

**A. PAUL SCHWAB**  
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### **Education**

Ph.D., Soil Chemistry, 1981, Colorado State University, Ft. Collins, CO  
M.S., Soil Chemistry, 1978, Colorado State University, Ft. Collins, CO  
B.S., Mineral Engineering – Chemistry, 1976, Colorado School Mines, Golden, CO

### **Professional Experience**

Professor, Soil and Crop Sciences, Texas A&M University, College Station, 2012-present  
Director, Natural Resources and Environmental Science Program, Purdue University, 2008-2012  
Professor, Agronomy, Purdue University, West Lafayette, Indiana, 1998-2012  
Adjunct Professor, Agronomy, Kansas State University, Manhattan, Kansas, 1998-1999  
Adjunct Professor, Division of Biology, Kansas State University, Manhattan, 1996-1999  
Professor, Agronomy, Kansas State University, Manhattan, Kansas. 1994-1998  
Associate Professor, Agronomy, Kansas State University, Manhattan, Kansas. 1989-1994  
Assistant Professor, Agronomy, Kansas State University, Manhattan, Kansas. 1983-1989  
Research Scientist, Battelle Pacific Northwest, Richland, Washington. 1981-1983

### **Professional Activities and Affiliations**

Editorial Board, *Geosciences*. 2018-present  
Editorial Board, *ISRN Soil Science*. 2011-2017  
Editorial Board (Founding Member), *Journal of Undergraduate Research* – Purdue University, 2011-2012  
Chair, USDA Regional Committee W-1170. 2004-2009  
Chair, Division S-11, Soils and Environmental Quality, 2004  
Chair, Soil Chemistry Division of Soil Science Society of America, 1998-1999  
Associate Editor, *Journal of Environmental Quality*, 1997-2003  
Chair, Western Regional Project 82, 1997  
Chair, graduate membership committee, Phi Kappa Phi, 1996-1997  
Chair, Soil Science Research Award Committee, 1996  
Associate Editor, *Soil Science Society of America*, 1988-1995  
Editor, *Chemical Equilibrium and Reaction Models*, SSSAJ special publication, 1995  
Committee Memberships in Soil Science Society of America:  
    Nominations committee for Soil Chemistry Division (S111.02), 1999-2001 (chair, 1999)  
    Soil Science Nominations Committee (S101), 1999  
    Soil Science Society of America Journal Editorial Board (S302), 1988-1995  
    Soil Science Research Award, 1995-1996 (chair, 1996)  
    Program Planning (S711), 1998-1999  
    Glossary of Soil Science Terms (S374), 1998-2001 (chair, 1999)  
    Soil Science Society of America Special Awards (S491.2)  
Committee Memberships in American Society of Agronomy:  
    Journal of Environmental Quality Editorial Board (ACS324.1), 1997-2003  
    Program Planning (A711), 1998-1999  
    Membership Committee, 1984  
Member, Soil Science Society of America

Member, American Society of Agronomy  
Member, American Chemical Society

### **Professional Honors**

Mentor of the Year, Purdue University Learning Communities. 2012  
Fellow, Soil Science Society of Agronomy, 2001  
Fellow, American Society of Agronomy, 1998  
Certificate of Commendation for Poster Presentation, HSRC/WERC Environmental Conference, 1996  
Certificate of Excellence for Educational Material, Amer. Soc. Agron., 1995  
Emil Truog Award for the Outstanding Dissertation in Soil Science, 1982  
Member, Sigma Xi, research honorary  
Member, Phi Kappa Phi  
Member, Gamma Sigma Delta, agriculture honorary

### **Instruction and Student Programs**

#### Courses Texas A&M University

SCSC 422 Soil Fertilizer and Fertilizers (3 credits)  
SCSC 432 Soil Fertility Laboratory (1 credit)  
SCSC 455/657 Environmental Soil and Water Science (3 credits)  
SCSC 618 Analysis of Environmental Systems (3 credits)  
SCSC 624 Soil Chemistry (3 credits)

#### Undergraduate Courses at Purdue

AGR 122 Natural Resources and Environmental Science Orientation (0.5 credit)  
NRES 200 Introduction to Environmental Careers (1 credit)  
AGRY 290 Introduction to Environmental Science (3 credits)  
NRES 410 Research in Natural Resources and Environmental Science (variable credit)  
NRES 420 Environmental Internship (1 credit)  
AGRY 498 Soil and Groundwater Remediation (3 credits)  
NRES 498 Regulatory Science (3 credits)  
CE 593/AGRY 498 Environmental Geotechnology (3 credits)

#### Graduate Courses at Purdue

AGRY 540 Soil Chemistry (3 credits)  
AGRY 555 Soil and Plant Analysis (3 credits)  
AGRY 598 Soil Physical Chemistry (3 credits)  
AGRY 598 Use of Vegetation in Remediation of Metal Contaminated Soils (3 credits)  
AGRY 598 Phytoremediation (3 credits)

#### Undergraduate Programs

Environmental Sciences Learning Community (Advisor and Instructor), 2011  
Environmental Science Club (Advisor), 2008-2012  
Engineering Projects in Community Service (Faculty Reviewer), 2009-2012

#### High School Programs

Intel International Science Fair, Expert Judge, Environmental Sciences Division, 2008  
FFA National Science Fair Judge, 2008-2012  
Advisor, Arthi Puri and Rani Iyer, Siemens National Science Fair. Indiana State Champions,  
National runners-up, 2009  
Advisor, Jacob Liggett, Indiana Regional Science Fair, Third Place, 2010

### **University, College, and Departmental Committees (past 5 years)**

#### Departmental Committee (Texas A&M)

Chair, Promotion and Tenure Committee (2015-present)

Chair, Faculty Advisory Committee (2016-2017)

#### University Committees (Purdue)

Enrollment Management Committee, 2010-2012

University Advisory Committee, 2010-2012

University Senate, 2007-2012.

University Resources Policy Committee. elected 2008-2012. (chair, 2010-12)

University Grievance Committee, 2005, 2010

Management Operations Review Team (MORT) –IT Organizational Structure Tiger Team. 2009

#### College of Agriculture Committees

Curriculum and Student Relations Committee. 2007-2012. (chair, 2009-10)

College of Agriculture Academic Program Review, 2009-2010

Readmissions Committee, 2008-2009

Transformational/Experiential Learning Committee. 2010

Honors Committee, 2008-2012

Careers Committee, 2008-2012

#### Department of Agronomy Committees

Undergraduate Teaching Committee, 2007-2012

Curriculum Committee, 2009-2010

Awards Committee, 2006-2008

Alumni Awards Committee, 2008-2012 (chair)

Doctoral Preliminary Examination Committee, 2009-2012

### **National/International Review Activities**

USDA AFRI Panel. Foundational Knowledge of Agricultural Production Systems (A1102). October, 2016  
CRDF Global. Shota Rustaveli National Science Foundation Research Competitions. Review Panel. July 2016.

American Association for the Advancement of Science Research Competitiveness Service. King Abdulaziz City for Science and Technology Program. 2011-2015.

National Institute of Environmental Health Sciences (NIEHS) Superfund Basic Research and Training Program Review, Nov. 2013.

U.S. Environmental Protection Agency. Federal Insecticide, Fungicide, and Rodenticide Act, Scientific Advisory Panel. Ad hoc member for “Pollinator Risk Assessment Framework.” 2012.

American Association for the Advancement of Science, Strategic Technologies Program. 2011.

U.S. Civilian Research and Development Fund. Russian Young Scientists Scientific Paper Competition. 2011.

World Class University (South Korea) Biology/Agriculture Panel Chair. 2011.

U.S. Civilian Research and Development Fund. Panel Chair, Environmental Biology Panel. February, 2009, February 2010.

National Institute of Environmental Health Sciences (NIEHS) ES07-006 Superfund Basic Research and Training Program Review, Nov. 2008, Nov. 2009.

Central Asia Research Travel Grant Competition, CRDF, Washington DC, Feb 2008-2012.

National Science Foundation, Small Business Innovation Research, 2007-2009, Washington DC.

National Science Foundation, Environmental Engineering Review Panel, June 22, 2007, Washington DC.

U.S. Civilian Research and Development Fund. January, 2007.

U.S. Dept. Agriculture National Research Initiative Review Panel. May 16-May 20, 2005.

U.S. Dept. Agriculture National Research Initiative Review Panel. May 17-May 21, 2004.

U.S. Civilian Research and Development Fund. May, 2004.

National U.S. Environmental Protection Agency Review Team, Oil Spill Remediation Research Center. Lake Charles, Louisiana. December, 2003.

U.S. Civilian Research and Development Fund. 2001-2007.

Review Team, Integrated Petroleum Environmental Consortium, Quality Assurance Project Plan. June, 1999.

Remediation Technologies Development Forum, Phytoremediation Action Team. Waterways Experiment Station, Vicksburg, Mississippi. March, 1999.

Research Proposal Review Panel, U.S. Environmental Protection Agency, September, 1998.

Research Proposal Review Panel, Exploratory Environmental Engineering, U.S. Environmental Protection Agency. June, 1998.

Review Panel, U.S. Department of Agriculture Appalachian Soil and Water Conservation Research Laboratory. Beckley, West Virginia. November, 1997.

### **Community Service and Outreach Boards**

Alcoa International Advisory Board. May 2009- 2012

Fort Riley Citizen's Advisory Board. Fort Riley Army Base, Junction City, KS. 1996-1998

### **Funded Research Grants (appx \$9.03 million total)**

Investigating the Unconfined Aquifer as the Source of Low-pH in 5 Surface Waters at Oak Hill Mine. Luminant Environmental Research Program. September 2015 - January 2018. \$195,482.

Chemical speciation and natural attenuation of arsenic, antimony, and heavy metals in soils and sediments contaminated by mine tailings. Texas A&M University-CONACYT: Collaborative Research Grant Program. Sep 2016-Aug 2017. Y. Deng, M.A. Armienta, A.P. Schwab, M. Newville, F.M. Michel, F.M. Romero. \$24,000.

Environmental Management for the Oil Sector. USAID/Uganda. A.P. Schwab, Lead Investigator. 2014-2017. \$1,200,000. (subcontract with Tetra Tech)

The evaluation of precast concrete sewer pipes, tanks, and vaults exposed to microbially induced concrete corrosion. National Precast Concrete Association. J. Weiss, M.K. Banks, and A.P. Schwab. 2011-2012. \$135,000.

The use of trees and other vegetation in the remediation of brownfields: Big Marsh property of Lake Calumet Area. Great Lakes Restoration Initiative, U.S. Forest Service, Dept. of Interior. A.P. Schwab. 2010-2012. \$193,595.

Revitalization and remediation of abandoned gas stations in Chicago. Chicago Dept. of Environment. F. Whitehead, D. Graham., and A.P. Schwab. 2010-2012. \$100,000. (In Cooperation with School of Art Institute of Chicago and Chicago State University). 2010-2012

Reclamation of steel mill slag. US Steel Corporation (Gary Indiana Works). A.P. Schwab. 2007-2010. \$25,000.

Evaluation of toxicity analysis for foundry sand specifications, Indiana Dept of Transportation, Joint Transportation Research Program. A.P. Schwab and M.K. Banks. 2008-2009. \$25,485.

Soil amendments to reduce bioavailability of metals in soils: Experimental studies and spectroscopic verification, DoD SERDP. M.K. Banks, A.P. Schwab, C. Johnston, and D. Schulze. 2004-2008. \$895,000.

Use of plants for remediation of dredged sediments: Optimization for PCB and PAH degradation. US EPA. A. P. Schwab and C. Rugh. 2004-2005. \$100,000.

Dewatering, remediation, and evaluation of contaminated dredged sediments. US EPA. A.P. Schwab, M.K. Banks, and L. Newman. 2001-2004. \$140,000.

Treatment of slag leachate with constructed wetlands, Indiana Department of Transportation. M.K. Banks, J. Alleman, and A. P. Schwab. 2001-2003, \$85,000.

Remediation and stabilization of soils contaminated by lead resulting from the removal of paint from bridges. Indiana Department of Transportation. M.K. Banks and A.P. Schwab. 2001-2004. \$150,000.

Development of an integrated biotoxicity protocol for biosolids. Water Environment Research Foundation. M.K. Banks, A.P. Schwab, J. Alleman, and M. Switzenbaum. 2000-2003. \$250,000.

The impact of soil chemical properties on the bioavailability and chemical lability of selected, organic priority pollutants. U.S. Environmental Protection Agency. A.P. Schwab, L. Lee, and M.K. Banks. 1998-2000. \$196,000.

Field validation of an optimal design methodology for vegetative remediation of sediments from the Central Vehicle Wash Facility, Custer Hill, Fort Riley, Kansas. Environmental Security Technology Certification Program, Department of Defense. A.P. Schwab, J.C. Tracy, and L.E. Erickson. 1997-1999. \$248,750.

The effects of plants on the bioavailability and toxicity of contaminants in soil. U.S. Environmental Protection Agency. M.K. Banks, A.P. Schwab, and S. Smith. 1996-1999. \$499,941.

Evaluation of lagoons for the containment of waste in western Kansas. Kansas Department of Health and Environment. A.P. Schwab, L.N. Reddi, J. Ham, and M.K. Banks. 1996-1997. \$140,000.

Phytoremediation of soil contaminated with hazardous chemicals. Applied Technology Demonstration Facility, Department of Defense. M.K. Banks, A.P. Schwab, and R.S. Govindaraju. 1995-1997. \$471,889.

Fate and transport of heavy metals in contaminated soils. U.S. Environmental Protection Agency. A.P. Schwab, M.K. Banks, L.E. Erickson, and J.C. Tracy. 1995-1998. \$220,476.

Acquisition of high performance liquid chromatograph and gas chromatograph mass spectrometer for studying dissipation of organic chemicals. National Science Foundation. A.P. Schwab, M.K. Banks, J. Blair, F. Oehme, and J. Pickrell. 1994-1995. \$184,647.

Kansas EPA EPSCoR - Enhancement of bioremediation research. U.S. Environmental Protection Agency. A.P. Schwab. 1994-1996. \$882,000.

Row crop pollution control demonstration project. Kansas Department of Health and Environment. C. Rice, P. Barnes, L. Maddux, and A.P. Schwab. 1990-1994. \$90,000.

Mycorrhizal mediation of grassland biotic interactions and plant community structure. National Science Foundation. D. Hartnett, B.A. Hetrick, and A.P. Schwab. 1994-1997. \$330,000.

Bioremediation of petroleum contaminated soil using vegetation - a technology transfer project. U.S. Environmental Protection Agency. M.K. Banks, A.P. Schwab, and R.S. Govindaraju. 1993-1996. \$260,036.

Row crop pollution control demonstration project. Atrazine analyses. Kansas Department of Health and Environment. A.P. Schwab, C. Rice, P. Barnes, and L. Maddux. 1991-1994. \$25,620.

Denitrifier ecology in stratified soil profiles: Implication for water quality. USDA National Research Initiative Grant. C. Rice, A.P. Schwab, and G. Kluitenberg. 1991-1993. \$119,374.

Biotic and abiotic factors controlling nitrogen flux in pristine and agricultural subsurface systems. National Science Foundation. A.P. Schwab, C. Rice, W.K. Dodds, M.K. Banks, and J.K. Koelliker. 1992-1995. \$594,965.

Coal Ash Reclamation Without Soil. Kansas City Power and Light Company. A.P. Schwab and P.D. Ohlenbusch. 1991-1992. \$50,000.

Bioremediation of hydrocarbon contaminated soils using vegetation: A field and greenhouse study. Conoco, Inc. M.K. Banks, A.P. Schwab, and B.A.D. Hetrick. 1991-1992. \$19,000.

Impact of soil microflora on revegetation efforts in southeast Kansas. U.S. Environmental Protection Agency. M.K. Banks, A.P. Schwab, and B.A.D. Hetrick. 1991-1994. \$203,000

Food and Agricultural Science National Needs Graduate Fellowship Program. U.S. Department of Agriculture. A.P. Schwab, G. Kluitenberg, and C. Rice. 1991-1995. \$108,000.

Mycorrhizal mediation of plant competition and community structure. National Science Foundation. D. Hartnett, B.A.D. Hetrick, A.P. Schwab, and D.J. Gibson. 1991-1993. \$278,000.

Reducing heavy metal availability to perennial grasses and row-crops grown on contaminated soils and mine spoils. U.S. Environmental Protection Agency. G. Pierzynski and A.P. Schwab. 1990-1993. \$42,000.

Leaching of atrazine, alachlor, and nitrate through soil and into groundwater. A.P. Schwab and G. Kluitenberg. Kansas Water Resources Research Institute. 1991-1992. \$14,500

Leaching of atrazine, alachlor, and nitrate through soil and into groundwater. A.P. Schwab and R. Greenland. Kansas Water Resources Research Institute. Apr 1990 - Mar 1991. \$14,600.

Leaching of atrazine and nitrate through soil and into groundwater. Kansas Water Resources Research Institute. A.P. Schwab. 1989-1990. \$17,600.

Ash reclamation for Kansas City Power and Light. P. Ohlenbusch and A.P. Schwab. 1987-1990. \$324,019.

Chemical and microbial degradation rate of atrazine in ground water systems. U.S. Geological Survey. A.P. Schwab. 1987-1990. \$120,000.

Movement of nitrate and atrazine in Kansas soils. Kansas Water Resource Research Institute. A.P. Schwab. 1987-1988. \$22,000.

Development of a phosphorus soil test for low input systems. U.S. Department of Agriculture. A.P. Schwab and S.J. Thien. 1988-1990. \$36,000.

### Peer-Reviewed Publications (122 total)

Rossi, L., W. Zhang, A.P. Schwab, and X. Ma. 2018. Mutual effects and in planta accumulation of co-existing cerium oxide nanoparticles and cadmium in hydroponically grown soybean (*Glycine max* (L.) Merr.) Environ. Sci: Nano DOI 10.1039/C7EN00931C

Rossi, Lorenzo; W. Zhang, A.P. Schwab, X. Ma. 2017. Uptake, accumulation and in-planta distribution of co-existing cerium oxide nanoparticles and cadmium in *Glycine max* (L.) Merrill. Environ. Sci. Technol. 51:12815-12824.

Fancher, J.P., J.A. Aitenhead-Peterson, T. Farris, K. Mix, A.P. Schwab, D.J. Wescott, and M.D. Hamilton. 2017. An evaluation of soil chemistry in human cadaver decomposition islands: Potential for estimating postmortem interval (PMI). Forensic Science International 279:130-139

Iqbal, A., A. Muhammad, I. Hashmi, R. Karthikeyan, T.J. Gentry, A.P. Schwab. 2017. Biodegradation of phenol and benzene by endophytic bacterial strains isolated from refinery wastewater-fed *Cannabis sativa*. J. Environ. Toxicol. <http://dx.doi.org/10.1080/09593330.2017.1337232>

Mao, Y., M. Sun, X. Chen, Y. Feng, J. Wan, K. Liu, D. Tian, M. Liu, J. Wu, A.P. Schwab, X. Jiang. 2017. Feasibility of sulfate-calcined eggshells for removing pathogenic bacteria and antibiotic resistance genes from landfill leachates. Waste Management <http://dx.doi.org/10.1016/j.wasman.2017.03.005>

Sun, M., M. Ye, K. Liu, A.P. Schwab, M. Liu, J. Jiao, Y. Feng, J. Wan, D. Tian, J. Wu, J. Li, F. Hu, X. Jiang. 2017. Dynamic interplay between microbial denitrification and antibiotic resistance under enhanced anoxic denitrification condition in soil. Environ. Pollut. 222:583-591.

Zhang, W.C., C. Musante, J.C. White, A.P. Schwab, Q. Wang, S.D. Ebbs, X. Ma. 2017. Bioavailability of cerium oxide nanoparticles to *Raphanus sativus* L. in two soils. Plant Physiol Biochem. 110:185-193. <http://dx.doi.org/10.1016/j.plaphy.2015.12.013>

Mao, Y., M. Sun, Y.F. Feng, X. Li, A.P. Schwab, J.Z. Wan, M.Q. Liu, D. Tian, K. Liu, Ju. Wu, X. Jiang. 2016. Calcined eggshell waste for mitigating soil antibiotic-resistant bacterial/antibiotic resistance gene dissemination and accumulation in bell pepper. J. Ag. Food Chem. 64: 5446-5453. <http://pubs.acs.org/doi/abs/10.1021/acs.jafc.6b00866>

Sun, M., M. Ye, A.P. Schwab, X. Li, J. Wan, Z. Wei, J. Wu, V-P. Friman, K. Liu, D. Tian, M. Liu, H. Li, F. Hu, X. Jiang. 2016. Human migration activities drive the fluctuation of ARGs: case study of landfills in Nanjing, eastern China. Journal of Hazardous Materials 315:93-101 <http://dx.doi.org/10.1016/j.jhazmat.2016.04.077>

- Ding, N., J. Xu, and A.P. Schwab. 2013. Accumulation and transformation of PCBs in ryegrass (*Lolium multiflorum* L.) In J. Xu, J. Wu, Y. He (eds), Functions of Natural Organic Matter in Changing Environment, Part IV. Springer Netherlands, Amsterdam. pp 637-640.
- Martin, W.A., L.S. Lee, and A.P. Schwab, 2013. Antimony migration trends from a small arms firing range compared to lead, copper, and zinc. *Science of the Total Environment* 463-464:222-228.
- Schwab, A.P. 2012. "Pollutants: Organic and Inorganic." In SE Jorgensen (ed). *Encyclopedia of Soils in the Environment*. CRC Press.
- Schwab, A.P. Soil Solution. 2012. "Soil Solution." In PM Huang, Y. Li, and ME Sumner (editors). *Handbook of Soil Sciences, Second Edition*. Chapter 12. 22 pp Taylor and Francis Publishers
- Kang, D.H., A.P. Schwab, C.T. Johnston, and M.K. Banks. 2010. Adsorption of iron cyanide complexes onto clay minerals, manganese oxide, and soil. *J. Environ. Sci. Health*. 45:1391-1396.
- Nedunuri, K., A.P. Schwab, and R.S. Govindaraju. 2010. Modeling the transport of lead within contaminated soils amended with phosphates, *Ecosystem Management and Restoration Track, Nonpoint source pollution and remediation – II, Proceedings of the ASCE EWRI conference on 3<sup>rd</sup> International Perspective on Current and Future State of Water Resources and the Environment*, pp 1-9, January 5-7, 2010, IIT Madras, Chennai, India. 9 pp.8
- Smith, K.E., M.K. Banks, and A.P. Schwab 2009. Dewatering of contaminated sediments. *Greenhouse and field studies. Ecol. Engg.* 35:1523-1528.
- Cofield, N., M.K. Banks, A.P. Schwab. 2008. Lability of polycyclic aromatic hydrocarbons in the rhizosphere. *Chemosphere* 70:1644-1652.
- Euliss, K, Chi-hua Ho, A.P. Schwab, S. Rock, M.K. Banks. 2008. Greenhouse and field assessment of phytoremediation for petroleum contaminants in a riparian zone. *Bioresour. Technol.* 99:1961-1971.
- Kang, D.H., L.Y.. Hong, A.P. Schwab, and M.K. Banks. 2008. Plant germination and growth after exposure to cyanide complexes. *J. Environ. Sci. Health Part A* 43:627-632.
- Kang, Dong-Hee, D. Tao, F. Wang-Cahill, S. Rock, A.P. Schwab, and M.K. Banks. 2008. Assessment of landfill leachate volume and concentrations of cyanide and fluoride during phytoremediation. *Bioremed. J.* 12:35-48.
- Keller, J., M.K. Banks, A.P. Schwab. 2008. Effect of soil depth on phytoremediation efficiency for petroleum contaminants. *J. Environ. Sci. Health Part A.* 43:1-9.
- Hong, L.Y., M.K. Banks, and A.P. Schwab. 2008. Removal of cyanide contaminants from rhizosphere soil. *Bioremed. J.* 12:210-215.
- Schwab, A.P., D.S. Zhu, and M.K. Banks. 2008. Influence of organic acids on the transport of heavy metals in soils. *Chemosph.* 72:986-994.
- Smith, K.E., A.P. Schwab, M.K. Banks. 2008. Dissipation of PAHs in saturated, dredged sediments: A field trial. *Chemosph.* 72:1614-1619.
- Cofield N., A.P. Schwab, M.K. Banks. 2007. Phytoremediation of polycyclic aromatic hydrocarbons in soil: Part I. Dissipation of target contaminants. *Internat. J. Phytorem.*9:355-370.
- Cofield N., A.P. Schwab, P. Williams, M.K. Banks. 2007. Phytoremediation of polycyclic aromatic hydrocarbons in soil: Part II. Impact on ecotoxicity. *Internat. J. Phytorem.*9:371-384.
- Cofield, N., M.K. Banks, A.P. Schwab. 2007. Evaluation of hydrophobicity in PAH-contaminated soils during phytoremediation. *Environ. Pollut.* 145:60-67.
- Kang, D.H., L.Y. Hong, A.P. Schwab, and M.K Banks. 2007. Removal of Prussian blue from soil in the rhizosphere of cyanogenic plants. *Chemosph.* 69:1492-1498.
- Schwab, A.P., D. Zhu, and M.K. Banks. 2007. Heavy metal transport from mine tailings as affected by organic amendments. *Bioresour. Technol.* 98:2935-2941.
- Smith, K.W., A.P. Schwab, and M.K. Banks. 2007. Phytoremediation of polychlorinated biphenyl (PCB)-contaminated sediment: a greenhouse feasibility study. *J. Environ. Qual.* 36:239-244.
- Banks, M. K., and A. P. Schwab. 2006. Ecotoxicity of pentachlorophenol in contaminated soil as affected by soil type. *J. Environ. Sci. Health Pt. A* 41:117-128.

- Banks, M. K., A.P. Schwab, N. Cofield, J.A. Alleman, M. Switzenbaum, J. Shalabi, and P. Williams. 2006. Biosolids amended soils: Part I. Effect of biosolids application on soil quality and ecotoxicity. *Water Environ. Resear.* 78:2217-2230.
- Banks, M.K., A.P. Schwab, and C. Henderson. 2006. Leaching and reduction of chromium in soil as affected by soil organic content and plants. *Chemosphere* 62:255-264.
- Schwab, A. P., K. Lewis, and M.K. Banks. 2006. Biosolids amended soils: Part II. Chemical lability as a measure of contaminant bioaccessability in biosolids amended soils. *Water Environ. Resear.* 78:2231-2243.
- Schwab, A. P., M. K. Banks, and W. Kyle. 2006. Heritability of phytoremediation potential for the alfalfa cultivar riley in petroleum contaminated soil. *Water Air Soil Pollut.* 177:239-249.
- Schwab, A. P., P.A. Splichal, and M.K. Banks. 2006. Persistence of atrazine and alachlor in groundwater aquifers and soil. *Water Air Soil Pollut.* 171:203-235.
- Schwab, A.P., J. Hickey, J.G. Hunter, and M.K. Banks. 2006. Characteristics of blast furnace slag leachate produced under reduced and oxidized conditions. *J. Environ. Sci. Health Part A.* 41:381-395.
- Schwab, A.P., K. Lewis, and M.K. Banks. 2006. Lead stabilization by phosphate amendments in soil impacted by paint residue. *J. Environ. Sci. Health Part A.* 41:359-368.
- Schwab, A.P., P. Splichal, and M.K. Banks. 2006. Adsorption of atrazine and alachlor to aquifer material and soil. *Water Air Soil Pollut.* 177:119-134.
- Euliss, K., A.P. Schwab, and M.K. Banks. 2005. Silica content of plants as an indirect measure of transpiration rate. *Ecol. Engg.* 25:343-348
- Euliss, K., A.P. Schwab, and M.K. Banks. 2005. Establishing plants under water for the purpose of dewatering contaminated dredged sediments. Paper C6-06, *Proceedings of the Third International Conference on Remediation of Contaminated Sediments*, Battelle Press, Columbus, OH, 2005.
- Parrish, Z., M.K. Banks, and A.P. Schwab. 2005. Assessment of contaminant lability during phytoremediation of polycyclic aromatic hydrocarbon impacted soil. *Environ. Pollut.* 137:187-197.
- Parrish, Z.D., M.K. Banks, and A.P. Schwab. 2005. Effect of root death and decay on dissipation of polycyclic hydrocarbons in the rhizosphere of *Melilotus officinalis* and *Festuca arundinacea*. *J. Environ. Qual.* 34:207-216.
- Schwab, A. P., Y. He, and M. K. Banks. 2005. Influence of organic acids on retention of lead in soil. *Chemosph.* 61:856-866.
- Spriggs, T., M.K. Banks, and A.P. Schwab 2005. Reduction of polycyclic aromatic hydrocarbons in the rooting zone of trees during phytoremediation of manufactured gas plant impacted soil. *J. Environ. Qual.* 34:1755-1762
- Parrish, Z.D., M.K. Banks, and A.P. Schwab. 2004. Effectiveness of phytoremediation as a secondary treatment for polycyclic aromatic hydrocarbons (PAHs) in composted soil. *Internat. J. Phytorem.* 6:119-137.
- Schwab, A.P., Y. He, and M.K. Banks. 2004. Influence of citrate on adsorption of zinc in soils. *J. Environ. Engg.* 130:1180-1187
- Sonon, L. and A.P. Schwab. 2004. Transport and persistence of nitrate, atrazine, and alachlor in large, intact soil columns under two levels of water saturation. *Soil Sci.* 169:541-553
- Banks, M.K., P. Kulakow, A.P. Schwab, Z. Chen, and K. Rathbone. 2003. Degradation of crude oil in the rhizosphere of *Sorghum bicolor*. *Internatl. J. Phytorem.* 5:223-234.
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## Research Assistants

### Former Graduate Students (current employment in parentheses) 14 Ph.D., 14 M.S.

- James Hetrick, Ph.D., 1986 (U.S. EPA. Wash DC)
- Abdulrazag Falatah, Ph.D., 1987 (Prof., King Faud Univ., Saudi Arabia)
- R.David Jones, Ph.D., 1987 (Research Director, Pesticides, U.S. EPA, Wash. DC)
- Rajendra Lal, Ph.D., 1990 (Prof., Allahabad Agric. Instit., India)
- Patrick Splichal, M.S., 1991 (Environmental Engineering Consultants, Kansas City, Mo.)
- Krishnaswamy Jayachandran, Ph.D., 1992 (National Tilth Lab., Ames , IA)
- Leticia Sarong-Sonon, Ph.D., 1992, (Assoc. Prof., Univ. Georgia)
- Abdul Al-Assi, M.S., 1993 (U.S. DoD, Ft. Riley, Kansas)
- Teresita Chua, M.S., 1993 (Iowa State Univ.)
- Zhi Chen, Ph.D., 1997 (AT&T)
- Yinghong He, Ph.D., 1997 (CH2M Hill)
- Jinbo Su, M.S. 1997. Medicinal Chemist, CVS Pharmacies.
- Dongsheng Zhu, Ph.D., 1997 (AT&T)
- Wendy Kyle, M.S., 1998 (Natl. Assoc. State Univ. & Land Grant Colleges)
- Karrie Rathbone, Ph.D. 1998, (Prof., Tabor College)

Narcissus Magturo, M.S., 2001 (US Army Corps of Engineers)  
Yanjun Maggie Zhao, M.S., 2001. (Pharmaceuticals Consultant, Detroit MI.)  
Kevin Lewis, M.S. June, 2003, (Engineering Consulting)  
Jason Hickey, M.S., 2004. (Roux Environmental Consulting, New Jersey)  
Katy Euliss, Ph.D. 2004 (Asst. Prof, Univ. of Minnesota)  
Micah Humphries, PhD, 2007 (Asst. Prof., Northwest College, Powell, Wyoming)  
Agnes Szlezak, PhD, 2007 (Private Consulting, Germany)  
La Riva, Diana, M.S., 2009, (Save the Dunes Foundation, Indiana)  
Atkinson, Ben, M.S., 2009, (US Environ. Protection Agency)  
Jessica Johnston, M.S., 2012. (Monsanto)  
William A. Martin, Ph.D. 2014. (Engineering Research and Development Center, USACE)  
Moyer, David, M.S. (2015)  
Igwé, Alexandria, M.S. 2015. (PhD candidate, UC Davis)

Current Graduate Students (projected graduation date)

Rathnayake, Sewwandi, Ph.D. (2018)  
Vallelian, Caroline, M.S. (2017)  
Dermody, Chris, M.S. (2017)  
Paul, Jason, PhD (2018)

Undergraduate Student Research Assistants

Ashley Hountz  
Janyne Little  
Chris Swalley  
Michelle Madden  
Madeline Porterfield  
Erin Buttrey  
Maryellen Przybylinski  
Taylor Alvarado  
Franklin Linam

Post-Doctoral Associates (8)

Rajendra Lal, 1991-1992  
Edward Brannan, 1995  
Xu Wang, 1995-1996  
Peter Kulakow, 1995-1997  
Baozhi Liu, 1998-1999  
Aneela Iqbal, 2015-2016  
Mingming Sun, 2015-2016  
Hongli Huang, 2017-present  
Iqbal Ahmad, 2017- present