

**STERLING B.
HENDRICKS**
MEMORIAL LECTURE



2005

**U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE**



Donald L. Sparks

STERLING B. HENDRICKS
MEMORIAL LECTURE

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Co-sponsored by the
AMERICAN CHEMICAL SOCIETY
ACS Agrochemical Division and ACS Agricultural and
Food Chemistry Division

The annual Sterling B. Hendricks Memorial Lectureship was established by the Agricultural Research Service in 1981 to honor the memory of a great scientist by recognizing scientists who have made outstanding contributions to the chemical science of agriculture.

Sterling Brown Hendricks (1902-1981) contributed to many diverse scientific disciplines, including soil science, mineralogy, agronomy, plant physiology, geology, and chemistry. He and his associates discovered and isolated phytochrome, the protein molecule that regulates many plant processes. Dr. Hendricks's work has enhanced our understanding about the nature of soil and the behavior of plants—knowledge essential to the development of effective agricultural management.

Candidates may be suggested for the Lectureship each year in October by sending a letter of nomination and a current curriculum vitae to Kim Kaplan, Lecture Coordinator, ARS Information Staff, Room 1-2253, 5601 Sunnyside Ave., Beltsville, MD 20705-5128. An impartial committee rates all nominees, and then a final selection is made by the ARS administrator.

The Agricultural Research Service is the principal scientific research agency of the U.S. Department of Agriculture. ARS provides knowledge and technology to benefit farmers and consumers. Its research focuses on the wise use of natural resources; protection of crops and livestock from insects, diseases, and other pests; more efficient agricultural production; new uses for agricultural commodities; and the relationships between nutrition and human health.

The American Chemical Society, with a membership of more than 143,000 chemists and chemical engineers from the United States and abroad, is the world's largest scientific society. The society is dedicated to the advancement of chemistry in all its branches. The lecture is co-sponsored by the ACS Agrochemical Division and the ACS Agricultural and Food Chemistry Division.



onald L. Sparks is an internationally renowned soil chemist, especially recognized for his research on the kinetics of soil chemical processes and the surface chemistry of soils and soil components.

Dr. Sparks pioneered the application of chemical kinetics to soils and soil minerals including elucidating rate-limiting steps and mechanisms and coupling kinetic studies with molecular scale investigations. He was one of the first soil scientists to use synchrotron-based techniques, particularly bulk- and micro-focused X-ray absorption fine structure spectroscopy to directly identify the forms of metal(oids) in soil, which is a critical step in determining the mobility and bioavailability of potentially toxic metals in contaminated soil. These tools have revolutionized research in the soil and environmental sciences.

He and his group's discoveries in the late 1990s about the formation and role of surface precipitates in the retention, fate and transport of trace metals such as nickel and zinc in natural systems have had major impacts not only in the field of soil science but also in the environmental and geological sciences. These findings also have important applied implications in the areas of soil management, model development, and soil remediation.

In addition to carrying out fundamental research, Dr. Sparks has consistently applied his work to agricultural problems such as relating the kinetics of potassium, nitrogen, phosphorous, and boron to soil fertility and environmental quality. He also conducts research on the environmental fate of industrial contaminants as part of an ongoing program to devise safe and effective methods to dispose of these materials.

Currently, Dr. Sparks is the S. Hallock du Pont Endowed Chair and Chairman of the Department of Plant and Soil Sciences at the University of Delaware. In addition to his research, he is known for his work as a teacher and advisor of more than 65 graduate students and postdoctoral researchers who are now becoming leaders in the soil and environmental sciences.

Among his many honors and awards are President, International Union of Soil Sciences; President, Soil Science Society of America; Fellow, American Association for the Advancement of Science, Soil Science Society of America, and the American Society of Agronomy; Soil Science Research Award; M.L. and Chrystie M. Jackson Award in Soil Chemistry and Mineralogy; Environmental Quality Research Award; Francis Alison Faculty Award, University of Delaware; and University of Delaware Doctoral Advising and Mentoring Award.

PREVIOUS LECTURERS

2004, Robert L. Buchanan, Director, Office of Science, U.S. Food and Drug Administration Center for Food Safety and Applied Nutrition

2003, Kriton K. Hatzios, Head, Virginia Agricultural Experiment Station, and Associate Dean for Research, Virginia Tech College of Agriculture and Life Sciences

2002, Irvin E. Liener, Professor Emeritus, Biochemistry Department, University of Minnesota.

2001, Malcolm J. Thompson, Insect Physiology Laboratory, Beltsville Agricultural Research Center, Agricultural Research Service.

2000, William S. Bowers, Professor, Department of Entomology, University of Arizona.

1999, Bruce D. Hammock, Professor, Department Entomology, University of California at Davis.

1998, Martin Beroza, Chief, Organic Chemicals Synthesis Laboratory, Agricultural Research Service.

1997, Ernest Hodgson, Head, Department of Toxicology, North Carolina State University.

1996, Hugh D. Sisler, Professor Emeritus, Department of Plant Biology, University of Maryland.

1995, Winslow R. Briggs, Director Emeritus, Department of Plant Biology, Carnegie Institution of Washington.

1994, Wendell L. Roelofs, Liberty Hyde Bailey Professor of Insect Biochemistry, Cornell University.

1993, **Philip H. Abelson**, Deputy Editor, *Science*, and Scientific Advisor to AAAS.

1992, **John E. Casida**, Professor of Chemistry and Toxicology, University of California at Berkeley.

1991, **Peter S. Eagleson**, Professor of Civil Engineering, Massachusetts Institute of Technology.

1990, **Roy L. Whistler**, Emeritus Professor of Purdue University.

1989, **Sanford A. Miller**, University of Texas Health Science Center at San Antonio.

1988, **Bruce N. Ames**, Chairman, Department of Biochemistry, University of California at Berkeley.

1987, **Mary-Dell Chilton**, Director of Biotechnology Research for Ciba-Geigy Corporation, Research Triangle Park, North Carolina.

1986, **Ralph Hardy**, President, Boyce Thompson Institute for Plant Sciences, Cornell University, and Deputy Chairman, BioTechnica International.

1985, **Alan Putnam**, Professor, Department of Horticulture and Pesticide Research Center, Michigan State University.

1984, **Frederick Ausubel**, Professor of Genetics, Harvard Medical School and Massachusetts General Hospital.

1983, **Melvin Calvin**, Nobel Laureate and University Professor of Chemistry, University of California at Berkeley.

1982, **Warren L. Butler**, Professor of Biology and Past Chairman, Biology Department, University of California at San Diego.

1981, **Norman E. Borlaug**, Nobel Laureate and Director of International Maize and Wheat Improvement Center, Mexico City.