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**President and Visiting Assistant Professor, UMN, St. Paul**  
**Center for Regulatory Research, LLC**  
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## Education

1968 - 1972	University of California, Riverside	B.S. Plant Science (Plant Pathology)
1972 - 1975	San Diego State University	M.S. Botany (Mycology)
1974	Certificate in Community College Teaching	
	Thesis: California chaparral microfungi: response to plant products	
1976 - 1981	Michigan State University	Post-graduate
1982 - 1989	University of Maryland, College Park	Post-graduate
1992 - 2000	George Mason University	Ph. D. Environmental Biology and Public Policy (Mycology, Microbial Ecology, Population Genetics)

Dissertation: A Comparative Population Ecology Study of the Fungal Pathogen,  
*Discula umbrinella* (Syn. *Discula quercina*), on *Quercus alba* and *Quercus rubra*  
(Degree officially awarded January 2001)

## Employment

PRESIDENT <i>Center for Regulatory Research, LLC</i> <i>University Technology Enterprise Center</i> <i>1313 Fifth Street SE, Suite 329</i> <i>Minneapolis, Minnesota</i>	2005 - PRESENT
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Founded the company in 2005 to provide products and services to academia, government, and industry. Products and services include commodity market assessments, commodity treatment reviews, ag/ecological risk assessments, risk assessment training, scientific workshops and compact disc production of resources/meetings.

PLANT PATHOLOGIST <i>Risk Analysis Systems</i> <i>Policy and Program Development</i> <i>Animal and Plant Health Inspection Service</i> <i>4700 River Road, Unit #117</i> <i>Riverdale, Maryland</i>	2004 – 2005
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Appointed to the prevention working group, invasive species pathways team, Invasive Species Council, promoted to assistant chairperson (<http://www.invasivespecies.gov>), risk mitigation and survey policy issues related to *Phytophthora ramorum*, pathogen responsible for the sudden oak death disease of forest and nursery crops. Climate modeling for prediction of *Phytophthora ramorum* establishment in the USA.

PLANT PATHOLOGIST 2003 - 2004  
*Animal and Plant Health Inspection Service*  
*USDA Forest Service*  
*North Central Research Station*  
*St. Paul, Minnesota*  
Assess the impact of multiple invasive species on the oak forests of the North Central region, conduct detection survey of nursery stock in Minnesota for the presence of *Phytophthora ramorum* using a species-specific PCR assay, and predict the probability of establishment of exotic pathogens based on climate modeling.

VISITING ASSISTANT PROFESSOR 2001 - PRESENT  
*Animal and Plant Health Inspection Service*  
*Department of Plant Pathology*  
*University of Minnesota*  
*St. Paul, Minnesota*

Design and evaluate risk assessment, risk management, and geospatial methods for exotic forest pathogens in conjunction with university scientists, U.S. Forest Service and U.S.D.A.-Agricultural Research Service. Organize, moderate, and participate as an author in the on-line international workshop on risks of exotic forest pests and their impact on trade, a web-based meeting hosted by the American Phytopathological Society.

PLANT PATHOLOGIST 1989 – 2001  
*Risk Analysis Systems Staff*  
*Animal and Plant Health Inspection Service*  
*U.S. Department of Agriculture*  
*Riverdale, Maryland*

Design and implement risk assessment methods, incorporate methods into federal regulations and integrate geospatial analysis into risk assessment methods. Accomplishments include risk assessments on *Melampsora* rusts, contributed to risk assessments on importation of timber and timber products from Siberia, New Zealand and Chile published by U.S. Forest Service, designed risk information and assessment software, and contributed risk assessment process to the Office of Technology Assessment's publication on invasion of non-indigenous organisms into the U.S.

BIOLOGICAL SPECIALIST 1989 - 1989  
*Applied Sciences Division*  
*American Type Culture Collection*  
*Rockville, Maryland*

Responsible for pharmaceutical contract which provided fungal extracts for drug research. Designed improved extraction methods for efficient yields of extracts. Also, responsible for contracts with medical laboratories to provide freeze-dried microbial cultures upon request.

INSTRUCTOR 1989 - 1989  
*Botany Department*  
*University of Maryland, College Park*  
*College Park, Maryland*

Teaching duties included laboratory preparation and all laboratory sections of Plant Pathology for one semester.

TEACHING ASSISTANT 1983 - 1989  
*Botany Department*  
*University of Maryland, College Park*  
*College Park, Maryland*

Teaching duties included laboratory sections of General Botany, General Biology, Plant Pathology, Mycology, Morphology of Vascular Plants, and Plant Physiology.

GRADUATE RESEARCH ASSISTANT 1981 - 1983  
*Soil-Borne Diseases Laboratory*  
*Agricultural Research Service*  
*U.S. Department of Agriculture*  
*Beltsville, Maryland*

Responsible for laboratory studies on chlamydospore formation and germination in *Trichoderma viride* and use of this spore type for biological control.

SENIOR RESEARCH ASSISTANT 1974 - 1981  
*Department of Botany and Plant Pathology*  
*Michigan State University*  
*East Lansing, Michigan*

Responsible for laboratory, field, and greenhouse studies on soybean seedling and root diseases. *Thielaviopsis*, *Fusarium*, *Rhizoctonia* and *Phytophthora* soil-borne disease cycles were investigated.

PLANT ECOLOGY FIELD TECHNICIAN 1973 - 1974  
*Botany Department*  
*San Diego State University*  
*San Diego, California*

Responsible for field collection and data analysis on the Mediterranean Chaparral Project sponsored by the International Biological Program.

### **Academic Honors, Awards, and Special Accomplishments**

1975 Lifetime Community College Instructor's Certificate in Ornamental Horticulture, Biology, and Botany

1981 Allen H. Meyers Fellowship Grant on survival of *Phytophthora* root rot on soybean

1985 International Society of Arboriculture Grant on alcohol dehydrogenase enzyme expression during rhizomorph development of *Armillaria mellea*

1990 Completed a multi-objective decision-making workshop, University of Virginia

1990 Completed a systems analysis workshop, APHIS

1990 Completed courses on landscape plants, USDA Graduate School

1991 Completed a Atlas-GIS software course by Strategic Mapping

1992 Completed a Epidemiology Workshop, Johns Hopkins University

1996 Completed a PCR workshop, American Type Culture Collection

1997 Completed a Molecular Evolution Workshop, Woods Hole, Massachusetts

1991 - 2000 Licensed Maryland Tree Expert

1989 - 2005 Awarded Certificates of Merit and Appreciation for outstanding work at APHIS, U.S. Department of Agriculture

### **Society Memberships and Professional Offices**

American Phytopathological Society

Past Chair, Forest Pathology Committee  
Past Chair, Regulatory Plant Pathology Committee  
Ad-Hoc Web Page Committee

American Society of Microbiology  
Mycological Society of America  
Society for Risk Analysis  
Society of American Foresters

### Teaching Experience

1974	Instructor	Introduction to Nursery and Landscape, Mesa Junior College
1982	Teaching Assistant	Laboratory Sections of General Botany, Plant Pathology, Plant Physiology, Biology, Mycology, Morphology of Vascular Plant, UMCP
1990	Instructor	All Laboratory Sections of Plant Pathology, UMCP

### Professional Presentations

1990-2005 Numerous presentations within APHIS on pest risk assessment and geographic information system applications

1992 Jointly organized a session on importation of logs and log products and presented a poster on proposed pest risk analysis process for importation of logs and log products into the United States. American Phytopathology Society, Portland, Oregon, August 1992.

1993 Jointly organized a session on geographic information system use in forestry and presented a talk on geographic information system applications for disease risk analysis. American Phytopathology Society, Nashville, Tennessee, November 1993.

1992-1994 APHIS-wide presentations on the plant pest risk information system pilot project. Provided training on the software prototype.

1996 Instructor for the Agricultural Quarantine Inspection Risk Analysis Workshop. APHIS, Sacramento, California, November 1996.

1997 GIS Activities in the Policy and Program Development unit of APHIS. APHIS-GIS Conference, Ft. Collins, Colorado, July 1997.

1998 GEORISKBOOK: *Melampsora laurici-populina*, A geospatial risk analysis case study with Eurasian Poplar Leaf Rust. Development of web application. APHIS-GIS Conference, Ft. Collins, Colorado, July 1998.

1998 Field Surveying with Handheld Computers and Garmin GPS Equipment. APHIS-GIS Conference, Ft. Collins, Colorado, July 1998.

1998 Evaluating the risks of importation of exotic pests using geospatial analysis and a pest risk assessment model. First International Conference on Geospatial Information in Agriculture and Forestry, Lake Buena Vista, Florida, June 1998 (poster).

2000 Discussion contributor to the Ecological Risk Assessment course at the University of Minnesota, St. Paul

2001 Career Opportunities in APHIS. Southwest State University, Marshall, Minnesota, October 2001.

2001 Regulatory plant pathology: risks of exotic pests and impacts on American agriculture. Southwest State University, Marshall, Minnesota, October 2001.

2002 *Phytophthora ramorum*, a new disease of oaks and rhododendrons discussion session (organizer and presenter). American Phytopathological Society annual meeting in Milwaukee, Wisconsin.

2002. Sudden Oak Death: Current scientific research, regulations and national pathway survey. Central States National Inspection Society, Deerwood, Minnesota October 2002.
2003. Sudden Oak Death Science Web Symposium (chair, organizer and presenter) April 16-May 5, 2003. American Phytopathological Society (<http://www.apsnet.org>).
2003. Federal-state-university interactions. Moving and utilizing plant and microbial germplasm: navigating the new biosecurity regulations. American Phytopathological Society annual meeting in Charlotte, North Carolina, August 9-13, 2003.
2003. A regulatory perspective on wood as a potential pathway for movement of exotic pathogens. World Trade in Wood symposium (organizer and presenter). American Phytopathological Society annual meeting in Charlotte, North Carolina, August 9-13, 2003.
2003. Preliminary findings of the Sudden Oak Death Survey. Exotics and Invasives Session. North Central Forest Pest Workshop, Cloquet Center, Minnesota, September 22-25, 2003 (organizer and presenter).
2003. Exotic Forest Pest Information System Update. Exotics and Invasives Session. North Central Forest Pest Workshop, Cloquet Center, Minnesota, September 22-25, 2003 (organizer and presenter).
2003. Exotic fungi in the forest: crossroads between policy and research. Seminar, Department of Plant Pathology, University of Minnesota, October 6, 2003.
2003. Risk-based policy, survey, mitigation, and regulations: a prescription for prevention of introduction of exotic pests into US forest ecosystems. The Ecological Impact of Exotic Pests and Pathogens in an Age of Global Trade, Society of American Foresters, Buffalo, New York, October 25-29, 2003.
2004. Sudden Oak Death: A Disease of Trees and Shrubs. "Insects of Mass Destruction" Seminar, University of Minnesota, St. Paul, sponsored by Minnesota Nursery and Landscape Association, March 2, 2004.
2006. Challenges in isolating nucleic acids from endophytic fungi suitable for amplification and direct sequencing. Cambridge Healthtech Institute's 14<sup>th</sup> Annual Meeting on Nucleic Acid-Based Technologies: Meeting the Demand, Arlington, Virginia, June 26-28, 2006.
- 2006-2008. Courses on Animal Health, Plant Health, Pest Risk Assessment, Sanitary and Phytosanitary Training, and Food Safety for the Cochran Fellowship Program, USDA-Foreign Agricultural Service.
2008. Biotechnology Risk Assessment Training. USDA-APHIS, Riverdale, Maryland, February 5-6, 2008.

## **Publications**

- Cohen, S.D. 1975. California chaparral microfungi: response to plant products. M.S. Thesis, San Diego State University, San Diego, California.
- Cohen, S. D. and J. V. Alexander. 1978. The southern California chaparral microfungi and secondary plant products. Amer. Midl. Nat. 100:97-102.
- Cohen, S. D. and J. L. Lockwood. 1978. Race determination of *Phytophthora megasperma* var *sojcae*, using differential soybean varieties inoculated with zoospores or incubated on flooded soil samples. Plant Disease Rep. 62:1019-1021.
- Sutherland, E. D. and S. D. Cohen. 1983. Evaluation of tetrazolium bromide as a vital stain for fungal oospores. Phytopathology 73:1532-1535.

Cohen, S. D. 1984. Detection of mycelium and oospores of *Phytophthora megasperma f. sp. glycinea* by vital stains in soil. *Mycologia* 76: 34-39.

Cohen, S. D., L. W. Chang, R. L. Griffin, and R. L. Orr. 1995. Plant pest risk information system (PPRIS) for USDA-APHIS: design of a functional prototype. *EPPO Bulletin* 25:637-650.

Cohen, S. D. 1999. An improved technique for large scale isolation of *Discula umbrinella* and other foliar endophytic fungi from *Quercus* species. *Mycologia* 91:917-922.

Cohen, S. D. 2001. A comparative population ecology study of the fungal pathogen, *Discula umbrinella* (syn=*Discula quercina*), on *Quercus alba* and *Quercus rubra*. Ph.D. Dissertation, George Mason University, Fairfax, Virginia.

Cohen, S. D. 2002. Regulatory Issues and Risk Management of Exotic Forest Pathogens. On-line international workshop on risks of exotic forest pests and their impact on trade. American Phytopathological Society web site April 16-29, 2001. [<http://www.apsnet.org/online/ExoticPest/index.html>]

Cohen, S. D. and J. M. Jones. 2003. Sudden Oak Death: Science, management and regulatory challenges. Online international symposium entitled "Sudden Oak Death: How Concerned Should You Be?" American Phytopathological Society web site, April 21- May 4, 2003. [<http://www.apsnet.org/online/SOD/>]

Cohen, S. D. 2004. Endophytic-host selectivity of *Discula umbrinella* on *Quercus alba* and *Quercus rubra* characterized by infection, pathogenicity, and mycelial compatibility. *European Journal of Plant Pathology* 110:713-721.

Cohen, S. D., Shaw, C.G. III and J. Juzwik. Eds. 2004. Sudden Oak Death on-line symposium; 2003 April 21 – May 12; St. Paul, MN. General Technical Report NC-238. St. Paul, MN: US. Department of Agriculture, Forest Service, North Central Research Station. [Available only on CD ROM].

Cohen, S. D. 2005. A protocol for direct sequencing of multiple gene specific PCR products from *Discula umbrinella*, a fungal endophyte, utilizing bufferless precast electrophoresis. *Journal of Microbiological Methods* 61:131-135.

R. C. Venette and S.D.Cohen. 2006. Climatic suitability of the eastern United States for establishment of *Phytophthora ramorum*. *Forest Ecology and Management* 231:18-26.

Cohen, S. D. 2006. Host selectivity and genetic variation of *Discula umbrinella* isolates from oak species detected by DNA sequences from the intergenic spacer region of ribosomal DNA. *Microbial Ecology* 52:463-469.

## Abstracts

Lockwood, J. L. and S. D. Cohen. 1977. Race determination of *Phytophthora megasperma var. sojae*, and the presence of *Thielaviopsis basicola* in Michigan soybean fields. *Proc. Amer. Phytopath. Soc.* 4:116.

Cohen, S. D. and J. L. Lockwood. 1981. Survival of mycelium, zoospores and oospores of *Phytophthora megasperma var sojae* race 1 in soil. *Phytopathology* 71:209.

Cohen, S. D. 1981. Use of vital and fluorescent-antibody stains to detect propagules of *P. megasperma f. sp. glycinea* race 1 in soil. *Phytopathology* 71:867.

Sutherland, E. D., S. D. Cohen, and J. L. Lockwood. 1981. Enhanced detection of fungal oospores by use of tetrazolium bromide. *Phytopathology* 71:907.

Cohen, S. D., J. A. Lewis, G. C. Papavizas and G. A. Bean. 1982. Morphological development of chlamydospores of *Trichoderma spp.* in culture and in soil. *Phytopathology* 72:1010.

- Cohen, S. D., J. A. Lewis, G. C. Papavizas and G. A. Bean. 1983. Cytological investigation of chlamydospores of *Trichoderma spp.* *Phytopathology* 73:965.
- Cohen, S. D., J. A. Lewis, G. C. Papavizas and G. A. Bean. 1983. Chlamydospore formation by *Trichoderma spp.* In organic matter-amended soil. *Phytopathology* 73:820.
- Cohen, S. D. and J. J. Motta. 1985. Associated protein changes with rhizomorph differentiation of *Armillaria mellea*. *Mycological Society of America Newsletter* 36:21.
- Cohen, S. D. and J. J. Motta. 1986. Analysis of alcohol dehydrogenase levels during rhizomorph differentiation of *Armillaria mellea*. *Phytopathology* 76:1081.
- Cohen, S. D. and J. J. Motta. 1987. Detection of isozymes of alcohol dehydrogenase from *Armillaria mellea* during rhizomorph development. *Phytopathology* 77:1756.
- Cohen, S. D., L. W. Chang, J. A. Acree and M. H. Royer. 1991. Application of systems analysis to designing plant and animal risk information systems. *Phytopathology* 81:1238.
- Cohen, S. D. and R. L. Orr. 1992. Proposed pest risk analysis process for importation of logs and log products into the United States. *Phytopathology* 82:1135.
- Cohen, S. D. 1993. GIS applications for disease risk analysis. *Phytopathology* 84:1412.
- Cohen, S.D. 1997. An improved technique for large scale isolation of foliar endophytic fungi. *Phytopathology* 87:S20.
- Cohen, S. D. 1998. Evaluating the risks of importation of exotic pests using geospatial analysis and a pest risk assessment model. Vol II: 327-334. First International Conference on Geospatial Information in Agriculture and Forestry, Lake Buena Vista, Florida, June 1-3, 1998
- Cohen, S. D. 1998. Somatic incompatibility studies of *Discula umbrinella* strains from *Quercus alba* and *Quercus rubra*. In *Foliage, Shoot and Stem Diseases of Trees*. Proceedings of the IUFRO WP7.02.02 Meeting, Quebec City, editors G. Laflamme, J. A. Berube, R. C. Hamelin. Pp. 64-68. Laurentian Forestry Centre, Sainte-Foy, Quebec, Canada.
- Cohen, S. D. 1999. *Discula umbrinella* DNA isolation protocol suitable for PCR amplification. *Phytopathology* 89: S16.
- Cohen, S. D. 2000. Measuring genetic diversity of *Discula umbrinella* populations derived from *Quercus alba* and *Quercus rubra*. *Phytopathology* 90:S15.
- Cohen, S. D. 2001. Role of scientific societies in the risk management and risk communication process. Society for Risk Analysis. December 2-5, 2001.
- Ostry, M. E., Juswik, J. and Cohen, S. D. 2001. Butternut canker and sudden oak death: Current and potential threats to eastern hardwood forests. North American Forest Insect and Disease Conference, May 14-18, 2001.
- Cohen, S. D. 2002. Predicting forest ecosystems at risk to invasion of exotic forest pathogens in the USA. *Phytopathology* 92:S15.
- Cohen, S. D. 2002. Regulatory agencies such as Animal and Plant Health Inspection Service offer alternative careers for plant pathologists. 92:S112.

Cohen, S. D. 2003. Characterizing the unmitigated and mitigated risks associated with pathways of movement of exotic forest pathogens in the USA. Sudden Oak Death Science Symposium, December 15 –18, 2002. [<http://danr.ucop.edu/ihrmp/sodsym/poster/poster58.html>]

Cohen, S. D. 2003. Protecting our world's forest ecosystems from exotic pathogens. *Phytopathology* 93:S119.

Cohen, S.D. and R.C. Venette. 2005. Predicting the potential for establishment of *Phytophthora ramorum* in the oak forests of the North Central states in the US. Sudden Oak Death Science Symposium II. January 18-21, 2005. [<http://nature.berkeley.edu/forestry/sodsymposium/abstracts/5PosterCohen.html>]

Cohen, S. D. 2005. Potential distribution of *Melampsora larici-populina* in the USA predicted based on physiological responses of spore types to climate variables. *Inoculum* 56:14.

Schwingle, B.W., Smith, J.A., Blanchette, R. A., Blanchette, B.L., Gould, S., Pokorny, J., and S.D. Cohen. 2005. *Phytophthora* species on woody plants in Minnesota nurseries and a first report of *P. hedraiaandra* in the United States. *Phytopathology* 95:S94.

Cohen, S.D. 2008. Assessing the scientific literature on food-borne pathogens for data gaps and content specific to microbial risk assessments. The Joint U.S. Environmental Protection Agency and Department of Homeland Security Conference on Real-World Applications and Solutions for Microbial Risk Assessment., April 8-10,2008, Bethesda, Maryland.

Cohen, S.D. 2008. Classifying and categorizing scientific literature specific to risk assessments of transgenic crops. *Phytopathology* 98:S40.

## **Extension**

Lockwood, J. L. and S. D. Cohen. 1977. *Phytophthora* root rot of soybean. Insect, Disease and Nematode Alerts, MSU Extension Service. 4:15-16.

## **Reports**

Orr, R.L., S. D. Cohen, and R. L. Griffin. 1993. Generic non-indigenous pest risk assessment process. USDA-APHIS Report, 40 pp, November 22, 1993.

Cohen, S.D. 1997. Evaluation of potential computerization options for the quarantine decision process for pests intercepted on cargo shipments. USDA-APHIS Report, 18 pp, June 1997.

Cohen, S. D. 1997. Evaluating pest risk of species of *Melampsora* using an enhanced hazard approach. USDA-APHIS Report, 20 pp, 1997.

Cohen, S. D. 2001. Pest risk assessment datasheet for Sudden Oak Death. USDA-APHIS Report, 5 pp. ,September 2001.

Contributed Risk Assessment Processes to the following publications:

U.S. Congress, Office of Technology Assessment. 1993. Harmful non-indigenous species in the United States. OTA-F-565. U.S. Government Printing Office, Washington DC.

U. S. Forest Service. 1991. Pest Risk Assessment of the Importation of Larch from Siberia and the Soviet Far East. Miscellaneous Publication No. 1495.

U.S. Forest Service. 1992. Pest Risk Assessment of the Importation of *Pinus radiata* and Douglas-fir Logs from New Zealand. Miscellaneous Publication No. 1508.

U.S. Forest Service. 1993. Pest Risk Assessment of the Importation of *Pinus radiata*, *Nothofagus dombeyi*, and *Laurelia philippiana* Logs from Chile. Miscellaneous Publication No. 1517.