullerenes,” better known as buckeyballs. And the three men who shared the 1995 prize “for their work in atmospheric chemistry, particularly concerning the formation and decomposition of ozone [and the role of CFCs],” Paul J. Crutzen, Mario J. Molina, and F. Sherwood Rowland, were there. They have now focused much of their attention on greenhouse gasses and global climate change.

On a lighter note, I had dinner with Werner Arber, who shared the 1978 prize in physiology or medicine “for the discovery of restriction enzymes and their application to problems of molecular genetics.” From personal accounts of Richard Ernst playing with his uncle’s chemistry set as a child in the attic, to the serious claims of Paul Crutzen that we are living in a new geologic era, the Anthropocene, named for the influence of human activity on global climate, the meeting certainly achieved its goal to “educate, inspire, and connect.” And the town of Lindau and the island of Mainau were lovely as well!

I would like to particularly thank my advisor, Donna Gibson, and my committee member, Larry Walker, for nominating me to attend this meeting. I would also like to thank our Director of Graduate Studies, Michael Milgroom, who encouraged Donna to nominate me. For more information about the meeting including videos of lectures, check out <http://lindau-nobel.de/>.



# DEPARTMENT DOINGS

## 2008 Fall Staff Retreat to the Cornell Lab of Ornithology and Herbarium

*Kelly A.W. Bulkeley*

On October 9, 2008, PPPMB staff members were treated to an exciting fall retreat that included visits to two CALS research facilities. The adventure began at the Cornell Lab of Ornithology, which is not just for the birds by the way, as we learned on our guided tour with extension specialist Charles Eldermire. The Lab of Ornithology focuses on studying North American birds, but also supports programs involving other vertebrates, whales and elephants in bioacoustic, conservation science, evolutionary and population studies. During the tour, staff members were able to see laboratories and various behind-the-scenes facilities, including specimen storage areas featuring rare and brightly-colored birds dating back to the 1800s.



*Guided tour of the Lab of Ornithology*

After lunch, the PPPMB staff made their way to the newly renovated Cornell Plant Pathology Herbarium. Located on Game Farm Road, the herbarium features a large collection of preserved fungi and other pathogens. We learned from Curator and intrepid tour guide Robert Dirig that roughly 400,000 different specimens are housed there, and that all of those specimens comprise the 4<sup>th</sup> largest mycological collection in North America. The staff enjoyed viewing these specimens, both dried in envelopes and preserved in jars, as well as a large collection of photographs of fungi and plant diseases.



*Bob Dirig giving tour the of Herbarium*



*A 22-foot-long skeleton of a reticulated python in the Cornell University Museum of Vertebrates housed at the Lab of Ornithology.*

## PPPMB Touchdown Tailgate Party Scores A Victory

*Marshall Hayes*

On November 1, 2008 nearly thirty PPPMB faculty, staff, students and friends gathered at the Schoellkopf Field Crescent and made the Department's 1<sup>st</sup> Annual Football Tailgate Party a resounding success. Thanks to everyone who came out and participated!

The "Touchdown Tailgate" was the brainchild of George Hudler, PPPMB Chair, and was scheduled to correspond with the annual CU Employee Celebration Day. Festivities began mid-morning with the arrival of Shawn and Carol Fisher (and family) and their trusty "Little Red Truck", fully outfitted with dual grills, tables, chairs and other tailgating essentials. Parked alongside the Cornell Football Association's own tailgating venue, Little Red served proudly as the tailgate centerpiece – even offering prime viewing and listening of the traditional pre-game concert by the Cornell Big Red Marching Band.



With midday temperatures barely reaching the low 50s, the tailgaters warmed up to George Hudler's award-winning Chili, Shawn and Alicia Kenaley's succulent New England Clam Chowder and Marshall Hayes' Mulled Cider and "Ain't the Anchor Bar, but Pretty Darn Close" Buffalo Wings. Food, beverages and camaraderie were plentiful!

On the field, the Big Red played host to the Ivy League rival Princeton Tigers and gave the home crowd of 7,122 something to cheer about, taking an early 13-0 lead on a strong performance by quarterback Nathan Ford and two field goals by



Brad Greenway. Cornell held a 13-10 advantage going into halftime, and the promise of a victory gave

some of the PPPMB crowd enough incentive to return to the parking lot and keep the party going.

Although the Tigers took control in the second half, the game came to a thrilling end. Cornell's Horatio Blackman caught a touchdown pass with 41 seconds remaining, pulling the Big Red to within 5 points. After recovering an onside kick, Cornell then drove to the Princeton 15-yard line with 9 seconds left. Ford's final pass attempt to Jesse Baker fell incomplete as time expired. Sadly, the Big Red came up on the losing end of the final score of 31-26.

# DEPARTMENT DOINGS

## Chili Cookoff

Joanne E Morello

The Plant Pathology Graduate Student Association once again participated in hosting the very popular “Annual Battle of the Plant Sciences Chili Cookoff” in November 2008. For this event, volunteers from Plant Pathology, Plant Biology,



John Gottula, Santiago Mideros and Michael Milgroom enjoy the festivities.

Plant Breeding and Horticulture put forth representative chilies in meat, vegetarian and wild-card categories. Attendance and tasting is free to all department members, who vote for their favorites in each category. Turn out was good again this year, and the graduate student associations were able to raise money through raffle and beverage sales. Plant Pathology had several delicious chilies, and although none came home with the grand prize, they definitely earned some department members bragging rights! Department graduate student Brian King and his band “Barley Legal” also provided the live musical entertainment.

Plant Breeding and Horticulture put forth representative chilies in meat, vegetarian and wild-card categories. Attendance and tasting is free to all department members, who vote for their favorites in each category. Turn out



Chili taste testers Kari Peters and Joanne Morello.



Sandra Jensen at the Chili Cookoff.



Brian King and his band “Barley Legal” provided live music.

## Light in Winter Event

Dave Kalb

A unique group of mycological and plant pathological related photos, videos and posters were displayed in Mann Library early this year from January through the end of February. The event was a joint effort from Kathie Hodge, Dave Kalb, Kent Loeffler, Susanne Lipari and grad students Marin Brewer and Alison Jack. The first part of the displays consisted of many framed photos of unique minuscule fungi and related organisms photographed from the boroscope with interesting captions written by Hodge. Many of these photos are part of a book published by Hodge and Loeffler entitled *Beneath Notice*.



Light in Winter display at Mann Library

In addition to the photos, TV monitors ran a continuous loop of many of the time lapse videos created by Loeffler. Various specimens obtained or produced by Kalb and Hodge were photographed for time-lapse video in Kent’s studio. The videos were organized in a continuous loop for constant playback to entertain viewers.

The last items on display were a series of large (3' x 6') posters with various fungal themes like “Fungal products in your medicine cabinet”. This poster was a large cabinet representing various items produced or containing compounds produced by fungi. One could lift up the tab of the item to reveal more detailed information about the fungal compounds. For example, under the part of the poster that showed a box of a prescription of “Migranal” one would read about dihydroergotamine, used as an anti-migraine produced by *Claviceps purpurea*. There were also posters on mycotoxins, “Fungi in your pantry” and “The good, the bad and the ugly”



An interactive poster at Light in Winter event.

Although the items were up for display for many weeks, they were planned as part of the annual Ithaca Weekend Celebration of Art and Science called “Light in Winter”. The public, young and old, was invited to see the photos, videos and posters after a kick-off lecture given by Hodge entitled *Beneath Notice: Little Fungi for Good and Evil*.

Over one hundred people visited the displays, which on the actual day of the kick-off included a coloring table with various fungus related items for the younger ones.

# DEPARTMENT DOINGS

## 2009 Annual Bowling Tournament

Julia Crane

The annual PPPMB bowling tournament was held on April 3<sup>rd</sup> at Cornell's Helen Newman Lanes, and all reports indicated that it was an enormous success! Over 50 faculty, staff, students, and their family members participated in the event, making it even larger than last year's tournament. A wide variety of skills were on display, from children practicing on bumper lanes to experts throwing down strikes. Bowlers from the Ithaca and Geneva departments fought side-by-side, and camaraderie was in the air as friends and peers chatted over pizza, soda, and beer.

Of course, besides being fun, the tournament was also a competition between teams and individuals. The trophy for the best team average went to the Geneva Team (126.5), with runner-up team Marin Brewer et al. (124.2). The highest individual score was recorded by Nick Gilbert (179), with Nick Sakowsky (161) and Ryan Seipke (160) taking 2<sup>nd</sup> and 3<sup>rd</sup>, respectively. Unlike

last year, when student/postdocs topped faculty/staff, this year Faculty/Staff beat out the students/postdocs, with an average of 107.9 vs. 104.9. Teams also competed for most creative team uniform, and while there were a number of original outfits to choose from,



Winner of the most most creative team uniform for the PPPMB bowling tournament

in the end team GillyFish, with a large fish picture on t-shirts, got top prize. Team GillyFish consisted of Carol and Shawn Fisher and Greg, Nick and Taylor Gilbert, along with Andrea Gilbert as team supporter. And finally, because mediocrity in sports can never be celebrated enough, a trophy was given to the person whose highest score was closest to the tournament average, and that person was Paolo Zaini (109)! There was a two-way tie for second between Carol Fisher and Dave Schneider (107).

## 'Cheers with your Peers' Weekly Event

Eric Carr

Global financial crises have a pesky way of dampening one's spirits. During the summer of 2009, two members of the Department of Plant Pathology and Plant-Microbe Biology set out to boost departmental morale by sponsoring a weekly social event. For eleven weeks, PPPMB

For eleven weeks, PPPMB hosted a 'Cheers with your Peers' happy hour

hosted a 'Cheers with your Peers' happy hour on the Susan A. Henry Garden Terrace, adjacent to the Plant Science Building. The goal was to bring together plant science faculty, staff, and students for a middle-of-the-week breather involving frosty fermented beverages, light snacks, and camaraderie.

Department Chair, George Hudler, came up with this intoxicating idea early in the summer after previously attempting to initiate a weekly happy hour among faculty. Research associate Marshall Hayes and research technician Eric Carr were quick to donate their time to such a worthy cause. Marshall and Eric provided a diverse selection of nonalcoholic beverages and local, domestic, and imported beer, including fantastic homebrewed options courtesy of Eric and Dave Kalb. Beverages were also donated by the Graduate Student Association (GSA) and Rebecca Nelson's lab. Fruit, veggies, chips and salsa, pretzels, peanuts, and other traditional fare were provided as a free perk. With a convenient garden venue, food, and beer on hand, everything was set in motion for a good time.

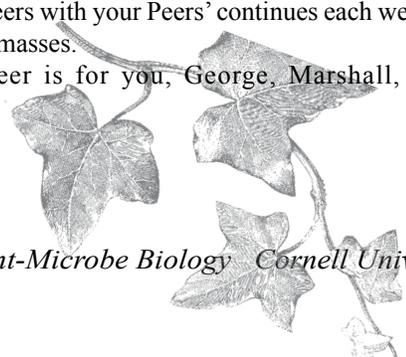
Both Marshall and Eric operated according to the time-honored philosophy, "provide the beer and people will come, and as long as they come, the festivities will continue." Soon enough, the event became routine for the department and there was often a line for beverages at 4:00 pm on the dot. Kent Loeffler, Phil Bronstein, and Melanie Filiatrault were among the regulars, and everyone deserves credit for their continuous support.

Light entertainment in the form of live music was added on a few occasions. Early in the summer, Eric jammed on the guitar with Jay Worley on saxophone. To celebrate the beginning of the school semester and welcome new students to the department, the event was taken up a notch – two beers were served on tap while two bands served as entertainment. Culled Onions, a two-piece blues/country/bluegrass band, and Barley Legal, a six-piece bluegrass band, played their best musical numbers for guests from PPPMB, Plant Biology, Horticulture, and Plant Breeding and Genetics.

'Cheers with your Peers' provided an atmosphere that allowed individuals to meet-and-greet, discuss research interests, take a break from their taxing lab work, or just share a laugh with fellow colleagues. For many individuals it was a nice break to their work week. Even if they were not interested in having a beer, they were still able to come for the free food and good company.

Thanks to the GSA for assuming responsibility of the event, 'Cheers with your Peers' continues each week to serve the thirsty masses.

This beer is for you, George, Marshall, and Eric. Cheers!



### Holiday Luncheon



### Binghamton Mets baseball game 5/17/09



### Retirements



*Nelson Terwilliger was joined by his wife Linda and daughter Lisa at a reception held on December 3, 2008 in honor of his retirement.*



*Susanne Lipari commemorates her retirement with her son Dominic.*



*Margaret Haus is honored by Jim Lorbeer as Carol Fisher looks on.*



*Ken Sandlan discusses his new retirement with George Hudler and Bill Fry.*

# FACILITIES

## A Great Year at the Uihlein Farm

Keith Perry

A great growing season and outstanding staff have made 2008 a bonus year at the Uihlein Farm. We had a record harvest and were at capacity with a total yield of 7990 cwt (799,000 lbs) of potatoes harvested and in storage. Importantly, most all of the crop was sold and shipped off the Farm in spring 2009, an approximately 59% increase from the previous year. Among the factors contributing to the success were good rainfall and moisture well distributed over the course of the season, and an increased planting of varieties in high demand. A few notable recent trends and events:

- up to 60,000 minitubers per year are produced and approximately 65 potato varieties are grown in the field
- there are now 11 certified seed potato producers operating in NY State; one seed grower is organic (double-certified) and a second organic producer is starting production in 2009
- outside contracts for tissue culture services, minitubers, and field production continue to increase and clients for foundation seed production include the USDA-ARS potato breeding program
- beginning in 2005-2006, seed orders from out of state have been accepted and now represent 19% of the total seed sales
- 48% of the seed ordered for 2009 is golden nematode resistant (largely Cornell developed varieties)
- the crash of a small plane in our fields in July 2008 was an unusual event, but fortunately resulted in no damage to persons or potatoes

For those less familiar with the Farm history and operation...

The Uihlein Farm of Cornell University is the foundation seed potato farm for New York State and has been in operation since 1961. The 569 acre site in Lake Placid, NY has ~180 tillable acres and the Farm includes a tissue culture laboratory and attached greenhouse, two plastic houses, a workshop, storage warehouse, pesticide storage and handling facility, and two family residence. The Farm was established through the efforts of Dr. Edward D. Jones and then Plant Pathology Department Chairman Dr. George Kent working in cooperation with the New York Certified Seed Potato Growers. A delightful reading of the history of the Farm was published in 2001, *The Uihlein Farm of Cornell University - The History of the Uihlein Farm and Development of Potato Seed Stocks by Tissue Culture* by Edward D. Jones, PhD.

The primary mission of the Farm has been to produce disease tested, foundation potato seed in service to the seed potato growers and potato industry of New York State. An increasingly important part of the Farm's mission is its role in support of the Golden Nematode (GN) management program in cooperation with the Departments of Horticulture (Dr. Don

Halseth) and Plant Breeding and Genetics (Dr. Walter De Jong), NYS Department of Agriculture and Markets, USDA-APHIS, and USDA-ARS (Dr. Xiaohong Wang, also our Department). The Farm both produces disease-tested nuclear stocks of GN resistant potato varieties and shortens the development time for release of GN resistant varieties by two to three years.

The Uihlein Farm is a remarkable facility in a unique setting. Its potential has been realized through the dedication and commitment of the employees who run the operation. Continuity and guidance has been provided by Dennis Lawrence who started working at the Farm in 1970! Though retired in 2005, Dennis continues to work half time and resides at the Farm. The two other field staff, Larry Strack and Dennis Lawrence Jr., see the potatoes through from planting to harvest, grading and delivery; they operate and repair all of the farm machinery (including the harvester that broke down this past season). Following the retirement of Barry Melching in 2007, Chris Nobles was hired on and now manages most of the Farm operation. Chris has a Cornell degree in agricultural engineering and background experience in business finance and management. Cheryl Craft and John English oversee the lab and greenhouse operation. Cheryl has been with the farm 9 years and is responsible for the tissue culture program. Two half time staff members, Chris Plank and Kathy Moody, fill in to take on a variety of tasks in the greenhouse and field. The Department is fortunate to have such a great group of individuals serving the University and the potato industry of NY State.

### Uihlein Farm Staff

**Dennis Lawrence**, former Farm Manager

As a boy, harvested potatoes in Lake Placid for 8 cents a bushel. Began employment at the Uihlein Farm in 1970

Retired in 2005, but still working half time



**Barry Melching**, former Lab Manager  
Cornell Plant Pathology M.S. graduate in 1972

Started working at the Uihlein Farm in 1976

Retired in 2007.



**Chris Plank**, Greenhouse and Field Staff  
Started working at the Uihlein Farm in 1981

Works half time



**Cathy Moody**, Greenhouse and Field Staff

Started working at the Uihlein Farm in 1992

Works seasonally



*Continued on pg 14*

# FACILITIES

## Uihlein Farm Staff *continued*

### Larry Strack, Field Staff

Started working at the Uihlein Farm in 1996

Can fix most any farm equipment that breaks



### Cheryl Craft, Research Support Specialist

SUNY ESF Biology M.S. graduate in 1987  
Worked in Cornell Plant Pathology 1987-1998

Started working at the Uihlein Farm in 2000  
Oversees the lab tissue culture operation



### Dennis Lawrence Jr., Field Staff

Grew up living at the residence on the Uihlein Farm

Started working at the Uihlein Farm in 2005



### John English, Lab and Greenhouse staff

Harvested potatoes at the Uihlein Farm in 2006 as seasonal help; subsequently hired full time



### Chris Nobles, Farm Supervisor

Cornell Agricultural Engineering B.S. graduate, 1997

Started working at the Uihlein Farm in 2007



## Herbarium Notes

by Robert Dirig (Curator)

The year 2008 brought many changes to the Department's world-class Plant Pathology Herbarium (CUP), which contains ca. 400,000 specimens of fungi, historical photographs, and diseased plant vouchers. We began moving from temporary quarters on South Hill to our beautiful new Herbarium building off Game Farm Road in December 2007, and continued into the early part of 2008.

On May 1, 2008, I began working as the new Curator of CUP, after nearly 28 years of curatorial experience at the Bailey Hortorium Herbarium, which houses Cornell's vascular plants, bryophytes, and algae. After settling, Kathie Hodge and I hosted an Open House on May 28<sup>th</sup> that was attended by about 75 guests from the campus and community. We debuted a colorful CUP brochure at that time, and have continued to distribute many copies in the interim.

The Lichen Herbarium, which had been stored for several years with me at the Bailey Hortorium, was moved back to

CUP in June and July, and reorganized in several cases. We had an unprecedented level of activity with lichens in 2008, including 11 loans, 9 gifts, and 1 exchange, with some activity or question nearly every week of the year.

Unpacking and organizing of CUP specimens proceeded throughout the summer and fall. Doug Murray, who comes to volunteer on Thursday mornings, helped me unpack and arrange three historical collections: a huge Reprint Collection, our specimens preserved in liquid, and thousands of microscope slides. We also finished unpacking the Atkinson Herbarium, and moved and organized all remaining CUP material from an adjacent building, where it had been stored for several years. In the autumn, we inventoried the collection, labeled cases, consolidated special collections and specimen-processing supplies, and distributed extra journals to libraries. Our new building has proven to be a beautiful and convenient place to work.

Other Herbarium personnel, in addition to Kathie and me, include Emeritus Director Dick Korf and two Honorary Curators of Fungi (Francoise Candoussau in France and Teresa Iturriaga, a former graduate student of the Department, who now lives in Venezuela). We had five volunteers in 2008 (contributing 124 hours), including Doug; also Lee Kass, who helped move; and undergraduates Alfonso Doucette, Oliver Ott, and Torben Russo, who helped with moving and specimens.

The year 2008's general statistics included 38 loan transactions (incoming, outgoing, returns), 1 exchange, and 16 gifts (395 specimens from Oliver Ott, Nina Shishkoff, and others). Kathie, Dick, and I handled 268 requests for information or identification, and we hosted 261 people at 30 events (23 tours), including 118 visitors at the Herbarium. Altogether, 2008 was very productive, and it is wonderful finally to have the collection reassembled and accessible for visitors.

The present year has seen the issue of two new fascicles (50 specimens) of Dick Korf's *Discomycetes Exsiccati* (an ongoing series of diverse ascomycete specimens), which we published in the winter and sent to thirteen other herbaria throughout the world. In early April, a large delegation of Chinese officials and diplomats visited Cornell to celebrate the formal repatriation of their *Fungi of China* collection, which had been sent to our Herbarium for safekeeping during WW-II. In early summer, I did a careful inventory of the G. F. Atkinson Herbarium, and learned a great deal about this important historical collection of 109,000 specimens. As I write, we are about to ship more than 2000 specimens of the Fungi of China back to Beijing. In the meantime, we have continued to send loans, identify specimens, host visitors, conduct tours, and perform all the other daily functions of a large fungal museum.

Department personnel, students, and alumni, as well as other University and community members, are welcome to visit our new building and see and use the collection. We are also happy to arrange tours for Cornell courses or outside groups. Please send a message to our email address ([cup-herbarium@cornell.edu](mailto:cup-herbarium@cornell.edu)) to schedule a visit.

# FACILITIES

## Photo Lab News 2009

by Kent Loeffler

It's been an exciting year so far in the PPPMB Photo Lab. First and foremost, the lab still exists! With all the economic problems of the world, country, state, university, department, and my wallet this is no small accomplishment.

In January, Kathie Hodge and I presented another exhibit of borescope images of fungi in the Mann Library's beautiful art gallery (<http://gallery.mannlib.cornell.edu/galleryinfo.html>). This exhibit, entitled "Beneath Notice", consisted of 25 framed images of tiny fungi photographed in the field the previous year with a borescope lens. The photos were accompanied by Kathie's "fungal outbursts", witty and insightful observations on the life and loves of the fungal world. A brief description of the borescope-camera setup and a gallery of images can be found on the Photo Labs web site (<http://www.plantpath.cornell.edu/PhotoLab/Boroscope/Boroscope-main.html>). We also exhibited a continuous loop of time lapse movies of mushrooms growing and fungi rotting fruits, vegetables, and to the horror of the library patrons a paperback book. The time lapse movies were created in the Photo Lab and displayed on the library's new large screen HD monitors. A gallery of pictures from the show is available on the Mann Libraries web site ([http://gallery.mannlib.cornell.edu/previous\\_exhibits/Beneath%20notice/index.htm](http://gallery.mannlib.cornell.edu/previous_exhibits/Beneath%20notice/index.htm)).

To accompany the exhibit we created (with the help of Noni Korf-Vidal) a catalog of 75 borescope images with outbursts. This book is, if I may say so myself, stunningly beautiful and informative. No mushroom lover's home should be without it. Looking for a gift for the Mycologist who has everything? "Beneath Notice" is available from Lulu Press (<http://www.lulu.com/content/paperback-book/beneath-notice/6500441>) and also Amazon ([http://www.amazon.com/Beneath-Notice-Kent-Loeffler/dp/B0029J7TZO/ref=sr\\_1\\_1?ie=UTF8&s=books&qid=1253298743&sr=1-1](http://www.amazon.com/Beneath-Notice-Kent-Loeffler/dp/B0029J7TZO/ref=sr_1_1?ie=UTF8&s=books&qid=1253298743&sr=1-1)).

In May, Kathie and I were invited by the Provost of the University of Rochester (U of R) to speak about our borescope photography project at the U of R's Institute of Optics. Duncan Moore, Chairman of the institute of Optics, founded the company from which we purchased the borescopes and has been a big supporter of our project. After our tag-team dog and pony show, we were treated to a wine and cheese reception and dinner at a toity downtown restaurant. Isn't that the way work should be every day!

In other news, we posted some 30+ time lapse movies on the Photo Lab web site ([http://www.plantpath.cornell.edu/PhotoLab/TimeLapse2/TimeLapse\\_MainGallery.html](http://www.plantpath.cornell.edu/PhotoLab/TimeLapse2/TimeLapse_MainGallery.html)). Check them out. Some are beautiful and some just downright scary! While you're at it have a gander at the gallery of

Cornell panoramic "planets" ([http://www.plantpath.cornell.edu/PhotoLab/PicOfMonth/POM9/PanoPlanets\\_FlashGallery/index.html](http://www.plantpath.cornell.edu/PhotoLab/PicOfMonth/POM9/PanoPlanets_FlashGallery/index.html)). You're sure to recognize the Plan(e)t Science Building from the front cover of this newsletter.

Also, we've just purchased three new computers for teaching Photoshop workshops for students and staff of the department. The lab has been 100% digital for about 5 years now and I must say, Photoshop ROCKS!



Time lapse movies are available on the photo lab web site

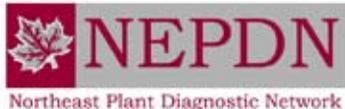


Borescope image by Kent Loeffler

# NORTHEAST PLANT DIAGNOSTIC NETWORK

Karen L. Snover-Clift

We have served as a member of the National Plant Disease Network (NPDN) and as the regional center for the Northeast, known as the Northeast Plant Diagnostic Network (NEPDN) for seven years. We are currently in our second, five-year cooperative agreement that runs through 2012. As you may remember from our introduction and updates in past newsletters, the network was established to enhance



national agricultural security by quickly detecting introduced pests and pathogens. The network allows Land

Grant University diagnosticians and faculty, State Agriculture and Markets personnel, and first detectors to efficiently communicate information, images, and methods of detection throughout the system in a timely manner.

A number of faculty and staff work with the program. Our Chariman, Dr. George Hudler holds the position of Director of the NEPDN. Karen L. Snover-Clift serves as the Associate Director of the NEPDN and Chairman of the National Diagnostics Subcommittee and the National Database Subcommittee. Other members of the NEPDN Regional Center team include Karen Scott as the Information Technology Specialist, Mary McKellar as the Education and Training Coordinator (who left the department in August to pursue a second masters degree in education), and Sandra Jensen-Tracy as our Clinic's lead Diagnostician. The Northeast region is comprised of 12 land grant universities and an Agricultural Experiment Station which include the University of Connecticut, the Connecticut Agriculture Experiment Station, University of Delaware, University of Maine, University of Maryland, University of Massachusetts, University of New Hampshire, Rutgers University, Cornell University, Pennsylvania State University, University of Rhode Island, University of Vermont, and West Virginia University.

It has been an exciting year. We had a new find of Oak Wilt here in New York State. It was found in an isolated area near Albany that is 200 miles from any other known site. Also a number of our members identified a new apple rust pathogen, *Gymnosporangium yamadae*. The apple rust pathogen may have been here for some time as it is easily confused with other *Gymnosporangium* rusts. A communication in the form of a pest alert was distributed through our regional list serve and within a week we had two new state identifications. In all, our members reported 14 new pathogen identifications during the past year.

Additional responsibilities of the NEPDN regional center included the provision of training, guidance, and sample diagnoses for the region, as well as back-up for the four other NPDN regional centers. One regional center staff member met the requirements to become provisionally certified to conduct *Phytophthora ramorum* testing at the Regional

Center laboratory. The certification program benefited the entire Network inasmuch as there are now ten laboratories that are approved to process these samples. This continues to relieve pressure on the APHIS confirmatory laboratory in Beltsville, Maryland, because only regional positive results were forwarded to them for confirmation, thus lowering the number of suspect samples that they needed to process. We continue to process samples associated with *Phytophthora ramorum*, the causal agent of Sudden Oak Death/ Ramorum Blight. The only samples being collected for a survey are done by a number of Northeastern States through the United States Forest Service. Additionally the PDDC, acting as the NEPDN Regional Center, supported all our NEPDN members by providing DNA extractions and molecular testing for anyone not capable of performing these techniques. We are continuing the search for *Phakopsora pachyrhizi*, the causal agent of Soybean Rust. This year we are working with Gary Bergstrom and his sentinel plot program to determine if the pathogen has moved into New York State. So far, no confirmed cases!

Training is a major component of the NEPDN mission. We provide training to our regional members and to first detectors. This year we worked with our colleagues in Beltsville, MD at the USDA-APHIS-PPQ-CPHST-National Plant Germplasm & Biotechnology Laboratory to offer advance morphological and molecular training on *Phytophthora kernoviae* (a European pathogen thought to be more aggressive and damaging than *P. ramorum*) and on the potato wart pathogen, *Synchytrium*



Training program for regional members

*endobioticum*. Nine NEPDN members attended the *P. kernoviae* training and five NEPDN members attended the potato wart training. Receiving this training for the identification of these pathogens is a critical component of our NPDN preparedness mission.

A major function of the network is to capture information about samples already moving through the land grant university (and sometimes state department of agriculture) laboratories. Between July 1, 2008 and June 30, 2009, the NEPDN laboratories processed a total of 15,861 samples. As we enter our 8<sup>th</sup> year, we are confident in our ability to train others on the potential risks to our agriculture and natural resources, to perform the testing required to quickly identify the pests and pathogens of concern and as needed, to communicate all this information to the responders in the system. We have come a long way thanks to the support and funding opportunities given to us through the National Plant Diagnostic Network.

# PLANT DISEASE DIAGNOSTIC CLINIC



Karen L. Snover-Clift and Sandra Jensen-Tracy

The 2008-2009 season in the Plant Disease Diagnostic Clinic was characteristic of most years with the majority of samples being ornamental woody evergreens and deciduous trees and shrubs. Samples were submitted by homeowners, commercial growers, consultants, extension personnel, researchers, and regulatory agents. The Clinic not only receives samples from within New York State (NYS) but a large percentage of the samples come from out-of-state clients. In addition to woody ornamentals, vegetables, fruit, turf, annuals, perennials, and forage crops were also submitted. The Clinic also receives occasional samples for fungal identification, although some fall outside the realm of plant pathology with dog vomit (possible mushroom consumption) and household spotting by the artillery fungus being two major topics.

A big event in August 2008 was the first ever identification of Oak Wilt, *Ceratocystis fagacearum*, in New York State. The clinic processed a number of samples from various sites but it appears this infection zone was a very small area located near Albany, NY. We thought the 2009 growing season might be an interesting one with a very wet, cool Spring and we were not disappointed. This season brought on a late blight outbreak at a scale never seen before in New York State and the northeast region. Reports on the identification of *Phytophthora infestans* on Tomato began in late June and questions about the disease continued well into October. We received reports from every State in the Northeast and as far West as Ohio and as far South as South Carolina. Fifty-five of 62 counties in New York State reported positive finds. The Clinic received numerous calls and emails as newspaper articles began appearing in small, local, extension publications and the granddaddy of the all, The New York Times which ran an article titled, "You Say Tomato, I Say Agricultural Disaster". Home gardeners wanted to know how to treat the soil, how to prevent the disease from reappearing, if they could eat the tomato fruit, and if they could can the tomato fruit. The pathogen was first seen in samples from big box stores and may have spread rapidly through this distribution chain.

The Clinic also regularly processes samples that may be of regulatory concern since we serve as the plant disease diagnostic laboratory for the NYS Department of Agriculture and Markets (DAM). In the fall of 2008 and 2009, we confirmed the diagnosis of Chrysanthemum White Rust (CWR), caused by *Puccinia horiana*, on numerous greenhouse samples submitted by NYS DAM inspectors. Surveying for CWR in NYS has been carried out for the last 12 years through the CAPS (Cooperative Agricultural Pest Survey) program. We also had the supposedly common disease but rare identification of Chrysanthemum Brown Rust, *Puccinia tanacetii*, this year. Additionally, we have been performing a survey for Bacterial Leaf Scorch as more and more, mainly oak, trees appear to have

leaf scorch Symptoms. We have routinely been getting positive results for out-of-state samples (Virginia, North Carolina and Georgia) but none from within NYS have delivered a positive reading this year. We enjoy fulfilling our role in the identification process of various regulatory pathogens and in assisting regulatory agents in a rapid confirmation or rejection of the presence of a harmful agent. Each year brings new challenges, but as always, if there is anything the Plant Disease Diagnostic Clinic staff can do to help diagnose and/or answer questions about your plant problems, please contact us. We are here to help!

## Oak Wilt in New York State



By Shawn Kenaley

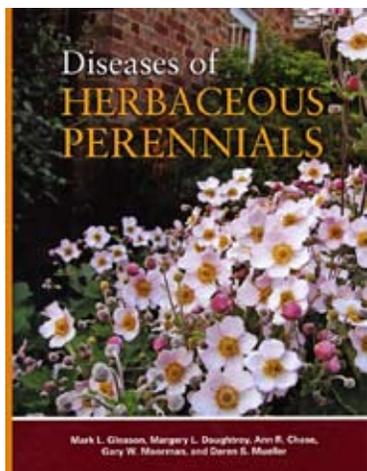
Red oaks (subgenus *Quercus*: section *Lobatae*) are some of the most recognizable and beloved tree species in eastern North America. They also are among the most economically and ecologically important trees, providing quality lumber, firewood, long-lived ornamental shade trees, and wildlife habitat and feed. Oak wilt, caused by *Ceratocystis fagacearum*, is a destructive and frightening vascular disease that can kill a large, otherwise healthy red oak in a single growing season. The oak wilt fungus was first described in 1944 following the initial discovery of the pathogen in Wisconsin. The spread of oak wilt has exacted a heavy toll on forests and urban landscapes in the midwestern and eastern U.S., killing thousands of oaks each year. In August of 2008, Sandra Jensen-Tracy, diagnostician at the Cornell Plant Disease Clinic, received several branches taken by Christopher Logue (Cornell Coop. Exten., Schenctady, Co.) from wilting northern red oak (*Q. rubra*) growing within the Glen Oaks community in Glenville, NY. One olive-grey fungus with "beautiful" endoconidia, phialides, and a fruit-like odor was consistently isolated from affected tissue. The fungus was suspected to be *Ceratocystis fagacearum* and the identity was later confirmed by Dr. Tom Harrington's laboratory at Iowa State University. This discovery shifts the northeastern limit of oak wilt occurrence in the U.S. by at least 200 miles.

Homeowners in the Glen Oaks neighborhood noted that at least 12 red oaks died during the last 3 years and following inspection by Cornell scientists, 12 additional trees were found expressing oak wilt-like symptoms. As a result, swift action was taken by the NY State Department of Environmental Conservation (DEC). The appearance of the oak wilt fungus in the Capital district motivated state authorities to initiate an eradication campaign and quarantine the movement of oak material from the site. In the early spring of 2009, infected trees as well as all neighboring red oak (<200 m away) were cut, chipped, and incinerated at an off-site burn facility. A total of 69 trees were removed across several residential properties. DEC scientists plan to monitor oaks within the neighborhood and surrounding forest for the next 2-4 years to detect the possible re-emergence of this destructive disease.

# BOOK, DVD, PODCASTS

## “Diseases of Herbaceous Perennials” is Published

This June a comprehensive and beautifully illustrated new book, *Diseases of Herbaceous Perennials*, was published



by APS PRESS. Margery Daughtrey, Senior Extension Associate, was one of the team of authors, which also included Mark Gleason and Daren Mueller of Iowa State University, Ann Chase of Chase Research Gardens in Mount Aukum, California and Gary Moorman of Penn State University.

*Diseases of Herbaceous Perennials*

has information on more than 150 herbaceous perennial plants and their diseases, arranged in a convenient encyclopedic format. The book is intended for use by commercial nurserymen, professional and private gardeners and diagnosticians. There are 800 illustrations of plants and their diseases throughout the 287-page book, and these photos are also available on a CD that allows image download for use in powerpoint presentations.

The book has been well received in its first few months. Favorable reviews have been published in both English and Dutch. A number of excellent images of flower bulb diseases were provided from

The Netherlands for use in *Diseases of Herbaceous Perennials*. Images were also generously contributed by the authors' colleagues from across the United States as well as from Denmark and Japan. Illustrations of the plants and their diseases



*Powdery Mildew on Dahlia*

originated from gardens on the Cornell campus, as well as from public and private gardens in Canada, Denmark, France and the United States. “Every scientific meeting, every talk that I’ve given in the past five years was an opportunity to visit lovely gardens to examine perennials for intriguing (and photogenic!) symptoms. Commercial perennial nurseries very obligingly allowed me to prowl about for hours, looking for trouble,” said Margery.

Samples collected in NY nurseries were identified at the Long Island Horticultural Research & Extension Center’s diagnostic laboratory, and these were supplemented by the perennials that growers and landscapers submitted for diagnosis in New York, California, Pennsylvania, Iowa and several other states. The book thus reflects the authors’ awareness of problems currently affecting herbaceous perennials in the horticultural trade on the West and East Coasts as well as in the Midwest. “This team of authors brought a lot of experience and a lot of different perspectives to the project, and, as a result, the book is far better than it would be with any single author,” Margery claims. Diseases threatening plant health during production as well as problems affecting plants in the garden are considered within the book. Readers who are new to the study of plant pathology will appreciate the introductory section, which describes and illustrates the basic types of diseases.

Any gardener, any phytopathologist, or any gardening phytopathologist will like this book! For ordering information, see <http://www.shopapspress.org/diofhepe1.html>

## Meg McGrath on National Garden Radio Show

Meg McGrath appeared on *The Garden Hotline* radio show on July 19, 2009. Host Ralph Snodsmith spoke to Meg about the latest update on late blight. Listen to the podcast at <http://podcast.wor710.com/wor/1857674.mp3>

## Dick Korf on NPR

Dick Korf, professor emeritus, was interviewed by Robert Siegel on National Public Radio regarding the collection of fungi that was repatriated to China in April 2009. To see the transcript and listen to the interview go to:

<http://www.npr.org/templates/story/story.php?storyId=103104825>

## Kathie Hodge Featured on National Public Radio (NPR) and Cornell’s CyberTower

Kathie Hodge was featured on NPR’s Science Friday on September 12, 2008. The episode was entitled “Fungi: The Good, The Bad and The Edible.” Listen to the NPR podcast at: <http://www.sciencefriday.com/program/archives/200809124>

Kathie also took part in Cornell’s School of Continuing Education and Summer Sessions in July 2009 through a CyberTower presentation entitled “A Visit to the Mushroom Planet.” See: <http://cybertower.cornell.edu/lodetails.cfm?id=406>

# BOOK, DVD, PODCASTS

## “The Science of Fire Blight”

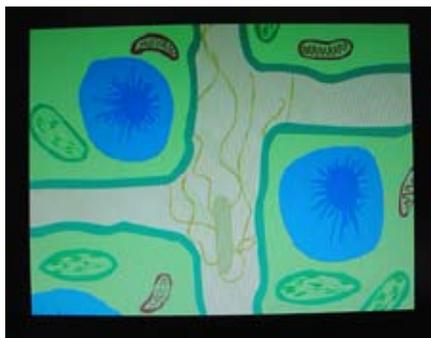
Steven V. Beer

I am pleased to announce our recently produced DVD entitled, “The Science of Fire Blight”. It resulted from the synergistic efforts of many persons in College of Agriculture and Life Sciences, both in Geneva and Ithaca, as well as several endowed units of Cornell. The DVD grew from the “outreach” aspect of the genome-sequencing project of the fire blight pathogen, *Erwinia amylovora*, which was supported by the NSF-USDA Microbial Genome Sequencing Program. For that project,



The 16-minute “The Science of Fire Blight” DVD

a module was developed, particularly for secondary school biology classes, that emphasized the importance of molecular genetics and approaches to experimental science using the fire blight – pear and apple disease system. The Cornell Institute for Biology Teachers (CIBT, which is supported by the Howard Hughes Medical Institute) worked in collaboration with people in my research program



Animation used in “The Science of Fireblight”

to develop the program that is available to high school biology teachers and classes throughout the State of New York.

“The Science of Fire Blight” was developed mainly to address the needs of Extension personnel in the field and fruit growers

whose training may have preceded the explosive growth in our understanding of biology, particularly molecular aspects, in the past few years.

A secondary goal was to clarify to the target audience the

relevance of current CALS research on fire blight to the practical problems of a recalcitrant disease that has plagued fruit growers in New York State from their earliest days, more than two centuries ago. CSREES Special Grants have supported, for several years, much of the work on Fire Blight described on the DVD.

Here are the annotated credits for the DVD. *Director and Narrator:* **Sara Carpenter**, Cornell M.S. in Plant Pathology; **Steven Beer**, Chair of the Special Committee; **Deborah Trumbull**, represented Education; (At present, Sara is a M.A.T. student at SUNY, Cortland).

*Producers:* **Steven Beer**, Professor of Plant Pathology and Plant-Microbe-Biology, Ithaca; **Juliet Carroll**, NYS IPM Coordinator of the Fruit Program, Geneva

*Writers:* **Sara Carpenter, Steven Beer, Juliet Carroll**

*Animation and Video:* **Eric Becker**, Undergraduate Researcher in PPPMB and Biology and Film Major, College of Arts and Sciences, Cornell.

*Time Lapse Photography:* **Kent Loeffler**, Photographer, Department of Plant Pathology and Plant-Microbe-Biology, Ithaca

*DVD Copying:* Communication Services, NYSAES, Geneva

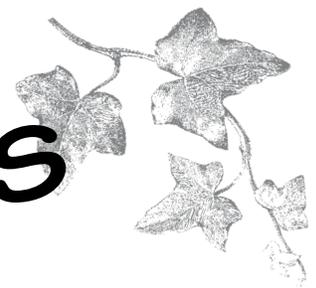
All present and several past personnel of the Beer (Ithaca) and Aldwinckle (Geneva) research programs appear in “The Science of Fire Blight”. Photographs and filming was accomplished in labs and orchards in both locations, and several scientists provided photographs.



Interview with Steven Beer during the DVD



# CONGRATULATIONS



## Alan Collmer Honored with CALS Award for Achievements in Research

Alan Collmer received Cornell University's 2008 College of Agriculture and Life Sciences' Award for Outstanding Accomplishments in Basic Research. Candidates for this award are recognized for their scholarly contributions to their discipline as determined by the quality and number of their publications and awards from professional societies. The Awards Committee specifically acknowledged Alan's pioneering research program to identify the molecular basis for bacterial-plant interactions in plant diseases caused by *Pseudomonas* spp. and the many advances in basic biology of host-pathogen interactions that have resulted from it. Alan has been at the forefront of his area of research from his earliest days as a graduate student at Cornell and he continues to be so with the same enthusiasm and dedication to excellence 30+ years later.

## Collmer Appointed as the Andrew J. and Grace B. Nichols Professor

In November 2008, Alan Collmer was appointed as the Andrew J. and Grace B. Nichols Professor, College of Agriculture and Life Sciences. Andrew "Jack" Nichols (Cornell B.S. Agriculture '34) had made important contributions to international agriculture after World War II in Europe and subsequently in this hemisphere as director of the USDA Latin America technical assistance program. Jack grew up in rural upstate New York and met his wife Grace when serving as an assistant county agricultural agent in Orleans County. Jack died in 1997, Grace in 2007, and their generous bequest to CALS was used to establish the Andrew J. and Grace B. Nichols Professorship, to be awarded to a faculty member in either the Department of Entomology or the Department of Plant Pathology and Plant-Microbe Biology.

In August 2009, several members of the Nichols family visited Alan in his lab, where he learned more about their Uncle Jack and Aunt Grace and the many connections this family has with Cornell, agriculture, and upstate New York. The meeting also gave Alan a chance to tout the many uses of an education in plant pathology, as indicated by a few recent achievements of former lab members. For example, Segenet Kelemu is now Director of the Biosciences eastern and central Africa (BecA) Hub in Nairobi, Sheng Yang He received the 2009 Distinguished Faculty Award at Michigan State University, and Adela Ramos was recently named Food Safety Senior Advisor to USDA by Secretary Vilsack.

## Marin Talbot Brewer wins MSA Awards

Graduate Student Marin Talbot Brewer won three awards from the Mycological Society of America in the summer of 2009. The awards included Best Student Oral Presentation, a Graduate Fellowship, and the Richard P. Korf Mentor Travel Award. Nice job Marin!

## Collaborative Crop Research Program to Expand with Bill & Melinda Gates Foundation Grant

Dr. Rebecca Nelson, Associate Professor in the Department of Plant Pathology and Plant-Microbe Biology, serves as the Scientific Director of The McKnight Foundation's Collaborative Crop Research Program (CCRP). The McKnight Foundation recently received the good news that The Bill & Melinda Gates Foundation has granted \$26.7 million to expand the CCRP. With this expansion, Nelson will take on the new role of Liaison Scientist for the CCRP grants cluster in the East and Horn of Africa.

She and her family spent the Spring 2009 semester in Kenya on sabbatical, to advance the CCRP work in the region and to further her lab's efforts on maize disease resistance. She was hosted at the BioSciences East and Central Africa hub at the International Livestock Research Institute in Nairobi.

Read more about the Gates Foundation Grant at <http://www.mcknight.org/newsandviews/>

### Congratulations to Our Newest Alumni

#### 2009

Tae Sung Kim	Ph.D.	January
Christopher Gee	Ph.D.	May
Amara Camp	M.S.	May
Angela Nelson	Ph.D.	May
Kathryn Bushley	Ph.D.	August

### Congratulations to Those Students Who Have Passed Their 'A' Exams

#### 2008

Santiago Mideros	November	Rebecca Neslosn
Daniel Moebius-Clune	November	Teresa Pawlowska

#### 2009

Bradford Condon	August	Gillian Turgeon
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# IN THE NEWS

## Improved test screens fungal pests for biofuel sources

By Sarah Perdue, *Cornell Chronicle*

Feb. 11, 2009

Those pesky fungi that wreak havoc on such important crops as corn and wheat just might be the key to low-cost biofuel production, report Cornell researchers who have improved a method to screen hundreds of fungal species rapidly to find ones that can most efficiently produce biofuels.

A report about their method is available online and will be published in a forthcoming issue of the journal *Biotechnology and Bioengineering*.

To make ethanol from plants, complex cellulose molecules in plant cell walls need to be broken down into simple sugars

that are then fermented into ethanol. Plant pathogenic fungi have evolved to quickly and efficiently breakdown cell walls as they infect plants, making them an untapped resource in the search for cheap bioethanol, said Marie Donnelly,



a graduate student in biological and environmental engineering and a co-lead author of the study.

This study is an important early step in identifying biofuel sources from agricultural plant waste, said Cornell plant pathologist and adjunct professor Donna Gibson and senior author of the paper. Current bioethanol production is too inefficient to be cost-effective, Donnelly added. Also, most bioethanol is derived from feed corn, which has made corn more expensive due to an increase in demand.

“We were looking for fungi that most efficiently break down nonfood plant materials, such as switchgrass and crop residues,” she said.

The researchers extracted cellulose-degrading enzymes, or cellulases, from four fungal species. They tested the ability of the extracts to break down cellulose sources, from pure cellulose to plants themselves.

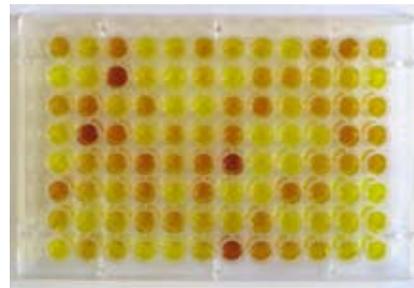
“Until recently, most research has focused on just cellulose

degradation, but the plant cell wall is more complicated than pure cellulose,” said Brian King, a graduate student in plant pathology and plant-microbe biology and also a co-lead author. “We’re hoping to identify enzymes that are more effective on plant material than the current industrial enzymes.”

Current methods assess how well fungal extracts degrade plant material by adding a chemical that changes color in the presence of the products derived from cellulose breaking down. The more degradation, the more intense the color change. The researchers greatly increased the rate of screening by using 96-well plates to perform the reactions; rather than putting each extract in an individual tube, they handled 96 samples in one 3-by-5-inch plastic dish. “We can collect data from 10,000 samples in a week,” said King.

The rapid screening was first developed on a small scale to optimize the technique for large sample numbers.

“Before we can screen these thousands of isolates, we had to have a standardized methodology that we hope will capture the potential of these fungi,” said Gibson. King is currently using this technology to screen dozens more fungi in an effort to identify the best species, or combination of species, for degrading a variety of plant materials.



Fungal extracts were added to a 96-well plate containing DNS, which changes color in the presence of cellulose breakdown products. The darker wells indicate extracts that broke down more cellulose; the lighter wells indicate extracts with little or no cellulose breakdown.

Other researchers in the study include Gary Bergstrom, professor of plant pathology and plant-microbe interactions, and Larry Walker, professor of biological and environmental engineering.

The study was supported in part by Cornell, the U.S. Department of Agriculture -- Agriculture Research Service, and the New York State Foundation for Science, Technology and Innovation.

Graduate student Sarah Perdue is a writer intern for the *Cornell Chronicle*.

# IN THE NEWS

## Chinese delegation visits campus to reclaim historic fungi collection after 70-year Cornell stewardship

By Anne Ju and Lauren Gold, *Cornell Chronicle*  
April 13, 2009

After years of careful stewardship by Cornell scientists, a collection of more than 2,000 species of native Chinese fungi, spirited out of the country for safety before World War II, is finally set to make its way home.

On April 13, a delegation of Chinese government officials, led by State Councilor Liu Yandong, visited campus to begin the process of repatriating the fungi to China. The specimens are not only a reminder of China's biodiversity, but also of the legacy of S.C. Teng, a Cornell student-turned-pioneering-scientist who risked his life during war to keep the fungi safe.

At a ceremony in Weill Hall, President David Skorton presented Liu with a letter of intent explaining Cornell's lengthy efforts to return the fungi.

"The fungi will be carefully prepared and documented in coming months, so we can accomplish the safe repatriation of this important collection on my next visit to Beijing at a mutually agreed upon time," Skorton said.

Liu, a high-ranking politician in the People's Republic of China and a member of its Political Bureau, called Cornell's efforts "a demonstration of the friendship of your university toward the Chinese people."

She and Skorton elaborated on Cornell's many connections with China over several decades. Liu, whose father-in-law received his Ph.D. from Cornell in 1937, described how he had traveled for 15 days in 1934 to get to campus and begin his studies.

"The shepherd boy realized his dream of becoming a Ph.D.," Liu said.

In a gift exchange at the end of the ceremony, Skorton presented Liu with a bound copy of her father-in-law's dissertation, published in 1937 on the agriculture of cotton. The Chinese delegation gave Skorton an ornately carved box.

Liu and other delegates from the Chinese government, including the Ministry of Education and the Ministry of Science and Technology, spent the day touring the campus and meeting with Cornell leaders, including Susan Henry, dean of the College of Agriculture and Life Sciences, and Stephen Kresovich, vice provost for life sciences.

Cornell's Plant Pathology Herbarium has been home to the fungi for nearly 70 years. During the 1920s, Cornell mycology graduate student Teng left Cornell for China before

completing his Ph.D. to conduct pioneering biological surveys by horseback. He, along with others, collected and classified thousands of fungi in their native China.

After the Japanese invaded China in 1937, Teng shipped 2,000 specimens to safety at Cornell in 1940, where they remain today. The specimens that remained in China were destroyed during World War II.

"The specimens are impressive in themselves, but more so due to their poignant history and the personal sacrifices made by Mr. Teng and his family to save them from destruction," said Skorton during his remarks.

According to a 2005 Plant Pathology Newsletter article by Kathie Hodge, assistant professor of mycology and director of the Plant Pathology Herbarium, Teng and his family members were persecuted and tortured during China's Cultural Revolution, which began in 1966 and lasted for a decade, and many of Teng's unpublished manuscripts were destroyed.

After his death in 1970, Teng's family recovered the manuscript of his greatest work in progress -- a book on the fungi of China. His daughter, Rosalie Deng, worked with Richard P. Korf, professor emeritus of mycology and director emeritus of the Plant Pathology Herbarium, to complete the book, which was published in 1996. It was the very collection of fungi specimens that Teng originally sent to Cornell that vouched for much of the work described in the book, according to Hodge's article.

Cornell's collection includes many types of specimens -- the first of their kind to be collected and scientifically identified as representatives of their species.

"These specimens are invaluable for Chinese mycologists to have available so they can document their own current flora and gain some insight into what conditions were at the time they were collected," Korf explained.

"Many of these collection areas no longer exist in China."



Liu Yandong reacts to a gift from President Skorton, a copy of her father-in-law's dissertation, during the fungi repatriation ceremony. Jason Koski/University Photography



An exhibit set up in Weill Hall shows specimens from Cornell's Chinese fungi collection and a picture of S.C. Teng, the Cornell graduate student and scientist who shipped 2,000 specimens to Cornell for safekeeping in 1940. Jason Koski/University Photography.

# IN THE NEWS

## CALS genomicists aim to save citrus from 'greening'

By Chris Bentley, Cornell Chronicle,

July 17, 2009

It has been a dismal two decades for the 450-year-old Florida citrus industry: On top of the constant pressure from hurricanes, a citrus canker epidemic shrank U.S. citrus production by roughly one-third in the 1990s, despite an eradication campaign by the U.S. Department of Agriculture.

Now a recently introduced disease known as citrus greening, which, in the words of a USDA entomologist, causes juice from infected fruit to “taste like jet fuel mixed with Vicks VapoRub,” threatens to be the most devastating blow yet for domestic citrus production. The search for a solution has brought researchers from around the world together in a race to save a troubled industry, with the College of Agriculture and Life Sciences (CALS) exporting its “local expertise in genome analysis and bioinformatics,” according to plant pathology senior research associate Magdalen Lindeberg.



Magdalen Lindeberg, senior research associate in the College of Agriculture and Life Sciences, is coordinating bioinformatic analyses of the genome sequence of the citrus greening pathogen that is devastating the Florida citrus industry. Photo by Chris Bentley

While the pathogen responsible is believed to be a variety of a bacterium called *Candidatus Liberibacter*, scientists have been unable to conclusively determine the cause of citrus greening because the bacterium cannot be routinely cultured independent from its host, a small insect known as a psyllid.

To get around these issues, CALS scientists are using an advanced method for sequence analysis -- known as metagenomics -- to identify the *Ca. Liberibacter* DNA from a genetically mixed population of environmental samples. Researchers are also looking to similar bacteria that cause zebra chip disease -- named for the dark striations it creates in chips made from infected potatoes -- as an alternative approach for understanding *Ca. Liberibacter*'s basic biology.

“There are a number of groups who are basically competing to try to culture it and get the complete genomic sequence,” said David Schneider, a USDA-Agricultural Research Service (ARS) scientist and adjunct associate professor of plant pathology at Cornell. Still, he said, this class of organisms

is not well understood, so the mechanisms of virulence are not known. “Without that basic knowledge, it’s hard to proceed.”

Once a psyllid delivers the bacterium into a citrus plant, infected trees may not show symptoms for years. Before dying early, trees with citrus greening will produce misshapen, undersized green fruit without economic value.

Meanwhile, the psyllid continues to spread as far as Texas and Louisiana, and most recently to southern California. The disease was first identified in China -- where it is known as Huanglongbing -- during the 1920s and was likely introduced to the U.S. via international transport of small ornamental plants during the 1990s.

“Genome analysis methods developed at CALS are transferrable to many, many systems,” Lindeberg said. “I think the potential for improved diagnostics will be of particular interest in developing countries.” Lindeberg will attend an annual meeting of the American Phytopathological Society in August for a special session on citrus greening with guest speakers from around the world.

In the fight against citrus greening, orchard management problems are proving to be a substantial obstacle. Private citrus growers facing bankruptcy have abandoned tens of thousands of acres of land in recent years. Lindeberg said these “feral orchards” act as petri dishes for *Ca. Liberibacter*. “If a hurricane goes through, it basically blasts the orchard all over the state.”

While the abandoned orchards are privately owned and thus difficult to manage, Cornell scientists, in partnership with other national universities, hope to produce cultivars resistant to citrus greening that may stop the spread of the disease before it is too late. “We are very much at the start of a true collaboration period,” Lindeberg said.

Author Chris Bentley '10 is a student intern with CALS Communications.

# IN THE NEWS

## The Scientist: George Hudler

By Jade Tabony, *The Cornell Daily Sun*

April 22, 2009

Some college students discover their passions at a ripe young age and begin their college education with zeal and direction, while others spend their college years stumbling through different fields of study until they find their career path. Department chair and teacher of the popular course “Magical Mushrooms, Mysterious Molds,” Dr. George Hudler, plant pathology, belongs to the latter group.

In Cloquet, MN, Hudler discovered his love for fungi as a senior. He began his undergraduate studies at the University of Minnesota as an engineer, transferring first to physics and later English, before finally settling into the forestry major.

It wasn't until he took a required course in forest pathology that he discovered his love for fungi. “Quite frankly, I didn't even know what forest pathology was at the time,” Hudler joked. “It was just like a moment in my life when I was just ready to be grabbed by somebody who was really enthusiastic about what they were doing and I just walked out of that lecture and I thought ‘This was really interesting. I can't wait for the next class.’ And I'm sad to say that that is one of the few times in my college career that I had that happen.”

After completing his B.S. degree in Forest Management and then an M.S. degree in Plant Pathology from the University of Minnesota, Hudler was awarded a Ph.D. in Plant Pathology from Colorado State University in 1976. He joined Cornell University as part of the Cornell Extension program, doing research in plant pathology on common tree diseases of the Northeast.

Since arriving at Cornell University, Hudler has conducted research with the Northeastern Plant Diagnostic Network on a myriad of different types of fungal-caused plant diseases. These research projects arise from tree tissue samples sent in from concerned citizens and range from the commercial Christmas tree diseases in the Adirondacks, to the tar spot fungus in Ithaca, to his most recent project, the fatal bleeding canker on European beech trees.

“Ever since I've been at Cornell, periodically I would get a call from someone who was absolutely frantic about the health of their European Beech tree,” Hudler said. “So I would go down and I would look at the tree, and the bark would be peeled off almost all the way around. The tree was almost dead. By the time they called me there would be all kinds of insects and microorganisms and you couldn't decide what came first and what caused it.”

Considering that a single European beech tree can raise property values by up to several hundred thousand dollars, it is no wonder that Hudler's callers were frantic.

By chance, Hudler found the cause six years ago while

visiting a dying European beech tree on Long Island. While the tree in question had passed the point of no return, Hudler noticed a condition on live European beech trees a mere 100 feet away known as bleeding cankers.

The bleeding canker is caused by several species of *Phytophthora* fungi and has a history of causing disease in many different species of trees and shrubs. The fungus causes the death of tissue by disrupting the water transport system within the infected tree.

“Once we realized that fungus was in the early stages of this, we set out to figure out, first of all, is this some new disease from overseas or has it always been around,” Hudler said, adding that the European beech tree itself was an imported species. “If it had always been around, why is it bad? Why is it causing this kind of problem on some trees now?”

Since the disease had been found on trees in Long Island, concern that the fungus species was invasive deepened due to the fact that most imported tree diseases enter through New York, the primary human immigration entry port. However, after several years of research at Cornell, Hudler and his team not only determined that the fungus was in fact domestic, but also successfully found a cure for trees in early stages of the disease: spraying the tree with the very natural and benign phosphoric acid.

“The phosphoric acid has two effects,” Hudler explained. “First, it kills the fungus that's in the bark and it also triggers kind of a whole tree defense reaction. It's almost like an immune response. So even though we are treating this particular organism, if some insect tries to feed on the leaves or some other disease tries to get in, they don't have as much luck.”

Thanks to Dr. Hudler and his team at the diagnostic clinic, plant care professionals throughout the Northeast are now able to spot the bleeding canker disease on European beech trees in its early stages and treat it, without using harmful or contaminating pesticides. The disease can be spotted early on by the appearance of black “bleeding” spots on the bark near the base of the tree. This treatment is readily welcomed due to the fact that 40 percent of European beech trees have this disease, including a few trees on the Cornell campus.

Hudler has moved on to two new research projects after his success with the European beech tree. The first project is focused on preventing the spread of an Oak Wilt disease found around Albany. The second project is concerned with diseases that attack willow trees currently being grown for biofuel. These willow trees could prove to be commercially important as a new fuel source, either as wood chips or fermented with yeast to make ethanol.

Ultimately, Hudler's passion for plant pathology lies in the ability to benefit society directly through his research. “The whole thing about plant pathology that has attracted my attention from day one is that people doing research, for the most part, were working on disease problems that were directly affecting farmers and the results of their work have an immediate impact on the quality of crops, quality of life in general. That really appealed to me that I could have that kind of an impact on whatever group of people or whatever industry I was working with.”

# ALUMNI NEWS

## Robert E. Davis (PhD 1967)

Robert E. Davis, of Crofton, MD was inducted into the Science Hall of Fame of the USDA-Agricultural Research Service (ARS) in September 2008. He is a research scientist, member of the Senior Scientist Research Service, and Leader of the USDA's Molecular Plant Pathology Laboratory in Beltsville, MD. He discovered and coined the term spiroplasmas and phytoplasmas, another group of wall-less bacteria. For outstanding contributions in research he has received the American Phytopathological Society (APS) Ruth Allen Award and the Distinguished Service Award from APS Potomac Division; ARS 1997 Outstanding Scientist of the Year Award; USDA's Silver Plow Award; U.S. Presidential Rank Award of Distinguished Senior Professional; Qilu Friendship Award from Shandong Provincial Government, China; and Medal of the Knight's Cross, State Decoration from the President of the Republic of Lithuania. He is a Fellow of the American Phytopathological Society, Fellow of the Washington Academy of Sciences, Fellow of the American Association for the Advancement of Science (AAAS), and member of the National Academy of Sciences USA.

## Roger Beachy

Dr. Roger Beachy, former Postdoctoral Scientist in Milt Zaitlin's lab, was recently appointed by President Barack Obama to lead the National Institute of Food and Agriculture (NIFA), an agency with the USDA. NIFA's mission "is to stimulate and fund the research and technological innovations that will enhance and make American agriculture more productive and environmentally sustainable while ensuring the economic viability of agriculture and production."

# NECROLOGY

## Martin Harrison

Martin Harrison, an alum and emeritus faculty member in our department passed away on September 11, 2008. Marty was born in Brooklyn, NY in 1924, attended public school in New York City, then graduated from Cornell with a B.S. in 1950. He went to Kansas State University where he received an M.S. in 1951, followed by a Ph.D. from Cornell in 1955. Immediately thereafter, Dr. Harrison joined our faculty and was assigned to the Nematode Research Laboratory at Seaford, then Farmingdale. On Long Island, Marty was on the front lines of the battle with the golden nematode and - together with mentor, Bill Mai - made significant headway in slowing the spread of the pathogen. In the early 1970s, Marty moved to the Ithaca campus where he oversaw activities in the nematode diagnostic laboratory and assisted in teaching plant nematology. He retired in 1987 and spent the rest of his life enjoying the surf and sand of coastal California.

## Departmental and University Web Sites of Interest

Plant Pathology & Plant-Microbe Biology  
[www.pppmb.cals.cornell.edu/](http://www.pppmb.cals.cornell.edu/)

Plant Disease Diagnostic Clinic  
[plantclinic.cornell.edu/Default.htm](http://plantclinic.cornell.edu/Default.htm)

Cornell Mushroom Blog  
[blog.mycology.cornell.edu/](http://blog.mycology.cornell.edu/)

Branching Out Newsletter  
[branchingout.cornell.edu/](http://branchingout.cornell.edu/)

Extension Publications  
[pppmb.cals.cornell.edu/cals/plpath/outreach/extpub.cfm](http://pppmb.cals.cornell.edu/cals/plpath/outreach/extpub.cfm)

CUP Herbarium  
[www.plantpath.cornell.edu/CUPpages/CUP.html](http://www.plantpath.cornell.edu/CUPpages/CUP.html)

CUP Photograph Collection  
[odell.mannlib.cornell.edu/cupp/catalog/](http://odell.mannlib.cornell.edu/cupp/catalog/)

Department Photo Lab  
[www.plantpath.cornell.edu/PhotoLab/Default.htm](http://www.plantpath.cornell.edu/PhotoLab/Default.htm)

Faculty Web Pages  
[www.pppmb.cals.cornell.edu/cals/plpath/directory/faculty-menu.cfm](http://www.pppmb.cals.cornell.edu/cals/plpath/directory/faculty-menu.cfm)

Glossary of Technical Terms  
[www.plantpath.cornell.edu/Glossary/Glossary.htm](http://www.plantpath.cornell.edu/Glossary/Glossary.htm)

International Agriculture  
[www.cals.cornell.edu/cals/plpath/about/international-ag.cfm](http://www.cals.cornell.edu/cals/plpath/about/international-ag.cfm)

Smokin' Doc Thurston's Greatest Hits  
<http://www.tropag-fieldtrip.cornell.edu/docthurston/smokinhome.html>

Christmas Tree Pests  
[www.plantpath.cornell.edu/trees/TreePests.html](http://www.plantpath.cornell.edu/trees/TreePests.html)

Vegetable Disease  
[vegetablemndonline.ppath.cornell.edu/](http://vegetablemndonline.ppath.cornell.edu/)

### Plant Pathology Photo Lab Web Site

Check out the images, movies and useful tips on this webpage! Useful, fun and interesting  
<http://www.plantpath.cornell.edu/PhotoLab/Default.htm>

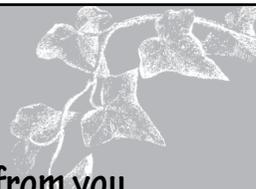
### Image Collections

Picture of the month - Time Lapse Movies -  
Boroscope Images

### Photography Tips

Studio and lighting - Digital photography - Making  
Object VRs - Making Panoramas

# NEWS FOR FUTURE NEWSLETTERS



We want to hear from you...

Send an e-mail to [plantpathcornell@cornell.edu](mailto:plantpathcornell@cornell.edu) or complete the form below and send to:

Newsletter Committee  
Department of Plant Pathology and Plant-Microbe Biology  
Cornell University  
334 Plant Science Building  
Ithaca, NY 14853

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Degree \_\_\_\_\_ (MS, PhD) Year \_\_\_\_\_

Newsletter items:

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**Feel free to attach additional sheets**

# Opportunities in Plant Pathology

The College of Agriculture and Life Sciences has evolved from being a state-supported institution to being state-assisted.

Because less and less of our financial support now comes from New York State, private support has become even more important.

The Department of Plant Pathology and Plant-Microbe Biology in Ithaca is building several endowment funds to support its future activities.

Your contributions to any of these funds will be greatly valued.

## Graduate Student Fund

The Department of Plant Pathology and Plant-Microbe Biology and society in general have benefited immeasurably from previous support for graduate education. Early in the history of the Department, the agriculture industry provided graduate assistantships to support investigations important to agriculture in New York. Later, major responsibility for this support came from New York State. Reduced funding from New York State has severely affected the departmental support for graduate students. Continued excellence of the graduate program in Plant Pathology and Plant-Microbe Biology at Cornell will be greatly assisted through the Graduate Student Fund. Gifts of any size are appreciated and enable the brightest minds and most dedicated individuals to work and study in plant pathology and plant-microbe biology.

## Plant Pathology Excellence Fund

Income from this endowment fund will be used to facilitate important projects which otherwise would be impossible. For example, the fund will help deserving students present their thesis results at a scientific meeting; it will facilitate the development of teaching aids; and it will aid graduate student research in unfunded areas by augmenting funding for supplies and small equipment items.

### NAMED GIFT OPPORTUNITIES

#### Graduate Fellowships

Full support	\$300,000
Partial support	\$50,000

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## Cornell Plant Pathology Pledge/Contribution Form

Name \_\_\_\_\_

Address \_\_\_\_\_

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Telephone \_\_\_\_\_

Please send form to:

Dept. of Plant Pathology & Plant-Microbe Biology  
334 Plant Science Bldg  
Cornell University  
Ithaca, NY 14853

### Plant Pathology Excellence Fund

Pledge \$ \_\_\_\_\_/yr  
Contribution \$ \_\_\_\_\_

### Plant Pathology Graduate Student Fund

Pledge \$ \_\_\_\_\_/yr  
Contribution \$ \_\_\_\_\_  
Other gift \$ \_\_\_\_\_