

PATRICK J. DROHAN

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Assistant Professor of Pedology
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RESEARCH INTERESTS

Geogenic vs. pedogenic imprinting on soils, aeolian and atmospheric deposition effects on biogeochemical cycling, soil and land use change.

EDUCATION

- 2000 Ph.D. Soil Science. The Pennsylvania State University, University Park, PA.
Dissertation: A study of sugar maple (*Acer saccharum* Marsh) decline during 1979 to 1989 in northern Pennsylvania.
- 1996 M.S. Environmental Pollution Control. The Pennsylvania State University, University Park, PA. Thesis: Natural and anthropogenic influences on late spring baseflow chemistry in Pennsylvania streams.
- 1992 B.S. Natural Resource Management. Cook College–Rutgers University, New Brunswick, NJ. Dual Senior Thesis: An examination of fishing industry collapse in Cordova, Alaska and Point Pleasant, NJ.; Soil erosion due to recreational hiking activity at John's Brook Lodge, NY.

EMPLOYMENT

- 2007-present, Assistant Professor, Department of Crop and Soil Sciences, The Pennsylvania State University, University Park, PA.
Responsibilities included research, teaching, and community service.
- Research areas included: pedology, examining soil and plant interactions, applications of soil survey databases, and the merger of soil genesis and hydrology to address environmental questions that would increase our understanding of soil development and variability.
 - Teaching experience: Geographic information systems, seminar in environmental studies, environmental senior thesis, introductory environmental studies, biogeochemistry, physical geography, and soil mapping.
- 2006-2007, Director, Pine Lake Institute for Environmental & Sustainability Studies, Hartwick College, Oneonta, NY
Responsibilities include outreach, management, research, teaching, and community service.
- ◆ Develop and direct new institute focused on college and community sustainability and environmental studies research, teaching, and outreach.
 - ◆ Develop new curriculum in sustainability and environmental studies.
 - ◆ Direct use of 900-acre college environmental campus and provide guidance on college environmental policy and practices.
- 2004-2006, Assistant Professor, Department of Geoscience, University of Nevada, Las Vegas, Las Vegas, NV.
Responsibilities included research, teaching, and community service.
- ◆ Research areas included: examining soil and plant interactions, applications of soil survey databases, and the merger of soil genesis and hydrology to address environmental questions that would increase our understanding of soil development and variability.

- ◆ Teaching experience: Geographic information systems, seminar in environmental studies, environmental senior thesis, introductory environmental studies, biogeochemistry, physical geography, and soil mapping.
- 2003-2004, Assistant Professor, Department of Environmental Studies, University of Nevada, Las Vegas Las Vegas, NV.
- Responsibilities included teaching, research, and community service.
- ◆ Research areas included: examining soil and plant interactions, applications of soil survey databases, and the merger of soil genesis and hydrology to address environmental questions that will increase our understanding of soil development and variability.
 - ◆ Teaching experience: Geographic information systems, seminar in environmental studies, senior thesis, introductory environmental studies.
- 2000-2003, Assistant Professor, Shepherd College, Institute for Environmental Studies, Shepherdstown, WV.
- Responsibilities included teaching, research, and community service.
- ◆ Teaching experience: soil science, hydrology, advanced geographic information systems, introductory environmental studies, forestry, sustainable agriculture, introductory biology, international environmental policy, and research methods. Incorporated use of WebCT distance education software into courses.
 - ◆ Initiated cooperative effort to create a display on soils and society in the National Museum of Natural History, Smithsonian Institution between the Soil Science Society of America, federal and state government, and private industry.
 - ◆ Led an annual two-week student exchange program on international environmental policy in Plymouth and Bristol, England (2002 and 2003).
 - ◆ Advised and oversaw 76 undergraduates on senior thesis project design and implementation. Advised honors theses and independent study and research.
 - ◆ Conducted GIS training workshop for county planners from the Eastern Panhandle.
 - ◆ Developed a college farm management plan and worked with local NRCS personnel to improve farm management.
- 1997-2000, Lab Instructor, Introduction to Soils, The Pennsylvania State University, University Park, PA.
- ◆ Taught two sections of lab (24 students each section) each semester and supervised two teaching assistants.
- 1996-2000, Graduate Research Assistant, The Pennsylvania State University, University Park, PA.
- ◆ Collected, organized, and analyzed data on tree growth and health, insect defoliation, atmospheric deposition, precipitation, soil physical and chemical properties, tree mortality, and forest management.
 - ◆ Developed GIS models of sugar maple decline across northern Pennsylvania. Utilized various geostatistical methods.
 - ◆ Conducted or supervised all field work and analytical lab work (physical and chemical soil properties).
 - ◆ Organized summer field program-Northern Pennsylvania Forest Soils Field Trip, May 1998. Cosponsored by the Pennsylvania Association of Professional Soil Scientists.
 - ◆ Delegate to and Public Relations Director for the Penn State Graduate Student Association (1998-2000).
- 1996-1997, Instructor, Wildlife Technology 106, Wildlife Management Techniques, The Pennsylvania State University, DuBois, PA.
- ◆ Designed and taught course with two sections of lab.

- ◆ 1997-Trip co-leader for field course held in New Jersey Pine Barrens. This was a one-week exploration of birds, flora, and ecosystems in the Pine Barrens.
- 1996, Instructor, Forestry 240, Forest Science/Silviculture, The Pennsylvania State University, DuBois, PA.
 - ◆ Designed and taught course with two sections of lab.
 - ◆ 1996-Trip co-leader for field course held in Northern Florida. This was a week-long exploration of birds, flora, ecosystems, and management practices in northern Florida.
- 1994-1997, Guest Lecturer, Fire Science, The Pennsylvania State University Park, PA.
 - ◆ Discussed wildland fire fighting techniques and experiences. (3 semesters).
- 1994-1996, Graduate Research Assistant, The Pennsylvania State University, University Park, PA.
 - ◆ Collected, organized, and analyzed data on insect defoliation, population, land use, and atmospheric deposition for research watersheds.
 - ◆ Maintained field equipment and monitoring stations with CR-10 data loggers and FW-1 liquid level recorders at five remote watershed sites as part of an EPA long-term monitoring study. Synthesized results from stream gaging stations into an annual data report for the U.S. Environmental Protection Agency.
 - ◆ Collected monthly and storm event water samples for stream chemistry analysis and performed monthly stream flow gaging. Collected precipitation measurements, including bulk precipitation, precipitation intensity, and snow depth.
 - ◆ Vice President (1995) and member (1994-95) of the Penn State student chapter of the American Water Resources Association.
- 1994, Forestry/Wildlife Technician, The Pennsylvania State University, University Park, PA.
 - ◆ Created woodcock and ruffed grouse habitat.
 - ◆ Conducted field work involving extensive chain saw practices, habitat design and enhancement, trail maintenance, and sign construction.
- 1993-1994, Hydrology Technician, The Pennsylvania State University, University Park, PA.
 - ◆ Assisted in data collection, development, and implementation of a hydrologic budget for a remote watershed.
 - ◆ Installed, maintained, and used hydrologic equipment, such as stream flow gaging instruments, sampling wells, stream gages, neutron probes, FW-1 liquid level recorders, ISCO automated samplers, and soil lysimeters.
- 1993-1994, Forestry Technician, The Pennsylvania State University, University Park, PA.
 - ◆ Conducted field work involving forest management, stand improvement, and timber cruising and grading.
 - ◆ Assisted in preplanning and burn operation for prescribed burn; led student fire crew.
 - ◆ Assisted in University research projects with forestry department faculty; conducted forest mapping and stand volume calculations.
- 1993, Engine Foreman, Pike National Forest, South Park Ranger District, Fairplay, CO.
 - ◆ Coordinated, scheduled, and supervised personnel engaged in wild land fire fighting.
 - ◆ Oversaw activities of up to 10 fire fighters and the operation of initial attack engine and equipment. Assisted in preplanning and burn operation for prescribed burns.
 - ◆ Composed and presented presentations to forest visitors on fire fighting and prevention.
 - ◆ Conducted Level II law enforcement in the national forest.
- 1992, River Ranger, Bureau of Land Management, Kremmling Resource Area-Craig District, Kremmling, CO, through the Student Conservation Association.
 - ◆ Patrolled the Colorado River and adjacent trails.

- ◆ Conducted compliance checks of rafting companies.
 - ◆ Delivered presentations to the public on safe boating practices.
 - ◆ Assisted in wild land fire fighting throughout Colorado and Wyoming. Assisted in prescribed burning operations.
- 1991, Assistant Hut Master, Adirondack Mountain Club, Lake Placid, NY.
- ◆ Assisted in supervising staff and scheduling activities at back-country lodge.
 - ◆ Lodge naturalist: educated guests on the natural history of the Adirondacks.
- 1990, Information Center Staff Worker, Adirondack Mountain Club, Lake Placid, NY.
- ◆ Educated the public on safe back-country hiking and camping practices, forest preservation, and the identification of flora and fauna.
- 1989, Research Technician, Department of Forestry, Cook College, Rutgers University, NJ.
- ◆ Maintained *Pinus strobus* research plots and *Paulownia tomentosa* greenhouse study.

GRANTS and SUPPORT RECEIVED

- 2009 USDA-SCRI, \$30,000. Manipulating Host-and mate finding behavior of plum curculio: Development of a multi-life stage management strategy for a key tree fruit pest. Tracy Leskey USDA, ARS (PI).
- 2009 National Science Foundation, EAR/IF Equipment Grant, \$69,862. Acquisition of an inductively coupled plasma optical emission spectrometer. Enid Martinez, PSU (PI).
- 2009 Penn State College of Agriculture. Seed grant program. \$10,000. Automated Molecular Spectroscopy for Soil-Water Interaction Research--Collaborative Development Studies to Support External Proposals. Doug Archibald, PSU (PI).
- 2009 Penn State College of Agriculture. Seed grant program. \$14,500. Extent and characteristics of freshwater subaqueous soils in Pennsylvania waterways with special focus on reservoir systems.
- 2008 USDA NRCS Soil Survey Program. \$20,878: Conversion of the Penn State University Soil Characterization Database into NRCS Pedon PC and NASIS Formats.
- 2008 College of Agricultural Sciences, The Pennsylvania State University. Professional Development Program. \$3,000. Development of Expertise in Soil Micromorphology - Obtain Training in the Lab of World-Renown Soil Microscopic's Lab of Dr. Davidson's, from the University of Stirling, United Kingdom.
- 2007 USDA, NRCS 2,582: Funded, laboratory equipment donation. Principal investigator.
- 2006 USDA CSREES National Research Initiative. \$100,000. Soil physical, chemical, and mineralogical development associated with *Cercocarpus ledifolius* stands on Mt. Charleston, Nevada. Co-PI: Brenda Buck, UNLV Geoscience.
- 2005 Bureau of Land Management: \$70,000. Funding for Post-Doctoral Scholar. Assessment of dust transport from Nellis Dunes, Las Vegas, NV. Co-PI: Brenda Buck, UNLV Geoscience.
- 2005 Bureau of Land Management: \$59,000. Characterization of soils in the Las Vegas Formation. Co-PI: Brenda Buck, UNLV Geoscience.
- 2005 UNLV New Investigator Award, \$14,984. Soil physical, chemical, and mineralogical development associated with *Cercocarpus ledifolius* stands on Mt. Charleston, Nevada. Principal investigator.

- 2005 UNLV-SITE grant, \$2,900. Determining the composition of mortars and finding the source of the soil used in mortars to construct Ancient Puebloan ruins in Mesa Verde National Park, CO. Principal investigator.
- 2005 USDA, NRCS: Field trip preparation and analyses, Travel grant from NRCS \$121, April 2004.
- 2004 USDA, NRCS: Travel grant to attend the Western Regional Cooperative Soil Survey Meeting, Jackson Hole WY, USDA NRCS, \$930. June 2004.
- 2003 National Park Service, Harpers Ferry, WV. Science consulting and GIS data processing and analysis of Aztec Ruins National Monument, NM and Washington's Olympic Peninsula (soils, geology, aquatics, wildlife, and vegetation). \$3,380.
- 2003 Equipment donation from the USDA Appalachian Fruit Research Station, Kearneysville, WV. Perkins Elmer Model 4000 Atomic Adsorption Spectrometer, Perkins Elmer HGA 400 Graphite Furnace, and block digester. \$1,500.
- 2002 NASA Fellowship awarded to students Kata Rishel and Dustin Hancock for their work with Dr. Patrick Drohan on: A Comparison to Soil Survey Data, and An Estimate of the Variability in Field and Laboratory Data of a Hillslope Transect Crossing Two Mapping Units of an Ultic Hapludalf and a Typic Hapudult. \$2,100.
- 2002 Jefferson County, WV. County land use mapping project. \$500.
- 2002 The Nature Conservancy. Nitrogen, phosphorus and carbon concentrations in a fine-loam, carbonatic, mesic fluventic calciudoll A horizon encroached upon by *Typha latifolia*. \$300.
- 2001 Soil Science Society of America Outreach Grant. Smithsonian Soil Exhibit, \$13,000.
- 2001 NASA Travel Grant. University of Maine composting school. \$750.
- 2001 Shepherd College Conard Fund Grant. Shepherd College composting and the effect on soil development. \$2,500.
- 2001 Shepherd College Professional Development Fund Grant. Shepherd College composting and the effect on soil development. \$2,500.
- 2001 National Conservation Training Center, Jefferson County Watershed Coalition, Four Season's Books, Mr. Peter Pennington, Shepherd College, Shepherd Environmental Organization. *Speaker fundraising for Julia "Butterfly" Hill*. Grants from Shepherd College and donations from outside environmental organizations in the Jefferson County area for a speaking engagement by Ms. Hill at the U.S. FWS National Conservation Training Center. \$5,300.
- 2000 National Science Foundation-WV EPSCoR and Shepherd College. Equipment grant for an atomic adsorption spectrophotometer. \$27,000.

HONORS and AWARDS

- 2008 "President's Citation for Outstanding Service" from Soil Science Society of America for contributions to the *Dig It* Smithsonian soil exhibit project.
- 2008 July, Person of the month, The Fertilizer Institute. For being a principal founder of the Smithsonian, *Dig It*, soil exhibit.
- 2000 First place, Life and Natural Sciences Division. Penn State University Graduate Research Poster Exhibition.
- 2000 Gerald T. Gentry Award for Excellence in Graduate Research. Gamma Sigma Delta Agricultural Honors Society, Environmental Sciences Division.
- 2000 Second place for oral presentation, Life and Biological Sciences Division. Third

- Environmental Chemistry Symposium, Penn State University.
- 1999 Gerald T. Gentry Award for Excellence in Graduate Research. Gamma Sigma Delta Agricultural Honors Society, Environmental Sciences Division.
- 1999 Conference Travel Award. Penn State College of Agricultural Sciences.
- 1998 Member of Gamma Sigma Delta Agricultural Honors Society.
- 1991 Dingler Foundation Scholarship, Cook College, Rutgers University.

PROFESSIONAL AFFILIATIONS

1. Member, American Quaternary Association, 2008-present
2. Member, American Association for the Advancement of Science, 2007-present
3. Member, Soil Science Society of America, 1997-present
4. Member, Ecological Society of America, 2004-2006
5. Member, Geological Society of America, 2003-2006
6. Member, Pennsylvania Association of Professional Soil Scientists, 1998-2000; 2007-present.
7. Member, West Virginia Association of Professional Soil Scientists, 2000-2005; 2002, vice president; 2003-president
8. Member, American Geophysical Union, 2000-2004
9. Member, SE Friends of the Pleistocene, 1997-2003
10. Member, National Association of Colleges and Teachers of Agriculture, 1997-2003

REFEREED PUBLICATIONS

1. Rumsey, S., Drohan, P., Harry, K., Ferguson, J., Carr, R. Cultural implications of architectural mortar and plaster selection at Mesa Verde National Park, Colorado. (In review: Geoarcheology).
2. Drohan, P.J. Cheng, H.H., Havlin, J.; Megonigal, P.; McSweeney, K. A history of the Smithsonian Soil Exhibit project and what opportunities exist beyond it. (In preparation: Soil Science Society of America Journal).
3. Stolt, M.J. and P.J. Drohan. Dynamic soil properties: Insights and approaches for mapping soil organic carbon (In preparation: Soil Science Society of America Journal).
4. Erich, E. and P.J. Drohan. Subaqueous soils: their identification and importance in ecosystem management. (In preparation: Soil Use and Management).
5. Foster, C., Drohan, P.J. and D.M. Miller. A GIS based tool for CRP land value assessment based on soil limitations. (In preparation: Soil Survey Horizons).
6. Drohan, P.J., Waltman, S., Foster, C., and S. Dadio. Soil limitations on Pennsylvania CRP/CREP lands and potential environmental, management and economic effects on biofuels production.
7. Drohan, P.J. and J. Galbraith. Arid soil development as influenced by *Cercocarpus ledifolius*; carbon allocation in relation to tree age and morphology. (In preparation: Soil Science Society of America Journal).
8. Yonovitz, M. and P.J. Drohan. 2009. Pore morphology characteristics of vesicular horizons in undisturbed and disturbed arid soils; implications for arid land management. In press, Soil Use and Management, ISSN '1475-2743'.

9. Boxell, J., Drohan, P.J. 2009. Surface soil physical and hydrological characteristics in *Bromus tectorum* L. (cheatgrass) versus *Artemisia tridentata* Nutt. (big sagebrush) habitat. *Geoderma*. 149:305-311.
10. Elliott, P.E. and P.J. Drohan. 2009. Clay accumulation and argillic-horizon development as influenced by aeolian deposition vs. local parent material on quartzite and limestone-derived alluvial fans. *Geoderma*. 151:98-108.
11. Drohan, P.J. and D.J. Merkler. 2009. How do we find a true gypsophile? *Geoderma*. 150:96-105.
12. Drohan, P.J., J.A. Joiner, and J.M. Ebeling. 2007. Evaluation of Hot Mustard as a Vermifuge for Sampling *Eisenia hortensis* Earthworms in Soil. *Soil Survey Horizons* 48(3):63-66.
13. Drohan, P.J., and T. J. Farnham. 2006. A proposal for the formal designation of rare and threatened soils. *Soil Science Society of America Journal* 70: 2086-2096.
14. O. Artieda, J. Herrero, and P.J. Drohan. 2006. A refinement of the differential water loss method for gypsum determination in soils. *Soil Science Society of America Journal* 70: 1932-1935.
15. Himes, J., and P.J. Drohan. 2006. Soil and topographical relationships associated with pygmy rabbit (*Brachylagus idahoensis*) populations in central Nevada. *Journal of Arid Environments* 68(3):371-382.
16. Mrozek, S.A., B.J. Buck, P.J. Drohan, and A.L. Brock. 2006. Decorative landscaping rock as a source for heavy metal contamination. *Soil and Sediment Contamination* 15(5):471-480.
17. Drohan, P. J., C.N. Ross, J. Anderson, R. Fortney, and J. Rentch. 2006. Soil and hydrological drivers of *Typha latifolia* encroachment in a marl wetland. *Wetlands Ecology and Management* 14(2):107-122.
18. Drohan, P.J., D.J. Merkler, and B.J. Buck. 2005. Evaluation of the PRS probe in the Mojave Desert. *Soil Science Society of America Journal* 69:1482-1491.
19. Drohan, P.J., G.W. Petersen, and E.J. Ciolkosz. 2003. Soil survey mapping unit accuracy in forested field plots in northern Pennsylvania. *Soil Science Society of America Journal* 67:208-214.
20. Drohan, P.J., G.W. Petersen, and S.L. Stout. 2002. A study of sugar maple (*Acer saccharum* Marsh) decline during 1979 to 1989 in northern Pennsylvania. *Forest Ecology and Management* 170(1-3), 1-17.
21. Drohan, P.J., and K.L. Butler. 2002. Evaluating many instructors across multiple lab sections—consistency and equity. *Journal of Natural Resources and Life Sciences Education* 31:73-80.
22. Drohan, P.J., and D.R. DeWalle. 2002. Defoliation and atmospheric deposition influences on spring baseflow chemistry in 56 Pennsylvania mixed land-use watersheds. *Water, Air, and Soil Pollution* 133(1-4), 31-48.
23. Drohan, P.J., G.W. Petersen, and S.L. Stout. 1999. Preliminary indications of sugar maple decline in ecoregions 212F and 212G. *Sugar Maple Ecology and Health—Proceedings of an international symposium*. General Technical Report NE-261, USDA Forest Service, Irvine, PA pp. 46-50.

NON-REFEREED PUBLICATIONS

1. Drohan, P.J., Ciolkosz, E.J., Waltman, W., Boyer, E., Craul, T., Kaye, J., Lin, H. 2009. The effect of climate on soil genesis. *Guidebook For The 2009 Northeast Graduate Student Pedology Field Tour June 8-12th, 2009, Central and North Central Pennsylvania*.

2. Braun, D., Ciolkosz, E..J., Drohan, P.J., and W. Sevon. 2008. The Pleistocene record in the middle and lower Susquehanna River basin and the longer term evolution of the Susquehanna basin landscape. 20th June 7-9, 2008, Biennial meeting of the American Quaternary Association, University Park, PA,. 58 pp.
3. Braun, D., Ciolkosz, E..J., Drohan, P.J., and W. Sevon. 2008. The Pleistocene record in the middle Susquehanna River Basin and the longer term evolution of the Susquehanna Basin landscape. NRCS Soil Geomorphology Institute, October 25, 2008, State College, PA. 33 pp.
4. Drohan P.J. Vesicular Crusts. *Encyclopedia of Soil Science*, In Press.
5. Megonigal, P. and Drohan, P.J. Home Stretch for the Smithsonian Soils Exhibition. Crops, Soil, Agronomy. *CSA News*, 52(10):21.
6. Drohan, P.J., T.J. Farnham, and J.R. Drohan. 2006. Can soil go extinct? Examining a proposal to recognize rare, threatened soils. *Crops, Soil, Agronomy (CSA) News*, November, 2006; 51(11):4-5.
7. Drohan, P.J. 2006. Pine Lake Review and Comprehensive Plan for the Future. Hartwick College. 115 pp.
8. Drohan, P.J., and B.J. Buck. 2005. Soil physical, chemical, and mineralogical properties and their effect on *Eriogonum corymbosum* var. and *Arctomecon californica* in North Las Vegas. Submitted to U.S. Bureau of Land Management. 62 pp.
9. Drohan, P.J., and R. Fairhurst. 2005. SEM and EDS analysis of crime soil samples for Las Vegas Metropolitan Police Department. 22 pp.
10. Dunkerly, C., and T. Radford (editors). 2004. "Mosaic of Diversity", Olympic National Park visitor center movie. US DOI, NPS. Patrick Drohan listed in credits for conducting GIS and imaging analysis used in the movie. Time: 25 min. Winner of a Golden Eagle Special Jury Award at the Cine Festival 2005 and Best in the Non-Broadcast category, at the 2005 International Wildlife Film Festival in Missoula, MT with a special merit for editing, cinematography and "unique footage."
11. Drohan, P.J. 2003. 2003 Conference committee 3--New inventory techniques and delivery systems in production soil survey. pp. 108-110. National Cooperative Soil Survey Committee.
12. Drohan, P.J. 2002. Constructing a history of soil survey in WV. *WV Assoc. of Prof. Soil Scientists Newsletter* 25(1).
13. Drohan, P.J. 2002. Smithsonian Soils Display Update. *WV Assoc. of Prof. Soil Scientists Newsletter* 24(2).
14. Drohan, P.J., L. Donaldson, D. Hancock, S. McClarin, A. Rugh, S. Shaffer, and N. Thomsen. 2002. An analysis of bighorn sheep (*Ovis canadensis*) habitat in Zion National Park. Submitted to Elena Robisch, GIS Analyst, Zion National Park. 21 pp.
15. Drohan, P.J., L. Donaldson, D. Hancock, S. McClarin, A. Rugh, S. Shaffer, and N. Thomsen. 2002. A greenways analysis of cultural and natural areas in Jefferson County, WV. Submitted to Steve Bockmiller, Jefferson County Planner. 44 pp.
16. Drohan, P.J. 2001. Shepherd College, Tabler Farm land management plan. 33 pp.
17. Drohan, P.J. 2001. Julia "Butterfly" Hill: Leader and writer in the environmental movement. *Good Shepherd newspaper*, Shepherdstown, WV. March.
18. Drohan, P.J. 2000. A study of sugar maple (*Acer saccharum* Marsh) decline during 1979 to 1989 in northern Pennsylvania. Ph.D. Thesis in Soil Science. The Pennsylvania State University, University Park, PA.
19. Drohan, P.J., G.W. Petersen, and S.L. Stout. 1999. An assessment of sugar maple decline on the Appalachian Plateau, ecoregions 212F and 212G. *In* W.E. Sharpe and

- J.R. Drohan (eds.), *The Effects of Acidic Deposition on Pennsylvania's Forests*. Environmental Resources Research Institute, University Park, PA. pp. 265-266.
20. Drohan, P.J. 1996. Use of a geographic information system to determine effects of defoliation, land use, and atmospheric deposition on stream water chemistry in Pennsylvania watersheds. M.S. Thesis. Intercollegiate Program in Environmental Pollution Control. The Pennsylvania State University, University Park, PA.
 21. Drohan, P.J., D.R. DeWalle, and W.E. Sharpe. 1995. Annual data report, Northern Appalachian Plateau Long-Term Monitoring Project. School of Forest Resources and Environmental Resources Research Institute, The Pennsylvania State University, University Park, PA, Submitted to: U.S. EPA Environmental Research Laboratory, Corvallis, OR.
 22. Drohan, P.J., D.R. DeWalle, and W.E. Sharpe. 1994. Annual data report, Northern Appalachian Plateau Long-Term Monitoring Project. School of Forest Resources and Environmental Resources Research Institute, The Pennsylvania State University, University Park, PA, Submitted to: U.S. EPA Environmental Research Laboratory, Corvallis, OR.
 23. Drohan, P.J. 1991. "The Trees of John's Brook Lodge." Adirondack Mountain Club, NY.
 24. Drohan, P.J. 1990. "Staff Guide to Hikers and the High Peaks." Adirondack Mountain Club, NY.

INVITED PRESENTATIONS

- 2009 Ecology IGDP Seminar. *"Don't bust the crust" and other dusty tales from the arid west: Exploring the resilience of arid soils to human disturbance.*
- 2009 Department of Anthropology, Penn State. *SASSA: The soil analysis support system for archeology.*
- 2009 Winter Meeting of the Allegheny Chapter of the Society of American Foresters. *How our regions forest soils have responded to a half century of clean air legislation.*
2009. Pennsylvania Agronomic Education Conference. *Impact of Soils on Crop Production in Pennsylvania.*
- 2007 State University of New York, College at Oneonta. *Changes in soil physical, chemical and mineralogical properties due to Bromus tectorum L. (cheatgrass) establishment over two decades in northern NV.* Invited by Dr. Donna Vogler.
- 2006 National Soil Caucus, Washington, D.C. *The Importance of Soil.* Invited by Dr. Karl Glasener, Director of Science Policy, Agronomic Science Foundation.
- 2005 Soil Science Society of America, Annual International Meeting, Salt Lake City Utah, November 6-10. *Developing a Graduate Level Soils Emphasis: Lessons Learned.* 262-1, Sponsor: Z01 Soil Science Education. Invited by SSSA President Dr. Mary Collins.
- 2005 Las Vegas Wash Coordination Committee. *Soils of the Las Vegas Formation: Tule Springs area.* BLM office, North Las Vegas Nevada. Invited by Gayle Marrs-Smith, BLM.
- 2005 University of California, Riverside; Department of Environmental Sciences. *Changes in soil physical, chemical and mineralogical properties due to Bromus tectorum L.*

- (cheatgrass) establishment over two decades in northern NV.* Invited by Dr. Robert Graham.
- 2004 Western Regional Cooperative Soil Survey Meeting: Jackson Wyoming. *Status of the Smithsonian soil display project.* June 2004. Invited by Bill Ypsilantis, BLM.
- 2003 Nevada State Soil Planning Conference. *The Smithsonian Soils Display Project and the Nevada Association of Professional Soil Scientists.* November 2003, Reno, NV. Invited by State Soil Scientist Bill Dollarhide.
- 2003 Soil Science Society Annual Meeting, Denver, CO. *The role of professional soil scientists in the Smithsonian soil display project.* November 2003. Invited by SSSA.
- 2003 Department of Geosciences, University of Nevada, Las Vegas. *The rarest soils, do they matter?* Las Vegas, NV. October, 2003. Invited by Dr. Brenda Buck.
- 2003 Department of Environmental Sciences, Plymouth University, United Kingdom. *Environmental stress and forest decline.* Plymouth, England. March, 2003. Invited by Plymouth University.
- 2002 Blue Ridge Center for Environmental Stewardship. *Soils and wetland delineation.* Purcellville, VA.
- 2002 Eisenhower Grant Teachers' Workshop. *Soils and society; the importance of soils in every-day life.* The Mountain Institute, Spruce Knob, WV.
- 2001 Penn State University. *Soils and geomorphology of Antietam National Battlefield, Harpers Ferry, West Virginia, and the C&O Canal National Park.* Mid-Atlantic pedology field tour for Penn State University.
- 2001 WV Solid Waste Authority. *Composting success in municipal facilities—feedstocks to marketing.* WV Solid Waste Authority Annual Meeting, Snowshoe, WV.
- 2001 USDA Appalachian Fruit Research Station. Drohan, P.J. 2001. *Relationships between soils and sugar maple decline in northern Pennsylvania.* USDA Appalachian Fruit Research Station, Kearneysville, WV.
- 2001 WV Department of Conservation and Natural Resources and WV Solid Waste Authority. *Composting at college and university campuses.* West Virginia Governor's Conference on the Environment. Charleston, WV.

PROFESSIONAL PRESENTATIONS

- 2008 Drohan, P.J., Bills, B., Miller, D., Waltman, S., Dadio, S., and E. White. Soil Science Society of America, Houston, TX: Geomorphic Relationships in the Fragi taxon across Pennsylvania: Clues to Genesis and Cementation Mechanisms. 140938. Oral presentation. (published).
- 2008 Dadio, S., Drohan, P. J., Clark, T., and S. Ogden. Soil Science Society of America, Houston, TX: Chemical and mineralogical cementing agents in fragipans from Pennsylvania parent materials. 140920. Oral presentation. (published).

- 2008 Drohan, P.J., Waltman, S., Bills, B., Miller, D., Foster, C., Dadio, S., and E. White. Soil Science Society of America, Houston, TX: Extent of fragi taxons on CRP/CREP lands and potential environmental, management and economic effects on biofuels production due to fragipan soil limitations. 141041. Oral presentation. (published).
- 2008 Yonovitz, M. and P.J. Drohan. Soil Science Society of America, Houston, TX: Pore Morphology of vesicular horizons following disturbance and reformation in the field. 148660. Poster presentation 3 hrs. (published).
- 2008 Drohan, P.J., Bills, B., Miller, D., Waltman, S., Dadio, S., and E. White. First International Hydropedology Conference, University Park, PA. Houston TX. Topographic and Parent Material Relationships of the Fragi Taxon across Pennsylvania. Oral presentation. p. 31 (published).
- 2008 Spehar, C., P.J. Drohan, and D. Miller. Northeastern section meeting of ASA, CSSA, and SSSA, Montreal, Canada. CRP, CREP or biofuel production – which is the most profitable? Oral presentation. p. 72 (published)
- 2008 Drohan, P.J. USDA-NRCS, Northeast Soil Survey Cooperators Meeting, Narragansett, Rhode Island. Preliminary results of associations between fragipans and geomorphology in Pennsylvania. Oral presentation.
- 2008 Drohan, P.J. and J. Thompson. USDA-NRCS, Northeast Soil Survey Cooperators Meeting, Narragansett, Rhode Island. Potential extent of freshwater subaqueous soils in Pennsylvania and West Virginia. Oral presentation.
- 2007 Elliott, P.E., and P.J. Drohan. Genesis of Argillic Horizons in Soils of the Charkiln Series, Spring Mtns., Clark County, NV. Soil Science Society of America, New Orleans, LA. Poster presentation 3 hrs. (published).
- 2007 Yonovitz, M., and P.J. Drohan. Pedogenesis of Vesicular Horizons in Disturbed and Undisturbed Soils. Soil Science Society of America, New Orleans, LA. Poster presentation 3 hrs. (published).
- 2007 Boxell, J.J., Drohan, P.J. Effects of *B. tectorum* upon Soil Physical and Hydrological Properties. Soil Science Society of America, New Orleans, LA. Poster presentation 3 hrs. (published).
- 2006 Boxell, J.J., Drohan, P.J. and C.R. Robbins. Soil Hydrological and Physical Changes Due to *Bromus tectorum* L. (Cheatgrass) Establishment in Northern Nevada, USA. #302-5. Soil Science Society of America, Indianapolis, IA. Poster presentation 3 hrs. (published).
- 2006 Yonovitz, M., and P.J. Drohan. Pedogenesis of Vesicular Horizons in Disturbed Soils. #302-1. Soil Science Society of America, Indianapolis, IA. Poster presentation 3 hrs. (published).
- 2006 Drohan, P.J., and T. Farnham. A Proposal for the Formal Designation of Rare and Threatened Soils. International Union of Soil Scientists, Philadelphia, PA. Poster (published).
- 2006 Robins, C., Howell, M., and P.J. Drohan. Assessing Post-Fire Soil Change: First Year Results from a Long-term Monitoring Project Following Ecosystem Recovery in Mesa Verde National Park. International Union of Soil Scientists, Philadelphia, PA. Poster (published).

- 2006 Boxell, J., Drohan, P.J., and M. Yonovitz. Changes in Soil Physical, Chemical and Mineralogical Properties due to *Bromus Tectorum L.* (Cheatgrass) Establishment over 2 Decades in Northern Nevada, USA. International Union of Soil Scientists, Philadelphia, PA. Poster (published).
- 2006 Merkler, D.J., and P.J. Drohan. Flooding on the Virgin River, USA: Impacts and Historic Perspective. International Union of Soil Scientists, Philadelphia, PA. Poster (published).
- 2006 Drohan, P.J., Buck, B.J., Merkler, D.J. Gypsophile or Extremophile? A Case Study Examining the Relationship between Gypsum Soils and the Rare Species that Occur on Them. International Union of Soil Scientists, Philadelphia, PA. Poster (published).
- 2005 Boxell, J., and P.J. Drohan. Evaluation of Field Methods for Hydrophobicity Assessment. Annual Meeting Abstracts, #1027, Soil Science Society of America, Salt Lake City, UT. Poster presentation 3 hrs. (published).
- 2005 Drohan, P.J., and B.J. Buck. Testing the Gypsum Hypothesis: An Assessment of the Soil Physical, Chemical, and Mineralogical Habitat Requirements for *Arctomecon Californica* in the Northeastern Mojave Desert. Annual Meeting Abstracts, #1233, Soil Science Society of America, Salt Lake City, UT. Poster presentation 3 hrs. (published).
- 2005 Robins, C., M. Howell, and P.J. Drohan. High-Intensity Fire Effects on Mineralogy and Pedogenesis of Piñon-Juniper Woodland Soils, Mesa Verde National Park, CO. Annual Meeting Abstracts, #920, Soil Science Society of America, Salt Lake City, UT. Poster presentation 3 hrs. (published).
- 2005 Buck, B., S. Mrozek, A. Brock, and P.J. Drohan. Decorative Landscaping Rock as a Source for Heavy Metal Contamination: the Need for Regulations. Annual Meeting Abstracts, #200-1, Soil Science Society of America, Salt Lake City, UT. Poster presentation 3 hrs. (published).
- 2005 Young, M.H., Z.Y. Zu, S. Tyler, P.J. Drohan, P.J. Verburg, C. Cooper, T.G. Caldwell, D. Decker, D. Devitt, D.K. Kreamer, E.V. McDonald, R.S. Nowak, L. Papelis, S.D. Smith, H. Sun, M. Ye, J. Zhu, Scaling Environmental Processes in Heterogeneous Arid Soils (SEPHAS): A New Nevada NSF EPSCoR Initiative; Weathering System Science Consortium Meeting, NSF Sponsored, Newark, DE.
- 2004 Drohan, P.J., D.J. Merkler, and B.J. Buck. Evaluation of the Suitability of the PRS probe in the Mojave Desert. Annual Meeting Abstracts, Soil Science Society of America, Seattle, WA. Poster presentation 3 hrs. (published).
- 2004 Merkler, D.J., P.J. Drohan, and M. Sappington. 2004. Spatial and Temporal Variation of Solar Insolation over Landscapes as a Tool for Mapping Soils in the Field. Annual Meeting Abstracts, American Society of Agronomy-Crop Science Society of America-Soil Science Society of America, Seattle, WA. (published).
- 2004 Buck, B.J., P.J. Drohan, and D.J. Merkler. 2004. New Graduate Soil Science Emphasis in Geoscience M.S. and Ph.D., University of Nevada, Las Vegas. Annual Meeting Abstracts, American Society of Agronomy-Crop Science Society of America-Soil Science Society of America, Seattle, WA. (published).
- 2004 Buck, B., and P. Drohan, 2004, Status of the IUSS 18th World Congress of Soil Science Desert Southwest U.S.A. Field tour, NRCS MO#3 Soil Science Meeting, 20 min, Nov. 15, 2004. (not published).

- 2004 Saxena, R., P. Drohan, and B. Buck, 2004, Soil Physical and Chemical Relationships Associated with *Arctomecon californica*, NRCS MO#3 Soil Science Meeting, 15 min, Nov. 15, 2004. (not published).
- 2004 Elliot, P., P. Drohan, and B. Buck, 2004, Age Correlation of Geomorphic Surfaces and Soils in Spring Mountains Clark County, NV, NRCS MO#3 Soil Science Meeting, 15 min, Nov. 15, 2004. (not published).
- 2004 Vetter, L. P. Drohan and B. Buck, 2004, Mineralogical changes and nutrient dynamics in soils following post-fire invasion of cheatgrass. NRCS MO#3 Soil Science Meeting, 20 min, Nov. 15, 2004. (not published).
- 2004 Mrozek, S., B. Buck, A. Brock, and P. Drohan, 2004, Heavy Metal Contamination and Salt Efflorescence Associated with Decorative landscaping Rocks, Las Vegas Nevada: the Need for Regulations, NRCS MO#3 Soil Science Meeting, 15 min, Nov. 15, 2004. (not published).
- 2004 Hirsch, A. C., McEwan, D. J., Howley, R. A., Mehling, J., Snelson, C. M., and Drohan, P.J. 2004. A Geophysical Study of Fissures in Pahrump, Nevada. EOS Trans. AGU, 85 (47), Fall Meet. Suppl. (published).
- 2004 Hirsch, A. C., Snelson, C. M., McEwan, D. J., Howley, R. A., Mehling, J. B., and Drohan, P. J. 2004. A geophysical study of fissures in Pahrump, NV. Geological Society of America, Denver, CO. (published).
- 2004 Drohan, P.J., and H. Neill. Soil and geological hazards as drivers of housing prices in Las Vegas, NV. American Real Estate Society Annual Meeting, Captive Island, FL. April 2004. (published).
- 2003 Joiner, J.A., Drohan, P.J., and Ebeling, J.M. Evaluation of a method for estimating earthworm populations: A tool for soil quality evaluation. Annual Meeting Abstracts, S07-drohan771754, American Society of Agronomy-Crop Science Society of America-Soil Science Society of America, Denver, CO. (published).
- 2003 McClaren, S. and P.J. Drohan. Bighorn sheep (*Ovis canadensis*) habitat in Zion National Park. West Virginia Academy of Sciences Annual Meeting, Wesleyan College, West Virginia. (published).
- 2003 Shaffer, S. and P.J. Drohan. A greenways design model for Jefferson County, WV. West Virginia Academy of Sciences Annual Meeting, Wesleyan College, West Virginia. (published).
- 2002 Ross, C.N. and P.J. Drohan. Nitrogen, phosphorus, and carbon concentrations in a fine-loamy, carbonatic, mesic Fluvaquentic Endoaquoll A horizon encroached upon by *Typha latifolia*. Annual Meeting Abstracts, S10-drohan074821, American Society of Agronomy-Crop Science Society of America-Soil Science Society of America, Indianapolis, IN. (published).
- 2002 Hancock, D., K. Rishel, and P.J. Drohan. A comparison to soil survey data and an estimate of the variability in field and laboratory data of a hillslope transect crossing two mapping units of an Ultic Hapludalf and Typic Hapudult. Annual Meeting Abstracts, S05-drohan075515, American Society of Agronomy-Crop Science Society of America-Soil Science Society of America, Indianapolis, IN. (published).
- 2002 Ross, C. N. and P.J. Drohan. Preliminary results on water depth and nitrogen and

phosphorus concentrations in a fine-loamy, carbonatic, mesic fluventic calciudoll A horizon encroached upon by *Typha latifolia*. West Virginia Academy of Sciences Annual Meeting, West Virginia University. (published).

- 2001 Drohan, P.J., E.J. Ciolkosz, and G.W. Petersen. Parent material and topographic relationships in northern Pennsylvania forested soils. Annual Meeting Abstracts, s07-drohan105900-P, American Society of Agronomy-Crop Science Society of America-Soil Science Society of America, Charlotte, NC. (published).
- 2001 Butler, K. and P.J. Drohan. Feats and failures: Achieving consistency among multiple TAs of large introductory courses. Annual Meeting Abstracts, a01-butler115440-P, American Society of Agronomy-Crop Science Society of America-Soil Science Society of America, Charlotte, NC. (published).
- 2000 Drohan, P.J., G.W. Petersen, and S.L. Stout. 2000. Soil and foliar calcium relationships in northern Pennsylvania healthy and declining sugar maple plots. Annual Meeting Abstracts, American Society of Agronomy-Crop Science Society of America-Soil Science Society of America, Minneapolis, MN. p. 335. (published).
- 2000 Drohan, P.J., G.W. Petersen, and S.L. Stout. Soil physical and chemical relationships in declining and non-declining plots of sugar maple in Pennsylvania. Penn State Environmental Chemistry Symposium, College of Agricultural Sciences, University Park, PA. (published).
- 1999 Drohan, P.J., G.W., Petersen, and S.L. Stout. Soil physical and chemical relationships in declining and non-declining plots of sugar maple in Pennsylvania. Annual Meeting Abstracts, American Society of Agronomy-Crop Science Society of America-Soil Science Society of America, Salt Lake City, UT. p. 306. (published).
- 1999 Butler, K.L. and P.J. Drohan. Many instructors--one class: An insurmountable challenge? Annual Meeting Abstracts, American Society of Agronomy-Crop Science Society of America-Soil Science Society of America, Salt Lake City, UT. p. 5. (published).
- 1998 Drohan, P.J., G.W. Petersen, and S.L. Stout. Preliminary indications of sugar maple decline in ecoregions 212F and 212G. Sugar Maple Ecology and Health—An International Symposium, Warren, PA. (published).
- 1998 Drohan, P.J., G.W. Petersen, and S.L. Stout. A comparison of mapping unit accuracy and sample size variability. Annual Meeting Abstracts, American Society of Agronomy-Crop Science Society of America-Soil Science Society of America, Baltimore, MD. p. 268. (published).
- 1998 Drohan, P.J., G.W. Petersen, and S.L. Stout. An assessment of sugar maple decline on the Appalachian Plateau, ecoregions 212F and 212G. Pennsylvania Acidic Deposition Conference, University Park, PA. (published).

PROFESSIONAL SERVICE

- 2009-present Chair elect, S-5, Pedology Division, Soil Science Society of America.
- 2008-present Committee Member: Department Soil Physics Cluster Committee, Dept. Crop and Soil Sciences, The Pennsylvania State University.
- 2008-present Committee Member: Department Computer Committee, Dept. Crop and Soil Sciences, The Pennsylvania State University.
- 2007-present Committee Member: Hunter Plot Rotation Experiment Committee, Dept. Crop and Soil Sciences, The Pennsylvania State University.
- 2006-present Committee Member: ACS536.2 Agronomic Science Foundation, Science Policy Advisory Committee.

2006-present	International Union of Soil Scientists – Vice Chair for Commission 4.4 - Soil education and public awareness.
2004-present	Soil Science Society of America (SSSA) - S590 Professional Development & Mentoring, ad hoc.
2003-present	USDA Natural Resource Conservation Service Volunteer.
2003-2006	Facilitating the creation of the Nevada Association of Professional Soil Scientists.
2003-2004	Committee member: National Academy of Sciences, National Trends in Undergraduate Soil Science Education, Subcommittee of the National Committee for Soil Science.
2003 - 2004	SSSA - S-587, Soil Science Society of America, Training and Continuing Education for Soil Scientists.
2003	Committee member: Western Regional Cooperative Soil Survey Committee; Research needs in production soil survey.
2003	Committee member: National Cooperative Soil Survey Committee; Committee 3: New inventory techniques and delivery systems in production soil survey.
2003 - present	SSSA - S589.4 Smithsonian Soils Exhibit--SSSA Design Committee Chair.
2003	President of the West Virginia Association of Professional Soil Scientists.
2002 - 2003	Vice President of the West Virginia Association of Professional Soil Scientists.
2000 - 2003	Webmaster, West Virginia Association of Professional Soil Scientists.
2002 - 2003	Blue Ridge Environmental Center, Purcellville, VA, Agricultural Board Representative.
2002 - 2003	Jefferson County, WV, Storm water detention basin design and West Nile virus review committee.
2002 - 2004	Member of the Soil Science Society of America, Division S-5 committee to investigate member benefits of ARCPACS certification.
2001 - present	SSSA - S589 Smithsonian Soils Exhibit--Steering Committee Co-Chair.
2001 - present	Referee for various journals.

UNIVERSITY SERVICE ACTIVITIES

2006-present	Hartwick College Enrollment Management/Retention Task Force
2006-present	Golisano Hall Leed Certification Committee, Hartwick College
2006-present	Member and Chair, Pine Lake Vested Users Group, Hartwick College
2006-present	Member and Chair, Campus Sustainability Committee, Hartwick College
2006/2007	Hartwick College Academic Theme Committee: Water
2005-2006	Department of Geoscience Promotion and Tenure Committee
2004-2006	Member and chair of the UNLV, Dept. Geoscience Library Committee
2004-2006	Member of the UNLV, Dept. of Geoscience Computer Committee
2003-2006	Member of the UNLV, College of Science and Technology Building advisory group
2003-2004	Member of the UNLV, Greenspun College of Urban Affairs Academic Standards Committee
2002-2003	Member of the Shepherd College Student Life Council
2002-2003	Member of the Shepherd College Buildings and Grounds Committee
2002-2003	Member of the Shepherd College Assessment Task Force

2002-2003	Member of the Shepherd College Graduate Programs Committee
2002-2003	Member of the Shepherd College Master Planning Committee
2002-2003	Shepherd College Faculty representative to the United Way

GRADUATE STUDENT ADVISING

1. Emilie Erich: PSU, Crop and Soil Sciences (MS began Fall 2008)
2. Katherine Lindeberg: PSU, Crop and Soil Sciences (MS began Fall 2008)
3. Maureen Yonovitz: UNLV, Dept. of Geoscience, M.S.: Pedogenesis of vesicular horizons in disturbed and undisturbed soils. (2008)
4. Joshua Boxell: UNLV, Dept. of Geoscience, M.S.: Changes in infiltration and percolation following establishment of *Bromus tectorum* in the Great Basin, NV. (2007)
5. Peggy Elliott: UNLV, Dept. of Geoscience, M.S.: Development of argillic horizons in a quartzite soil along a toposequence on Mt. Charleston, NV: relic formation process or current development? (2007)
6. Shane Rumsey: UNLV, Dept. of Anthropology, M.S.: (co-advisor UNLV Karen Harry (Anthropology)): Mineralogical and chemical composition of soil used in mortars between kivas in Mesa Verde National Park. (2007)
7. Nancy Williams: UNLV, College of Science, M.A.S.: Soil physical and chemical relationships associated with rare plant species in the White River Valley, NV. (2006)
8. Rekha Saxena: UNLV, Dept. of Environmental Studies, M.S.: Soil chemical relationships associated with *Arctomecon californica* in gypsiferous and non-gypsiferous soils. (2005)

CONTINUING EDUCATION

- 2001 University of Maine, Maine Compost School, medium- and large-scale composting certification.
- 1993 USDA–Forest Service, Course series on wild-land fire fighting. Advanced fire behavior; fire behavior calculations; hydraulic pumps.

TECHNICAL/COMPUTER SKILLS

- Director, Penn State Soil Characterization Laboratory.
- Co-Director of UNLV Pedology Laboratory; Experience with standard NRCS and USDA soil chemical, physical, and mineralogical analysis, operation of laboratory analytical equipment (AA, ICP, graphite furnace, microwave digester) and field equipment in soils and hydrology. Experience with climate and stream monitoring stations, construction, and maintenance.
- GIS software skills: ArcGIS and Arc Info Desktop and extensions; ArcView 3.3 (experience with multiple ArcView extensions) on Windows workstations. Working knowledge of Bryce 5.0, Terragen, 3DEM, IDRISI, and IMAGINE. Experience with several hydrologic modules (HEC, SWAT, SWMM, and AGNPS).
- Intermediate to advanced knowledge of computer setup, components, networking, and trouble-shooting.
- Proficient in the use of personal computers for word processing, spreadsheet, statistical, WWW design and graphics applications. Proficient in Microsoft Office; Minitab; SPSS; S-PLUS; Netscape Composer; Word Perfect; WebCT educational software for distance education; Adobe Acrobat, PageMaker, Photoshop, and Illustrator; Corel Bryce; Terragen; JASC Paint Shop Pro; HTML code.