# Fellows

Eight members of the American Phytopathological Society are honored as fellows of the Society at the 2001 APS/MSA/SON Joint Meeting in Salt Lake City, Utah. Election as a fellow is a reflection of the high esteem in which a member is held by his or her colleagues. The award is given in recognition of outstanding contributions in extension, research, teaching, or other activity related to the science of plant pathology, to the profession, or to the Society. Publication no. P-2001-1113-01O

## Gary C. Bergstrom

Gary C. Bergstrom was born in Chicago, IL. He was inspired to pursue a career in science by his father, Robert Bergstrom, a geologist and educator, and he developed an early interest in biology, especially plants. He obtained a B.S. degree in microbiology from Purdue University in 1975. His interest became focused on plant pathology while studying rust fungi as an undergraduate in Purdue's J. C. Arthur Herbarium under the guidance of Joseph Hennen. He earned his M.S. and Ph.D. degrees in plant pathology from Purdue University and the University of Kentucky, respectively. His principal mentors, Ralph Nicholson and Joseph Kuc, each encouraged and fostered his dual career interests in research and the practical application of knowledge. He joined the faculty of Cornell University in 1981 and currently serves as professor of plant pathology. He is responsible for research and extension programs on diseases of cereal and forage crops in New York. He has authored or coauthored more than 300 articles and publications, including 56 refereed journal articles. He is widely respected as an authority on the epidemiology and integrated management of field crop diseases, especially of winter wheat.

Dr. Bergstrom is a strong proponent of integrated crop management and he conducts his research in close collaboration with agronomists, plant breeders, and entomologists. He makes extensive use of disease surveys to set priorities for his disease management research. Dr. Bergstrom is codeveloper of two disease resistant wheat germ plasms and one registered wheat cultivar.

Dr. Bergstrom and colleagues demonstrated that fungal leaf spots, especially Stagonospora nodorum blotch, were the principal yield reducers of winter wheat in New York. They found that most commercial seed lots of eastern soft winter wheat are infected to some extent by the leaf-spotting pathogens *Stagonospora nodorum* and *Pyrenophora tritici-repentis*. In an innovative field study employing DNA-fingerprinted fungal isolates, they showed that even low levels of seedborne inoculum contributed to the initiation of Stagonospora nodorum blotch epidemics. They also contributed to knowledge of wheat tan spot epidemiology, including characterization of seed infection, seed-to-seedling transmission, and spatial gradients of conidium and ascospore dispersal. Dr. Bergstrom is an advocate of seed health-based disease management and has ongoing programs for seed health survey and evaluation of seed fungicides and insecticides on cereals.

Dr. Bergstrom and colleagues determined that *Wheat spindle streak mosaic virus*, a member of the genus *Bymovirus*, was a major reducer of wheat yields in the Northeast. They identified resistance in adapted cultivars and recommended them to producers. The resistance in 'Geneva' wheat was linked to selectable restriction fragment length polymorphism markers.

Dr. Bergstrom is an active participant in the National Wheat and Barley Scab Research Initiative. He cooperates in research to identify winter wheat cultivars and lines with resistance to scab and to evaluate fungicides and biocontrol agents for reduction of scab. In partnership with Brazilian colleagues, Dr. Bergstrom and coworkers have identified antagonistic bacteria with potential for biological control of scab and other cereal diseases. They demonstrated that viable ascospores of *Gibberella zeae* are transported in the planetary boundary layer of the atmosphere and, thus, comprise a regional source of inoculum for cereal crops.

Dr. Bergstrom has made several fundamental contributions to understanding the biology and management of corn anthracnose. His group characterized *Colletotrichum graminicola* as a vascular parasite of corn stems and characterized resistance associated with corn genotype, growth stage, and wound healing. They demonstrated that European corn borer (ECB) was a significant factor in predisposition of corn to anthracnose stalk rot and that transgenic Bt corn hybrids have significant potential for reducing anthracnose stalk rot in production areas where both *C. graminicola* and ECB are present.

Dr. Bergstrom's research and extension programs on field crop disease management have helped sustain profitable and ecologically sound, food grain and forage production systems in New York and other areas of the Northeast. Through in-service education, consultation, and development of educational resource materials, he has increased the plant pathology knowledge of extension staff, multipliers, and producers. He contributed to development of the Northeast Certified Crop Advisor Program. Dr. Bergstrom and his extension colleagues developed a highly visible and effective statewide Dairy/Field Crops Integrated Pest Management implementation program emphasizing corn and alfalfa pest management. Bergstrom also initiated a wheat health management program that was based on on-farm experimentation and surveys of more that 100 farms. He organizes an annual Small Grains Management Field Day each June that has become a principle forum for information exchange on small grains and dialogue among producers, agribusiness, and consultants in the Northeast.

Dr. Bergstrom has been the major advisor for six M.S. and eight Ph.D. students and a graduate committee member for more than 37 other students. He coordinated Cornell's professional masters degree program in plant protection for 10 years. He has served his department, college, and university in numerous ways as president of the Cornell chapter of Gamma Sigma Delta (Honor Society of Agriculture), chair of the College of Agriculture and Life Sciences Faculty Policy Committee, member of the University Faculty Advisory Committee on Tenure, and member of the University Faculty Committee on Academic Program Review. He also served on the Steering Committee of the Mid-Atlantic Consortium Food System Professions Education Initiative (W.K. Kellogg Foundation).

Dr. Bergstrom has been an invited speaker at numerous U.S. and international scientific forums. He has given generously of his time as an editor and reviewer of manuscripts and grant proposals. He has served as member and officer of several regional technical committees. He has served the American Phytopathological Society (APS) in many roles including president of the Northeastern Division, chair of the Extension and Public Relations Committee, member of the 1992 Strategic Planning Committee, and senior editor of APS Press. Dr. Bergstrom is passionate about informing the public and policymakers of the importance of agriculture, especially plant pathology. He was appointed director of

the new APS Office of Public Affairs and Education (OPAE) in 1996. Under his leadership, OPAE launched new programs to educate the public about the importance of plant health and to increase the visbility of our profession and Society.

## Lester W. Burgess

Lester W. Burgess was born 18 February 1942, in New South Wales, Australia. He has spent his entire academic career associated with the University of Sydney where he received a B.S. degree in 1963 and a Ph.D. in 1968. After postdoctoral studies at the University of California-Berkeley, Cornell University, and the University of Melbourne, he was appointed as lecturer in plant pathology at the University of Sydney. He advanced through the ranks, becoming professor and dean of the faculty of agriculture in 1988, a position from which he stepped down in December 2000. He is presently professor of plant pathology and adjunct professor of plant pathology at Pennsylvania State University and Kansas State University. Professor Burgess is a fellow of the Australasian Plant Pathology Society and has served in all positions except treasurer. He will be president of that society during the International Plant Pathology Congress held in New Zealand in February 2003.

Professor Burgess has made important contributions to plant pathology in research, extension, and administration. He has been active in the international *Fusarium* research community. He assisted with the teaching of *Fusarium* laboratory workshops at the University of Sydney, Kansas State University, and Pennsylvania State University, and has written a laboratory manual that will be updated soon. These workshops have been of critical importance to the *Fusarium* research community, because they have maintained communication among the members and helped set common research agenda. Dr. Burgess helped begin the reappraisal of the *Liseola* and *Elegans* sections of the genus with the description of the new species, *Fusarium nygami*, indicating that species in these portions of the genus required revision and new descriptions. This process continues today and is particularly important to researchers in tropical and third world countries, where a significant number of species resemble common species in more temperate climates but need recognition as separate species. All of the species he has established are in general use today.

Dr. Burgess has studied the ecology of *Fusarium* spp. in both native grasslands and agriculturally important cereal crops such as wheat, maize, and sorghum. He and his colleagues pioneered climatic modeling for determining the expected distribution of *Fusarium* spp. He has conducted two large transect studies, each involving more than 10 years of field and laboratory work. A third transect study running through Australia, Indonesia, Vietnam, and China is in progress. He also determined that the distribution of *Fusarium* spp. is often different in above- and below-ground plant parts, and that effective ecological studies necessarily differentiate among these and other microclimate factors. His approach to ecological studies has set the benchmark against which other work is compared and as a model for how such work should be conducted.

Professor Burgess' wheat pathology research program is his most significant contribution to Australian agriculture. His taxonomic and ecological research feeds back to the Australian farmer. Crown rot, caused by *F. pseudograminearum*, is responsible for devastating losses in Australian wheat fields. Crop and stubble management concepts introduced by Dr. Burgess and his colleagues have reduced losses significantly. As a part of his research program, Professor Burgess maintains a cooperative network of private consultants and district agronomists, with over 150 sites for monitoring crown rot in New South Wales. The basic research by Professor Burgess and his colleagues determining the relationship between soil moisture and crown rot potential was critical to the success of the management program. They found that soil moisture is needed for infection, although white head formation, the consequence of crown rot, is favored by dry soil and drought stress. Dr. Burgess' wheat research program serves as an extension program for much of the Wheat Belt in New South Wales, although Australia does not have a university-based extension program. He has had a long association with the grain industry and usually attends 10 to 15 field days and farmer meetings per year. In this role, he provides advice on crop rotation, variety selection, and agronomic practices in addition to diagnosing plant disease problems and conducting research to reduce their severity.

Professor Burgess maintains an active teaching program and has a slide collection that is used for teaching students in regular classes at the University of Sydney and international students who attend special master classes, which are full-time efforts in a focused area. He has produced a CD-ROM for the identification of soilborne plant diseases that is widely distributed throughout Southeast Asia and other regions of the world. His course on soil biology, which he continued to teach while serving as dean, is the only one in Australia to contain a major component on the control of soilborne plant pathogens.

Professor Burgess was elected twice and appointed once as dean of the faculty of agriculture at the University of Sydney. During his tenure, he maintained active research and teaching programs. He increased the quality and quantity of students in agriculture at the University of Sydney through the establishment of the Undergraduate Entry Scholarship, a Merit Scholarship, and an Undergraduate Achievers Program, which includes a field study in Central Australia that Dr. Burgess leads during winter break between semesters. He also helped establish and serves on the Board of Directors of the Sunprime Corporation, a joint venture between the University of Sydney and Graincorp, the largest grain handling company in Australia. Currently, Sunprime is the leading distributor of seed wheat in the country.

Professor Burgess has changed the way scientists in general, and plant pathologists in particular, approach speciation in *Fusarium*, and has inextricably linked ecological, pathological, and taxonomic studies in these fungi. He has provided exceptional service to Australian wheat farmers through his network of on-site collaborators, problem-oriented research, and the establishment of Sunprime Corporation. His enthusiasm as dean has reinvigorated his faculty and, while serving as dean, his research and teaching programs have flourished. Clearly, Lester Burgess embodies the essence of a well-rounded plant pathologist and is most worthy of the honor of APS Fellow.

## Noriyuki Doke

Noriyuki Doke was born in Nagoya, Japan, on 7 April 1942. He attended Nagoya University and received a B.S. degree in 1965, an M.S. degree in 1967, and a Ph.D. in 1971 in agricultural sciences with a major in plant pathology, studying the physiology and biochemistry of virus-infected plants. In 1972, after a postdoctoral appointment sponsored by the Japanese Society for the Promotion of Science, Dr. Doke accepted a position as assistant professor in the plant pathology laboratory in the School of Agricultural Sciences at Nagoya University and progressed through the ranks to professor in 1989. He assumed his current position of professor in the Graduate School of Bioagricultural Sciences in 1997.

Professor Doke is an international authority in the physiology and biochemistry of host–pathogen interactions. He began his research on the mechanism of induced resistance and race-cultivar specificity in potato late blight with Professor Kohei Tomiyama. As a postdoctoral scientist with Dr. Joseph Kuc at the University of Kentucky, Professor Doke investigated suppressors as determinants of race-cultivar specificity.

Early in his career, Professor Doke conducted pioneering research on the oxidative burst in the induction of hypersensitive resistance in response to pathogens. His discoveries, made at a time when the phenomenon was not well known in plants, were largely responsible for launching a new era in the study of biochemical and molecular mechanisms of defense responses to pathogens. He demonstrated the novel occurrence of superoxide generation as an early response of potato tuber tissues to incompatible but not compatible races of *Phytophthora infestans*. He documented this rapid response in potato protoplasts treated with an elicitor from the pathogen as well as a race-specific suppression of elicitor-stimulated superoxide formation by glucans from the pathogen. In subsequent work, Dr. Doke documented the involvement of a membrane-bound NADPH oxidase in the elicitor-stimulated generation of superoxide and showed that resistance against the pathogen could be enhanced by chemical induction of the oxidative burst. He extended these findings to show the involvement of NADPH-dependent and temperature-sensitive superoxide generation in local lesion formation in *Tomato mosaic virus*-infected N gene tobacco. The citation index of this series of papers and the number of publications on the oxidative burst in various host-pathogen systems during recent years testify to the significance of his contributions. In 1997, Professor Doke was awarded the prize of the Phytopathological Society of Japan for his outstanding contributions to research on mechanisms of active defense in host plants and race-specific pathogenicity of the pathogen in potato late blight.

In addition to his research defining the defense response of plants to pathogen infection and to microbial products, Professor Doke, with graduate student colleagues, has contributed to our understanding of the chemical structure, role, and mode of action of fungal phytotoxins. His recent discovery of a systemically induced oxidative burst provides the basis for his current work on mechanisms of systemic signaling in relation to systemic acquired resistance with the ultimate goal of developing methods for "immunization" of plants against pathogens. His current research efforts also involve characterization of genes and gene products whose expression is influenced by pathogen infection or in response to suppression and elicitation of the defense response.

Professor Doke has contributed significantly to the open line of scientific communication between the United States and Japan. He has been a major participant in the U.S.-Japan Seminars from 1976 through 1999, and has served as an organizer, observer, or speaker in a majority of those seminars. He has been an active member of the Phytopathological Society of Japan since 1965 and has contributed substantially to affairs of that society. He has served on the Council Board since 1989 and as a member of several committees, including the Organizing Committee for Annual Meetings. In addition, Professor Doke is a member of the Council and Editorial Boards of the Japanese Society of Bio-Defense Research, the Kansai Plant Protection Society, and is on the Steering Board of the Nitric Oxide Society of Japan. He has been a member of the American Phytopathological Society since 1976.

Professor Doke is an enthusiastic educator who teaches courses on introductory plant pathology, physiological plant pathology, plant bio-defense science, and plant protection science to undergraduate and graduate students at Nagoya University and other universities. He has supervised and directed the research of numerous undergraduate students and graduate students as well as visiting scientists from China, Korea, the Philippines, and Germany.

Professor Doke is the seventh plant pathologist from Japan and the third from Nagoya University, following Professors Ikuzo Uritani and Kohei Tomiyama, to be presented the Fellow Award of APS. Indeed, Professor Doke's research accomplishments and his influential contributions to plant pathology set him apart as a leader and a worthy recipient of this distinction.

## Jeffrey B. Jones

Jeffrey B. Jones was born 5 February 1951, and grew up in Scarsdale, NY. He received his B.S. degree in botany from the University of Massachusetts in 1973, and an M.S. and Ph.D. with Dr. Curtis Roane in plant pathology from Virginia Tech in 1973 and 1980, respectively. His dissertation involved studying the interaction between *Septoria nodorum* and *Xanthomonas campestris* pv. *translucens* on wheat. Dr. Jones joined the Department of Plant Pathology at the University of Georgia in 1980 as a postdoctoral associate working with Dr. States McCarter on the ecology and epidemiology of bacterial speck of tomato. He developed a sensitive bioassay for detecting the target bacterium in crop residue, as an epiphyte on weed species, in soil and on seed. Furthermore, in work with Dr. McCarter and Dr. R. D. Gitaitis, it was determined that the bacterium overwintered in crop residue for up to 6 months, but was ineffective in oversummering. They also noted that two fluorescent pseudomonads, *Pseudomonas syringae* pvs. *syringae* and *tomato*, were associated with the leaf spots on commercial tomato transplants and the latter pathovar was destructive. They developed several assays to distinguish rapidly between these bacteria, with commercial transplants infected by *P. syringae* pv. *tomato* being rejected for shipment.

In 1981, Dr. Jones was appointed assistant professor and later professor of plant pathology at the University of Florida's Gulf Coast Research & Education Center in Bradenton. In 1998, Dr. Jones moved to the Department of Plant Pathology in Gainesville where he currently resides. During his tenure at the University of Florida, he has made significant contributions to plant pathology in a number of areas. Dr. Jones and coworkers identified the first sources of resistance in tomato to the bacterial spot pathogen, *X. campestris* pv. *vesicatoria*, which was associated with a hypersensitive reaction. He and coworkers determined that this resistance was associated with several genes in tomato and a single avirulence gene (*avrRxv*) in the pathogen. They characterized strains collected in South America lacking the avirulence gene and designated them tomato race 2. As a result of the initial work, two races of the bacterium were identified, and based on DNA-DNA hybridization studies and other genotypic and phenotypic data, which represented distinct species and have more recently been classified as *X. vesicatoria* and *X. axonopodis* pv. *vesicatoria*. In depth analysis of a worldwide collection using a polyphasic approach revealed considerable genetic and phenotypic diversity and resulted in the identification of four distinct groups. These groups were genetically or phenotypically distinct and represented three distinct species, with one species consisting of two groups that represent distinct subspecies. Dr. Jones in cooperation with other scientists identified several avirulence genes associated with the tomato races, one of which is regulated by the hrp system and was the first one identified to be induced. Dr. Jones, working with Dr. R. E. Stall, was involved in demonstrating that copper resistance in *X. campestris* pv. *vesicatoria* strains is plasmid-borne.

Dr. Jones has developed detection strategies for isolating and identifying bacteria for ecological studies including seed detection when the target organism is present in mixed populations with nontarget microorganisms. He and coworkers developed a vacuum infiltration procedure for isolating *P. syringae* pv. *tomato* from plant tissue and developed selective media for the isolation of

bacteria from contaminated environments. While on sabbatical in the Netherlands at the Institute for Plant Protection, he and Dr. J. W. L. van Vuurde developed a procedure termed magnetic immunoisolation, which involved using paramagnetic beads and antibodies specific to the target bacterium to isolate the bacterium with reduced contaminating microorganisms from samples on selective or semiselective media. Dr. Jones developed an improved extraction buffer that increased enzyme-linked immunosorbent assay sensitivity 10-fold in leaf tissue. He has also been involved in developing polymerase chain reaction-based strategies for identifying xanthomonads in seed and plant tissue.

In addition, his research has focused on studying the ecology and epidemiology of bacterial pathogens. He studied survival mechanisms of the bacterial spot disease of tomato pathogen and determined that it can effectively survive on volunteer tomato plants for extended periods and serve as inoculum for the following crops. He determined that soil survival, survival in crop residue, and epiphytic survival on nonhost plants are generally of a short duration. Dr. Jones authored or coauthored 14 refereed publications describing new diseases or unique symptoms associated with diverse pathogens including species within *Pseudomonas*, *Erwinia*, and *Agrobacterium*. One of the pathogens was determined to be a new species of *Agrobacterium*, which was named *A. larrymoorei*.

Dr. Jones, with several other scientists, developed a strategy for using bacteriophages to control bacterial spot disease on tomato. The strategy consisted of applying a mixture of host-range mutant bacteriophages and wild-type bacteriophages. Their work clearly demonstrated that the bacteriophages provided significantly better control of the disease in greenhouse and field production compared with the standard bactericide (copper) application. Currently, many transplant and field production sites are utilizing this technology.

Dr. Jones has been involved in cooperative projects to develop tomato genotypes with high levels of resistance to two bacterial pathogens, *X. campestris* pv. *vesicatoria* and *Ralstonia solanacearum*. Tomato cv. Neptune, which has fair resistance to *R. solanacearum*, was developed by J. W. Scott, J. B. Jones, and other coworkers. J. W. Scott, J. B. Jones, R. E. Stall, and other coworkers have developed tomato genotypes with resistance to all three tomato races of the bacterial spot pathogen.

Dr. Jones has been an active member of the American Phytopathological Society since 1980. He has served on a number of APS committees (Bacteriology Committee twice and Tropical Plant Pathology Committee) as a member and as chairman of each once. He has served as a senior editor for *Plant Disease* and is currently a senior editor for APS Press. He has also edited or coedited two books (Compendium of Tomato Diseases and Laboratory Guide for Identification of Plant Pathogenic Bacteria, Third Edition) published by APS Press.

## Joyce E. Loper

Dr. Joyce Loper is a research plant pathologist at the USDA-ARS Horticultural Crops Laboratory located at Corvallis, OR, and a professor (courtesy) in the Department of Botany and Plant Pathology at Oregon State University. She joined ARS in 1985 as a research microbiologist with the Soilborne Diseases Laboratory in Beltsville, MD, and moved to Corvallis in 1987. Prior to joining the USDA, she served as a research scientist in the Biological Control Program of the Biotechnology Group of Chevron Chemical Company in Richmond, CA, from 1983 to 1985. As a native Californian, Joyce grew up in the San Francisco Bay area and obtained her B.S. degree in biology and her M.S. degree in plant pathology at the University of California-Davis before moving to Berkeley to obtain her Ph.D. degree in plant pathology working with Dr. Milton Schroth on the ecology of rhizosphere bacteria in 1983.

Dr. Loper is well known for her research involving the ecology of rhizosphere bacteria, with a special emphasis on biological control. Early in her career, Dr. Loper conducted research on the role of IAA production by rhizosphere bacteria on root development. In a seminal study, Dr. Loper showed how bacterial IAA production is a quantitative trait; because roots respond both positively and negatively to exogenous IAA, those bacteria that stimulated root growth produced only modest amounts of IAA, whereas strains producing higher amounts were inhibitory. This study revealed the complexity of such bacterial–root interactions and brought synthesis to a complicated literature. The work has proved useful in developing rational screens for beneficial bacteria.

Dr. Loper is perhaps most known for her detailed analysis of how iron-sequestering agents, called siderophores and produced by *Pseudomonas* spp. in the rhizosphere, affect iron availability to plant pathogens, leading to biological control of disease. She first genetically blocked siderophore production in mutant strains to demonstrate that these molecules contribute to a substantial part of the antagonistic effect toward pathogens such as *Pythium ultimum* and *Fusarium oxysporum*. She did more detailed analysis of the interactions between *Pseudomonas* biocontrol strains and plant pathogens using innovative molecular genetic techniques. She demonstrated that strains of *Erwinia carotovora* that were not well controlled by *Pseudomonas* isolates harbored genes for production of high-affinity iron uptake systems that made them insensitive to the "weaker" siderophores produced by *Pseudomonas* biocontrol strains. She has cloned and characterized many of the genes that are involved in siderophore production and regulation in various bacteria in natural habitats. Her group was among the first in the world to apply molecular genetic approaches to study bacterial habitats in situ by employing "biological sensors" consisting of iron-responsive promoters linked to an ice nucleation reporter gene. She has been able to show clearly that iron availability to microbes on roots varies greatly as a function of root age, soil type, plant species, and presence of other siderophore-producing bacteria. These landmark studies are at the forefront of microbial ecology and demonstrate how research in plant pathology can contribute to the broader field of microbiology. Thus, she has been able to greatly clarify the complexities of microbial iron nutrition.

Dr. Loper's more recent work has focused on the genetics of antifungal compound production by plant-associated bacteria, particularly *Pseudomonas fluorescens*. She is a world leader in the use of molecular biology for studying biological control. Not only has she cloned and characterized the structural genes for several important antibiotics such as pyoluteorin and other polyketide antibiotics, but also she has made major advances in our understanding of how production of antibiotics and other antimicrobial compounds are coordinately regulated. She has identified alternative sigma factors and global regulators in *Pseudomonas fluorescens* and shown their importance in directing important aspects of rhizosphere interactions such as stress responses and secondary metabolite production. Dr. Loper has greatly enhanced our appreciation for the complexity of antibiosis in biocontrol organisms. She is clearly a world leader in the field of molecular microbial ecology as it applies to plant pathology, evidenced by more than 60 invited lectures she has made to national and international audiences.

Dr. Loper has an outstanding record of professional service, particularly to the American Phytopathological Society. She served on the Biological Control and Bacteriology Committees as secretary-treasurer for the APS Pacific Division from 1990 to 1993 and as a senior editor for APS Press from 1990 to 1993. She also codeveloped a slide set on biological control of plant disease for APS Press that has gained wide circulation as an important teaching tool for plant pathology and pest management courses around the world. Dr. Loper served as APS councilor-at-large from 1997 to

2000. She was selected to represent plant pathologists on the National Research Council Board on Agriculture panel that developed a position document on "ecologically based pest management." This important document will guide pest management research in the future, and Dr. Loper's insight will benefit many plant pathologists as we enter a new era of agricultural research priorities.

Dr. Loper has also served the field of plant pathology in many other ways, such as on the editorial committees of the *Annual Review of Phytopathology* (1996 to 2006) and *European Journal of Plant Pathology*, as an associate editor of *Molecular Plant-Microbe Interactions*, and on advisory boards for the NSF Center for Microbial Ecology, EPA-FIFRA, National Academy of Sciences, as well as serving on a USDA-NRI biological control grants panel. She has served the USDA as well as Oregon State University by her participation in numerous administrative and advisory committees. She has been particularly active in presenting lectures around the country as well as participating in workshops and symposia at Oregon State University on topics related to the role of women in science. It is clear from the description of her many accomplishments presented above that she is an outstanding role model for young scientists.

## James W. Moyer

James W. Moyer, born 14 June 1949, grew up on a wheat farm near Walla Walla, WA. He received a B.S. in agronomy in 1971 from Washington State University and a Ph.D. degree in 1975 from The Pennsylvania State University under the direction of Sam Smith. After a postdoctoral position at the University of California-Davis, he joined the Department of Plant Pathology at North Carolina State University (NCSU) as an assistant professor in 1976.

Dr. Moyer is an international authority on viruses and other diseases of sweet potatoes. He characterized *Sweet potato feathery mottle virus* (SPFMV), the first and one of only four sweet potato viruses to be characterized to date, and his laboratory continues as the world source for antiserum and isolates for SPFMV. He was a pioneer in the meristem-tip culture and virus indexing of sweet potato germ plasm and, as a result, became the architect of the guidelines for the international movement of vegetatively propagated germ plasm as adopted by the International Board for Plant Genetic Resources of the Food and Agriculture Organization of the United Nations. From 1976 to 1987, he contributed significantly to the understanding of diseases of sweet potato caused by *Fusarium solani* and *Streptomyces ipomoea*. He developed the techniques and methodology to screen for resistance to *S. ipomoea* in sweet potato germ plasm that are currently used in several state screening programs. His collaborative efforts also resulted in the release of five sweet potato cultivars.

In 1987, Dr. Moyer turned his research efforts to major viruses and virus diseases of vegetable, ornamental, and field crops, with special emphasis on the molecular characterization of tospoviruses. He discovered and has characterized a new tospovirus, *Impatiens necrotic spot virus* (INSV), which is the predominant cause of *Tomato spotted wilt virus* (TSWV)-like diseases in ornamentals in the United States. The evidence of the existence of more than one TSWV-like disease resulted in the demise of the long held belief that TSWV was a monotypic group, and contributed to the establishment of a new virus genus. He and his associates were the first to completely sequence and demonstrate the correct genomic organization of the M RNA of INSV as ambisense. Subsequent research has confirmed that tospoviruses are the only member of the Bunyaviridae with two ambisense RNAs. His research on the genetics of tospoviruses continues and supports continuing efforts on transgenic and host resistance to this type of virus. He has recently published the discovery of a strategy by which TSWV adapts to resistant cultivars, providing a major breakthrough in the understanding of the evolution of pathogenicity of this virus.

In addition to Dr. Moyer's pioneering work on the biology of tospoviruses, his work has had an enormous impact on control of these viruses, particularly in the greenhouse floral industry. Soon after the discovery and characterization of INSV, Dr. Moyer produced antisera, which is the industry standard for routine diagnosis and indexing of this virus. Prior to the identification of INSV and the availability of this antisera, growers were unable to control this disease in greenhouse crops, and some abandoned production of the most susceptible crops. Dr. Moyer's many contributions and eminence in the field of tospoviruses is well documented by invitations to write key reviews and chapters for publications such as the *Annual Review of Phytopathology*, the Ball Guide on New Guinea Impatiens, and the Encyclopedias of Virology, Microbiology, and Plant Pathology. He is a consultant for several international corporations and U.S. floral crop industries, and is routinely invited to present lectures and seminars. His pioneering work is responsible both for the resurgence of interest in the tospoviruses and the ability of the greenhouse floral industry to manage these devastating viruses.

Dr. Moyer teaches two graduate-level courses in the department and is an excellent advisor and mentor for graduate students. In the past 12 years, three of his Ph.D. students have received the N.C. State Department of Plant Pathology Nusbaum Award for the best departmental Ph.D. dissertation, and one of these students received the K.R. Keller Award for the outstanding dissertation in the College of Agriculture and Life Sciences. Dr. Moyer has served on a large number of university, college, and departmental committees. He was elected chair of the University Research Committee in 1992 to 1993, and served from 1993 to 1994 as the coordinator for the NCSU component of a national study on Stresses on Research and Teaching in Research in Universities. He served as interim head of the Department of Biochemistry at NCSU from 1994 to 1997.

Dr. Moyer has developed a national and international reputation for excellence. He has been a senior editor of *Phytopathology* and served on standing and ad hoc committees, most recently on the APS Intellectual Property Rights Committee. He has been a panel member for the USDA/CSREES/NRI grants program, a member of the USDA Sweet Potato Crop Advisory Committee, and at the invitation of the International Potato Center (CIP), an evaluator of sweet potato programs in the Dominican Republic, Argentina, and Uruguay. He has collaborated with researchers and presented seminars or workshops by invitation in Argentina, Bulgaria, Colombia, Germany, Israel, Japan, the Netherlands, Nigeria, Peru, Scotland, Spain, Taiwan, and Uganda.

## Christopher C. Mundt

Christopher C. Mundt, born in Teaneck, NJ, in 1957, received the B.S. in plant science with honors from Cornell University in 1979. In 1981, he completed an M.S. in plant pathology at Iowa State University, and in 1985, a Ph.D. in plant pathology at North Carolina State University. Dr. Mundt joined the Department of Botany and Plant Pathology at Oregon State University in 1985, and from 1992 to 2000 was a visiting scientist at the International Rice Research Institute, the Philippines, where he conducted collaborative research on projects that extend to China, Vietnam, and Thailand.

Dr. Mundt has developed an international reputation for his contributions to the understanding of the genetics of host plant resistance and its relationship to the epidemiology of plant disease. His research has focused on the population genetics of cereal pathogens, the development of models to understand dispersal of plant-pathogenic propagules, and the development of strategies to increase durable host plant resistance and achieve sustainable agriculture. His research approach is both theoretical and applied, and it has led to the widespread modification of farming practices that have resulted in decreased disease incidence and severity, larger crop yields, and a reduction in the use of chemical pesticides.

A major thrust of Dr. Mundt's research has been the development of systematic studies of the combinatorial effect of pathogen population size and host plant genotypes in the epidemiology of plant disease. In a critical early study, Dr. Mundt studied the relationship of the number of host genotype units and effectiveness of host mixtures for control of disease. An analytical model was used to show that the alloinfection/autoinfection ratio increases with an increasing number of host units in a population. The model suggested that mixtures of large host units could be very effective for controlling plant disease when the number of host units is large. This hypothesis was tested by simulating the effects of interfield diversification on the development of wheat stem rust. The model and hypothesis implied that both area and number of host units influence the effectiveness of host mixtures for disease control. Using computer simulations of oat crown rust, the relative importance of these two variables on disease control was quantified. The results suggested that intraspecific or interspecific mixtures of different genotypes planted in alternating rows, swaths, or fields could provide greater disease control than was previously thought.

Using these findings, Dr. Mundt designed experiments over the next decade that showed the value of combining ability of genotype mixtures to control diseases of wheat, barley, potato, and rice. Using genetically diverse wheat populations, he and his students examined the effect of spatial patterns of cultivar mixtures on the dynamics of several diseases including wheat stripe rust, Septoria rice blast, and potato late blight. In these studies, Dr. Mundt examined the role of pathogen and host diversity in epidemics. Results from these studies identified modeling strategies and mixtures of plant cultivars, representing a variety of cropping systems that are effective in reducing plant disease. Primarily because of his research, 13 and 18% of the soft white winter wheat areas of Oregon and Washington, respectively, were sown to cultivar mixtures in Fall 2000.

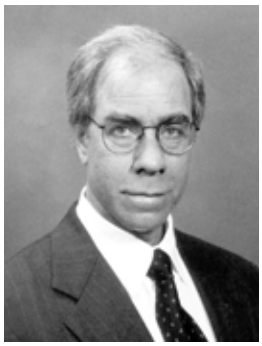
In Dr. Mundt's most recent studies, collaborations with Drs. Youyong Zhu of Yunnan Africultural University and Tom Mew and Hei Leung of the International Rice Research Institute, demonstrated that rice cultivar mixtures could be used to reduce the severity of the devastating rice blast disease. Large-scale tests involving thousands of farmers were conducted to determine how the occurrence of rice blast would be affected by cultivar mixtures of highly desirable but blast-susceptible rice varieties. In 1998, blast severity was reduced to 1% in the mixtures compared with 20% in susceptible varieties. Yield of the mixtures was 89% greater than that of the susceptible cultivars. Although similar results were obtained in 1999, the success of this work was so striking that no foliar fungicides were used in 1999. It is estimated that 24,800 families have realized increased income of 150 to 190 U.S. dollars using this practice. Recently, Dr. Mundt and his collaborators at the International Potato Center in Peru and Ecuador have begun studying similarly employed mixtures of potato cultivars to significantly control the severity of late blight disease in Peru and Ecuador.

Dr. Mundt has also made an important contribution to international agriculture through his work on several committees including the APS Office of International Programs. While on that board, he authored a resolution on World Population/Hunger that was adopted by APS in 1996. His editorial in *Phytopathology News* in 1992 was key to convincing plant pathologists of the need to address world population growth to prevent hunger.

At Oregon State University, Dr. Mundt has guided numerous graduate students and is engaged in international education and extension programs. He has served as advisor for 15 to 20 undergraduate biology majors each year since 1994. He offers graduate courses on sustainable agriculture and population biology of host–pathogen interactions and team teaches a course on plant disease management.

Dr. Mundt has an outstanding record of innovative research extending from studies of theoretical modeling of host pathogen systems to applied research involving thousands of farmers. His research has made a positive impact in areas as diverse as wheat production in the Pacific Northwest and rice production in China. He has previously been recognized by APS as recipient of the Novartis Award in 1997 and the International Service Award in 2000.

## David M. Weller



David Weller was born 19 February 1951 in Covington, KY, and received his primary and secondary education in Cincinnati, OH. In 1973, he graduated from Miami University in Oxford, OH, with a B.A. degree in botany. He went on to graduate school at Michigan State University in the Department of Botany and Plant Pathology, where he received his M.S. and Ph.D. degrees in plant pathology in 1975 and 1978. During his graduate career, he conducted research on the epidemiology and control of bean common blight caused by *Xanthomonas campestris* pv. *phaseoli*. In 1979, Dr. Weller began work with the USDA, ARS Regional Cereal Disease Research Laboratory at Washington State University as a postdoctoral microbiologist with Dr. R. J. Cook. In 1981, he was appointed research plant pathologist with responsibilities for biological control of soilborne pathogens of small grain crops. Dr. Weller has conducted international cooperative research projects with scientists in Australia, the Netherlands, Switzerland, and England. In 1998, he was appointed research leader of the ARS Root Disease and Biological Control Research Unit.

Dr. Weller is recognized as an international authority on biological control of soilborne plant pathogens, suppressive soils, and molecular mechanisms of pathogen suppression by rhizobacteria. His scientific contributions have been a major force in moving research on biological control of soilborne pathogens in new directions. His work focuses on take-all, Rhizoctonia root rot, and Pythium root rot, three diseases that are major constraints to the production of wheat in the Pacific Northwest and worldwide. Rhizobacteria were isolated so that when applied individually, or in combination, they protected wheat and barley against root diseases in the field. He has developed concepts relating biological control to the process of root colonization and the mechanisms by which introduced bacteria suppress root diseases. Working with strain 2-79 and other isolates, he described the movement of fluorescent *Pseudomonas* spp. from the seed to the roots of wheat and documented the pattern of multiplication on roots in the field. With his graduate student, he demonstrated, for the first time, a direct correlation between take-all suppression and the population size of an introduced antagonist on the roots. With other colleagues, he showed that biotic and abiotic factors including soil matric potential, rhizosphere pH, wheat cultivar, and competition from indigenous microflora profoundly influence the rhizosphere population size and the biocontrol activity of rhizobacteria intro-

duced on wheat seed. These studies, and related investigations with *Trichoderma koningii*, provide novel insight into the effects of soil physical and chemical factors on the activity of biocontrol agents. This helped define a strategy for targeting biocontrol agents to sites where the soil environment is supportive of their activity.

Seminal research conducted by Dr. Weller, Dr. L. S. Thomashow, Dr. R. J. Cook, and others, showed that the production of phenazine antibiotics by strains 2-79 and 30-84 is a major determinant in their biocontrol activity and their ability to grow and survive in the rhizosphere. This and related work with strains that produce a different antifungal metabolite, 2,4-diacetylphloroglucinol (DAPG), established unequivocally that rhizobacteria not only produce antibiotics in the rhizosphere environment, but also that these metabolites have a significant role in the ecology of rhizobacteria in natural habitats. The genetic and biochemical protocols outlined in these landmark studies are now considered essential to any definitive investigation of mechanisms of bacterial suppression of soilborne pathogens.

Equally important are Dr. Weller's contributions toward understanding the molecular basis of pathogen suppressive soils. A majority of the thousands of rhizosphere strains he has isolated throughout his career originated from take-all decline soils—soils that, after sustained wheat monoculture, have developed a natural and microbiologically based suppressiveness of take-all disease. Dr. Weller demonstrated that take-all decline, long-recognized and poorly understood, results in Pacific Northwest soils from the buildup of fluorescent *Pseudomonas* spp. that produce DAPG. Using genetic probes and primers specific for the DAPG biosynthetic locus, he and his postdoctoral associates showed that DAPG producers are present in take-all decline soils but not in conducive soils at population densities above a threshold level required for suppressiveness. Suppressiveness was lost when population densities dropped below the threshold level, and could be transferred with small quantities of take-all decline soil containing DAPG producers. These results have reinvigorated research worldwide on the molecular basis of soil suppressiveness. More significantly, they led to the identification of a specific "premier" class of DAPG producers with a unique genetic fingerprint and exceptional biological control and root colonizing abilities. These rhizobacteria represent a major advance in biocontrol technology because they are effective in the rhizosphere when applied to seed or soil at doses much lower than those typically needed to achieve control of take-all, and apparently regardless of soil composition. These strains have been licensed for commercial development.

Dr. Weller has been active in the American Phytopathological Society as a member, vice chair, and chair of the Biological Control Committee, member of the Root Disease and Soil Microbiology Committee, and organizer and moderator of discussion sessions and symposia at numerous annual meetings. He served as an associate editor of *Plant Disease*, an associate and senior editor of *Phytopathology*, and is now on the editorial advisory board of *Biocontrol Science and Technology*. He has been ARS representative to regional project W-147 since 1991, and has been a member of several CSRS review teams and USDA competitive research grants panels. Since 1995, he has been a member of the ARS Pacific West Area Patent Committee. He was a joint recipient of the APS Ruth Allen Award in 1997, has received many meritorious awards from ARS, and was elected a Fellow of the American Association for the Advancement of Science in 1999. He is a member of the graduate faculty at Washington State University, where he is active in the affairs of the Department of Plant Pathology and serves on the University's Marketing and Communications Leadership Council.

# Excellence in Extension Award

This award was established in 1988 by APS Council in recognition of excellence in extension plant pathology. The award is presented to those involved in formal plant pathology extension with recognized superior contributions in creating, developing, or implementing extension-related programs or materials, or those who have provided significant leadership in an area of extension plant pathology.

## Patrick (Pat) E. Lipps

Patrick (Pat) E. Lipps received his B.S. degree in botany in 1975 from Miami University, Ohio. He then attended Washington State University, receiving his M.S. degree in 1977 and his Ph.D. in 1979 in plant pathology. He joined the faculty in the Department of Plant Pathology at The Ohio State University as an assistant professor to conduct research on corn and wheat diseases and to develop an extension education program for all field crops. He was promoted to associate professor in 1984 and professor in 1992. His current appointment is 60% research and 40% extension.

Over the past 2 decades, Dr. Lipps has established a nationally respected and innovative region-wide extension education program on the biology, epidemiology, and management of soybean, wheat, and corn diseases. His program emphasizes the use of integrated disease management strategies as critical portions of an overall IPM and crop management program. His ongoing teaching efforts, in oral and written form, have been extremely valued for their clarity and quality by agronomic crop producers, crop consultants, agri-chemical representatives, and county extension agents. He is highly sought as a speaker for agronomic crop-producer meetings sponsored by both extension and industry. He has developed a well-earned reputation as an expert who is very knowledgeable of agriculture and plant pathology, who can directly relate to the concerns of the agricultural industry and explain difficult concepts in a clear and concise manner. In the past 10 years, he has presented over 250 extension lectures to over 18,000 participants. In addition, he has published over 370 articles in meeting proceedings, newsletters, and fact sheets, and has prepared numerous video and slide sets for use in extension educational programs. He is an integral part of The Ohio State University Extension Agronomic Crops Team and a regular contributor to the Team newsletter. For his many contributions, Dr. Lipps was recently the recipient of the 2000 Excellence in Extension Award presented by The Ohio State University's College of Food, Agriculture, and Environmental Science.

Dr. Lipps has provided extension expertise to international programs in Africa and Eastern Europe. He recently developed a wheat disease extension bulletin and set of fact sheets to be used by producers in the Ukraine as part of the International IPM program. These publications are having a major positive impact on the growers in this former Soviet State.

He uses both problem solving and basic research to support his extension programs and provides new information on plant health management that benefits growers in Ohio and the region. His research over the past 21 years has greatly increased our understanding of fungal diseases of corn and wheat. Significant contributions have been made in three main areas. (i) He has shown the influence of reduced tillage on field crop diseases and the relationship between inoculum density in no- or reduced-tillage systems and resulting disease epidemics. He has documented the spread of anthracnose and gray leaf spot of corn from infested plant debris and shown how row orientation, plant density, and other factors influence disease development. (ii) He and his colleagues have characterized epidemics of powdery mildew of wheat in relation to the degree of plant resistance and fungicide application. This work showed how to efficiently control this disease and minimize yield loss through a single well-timed application of fungicide based on field scouting. (iii) He has contributed greatly to our understanding of the genetics of resistance in wheat (especially powdery mildew) and corn (gray leaf spot), and has been instrumental in the ongoing development of wheat cultivars for resistance against powdery mildew, Septoria diseases, and other pathogens. Recently his research has shed new light on the selection of resistance in wheat to Fusarium head blight, and current work is showing the influence of the environment on head blight development. New cultivars with resistance to head blight are being developed based on his research. Dr. Lipps' research efforts have clearly led to improved control of diseases of corn and wheat throughout the northcentral United States, and have had a major impact on grower profitability throughout the region. Over the past few years, he has taken a leadership role in the creation and management of the National Fusarium Head Blight Initiative, which combines extension and research efforts throughout the United States to better understand this disease, develop efficient controls, and distribute management information in an organized and clear manner. He currently serves as the epidemiology research leader for this national effort.

Dr. Lipps has served APS as associate editor of *Plant Disease*, section editor of *Biological and Cultural Control Tests for Small Grains*, membership in several APS committees, secretary, chair of the APS Extension Committee, and North Central Division Councilor on APS Council. He has served on several USDA regional committees, including NCR-25 Technical Committee for Diseases of Corn and Sorghum, NCR-129 Technical Committee for Occurrence and Effects of Mycotoxins in Feeds and Foods, and NCR-184 Technical Committee for Management of Head Scab of Small Grains. In 2000, he was honored with the Northcentral Division Distinguished Service Award for his numerous contributions to the profession and science of plant pathology.

Dr. Lipps is active in his department and college at Ohio State University. He has advised nine M.S. and five Ph.D. students, and is a frequent guest lecturer in undergraduate and graduate courses. He has served on numerous department, college and ag-industry committees, and chaired many of them. He currently serves on the board of directors for the Ohio Seed Improvement Association and the Ohio Wheat Growers Association.

# Excellence in Industry Award

This award was established in 1988 by APS Council in recognition of significant contributions to plant pathology through activities associated with employment in industry. The award is presented to the individual whose work has advanced the technological development of plant pathology through publication, patents, novel information programs, effective coordination of development programs for new chemicals and biocontrol agents, or demonstrated leadership for an organization with a focus towards plant pathology.

## Molly Niedbalski Cline

Molly Niedbalski Cline is a native of Dunkirk, NY. She was awarded her B.A. in Spanish and biology, cum laude, at Kalamazoo College, MI, and her M.S. (1978) and Ph.D. (1980) degrees in plant pathology from the University of Illinois, Champaign-Urbana. She began her professional career as an extension associate in the Department of Plant Pathology at the University of Illinois with responsibilities in the diagnosis of corn, soybean, ornamental, and turf diseases. There she developed a screening technique for soybean white mold, investigated Botrytis leaf blight of geranium during storage and shipment, and conducted pesticide-applicator training programs. She discovered and named a new fungal genus and species–*Grovesinia pyramidalis*. In 1983, Dr. Cline joined Mallinckrodt Inc. as a senior research horticulturist, where she developed fungicide and insecticide products for use in nursery and greenhouse crops. She contributed numerous articles for popular and refereed publications on foliar and root rot diseases of ornamentals.

When she joined Monsanto in 1987, Dr. Cline served as a turf specialist in the field product development group. That role led to several management positions for the consumer products division, through which she helped bring several new lawn and garden products to market. Her responsibilities included managing technology and environmental issues, along with the consumer hotline for Monsanto's Roundup and Greensweep consumer products. She was a spokesperson on pesticide safety and chair of the packaging task force for Responsible Industry for a Sound Environment.

Through a diverse career path, she spent the past 20 years helping new technology evolve from scientific theory into new products and bringing those products to the people who used them. For the past 7 years in her role as director of food industry relations, Dr. Cline has focused on building agricultural biotechnology acceptance in food and feed marketing chain domestically and internationally, focusing on glyphosate-tolerant soybeans. A large part of that responsibility has involved assisting numerous trade groups and associations build capacity for biotechnology outreach programs.

Dr. Cline lends her talents to various scientific and trade organizations. She serves on the executive committee of the American Soybean Industry Council; on the Board of Directors and the Biotechnology Committee of the International Food Information Council; as a member of the Food and Feed Safety Committee of the National Grain and Feed Association; is on the Board of Directors and Executive Committee of the American Feed Industry Association; and is co-chair of the Council for Biotechnology Information's Food Industry Outreach team. She is frequently invited to speak at domestic and international grain and food trade group conferences and meetings.

Dr. Cline has played a particularly active role for the past 20 years in the APS, holding the offices of council-at-large, chairwoman of the councilor's forum, and secretary during her tenure. She has served as the chair for many of the APS committees including Public Relations, Diseases of Ornamentals and Turfgrasses, Illustrations of Plant Pathogens and Diseases, the Committee on Committees, Public Responsibilities, and Sustaining Associates. She currently is a board member of the Office of Public Affairs and Education (OPAE), a member of the Industry Advisory Council, chair of the Sustaining Associates Committee, and recently completed a 3-year term as a director of the APS Foundation.

Dr. Cline's professional honors include the Whetzel-Westcot-Dimock Distinguished Lecturer in Plant Pathology, Cornell University (1998); Domestic Marketing Award from the United Soybean Board (1995); and the Monsanto YMCA Leadership Award (1989 and 1991). While her career has taken her down many paths, her mission over the years has remained clear: to share, promote, and communicate the value that agriculture brings to all potential users. She played an instrumental role in developing new, technology-based products that enhance the lives of consumers. She ardently supports contributions to Healthy Plants, Healthy World, an organization (APS) committed to helping meet the increased global food demands of the next century.

Dr. Cline lives in St. Louis with her husband Steven and two children, and she voluntarily contributes to the community in many ways.

# Excellence in Teaching Award

This award, established in 1987 by the APS Council, is in recognition of excellence in teaching plant pathology. The award is presented to individuals with active responsibility for one or more courses in plant pathology and recognizes the individual's distinguished proficiency in teaching, as indicated by development and effectiveness of courses taught. In 1999, the Lucy Hastings de GutiÈrrez Fund was established to provide a cash prize to the recipient of the Excellence in Teaching Award. This fund was set up in honor and memory of Lucy by her family and friends.

## William F. Zettler

William F. Zettler was born in Easton, PA, on 13 August 1938. He received his B.S. degree in botany and plant pathology at the Pennsylvania State University in 1961. He continued his studies at Cornell University, where he received his M.S. in 1964 and his Ph.D. in 1966. While at Cornell University, Dr. Zettler held a teaching assistantship under the direction of Drs. Carl W. Boothroyd and Roy L. Millar. After graduation, he assumed a tenure-accruing position at the University of Florida, Department of Plant Pathology, to do research and teach graduate-level classes in plant virology.

About 10 years ago, Dr. Zettler's primary responsibilities shifted from research to teaching, especially at the undergraduate level. In 1990, he initiated a new lower-division course, Plants, Plagues, and People. Four years later, he assumed responsibility for teaching Fundamentals of Plant Pathology and its graduate equivalent, General Plant Pathology. He also teaches, on an ad hoc basis at the University of Florida, Agricultural Honors Colloquium, an upper division course restricted to academically gifted students. In earlier years, he also taught virology short courses in Bolivia (1983) and Ecuador (1989).

Dr. Zettler has been the graduate coordinator for the department since 1991. Two years later, he also became undergraduate coordinator. Since then, the number of undergraduates majoring in plant pathology has increased from 1 to an all-time high of 25. In keeping with his teaching responsibilities, Dr. Zettler is a member of the National Association of Colleges and Teachers of Agriculture (NACTA). He also served (or is serving) on several committees involved with teaching activities, including the APS Teaching Committee (1993 to 1994) and the University of Florida College of Agriculture and Life Sciences (UFCALS) Graduate Curriculum Committee (1993 to 1996), its Academic Development Committee (1996 to 1999) and its Teaching/Advising Awards Committee (2000 to 2001). Earlier this year, Dr. Zettler received the UFCALS Undergraduate Teaching Award and the University of Florida Teacher of the Year Award.

Plants, Plagues, and People is a course for nonscience majors of diverse backgrounds. Dr. Zettler's course had an initial enrollment of only 10 students, but 10 years later, its annual enrollment ballooned to over 600. This course meets University of Florida general education requirements for either biological sciences or humanities and has its own text, written by Dr. Zettler in collaboration with Dr. Carlye A. Baker. The text, "Biohistory: Plants, Plagues, and People," approaches biology chronologically, covering Earth's history from the Big Bang through modern times. In it, the historical and potential modern day impact of such plant diseases as ergot, potato late blight, wheat rust, and brown spot of rice are explained. Students find this integrative approach very appealing, as evidenced by their class evaluations stating, "This is one of the most comprehensive courses I've ever taken. It included history, religion, sociology, climatology, as well as plant pathology. I would recommend this course to anyone. This class was extremely relevant and I think everyone should be exposed to its content, and numbers don't say it all. This is one of the best courses I have ever taken in college."

Dr. Zettler consistently receives superb evaluations for all courses he teaches. He always makes his classes interesting, of practical value, and encourages critical thinking. Students of Plant Virology, Honors Colloquium, Fundamentals of Plant Pathology, and General Plant Pathology write, "This is a fine example of what a graduate-level course can be: challenging, thought-provoking, stressing cognitive processes over memorization. This is the most thought-provoking class I have ever taken, and Dr. Zettler is the kind of teacher that makes you want to go to class. He made plant pathology make sense for my future career. I never thought I would like it. Again, credit goes to the instructor. He intended for pathology to make sense in the real world, not just know definitions and spit them back on paper."

Dr. Zettler served as committee chair or co-chair of 16 masters and 8 Ph.D. candidates and served as committee member of 67 others, many of who have attained prominence in plant pathology and related disciplines. His research emphasis was the characterization and control of viruses infecting tropical root crops, ornamentals, and legumes. He is the codiscoverer of several viruses, including *Dasheen mosaic virus*, a member of the genus *Potyvirus*, and was instrumental in assisting commercial tissue culture laboratories in Florida and elsewhere to control many virus and other diseases. Dr. Zettler also cofounded our department's aquatic

weed biocontrol program, now headed by Dr. Raghavan Charudattan. Dr. Zettler has published 58 refereed papers, 19 book chapters, two feature articles in *Plant Disease*, one article in the *Annual Review of Phytopathology*, and over 100 other manuscripts. He also coordinated the publication of the graduate and undergraduate recruitment brochures currently being used by the Department of Plant Pathology.

Dr. Zettler is married and has two children, one born in Ithaca, NY, and the other in Gainesville, FL. He and his wife, Carol R. (nee Schurz), also from Easton, reside in nearby Archer, and on most weekends, travel to the secluded fishing village of Horseshoe Beach, FL, where they have a cottage and fret about hurricanes. Their son, Lawrence W., received his doctorate from Clemson University and now holds a tenure-accruing position at Illinois College, where he teaches biology and studies mycorrhizae of native orchids. Their daughter, Jennifer A., also a student at Clemson, is studying biology and hopes to graduate with her doctorate in 2001. Not to be outdone by her father, she won the Clemson University Graduate Student Teaching Award this year.

# International Service Award

This award, first given in 1998, was established by the APS Council in recognition of outstanding contributions to plant pathology by APS members for a country other than his or her own. Contributions may have been through collaborative projects, sabbaticals, short- and long-term assignments with educational or government agencies, or effective coordination of education programs. Beginning in 2000, the John and Ann Niederhauser Endowment Fund provides a cash prize to the recipient of the International Service Award and an additional amount for donation to an international program of their choice.

## Robert Stewart Zeigler

Robert Stewart Zeigler was born in Bellefonte, PA, and reared in an agricultural setting. After earning his B.S. in biological sciences in 1972 with high honors from the University of Illinois, he served in the Peace Corps for 2 years and taught secondary school science in Mokala, Zaire. From 1980 to 1981, Bob Zeigler investigated the superelongation disease of cassava at the Centro Internacional de Agricultura Tropical (CIAT) in Cali, Colombia. His publications from this work are still among the definitive references on host resistance, the taxonomy and racial specialization of the causal agent, and the physiology of this important disease. After receiving his Ph.D. from Cornell University in 1982, Dr. Zeigler returned to Africa as an employee of the International Development Research Centre (Ottawa, Canada). From 1982 to 1985, he served as a technical advisor for the Brundi Maize-Pea Program, Institute de Sciences Agronomique du Burundi (ISABU). In this position, he was responsible for virtually all aspects of managing this national commodity research program. Dr. Zeigler reoriented varietal development and agronomic research programs of ISABU to the needs of small maize farmers, and developed two highland maize populations from which three varieties were released in 1988. The on-farm methodology that he utilized to evaluate promising material was adopted as a standard procedure for other commodities.

In 1985, Dr. Zeigler began a productive 15-year phase of work as a rice pathologist and rice program leader in the Consultative Group for International Agricultural Research (CGIAR). He was first hired as a senior staff plant pathologist in CIAT's Rice Program, and remained in Columbia until 1992, becoming leader of the rice program in 1986. While at CIAT, Dr. Zeigler was responsible for rice disease research throughout Latin America. This included the development of diverse disease screening and management strategies, clarification of the etiology of poorly understood diseases, and support of pathology and breeding programs of National Agricultural Research Systems (NARS) in the region. Among his many achievements were the development of lines with stable blast and hoja blanca resistance, the identification of Pseudomonas seed pathogens that were previously unknown in Latin America, and, in cooperation with scientists at Purdue University, the application of biotechnological innovations to the understanding of population diversity in the rice blast pathogen and its implications for rice improvement. Dr. Zeigler oversaw a budget of $2.3 million and coordinated 12 CIAT scientists and over 100 locally recruited scientists, technicians, and laborers during his fruitful time at CIAT.

In 1992, Dr. Zeigler was hired as plant pathologist and leader of the Rainfed Lowland Rice Research Program of the International Rice Research Institute (IRRI) in the Philippines. Under his direction, the program pioneered the environmental characterization of production area via GIS integration of data from the social sciences and agronomic and germ plasm research, and used this holistic analyses to define and prioritize research problems. Significantly, breeding was completely decentralized to two regional shuttle programs in northeast Thailand and Eastern India. Strong linkages were established in developing countries in the areas of physiology and molecular genetics of tolerance to drought, prolonged submergence, and resistance to blast. With modern molecular tools, his team significantly increased our understanding of genetic variation in *Magnaporthe grisea*, the cause of blast, and clarified the genetics of blast resistance. During 1996 to 1998, he was leader of IRRI's Irrigated Blast Research Program. This is IRRI's largest program, budgeted at over $10 million, with 40 Ph.D. staff, postdoctorates, and visiting scientists of over 20 nationalities. As leader, he was engaged in disparate disciplines ranging from traditional agricultural sciences through molecular genetics and social sciences.

Despite the increasingly administrative nature of his duties in CIAT and IRRI, Dr. Zeigler was a prolific and respected author, publishing over 170 publications including 44 papers in refereed journals, 25 books, reviews, and book chapters, and numerous technical papers. Dr. Zeigler is fluent in written and spoken Spanish and French. He had been adjunct faculty member in plant pathology at Kasetsart University, Thailand (1995 to present), University of the Philippines at Los Banos (1992 to present), Colorado State University (1993 to 1996), and Oregon State University (1988 to 1992). He has served on several important CGIAR committees, organized numerous international conferences on rice diseases and improvement, and conducted program reviews and intensive training sessions throughout his time in CG system.

In 1999, Dr. Ziegler returned to the United States as professor and head of the Department of Plant Pathology and director of the Plant Biotechnology Center at Kansas State University (KSU).

Since returning to the United States, he has maintained his commitment to international collaborative research. He led the creation of the Great Plains Cereals Biotechnology Consortium that includes KSU, University of Nebraska, Oklahoma State University, and the Nobel Foundation; has been funded by NSF, USDA, and state; and includes explicit research linkages with IRRI and CIMMYT in cereals genomics. He currently serves as chair of the Wheat Committee for Mid-America International Agriculture Consortium, and has promoted relationship between the Colegio de Post Graduados and the University of Sonora in Mexico and KSU. He is currently leading a very large global effort to promote and seek support for collaboration among U.S. universities and international agricultural research centers in the area of comparative cereals genomics. He is APS councilor for the International Society for Plant Pathology. For his outstanding contributions to plant pathology and international agriculture, as well as rice science, he has been awarded the APS International Service Award.

# Lee M. Hutchins Award

The Lee M. Hutchins Fund was established in 1979 by gifts from the estate of Dr. Lee M. Hutchins. The award, consisting of a certificate and income from the invested fund, is made for the best contribution to basic or applied research on diseases of perennial fruit plants (tree fruits, tree nuts, small fruits and grapes, including tropical fruits but excluding vegetables). The results of the research must have been published in an official journal of the Society.

## Mark Mazzola

Dr. Mark Mazzola is a research plant pathologist with the U.S. Department of Agriculture, Agriculture Research Service (USDA-ARS), located at the Washington State University Tree Fruit Research Laboratory in Wenatchee. He was born in Boston, MA, on 25 April 1960. He received a B.S. in forestry from the University of Vermont, Burlington, and an M.S. degree in forest pathology from the same institution under the direction of Dr. Dale R. Bergdahl. For his Ph.D. research, he switched from forest pathology to soilborne pathogens and biological control, studying under the guidance of Dr. R. James Cook at Washington State University, Pullman. After graduating in 1990, he worked for 5 years as a postdoctoral associate, first with Drs. Frank White and Jan Leach at Kansas State University and then as a national research initiative postdoctoral fellow with the USDA-ARS Root Disease and Biological Control Research Unit at Pullman. In 1995, he assumed the present position with the USDA-ARS at Wenatchee, WA, with a research focus on soilborne diseases of deciduous fruit trees.

Dr. Mazzola is recognized for his contributions in resolving the etiology of apple replant disease and for pioneering a potential means of biological control of the disease that reduces dependence on fumigants such as methyl bromide. This work is summarized in a series of papers published in *Phytopathology*. The apple replant disease is distributed worldwide and is especially an economic constraint to the apple industry of the Pacific Northwest. Historically, the apple replant etiology was attributed to accumulation of arsenic in the orchard soil following years of use as an insecticide. Although methyl bromide was used for control of apple replant disease, changes in soil nutrient status after fumigation were believed to be responsible for disease control, because a biotic causal agent had not been identified.

He used a simple but elegant approach to establish that soilborne microorganisms are involved, and then sought to identify the pathogens responsible for apple replant disease. First, he perfected an apple seedling test for the disease from soil collected within and bordering the apple orchard being studied. Although planted in the same soil types, apple seedlings were stunted when grown in soil from sites where apple trees had been removed; seedlings grew normally in soil collected from sites adjacent to affected orchards. He showed by pasteurization that the stunting effect of the old orchard soil was eliminated by moist-heat treatment at 50°C for 30 min. After ruling out the possibility of bacteria and nematodes as major etiological agents, Dr. Mazzola focused on soilborne fungi. *Cylindrocarpon destructans*, *Phytophthora cactorum*, *Pythium* spp., and *Rhizoctonia solani* were consistently isolated from the roots of stunted seedlings and, when added to soil, caused stunting similar to that observed for seedlings grown in orchard soil. Orchards were shown to have different mixtures of these four pathogens, with *Rhizoctonia* and *Pythium* spp. being the most important in the Pacific Northwest.

He is recognized for discovering the first practical alternative to soil fumigation for control of apple replant disease. Using the apple seedling bioassay system that he developed, disease was controlled by planting the orchard soil with three 28-day cycles of wheat. The cycling of wheat markedly reduced apple root infection by *Rhizoctonia* and *Pythium* spp. and disease control was as effective as soil pasteurization. Dr. Mazzola observed that successive cycles of wheat significantly increased *Pseudomona*s populations in the apple rhizosphere, with *P. putida* becoming the predominant species associated with disease suppression. More recently, he has shown that the process is limited to specific wheat cultivars that select for specific genotypes of *P. putida* that effectively colonize the apple rhizosphere. His research demonstrates how an orchard disease complex can be managed by transforming a soil from conducive to suppressive by successive planting of wheat to stimulate a shifting in the microbial composition of the rhizosphere. The apple industry, including organic apple growers, recognizes the advances Dr. Mazzola has made in solving the chronic apple replant disease problem, and is using the control method before reestablishing apple orchards.

Dr. Mazzola has been active in APS by serving as associate and senior editor for *Phytopathology* and as chair of the Soil Microbiology and Root Disease Committee. For the 1999 joint APS/CPS meeting held in Montreal, he co-organized a symposium, "Molecular Techniques in Ecological Studies of Soil Microbial Communities." In addition to APS, he is a member of the American Association for the Advancement of Science, the American Society for Microbiology, and the International Society for Molecular Plant-Microbe Interactions. He has been an invited speaker at national and international meetings organized by various scientific organizations, and served on a USDA competitive grants panel. He is a member of the Xi Sigma Pi and Phi Kappa Phi Honor Societies. He serves as a member of the graduate faculty at Washington State University, and supports the programmatic activities of the Department of Plant Pathology.

# Ruth Allen Award

The Ruth Allen Memorial Fund was established in 1965 by gifts from the estate of Dr. Ruth Allen through the generosity of her heirs: Sam Emsweller, Mabel Nebel, Hally Sax, and Evangeline Yarwood. The award, consisting of a certificate and income from the invested fund, is given for outstanding contributions to the science of plant pathology.

## Robert E. Davis

Robert E. Davis received the B.S. degree in botany from the University of Rhode Island in 1961, and a Ph.D. in plant pathology from Cornell University, the latter under the guidance of Dr. A. F. Ross in 1967. After 18 months as a postdoctoral resident research associate with the USDA-Agricultural Research Service (ARS) in the pioneering laboratory for plant virology in Beltsville, MD, Dr. Davis became a research plant pathologist in the pioneering laboratory in 1968. In 1985, he became research leader of the molecular plant pathology laboratory of the Plant Sciences Institute, USDA-ARS, in Beltsville. He is also an adjunct professor in the Department of Plant Pathology at Cornell University.

Dr. Davis led the way toward discovery of an entirely new taxon of pathogens. He discovered in the corn stunt disease a unique helical, motile wall-less prokaryote that he named spiroplasma. This began a new field in which diverse spiroplasma pathogens have subsequently been found capable of affecting plants, insects, and mammals. While proposing a hydrodynamic theory of spiroplasma motion and the existence of a fibrillar contractile structure as the mechanism, he provided the first demonstration that a cell wall-free organism could be helical and motile. He predicted discovery of spiroplasmas in citrus and has been a central player in the characterization of spiroplasma genetic elements including plasmids and spiroplasma viruses. In the course of this latter work, he discovered the only known virus capable of infecting spiroplasmas across species.

Following his seminal discovery of spiroplasma, Dr. Davis and his research group proposed the first taxonomic classification of spiroplasmas, based initially upon serological reactions of spiroplasma membrane antigens and supported by reciprocal DNA-DNA hybridization analyses and electrophoresis of cellular proteins. Dr. Davis and his team initially proposed that each major spiroplasma serogroup represented at least one species of *Spiroplasma*. However, separate subgroups within the same serogroup cross-reacted in tests (e.g., growth inhibition) by which species of *Mycoplasma* could be readily distinguished. Dr. Davis and his team asserted that major criteria for species differentiation within the genus *Mycoplasma* could not be appropriately applied to the genus *Spiroplasma* without modification. Amid skepticism from established medical mycoplasmologists about taxonomic designations for spiroplasmas that cross-reacted in tests that differentiated *Mycoplasma* spp., the proposal by Dr. Davis and his team prevailed that major serogroups and distinct subgroups (within a major serogroup) be given the status of separate *Spiroplasma* spp.

Dr. Davis's studies revealed the existence of diverse spiroplasmas and mycoplasmas on surfaces of flowers. This finding demonstrated a totally new ecological niche for cell wall-less prokaryotes and showed for the first time that spiroplasmas can exist outside of living host tissues in nature. He showed that several new mycoplasmas and spiroplasmas were epiphytes on flowers of a single plant species and that phylogenetically diverse plant species can harbor spiroplasmas. He hypothesized that flowers serve as important foci for dissemination of some spiroplasmas pathogenic in insects and possibly other fauna, including vertebrates.

Later in his career, Dr. Davis shifted the majority of his attention to the mycoplasma-like organisms (MLOs, now called phytoplasmas), a related group of cell wall-less prokaryotes that cause devastating plant diseases worldwide, impacting both nutritional and sociological needs. Because the phytoplasmas cannot be obtained in pure culture, they still present a challenge for understanding their properties. Dr. Davis, often in collaboration with his close colleague of many years, Dr. Ing-Ming Lee, took a primary role in the effort to understand the relationships among the phytoplasmas, developing a taxonomic model based on 16S rDNA analysis that is still used today. Dr. Davis's laboratory introduced the concept of genetic cluster-specific molecular tags for phytoplasmas, and devised practical molecular methods for detecting and identifying spiroplasmas, as well as phytoplasmas. The molecular reagents and monoclonal antibodies developed by Dr. Davis and colleagues have been internationally used for pathogen detection and identification. Research by Dr. Davis's laboratory made important contributions to understanding the phylogenetic relationships among phytoplasmas, to concepts used for phytoplasma classification based on genomic cluster and 16S rRNA, and to pioneering the taxonomy and nomenclature of phytoplasmas. In fundamental studies of the phytoplasma rRNA operon, Dr. Davis's laboratory discovered that rRNA interoperon sequence heterogeneity was common among phytoplasmas and proposed that, where possible, descriptions of "*Candidatus* Phytoplasma species" include nucleotide sequences of 16S rRNA genes from both operons in the genome.

Important new insights into numerous plant diseases caused by poorly understood microbes were developed through national and international collaborative and team research by Dr. Davis and colleagues. These include insights that came from extensive data indicating that corn stunt was caused by a spiroplasma, that spiroplasma and a phytoplasma contributed to major corn disease outbreaks in the 1990s in Brazil, that *Spiroplasma citri* was the probable cause of devastating epidemics of horseradish brittleroot disease in Illinois, and that a coryneform bacterium, not a virus, was the probable cause of the ratoon stunt disease of sugarcane. In work on grapevine yellows diseases, which are virtually indistinguishable on the basis of symptoms in the United States, Europe, and Australia, Dr. Davis and collaborators found that phylogenetically diverse phytoplasmas were involved and that the various grapevine yellows pathogens could be distinguished on the basis of rDNA sequences These findings opened the way to accurate detection and identification of the pathogens involved in grapevine yellows disease outbreaks, and they changed approaches in research on epidemiology and efforts to control disease spread.

Based on international recognition for his scientific accomplishments and his leadership skills in organization and management, Dr. Davis has drawn together highly effective national and international research teams whose contributions continue to impact basic science and provide solutions to economic problems in agriculture in the United States and elsewhere. These have included projects with Italy, Hungary, and Australia on grapevine yellows disease, with Spain on spiroplasmal diseases, with Israel on phytoplasmal diseases of crops, with Florida on emerging diseases of strawberry, with Mexico on corn stunt disease, with Illinois on

horseradish brittleroot disease, with Taiwan on sweet potato witches'-broom disease, with Brazil on biotechnology to solve economically damaging crop diseases of unknown cause, and with Lithuania on phytoplasmas and biodiversity in natural and agricultural ecosystems. His research has attracted numerous visiting scientists from the United States as well as Italy, Spain, Lithuania, Hungary, Brazil, Chile, Israel, Taiwan, India, Malaysia, and Japan to his laboratory. He has trained a number of graduate students, most of whom were degree candidates at the nearby University of Maryland. Most recently, Dr. Davis launched an ARS/University of Oklahoma/Lithuania/Brazil/Oklahoma State University project to sequence the genome of *Spiroplasma kunkelii*.

Dr. Davis has published over 150 refereed papers. He is a Fellow of the American Phytopathological Society and a Fellow of the Washington Academy of Sciences. In 1984, he received the Washington Academy of Sciences Award for Outstanding Research in the Biological Sciences. In 1997, Dr. Davis received the ARS Outstanding Scientist of the Year Award, followed by the USDA's esteemed Silver Plow Award in 1998 when he was only one of three persons within the USDA to receive that award. His creativity and innovative research leadership have contributed significantly to knowledge of the causes of numerous important plant diseases. As a world authority and leader in plant diseases caused by phytoplasmas and spiroplasmas, he continues to take an active leadership role in the science of his profession, in research, teaching, and outreach. This he continues while effectively carrying out the responsibilities of chief scientist of the molecular plant pathology laboratory of the USDA-ARS at Beltsville, MD.

# Syngenta Award

Sponsored by Syngenta (formerly Novartis Crop Protection), this award is given to individual plant pathologists who have made significant contributions to the advancement of knowledge of plant diseases or their control. The award consists of a trophy and an expense-paid trip to Basel, Switzerland.

## Eric L. Davis

Eric L. Davis was born in Long Branch, NJ, in 1958. He received his B.S. degree in plant science from the University of Rhode Island in 1980 and his Ph.D. degree in nematology/entomology from the University of Florida in 1988. After postdoctoral research positions in the USDA in Orlando and at the University of Georgia, he joined the plant pathology faculty at North Carolina State University in 1993.

His primary research program focuses on the mechanisms of pathogenicity utilized by two groups of unique, plant-parasitic nematodes. He has made pioneering contributions in the understanding of the host-parasite relationships between cyst (*Heterodera glycines* and *Globodera* spp.) and root-knot (*Meloidogyne* spp.) nematodes and the major crop plants that they attack. The focus of his research at North Carolina State University has been on esophageal gland-cell proteins and their involvement in plant pathogenesis. Dr. Davis generated a panel of monoclonal and polyclonal antibodies that bind to esophageal gland-cell proteins and used these to isolate and characterize the biologically important proteins from *H. glycines*. These findings interfaced with related collaborative research on the potato cyst nematode (*G. rostochiensis*) and evolved into projects to clone parasitism genes expressed in the secretory gland cells of cyst nematodes. He and his associates have succeeded in cloning, sequencing, and identifying cDNAs encoding cellulases (β-1,4-endoglucanases) from *H. glycines*. This was the first isolation of this important hydrolytic enzyme gene from an animal, and this significant discovery was published in the Proceedings of the National Academy of Sciences in 1998. Related findings revealed that the cellulases are released into the plant roots during intracellular migration by the nematode. Furthermore, recent research in his laboratory has resulted in the cloning and identification of similar cellulase genes in *G. tabacum* and in a number of other plant-parasitic nematode species. The cyst nematode cellulase gene has proven to be an excellent model for investigation of the role of nematode-stylet secretion during different stages of plant pathogenesis by these pathogens. For example, the infective stage of *H. glycines*, but not the sedentary adult female, secretes these enzymes. Interestingly, these cellulases have highest similarity with bacterial cellulases. The cyst nematode cellulases present the first strong evidence that some genes for parasitism by nematodes may have been acquired via ancient horizontal gene transfer from prokaryote to eukaryote.

Dr. Davis is also interested in host plant resistance. He has made significant progress in characterizing the genetic variability and virulence among populations of cysts, reniform, and root-knot nematodes from different geographic regions. He and his associates have demonstrated the presence of promising resistance to nematodes in a range of soybean breeding lines and cultivars as well as in sweet potato.

Recognition of the quality and importance of Dr. Davis and his research is reflected in a number of honors and awards. In addition to receiving the Certificate of Merit Award from the USDA in 1989, he was selected by the plant scientists at the Max Plank Institute as the North Carolina participant in a Scientist Exchange Program.

Dr. Davis contributes much through an active commitment to professional service. He has been an active member of a number of professional societies and a reviewer for numerous research journals. In addition to service on editorial boards and society committees, he has published key, invited annual reviews and book chapters. His ability to collaborate effectively with other scientists on a national and international basis serves to enrich his own research program as well as involve researchers in a number of countries. He is a principal contributor to a research project on nematode secretions involving collaboration with scientists from the Wageningen Agricultural University, the Netherlands, the Institut National de la Recherché Agronomique, Antibes, France, Iowa State University, and the University of Georgia. He also recently initiated a collaborative project with researchers at the Hebrew University of Jerusalem on bioengineering plant resistance to nematodes. A result of this collaboration was the finding that the promoter of a cellulase gene of *Arabidopsis thaliana* is specifically upregulated in root-knot nematode feeding cells in a heterologous tobacco host. With his collaborators from Iowa and Georgia, Dr. Davis has most recently embarked on a functional genomics effort designed to identify multiple secretory genes expressed in the secretory gland cells of the soybean cyst nematode during plant parasitism. An ultimate goal of Dr. Davis's research is to identify molecular targets crucial for parasitism by nematodes and to disrupt their activity to provide novel resistance to nematodes in crops.