



David H. McNear Jr.

Associate Professor of Rhizosphere Science

Curriculum Vitae

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David H. McNear Jr.

N122S Ag. North Bldg
University of Kentucky
Lexington, KY 40546-0091

dave.mcnear@ukyu.edu

Phone: (859) 257-8627

Fax (859) 257-3655

Lab Website: www.rhizolab.com

A. EDUCATION

Ph.D., Environmental Soil Chemistry, University of Delaware, Feb 2006
M.S., Environmental Pollution Control, Pennsylvania State University, May 2001
B.S. Environmental Resource Management, Pennsylvania State University, Dec 1997
A.A. Life Science, Harrisburg Area Community College, May 1995

B. EMPLOYMENT HISTORY

July 2015-Present Director of Undergraduate Studies, NRES Program
Jan 2013-Present Associate Professor, Rhizosphere Science, University of Kentucky
2007-2013 Assistant Professor, Rhizosphere Science, University of Kentucky
2006 (9mo.) Postdoctoral Associate, University of Delaware, Plant Biology
2001-2005 Graduate Research Fellow University of Delaware
1998-2001 Graduate Teaching/Research Assistant, The Pennsylvania State University

C. RESEARCH

1. FUNDING SUMMARY (2007-2016):

Nationally/internationally competitive.....	\$4,191,334
National Lab user time.....	\$256,318
State/Internally competitive	\$103,355
Industrial contracts.....	\$224,709
TOTAL FUNDING TO DATE.....	\$4,775,716
TOTAL AWARDED TO MY PROGRAM	\$2,448,411

2. GRANT FUNDING:

a. EXTRAMURAL

i. Federal (Nationally/Internationally Competitive)

1. **McNear, D.H. (PI)**, J. McGrath and J. Grove. 2016-2019. *Rhizosphere priming effects on legacy organic phosphorus (Po) in a winter wheat/corn rotation. USDA NIFA AFRI, Microbial Communities Program* **\$499,435 (100%)**
2. Moe, L. (PI), **D.H. McNear** and S. Debolt. 2011-2015. *Plant-Microbe communication in the Medicago truncatula rhizosphere: functional metagenomics, biochemistry and community analysis. USDA NIFA AFRI, Microbial Communities Program* **\$452,000 (10%)**
3. **McNear, D.H.(PI)**, 2011-2014. *Influence of tall fescue cultivar and endophyte genotype combinations on root system architecture, exudate composition and soil biogeochemical properties. USDA NIFA-AFRI Microbial Communities Program.....* **\$265,000 (100%)**
4. **McNear, D. H. (PI)**, N. Fierer (University of Colorado) and R. McCulley (University of Kentucky). 2008-2013. *Understanding endophyte effects on soil processes in tall fescue*

pastures: from rhizosphere to regional scales. USDA-NRI, Soil Processes Program.
\$397,500 (90%)

5. Bertsch, P.M. (Univ. of KY), S. MGrath (Rothamsted Research, UK), A. Neal (Rothamsted Research, UK), J. Unrine (Univ. of KY), **D. McNear** (Co-PI) Univ. of KY), O. Tsyusko (Univ. or KY), N. Kabengi (Univ. of KY), C. Svendsen (NERC Center for Ecology & Hydrology (CEH), Wallingford, UK), D. Spurgeon (CEH, Wallingford, UK), S. Lofts (CEH, Wallingford, UK), et. al. *2010-2014. Transatlantic initiative for nanotechnology and the environment (TINE). Joint U.S. EPA- United Kingdom ENI,\$2,000,000 (10%)*

ii. National Lab User Time (internationally competitive)

1. McNear D.H. (PI) and W. Morris*. *Does the Plant Microbiome influence Cd toxicity and tolerance in the metal hyperaccumulator Nocacea Caerulescense?* Lawrence Berkeley National Lab, Advanced Light Source (LBNL-ALS). Awarded 7 days (30 shifts) of general user access to beamline 10.3.2 **PI, Internationally competitive\$11,805* (100%)**
2. McNear D.H. (PI) and W. Morris*. *Does the Plant Microbiome influence Cd toxicity and tolerance in the metal hyperaccumulator Nocacea Caerulescense?* Argonne National Laboratory, Advanced Photon Source (ANL-APS). Awarded 4 days (12 shifts) of general user access to the Geology, Soils and Environmental Consortium for Advanced Radiation Sources (GSECARS) beamline 13-ID-E. **PI, internationally competitive\$20,237* (100%)**
3. McNear D.H. (PI) and A. White*. *The role of metals in root nodule formation and function in the model legume Medicago truncatula.* Lawrence Berkeley National Lab, Advanced Light Source (LBNL-ALS). Awarded 12 shifts to beamline 10.3.2 and 3 shifts to beamline 8.3.1. **PI, Internationally competitive.....\$25,296*(100%)**
4. **McNear, D.H.** (PI) and A.E. del Real*. 2011-2012. *Elucidating the Chromium Detoxification Pathway in the Metal Hyperaccumulator Silene vulgaris.* Lawrence Berkeley National Lab, Advanced Light Source (LBNL-ALS) Awarded 6 days (19 shifts) of general user access to beamline 10.3.2. **PI, Internationally competitive...\$32,040*(100%)**
5. **McNear, D.H.** (PI) 2010-2012. *The role of metals in plant chemical defense response to insect herbivore attack.* Lawrence Berkeley National Lab, Advanced Light Source (LBNL-ALS). Awarded 10 days (30 shifts) of general user access to beamline 10.3.2 **PI, Internationally competitive\$50,580* (100%)**
6. **McNear, D.H.** (PI) 2008-2010. *Soil physiochemical properties influencing As, Cr and Cu mobility, bioavailability and potential trophic transfer across the landscape.* Lawrence Berkeley National Lab, Advanced Light Source (LBNL-ALS). Awarded 7 days (21 shifts) of general user access to beamline 10.3.2. **PI, Internationally competitive..\$35,414*(100%)**
7. **McNear, D.H.** (PI) 2008-2010. *Soil physiochemical properties influencing As, Cr and Cu mobility, bioavailability and potential trophic transfer across the landscape.* Argonne National Laboratory, Advanced Photon Source (ANL-APS). Awarded 4 days (12 shifts) of general user access to beamline 13-ID. **PI, Internationally competitive...\$20,235*(100%)**

8. **McNear, D.H.** (PI) 2007-2009. *The distribution of Zn in raz (requires additional zinc) a Medicago truncatula (Barrel medic) mutant.* Brookhaven National Lab, National Synchrotron Light Source (BNL-NSLS). Awarded 8 days (24 shifts) of general user access to beamline X26A. **PI, internationally competitive** **\$40,474*** (100%)
9. **McNear, D.H.**, S. Afton (Univ. of Cincinnati) and J. Caruso (Univ. of Cincinnati). 2007-2008. *In search of a mercury-selenium antagonism in plants.* Proposal submitted to Argonne National Laboratory, Advanced Photon Source (ANL-APS). Awarded 4 days (12 shifts) of general user access to the Geology, Soils and Environmental Consortium for Advanced Radiation Sources (GSECARS) beamline 13-ID. **PI, internationally competitive**.....**\$20,237*** (100%)

* **PRT equiv.**– Participating Research Team – there is the option to buy time on these beamlines by becoming a PRT member. The purchase can be > \$30K per year depending on the beamline. The other option is to do what I have done which is to compete against other researchers via a proposal driven process for time on these instruments. I have, therefore, reported the dollar amt that would be required to purchase the amount of time I was awarded with the proposals I wrote based on the \$1686.42/8hr shift estimate provided by Lawrence Berkeley National Lab, Advanced Light Source (LBNL-ALS) User Services Group leader Sue Bailey.

iii. State/University

1. D’Angelo, E., **D.H. McNear**, C. Agouridis, J. Hower, J. Unrine, and R. Warner. 2012. *Remediation of coal slurry impoundment liquids using a multi-stage constructed treatment wetland system.* Kentucky Department for Energy Development and Independence. **CoPI, State Competitive****\$ 61,355** (10%)
2. **McNear, D.H.**, P.M. Bertsch and S. Debolt. (Co-PIs) 2010-2011. Integrated Research, Education and Extension to Enable Sustainable Bioenergy Production – A Proposed Workshop to Organize Research Efforts in the Southeast. U.S. KY-EPSCoR/CDRG, **PI, State competitive**.....**\$30,000** (100%)
3. Grabau L.(PI), **D.H. McNear** and M. Mullen (Co-PIs). 2006. *Technology support for a mastery learning initiative in a growing soil science course.* TASC Teaching + Technology Innovation Grant. **CoPI, internally competitive.** **\$12,500** (10%)
4. **McNear D.H.** 2011. “*Video Devices and Student Videographers to Enhance Soils Instruction*”. TIFF Grant. **PI, Internally competitive.** **\$4,000** (100%)

iv. Private Contracts

1. **McNer, D.H.** (PI) 2016-present. Industrial contract with EnviroKure supporting Rhizolab research projects on the influence of biostimulants on nutrient cycling, microbial populations and plant growth parameters. **\$12,000** (100%)
2. **McNear, D.H.** (PI) 2009-present. Industrial contract with Advanced Microbial Solutions (AMS) supporting Rhizolab research projects on the influence of biostimulants on nutrient cycling, microbial populations and plant growth parameters.**\$210,709** (100%)

b. PROPOSALS SUBMITTED (pending or unfunded)

1. **McNear, D.H.** , L. Moe, J. Pett-Ridge, and J. Clemente. 2016. Metallophyte microbiome: Do bacterial and fungal endophytes facilitate metal hyperaccumulation and tolerance? NSF-Dimensions of Biodiversity. PI, nationally competitivepreproposal pending

2. Bertsch, P.M., **D.H. McNear**, J.Judy and J. Unrine. 2013. *Engineered nanomaterial (ENM) interactions with terrestrial fungi: Understanding the roles of particle and receptor surface chemistry and ENM toxicity*. NSF-Division of Chemical, Bioengineering, Environmental and Transport Systems. **CoPI, nationally competitive.\$320,000 (unfunded)**
3. D'Angelo, E., **D.H. McNear**, C. Agouridis, J. Hower, J. Unrine, and R. Warner. 2012. *Remediation of coal slurry impoundment liquids using a multi-stage constructed treatment wetland system*. NSF-Division of Environmental Engineering. **Co-PI, nationally competitive\$380,000 (unfunded)**
4. Matocha, C. and **D.H. McNear**. 2011. *Mechanistic Studies of Nitrate and Nitrite Reduction at the Iron(II) Mineral-Water Interface*. NSF-Division of Environmental Chemical Sciences. **Co-PI, nationally competitive.....\$224,164 (unfunded)**
5. Bertsch, P.M., **D.H. McNear**, S. Grunwald, T. Teferi, D. Radcliffe, M. Risse, J. Molnar, C.E. Brummer *et al.* (~65 others). 2010. USDA AFRI NIFA Sustainable Bioenergy. *Sustainable bioenergy coordinated agricultural project: toward sustainable bioenergy production systems in the Southeast U.S.* **Co-PI, nationally competitive.....\$45,000,000 (unfunded)**
6. Moe, L., **D.H. McNear** and S. Debolt. 2010. NSF Dimensions of Biodiversity. *The effects of legume genetic diversity on the taxonomic and functional diversity of the associated rhizosphere microbial community*. **Co-PI, nationally competitive...\$1,604,711 (unfunded)**

c. PATENTS FILED:

1. **McNear Jr. D.H.**, M.B. Ali, B. Ames. Microbially based products trigger a defined phenylpropanoid response and flavonoid production in plants. U.S. Patent #

D. PUBLICATIONS

Refereed journal articles	24	Refereed book chapters	1
Journal articles in preparation/submitted.....	8	Published abstracts/presentations.....	49

†Indicates presenting author. * Indicates graduate student of mine. Volunteered unless otherwise indicated

1. REFEREED JOURNAL ARTICLES:

1. Judy, J.D., J.K. Kirby, M.J. McLaughlin, **D.H McNear**, and P.M. Bertsch. *In Press*. Symbiosis between nitrogen-fixing bacteria and *Medicago truncatula* is not significantly affected by silver and silver sulfide nanomaterials. *Environ. Pollution*.
2. Rojas, X., J.W. Leff, **D.H. McNear Jr.**, and R.L. McCulley. 2016. Infection with a shoot-specific fungal endophyte (*Epichloë*) alters tall fescue rhizosphere microbial communities. *Microbial Ecology*, (IF=4.82)
3. *Ding, N., H. Guo, J.V. Kupper and **D.H. McNear Jr.** 2016. Shoot specific fungal endophytes alter soil phosphorus (P) fractions and potential acid phosphatase activity but do not increase P uptake in tall fescue. *Plant and Soil*, 401(1), 291-305. (IF=2.64)

4. Judy, J., **D.H. McNear Jr.**, C. Chen, R.W. *Lewis, O.V. Tsyusko, P.M. Bertsch, W. Rao, J. Stegemeier, G.V. Lowry, S.P. McGrath, M. Durenkamp and J.M. Unrine. 2015. Nanomaterials in biosolids inhibit nodulation, shift microbial community composition, and result in increased metal uptake relative to bulk/dissolved metals. *Environ. Sci. Technol.* 49(14):8751–8758. (IF=5.48)
5. Chen, C. J.M. Unrine, J.D. Judy, R.W. *Lewis, J. Guo, **D.H. McNear Jr.**, and O.V. Tsyusko. 2015. Toxicogenomic responses of the model legume *Medicago truncatula* to aged biosolids containing a mixture of nanomaterials (TiO₂, Ag and ZnO) from a pilot wastewater treatment plant. *Environ. Sci. Technol.* 49(14):8759–8768 (IF=5.48)
6. *Ding, N., Kupper, K and **D.H. McNear Jr.** 2015. Phosphate Source Interacts with Endophyte Strain to Influence Biomass and Root System Architecture in Tall Fescue. *Agronomy Journal.* 107(2): 662-670. (IF= 1.6)
7. *Guo, J., R.L. McCulley and **D.H. McNear Jr.** 2015. Tall fescue cultivar and fungal endophyte combinations influence plant growth and root exudate composition. *Front. Plant Sci.* 6:183. doi: 10.3389/fpls.2015.00183 (IF=3.6)
8. Pradas del Real, A.E., A. Pérez-Sanz, M.C. Lobo, and **D.H. McNear Jr.** 2014. The Chromium Detoxification Pathway in the Multi-metal Accumulator *Silene vulgaris*. *Environmental Science and Technology.* 48(19) pp 11479-11486 (IF=5.48)
9. Szoboszlay, M., J. Lambers, J. Chappell, J.V. Kupper, L. Moe, and **D.H. McNear Jr.** 2014. Comparison of root system architecture and rhizosphere microbial communities of Balsas teosinte and domesticated corn cultivars. *Soil Biology and Biochemistry.* 80:34-44 (IF=4.41)
10. Ali, M.B. and **D.H. McNear Jr.** 2014. Induced transcriptional profiling of phenylpropanoid pathway genes increases flavonoid and lignin content in *Arabidopsis* in response to microbial products. *BMC Plant Biology* 14:84 (IF=4.56)
11. **McNear Jr., D.H.** and J.V. *Kupper. 2014. Mechanisms of trichome-specific Mn accumulation and toxicity in the Ni hyperaccumulator *Alyssum murale*. *Plant and Soil.* 377(1-2) pp 407-422 (IF=2.638)
12. **McNear Jr., D.H.** 2014. The Rhizosphere – roots, soil and everything in between. *Nature Education Knowledge 0(0)*
13. Lewis, R.W.* , G. Tang and **D.H. McNear Jr.** 2012. Morphological and Genetic Changes Induced by Excess Zn in Roots of *Medicago truncatula* A17 and a Zn Accumulating Mutant. *BMC Research Notes.* 5:675 (IF = 1.25)
14. Zhao, J., **D.H. McNear Jr.** and X. Xiong. 2013. Changes in Structural Characteristics of Antioxidative Soy Protein Hydrolysates Resulting from Scavenging of Hydroxyl Radicals. *J.Food Sci.* 78(2):C152-159 (IF=1.73)
15. Schwer III, D.R.* and **D.H. McNear Jr.** 2011. Chromated copper arsenate treated fence posts in the agronomic landscape: soil properties controlling arsenic speciation and spatial distribution. *J. Environ. Qual.* 40(4):1172-1181. (IF=2.33)

16. **D.H. McNear Jr.**, S. Afton, and J. Caruso. 2011. Exploring the structural basis for selenium/mercury antagonism in *allium fistulosum*. *Metallomics*. 4, 267-276 (IF=3.902)
17. Shoults-Wilson, A., O.I. Zurbich, **D.H. McNear Jr.**, O.V. Tsyusko, P.M. Bertsch and J. Unrine. 2011. Evidence for avoidance of Ag nanoparticles by earthworms (*Eisenia fetida*). *Ecotoxicology*. 20:385-396 (IF= 3.05)
18. **McNear Jr., D.H.**, R.L. Chaney and D.L. Sparks. 2010. Hyperaccumulator *Alyssum murale* uses complexation with oxygen and nitrogen donor ligands for Ni transport and storage. *Phytochemistry*, 71:188-200. (IF = 2.32)
19. **McNear, D.H.**, R.L. Chaney and D.L. Sparks. 2007. The effects of soil type and chemical treatment on nickel speciation in refinery enriched soils: a multi-technique investigation. *Geochimica et Cosmochimica Acta*, 71(9) 2190-2208.
20. **McNear, D.H.**, R. Tappero and D.L. Sparks. 2006. Synchrotron based tomographic methods for determining metal compartmentalization and concentration in plant tissues. p. 204-205. *In*. Luster, J. and Finlay, R. Ed. COST 631 Handbook of methods in rhizosphere research. Swiss Federal Research Institute WSL, Birmensdorf.
21. Tappero, R., **D.H. McNear** and D.L. Sparks. 2006. Synchrotron micro x-ray fluorescence mapping and absorption edge spectroscopies for determining metal speciation in plant tissues. p. 209-210. *In*. Luster, J. and Finlay, R. Ed. COST 631 Handbook of methods in rhizosphere research. Swiss Federal Research Institute WSL, Birmensdorf.
22. Everhart, J.L., **D.H. McNear**, E. Peltier, D. VanderLelie, R.L. Chaney and D.L. Sparks. 2006. Assessing nickel bioavailability in smelter-contaminated soils. *Science of the Total Environment*, 367:732-744.
23. **McNear, D.H.**, E. Peltier, J. Everhart, R.L. Chaney, S. Sutton, M. Newville, M. Rivers, and D.L. Sparks. 2005. Application of quantitative fluorescence and absorption-edge computed microtomography to image metal compartmentalization in *Alyssum murale*. *Environ. Sci. Technol.* 2005, 39:2210-2218.
24. **McNear, D.H.**, R. Tappero and D.L. Sparks. 2005. Shining light on metals in the environment. *Elements*, 1, 211-216.

2. REFEREED PROCEEDINGS ARTICLES:

25. **McNear, Jr., D.H.** and R.L. McCulley. 2011. Influence of the *Neotyphodium* – tall fescue symbiosis on belowground processes. Proceedings of the 7th International Symposium on Fungal Endophytes of Grasses, Noble Foundation, Ardmore, OK.

3. REFEREED BOOK CHAPTERS:

26. *Lewis, R.L., V. Mendu, **D.H. McNear** and G. Tang. 2010. Role of micro-RNA's in plant abiotic stress. *in* Molecular techniques for crop improvement, 2nd ed. Eds. S. Mohan Jain and D.S. Brar. Springer, Cambridge, MA.

4. PUBLICATIONS SUBMITTED, UNDER REVIEW OR IN PREPARATION:

1. Calvo, P., S. Zebelo, D.H. McNear Jr., H. Fadamiro and J. Kloepper. *Submitted*. Plant growth-promoting rhizobacteria increase plant growth and induce changes in *Arabidopsis thaliana* gene expression of nitrate and ammonium uptake genes. *Plant Cell & Environ* (IF=6.96)
2. *Lewis, R.W., P.M. Bertsch, and **D.H. McNear Jr.** *Submitted*. The Respiration Stress Index: A Way of Interpreting Viability and Respiration Responses in Aerobic Microorganisms. *Applied Microbiology and Biotechnology Express* (IF=2.0)
3. *Lewis, R.W., P.M. Bertsch, and **D.H. McNear Jr.** *Submitted*. Nanotoxicological Studies of Environmentally Relevant Engineered Nanomaterials and Beneficial Soil Bacteria – A Critical Review. *Ecotoxicology* (IF = 2.77)
4. *Na, D., Guo, H., J.V. Kupper and D.H. McNear Jr. 2016. Phosphorus availability strongly influences tall fescue fungal endophyte induced changes in rhizosphere microbial community structure and function. *Soil Biology & Biochem.* (IF=3.93)
5. *Guo, J., R.L. McCulley, T. Phillips, and **D.H. McNear Jr.** *In Preparation*. Fungal endophyte and tall fescue cultivar interact to differentially effect bulk and rhizosphere soil processes governing C and N cycling. *Soil Biology & Biochem.* (IF=3.93)
6. *Sims, R., M. Reyzer, R. Capriolli, and **D.H. McNear Jr.** *In preparation*. Spatiotemporal tradeoffs of Zn for glucosinolates influence insect feeding in the Zn hyperaccumulator *Noccaea caerulescens*. *New Phytologist* (IF=5.23)
7. McNear Jr., D.H., A. White*, R. Tappero., J. Blair, and D. Parkinson. *In preparation*. Sample preparation for synchrotron-based analysis of plant tissues. *Environ. Sci. Technol.* (IF=5.48)
8. *Guo, H., D. Na*, R.L. Lewis*, J.V. Kupper* and D.H. McNear Jr. *In Preparation*. Effects of microbial-based inoculants and P sources on spring wheat growth, soil phosphorus speciation and microbial community structure. *Soil Biology & Biochem* (IF=3.93)

5. OTHER PUBLICATIONS:

1. **McNear, D.H.** and D.R. Schwer*. 2010. Pressure treated lumber in the landscape: occurrence and safety precautions. *UK Environmental and Natural Resource Issues Newsletter*, Spring 2010

6. SELECTED PUBLISHED ABSTRACTS/PRESENTATIONS

1. †McNear Jr., D.H. 2016. **INVITED KEYNOTE**. Rhizosphere Science for the 21st Century: Meeting Global Challenges. 25th Annual Goldschmidt Conference. Yokohama Japan. June 26-30.
2. †McNear, Jr., D.H. 2016. **INVITED**. Eurosoil 2016. The frontier in rhizosphere research, linking soil food webs and nutrient uptake. Istanbul, Turkey. July 17-22
3. †McNear Jr., D.H. 2016. **INVITED**. Interaction of the shoot and rhizosphere microbiomes influence key soil processes. University of Massachusetts- Amherst. Amherst, MA, September 26-27

4. †McNear Jr., D.H. 2015. **INVITED**. 24th Annual Goldschmidt Conference. Prague, Czech Republic. (Declined)
5. †McNear Jr., D.H. 2015. The Role of Plant Fungal Endosymbionts in Rhizosphere Priming. **INVITED**. Symposium on Biological Weathering. 2015 SSSA Annual Meetings. Minneapolis, MN. Nov 15-18, 2015.
6. †McNear, Jr., D.H. 2015. **INVITED**. Rhizosphere Processes Controlling Metal Speciation and Bioavailability. 249th ACS National Meetings. March 22-26.
7. †McNear, Jr., D.H. 2014. **INVITED**. From root tip to shoot tip: exploring metal distribution and speciation in plant tissues. University of Saskatoon and Canadian Light Source Guest Lecture Series. September 14-17, 2014.
8. †McNear, Jr., D.H. 2014. **INVITED**. From root tip to shoot tip: exploring metal distribution and speciation in plant tissues. National Synchrotron Light Source Users Meeting. Upton, NY. May 19-21.
9. †McNear Jr., D.H. 2012. **INVITED**. From Rhizosphere to Ecosystems: Heavy Metals and Plant Defense. The 21st Annual Goldschmidt Conference, Montreal, CA. June 20-26th
10. †McNear Jr., D.H. 2012. Mass spectrometric imaging of glucosinolates in metal hyperaccumulating plant *Noccaea caerulescens*. SSSA international meetings, Cincinnati, OH, Oct 21-24.
11. †* Lewis, R. 2012. Manufactured Nanomaterials and Plant Growth Promoting Rhizobacteria: Building a Microbial Perspective of the Nano Age. SSSA international meetings, Cincinnati, OH, Oct 21-24.
12. †* Guo, J., R. McCulley and D.H. McNear Jr. 2012. From Rhizobox to field scale: influence of Tall fescue cultivar and endophyte status on rhizosphere processes. SSSA international meetings, Cincinnati, OH, Oct 21-24.
13. †* Ali, M.B. and D.H. McNear Jr. 2012. Plant Biosensors: Monitoring changes in the PPP in response to microbial based soil additives. America Society of Plant Biologists annual meetings. Austin, TX, July 20-24.
14. †* Sims, R. and D.H. McNear Jr. 2011. Metal uptake and Its utility for insect herbivore defense in *Noccaea Caerulescens*. SSSA international meetings, Austin, TX, Oct 16-19.
15. †* Guo, J., and D.H. McNear Jr. 2011. Influence of Tall fescue cultivar and endophyte genotype on rhizosphere processes. SSSA international meetings, Austin, TX, Oct 16-19.
16. †McNear, D.H. 2011. **INVITED**. The use of synchrotron methods to elucidate metal behavior in the terrestrial environment. 21st Annual International Congress on X-ray Optics and Microanalysis (ICXOM21), Campinas, Brazil.
17. †McCulley, R.L., McNear, Jr., D.H., and J. Iqbal. June 2010. Effects of fungal endophyte symbiosis on belowground processes. International Symposium on Fungal Endophytes of Grasses, Lexington, KY.

18. †*Schwer, D. R. and D.H. McNear. 2010. Concentration and Chromium and Copper in the Soil System Adjacent to Chromated Copper Arsenate Treated Lumber Fence Posts. SSSA International Annual Meetings Long Beach, CA, Oct 31-Nov3
19. Afton, S., D.H. McNear, S. Mounicou, S. Yathavakilla and J.A. Caruso[†]. Exploring the structural basis of antagonism between mercury and selenium in green onion. 2009. Int. Conf. on Analytical Sciences and Spectroscopy, Kingston, ON, Canada.
20. †McNear, D.H. 2009. **INVITED**. Fence posts: A surprising biogeochemical story. Special Seminar. UC Davis, Davis, CA.
21. †McNear, D.H. 2009. Response of soil processes to an above ground plant-fungal symbiosis: From rhizosphere to regional scales. AFRI-PD meeting. Michigan State University, East Lansing, MI.
22. †*Schwer, D. R. and D.H. McNear. 2009. Concentration and Speciation of Arsenic, Chromium, and Copper in Soil System Adjacent to Chromated Copper Arsenate Treated Lumber Fence Posts. SSSA International Annual Meetings, Pittsburgh, PA.
23. †Afton, S.E., D.H. McNear and J. Caruso. 2009. Exploring the structural basis of the antagonism between mercury and selenium in *Allium fistulosum* (green onion). International Symposium on Metallomics, Cincinnati, USA, June 7-10.
24. Afton, S., D.H. McNear, S. Mounicou, S. Yathavakilla and J.A. Caruso[†]. 2009. Metallomics approaches to study phytoremediation and Se/Hg antagonism in plants, Colloquium Spectroscopium Internationale, Budapest, Hungary.
25. Afton, S., D.H. McNear, S. Mounicou, S. Yathavakilla and J.A. Caruso[†]. 2009. Metallomics approaches to study phytoremediation and Se/Hg antagonism in plants, BAM, Bundesanstalt für Materialforschung und –prüfung, Berlin, Berlin DE
26. Afton, S., D.H. McNear, S. Mounicou, S. Yathavakilla and J.A. Caruso[†]. 2009. Metallomics, an approach for studying phytoremediation and Se/Hg antagonism in plants, Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Louisville, KY
27. Afton, S., D.H. McNear, S. Mounicou, S. Yathavakilla and J.A. Caruso[†]. 2008. Elemental Speciation for Improved Approaches to Study Se Phytoremediating Plants and Selenium/Mercury Antagonism in Plants, EnviroAnalysis, Toronto CA, June.
28. †*Lewis, R.L., M. Grusak, D.J. Sherrier and D.H. McNear. 2008. The influence of soil metal concentrations on root nodule formation and function. 7th Annual Posters-at-the-Capitol, Frankfort, KY.
29. †McNear, D.H. 2008. Speciation and spatial distribution of Cr, Cu and As from CCA treated fences across the KY landscape. 72nd SSSA meetings Houston, TX.
30. †McNear, D.H. 2008. Metal physiology and nodule development in a *Medicago truncatula* mutant that requires additional zinc (raz). 72nd SSSA Meetings, Houston, TX.

31. †McNear, D.H., and J. Kupper. 2007. The influence of endophyte infection on rhizosphere biogeochemical processes: tall fescue as a model. 71st SSSA Meetings, New Orleans, Louisiana.
32. †Grabau, L.H., D.H. McNear and M. Mullen. 2007. Technology support for a mastery learning initiative in an expanding soil science course. 71st International Annual Meeting of the Soil Science Society of America, New Orleans, Louisiana.
33. †*Lewis, R.L., D.H. McNear, M. Grusak and D.J. Sherrier. 2007. The influence of soil metal concentrations on root nodule formation and function. 71st International Annual Meeting of the Soil Science Society of America, New Orleans, Louisiana.
34. McNear, D.H. and D.L. Sparks. 2006. **INVITED**. Where's the metal? Synchrotron techniques for elucidating the compartmentalization and speciation of metals in plant tissues. Paul Scherrer Institute and Swiss Federal Light Source, Workshop on X-ray absorption spectroscopy and micro-spectroscopic techniques. Feb 20th-21st, 2006. Villigen, Switzerland.
35. McNear, D.H. and D.L. Sparks. 2005. **INVITED**. Using synchrotron-based techniques to explore heavy metal interactions at the plant-soil-water interface. Canadian Light Source Inc. Annual Users' Meeting and Workshops Nov18– 20th, Saskatoon, Saskatchewan, Canada
36. **McNear, D.H.**, R.L. Chaney, and D.L. Sparks. 2005. *The Plant-Soil Interface: Soil Ni speciation and the mechanisms of Ni hyperaccumulation*. 69th Annual Meeting of the Soil Science Society of America, Salt Lake City, Utah.
37. McNear, D.H. 2004. **INVITED**. Soil Ni speciation and the mechanisms of uptake and cellular compartmentalization by hyperaccumulating plants. Department of Environmental Sciences, Swiss Federal Institute (ETH-ITO), Sept 17th, Zurich Switzerland.
38. McNear, D.H. and D.L. Sparks. 2004. **KEYNOTE**: The role of synchrotron radiation in advancing the frontiers of water-rock interactions. Eleventh international symposium on water-rock interactions, June 27th – July 2nd Saratoga Springs, NY
39. **McNear, D.H.**, R. Tappero, D.L. Sparks. 2004. *Uptake and cellular compartmentalization of metals from the rhizosphere by hyperaccumulating plants: A real time approach using confocal microscopy*. 68th Annual Meeting of the Soil Science Society of America, Seattle, Washington.
40. **McNear, D.H.**, R. Tappero and D.L. Sparks. 2004. *Uptake and cellular compartmentalization of metals from the rhizosphere by hyperaccumulating plants: A real time approach using confocal microscopy*. Rhizosphere 2004, Munich, Germany.
41. **McNear, D.H.**, E. Peltier, J. Everhart, D.L. Sparks, R. Chaney, M. Rivers, S. Sutton and M. Newville. 2004. *Novel synchrotron-based techniques to explore the connection between metal speciation in soils and plants*. 2004 Users Meeting for the Advanced Photon Source, Chicago, Ill.
42. **McNear, D.H.**, E. Peltier, J. Everhart, D.L. Sparks, R. Chaney, M. Rivers, S. Sutton and M. Newville. 2004. *Use of novel synchrotron-based techniques to explore the connection between metal speciation in soils and plants*. 227th ACS National Meeting, Anaheim, CA,

43. **McNear, D.H.**, E. Peltier, J. Everhart, D.L. Sparks, R. Chaney, S. Sutton and M. Newville. 2003. *From factory to field: Soil metal speciation and plant accumulation*. 67th Annual Meeting of the Soil Science Society of America, Denver, Colorado.
44. **McNear, D.H.** and D.L. Sparks. 2003. *Trying to Make the Connection: Soil Metal Speciation and Plant Accumulation*. First annual graduate student symposium. University of Delaware, Newark, DE.
45. **McNear, D.H.**, and D.L. Sparks. 2002. *Dissolution of nickel oxide in smelter contaminated soils*. 66th Annual Meeting of the Soil Science Society of America, Indianapolis, IN
46. **McNear, D.H.** and J. Chorover. 2001. *Speciation and lability of lead in rifle range impacted soils*. Army National Guard's 2002 RTLP/ITAM Conference, Ft. Indiantown Gap, Annville, PA
47. **McNear, D.H.** and J. Chorover. 2001. *Speciation and lability of lead in rifle range impacted soils*. Third Annual Environmental Chemistry Symposium, University Park, PA
48. **McNear, D.H.** and J. Chorover. 2000. *Lead (Pb²⁺) speciation of firing range soils*. 65th Annual Meeting of the Soil Science Society of America, Agronomy Abstracts p. 186. Minneapolis, MN
49. **McNear, D.H.** and J. Chorover. 1999. *Assessing the potential mobility and environmental impact of lead (Pb²⁺) in the rifle ranges at fort Indiantown Gap*. Second Annual Environmental Chemistry Symposium, University Park, PA

E. TEACHING AND ADVISING

1. COURSES TAUGHT AND TCE SCORES:

PLS 366 – Fundamentals of Soil Science; **GEN 300** – Undergraduate Experience in College Teaching

Semester	Course	Student #	Lab Sections	Avg. course Evaluation Score*	Avg. Teacher Evaluation Score*
Fall 2007	PLS 366 (4 cr.)	52	4	3.5/4.0	3.8/4.0
Fall 2008	PLS 366 (4 cr.)	40	3	3.6/4.0	3.8/4.0
Fall 2009	PLS 366 (4 cr.)	44	3	3.4/4.0	3.7/4.0
Fall 2010	PLS 366 (4cr)	55	4	3.6/4.0	3.9/4.0
Fall 2011	PLS366 (4cr)	57	4	3.4/4.0	3.7/4.0
Fall 2012	PLS366 (4cr)	54	4	3.5/4.0	3.7/4.0
Fall 2013	PLS 366 (4 cr.)	53	4	3.4/4.0	3.6/4.0
Fall 2014	PLS 366 (4 cr.)	53	4	3.6/4.0	3.7/4.0
Fall 2015	PLS 366 (4 cr.)	40	4	Pending	Pending

* For comparison - Avg. course rating UK = 3.3/4.0, CAg = 3.4/4.0; Avg. teacher rating UK = 3.4/4.0, CAg= 3.4/4.0

2. GUEST LECTURES AND SEMINARS:

- McNear, D.H. 2014. Emerging uses of microorganisms in agriculture. Presented to IPS625 Nov, 12th.
- McNear, D.H. 2010. The Plant Rhizosphere. Presented to ABT101 Sept 22nd.

- McNear, D.H. 2010. Plant-based methods for the removal of metals from contaminated soils. Presented to PLS 597 (IPS625) Sept, 8th
- McNear, D.H. 2009. Rhizosphere Science: Plant soil interactions and everything in between. Plant Physiology Seminar. University of Kentucky, Lexington, KY.
- McNear, D.H. 2009. Rhizosphere Science: Plant soil interactions and everything in between. Plant Pathology Seminar. University of Kentucky, Lexington, KY.
- McNear, D.H. 2007. Multitrophic influences of the plant mycorrhizal association. Presented to IPLSS 625: Integrated Transdisciplinary Research. Instructors. Drs. Mark Coyne, Robert L. Houtz and Dave VanSanford. University of Kentucky

3. GRADUATE STUDENT ADVISING:

a. Primary Graduate Advisor

- Wes Morris, PhD in Integrated Plant and Soil Sciences. 2015-Present. NSF-GRF recipient. Thesis: *"An investigation of bacterial and fungal microbiome in response to increasing cadmium concentrations in the roots and aerial tissues of Noccaea caerulea"*
- Rick Lewis, PhD. Candidate in Integrated Plant and Soil Sciences, 2010-present. Co-adviser with Dr. Paul Bertsch. Thesis: *"Implications of manufactured nanomaterials in agroecosystems"*
- Don Schwer, MS in Plant and Soil Sciences. 2008-2010. Thesis: *"Chromium, Copper and Arsenic concentrations and speciation in soils adjacent to CCA treated lumber along a topohydrosequence."*– Received Peaslee Award for outstanding graduate student in Department of Plant and Soil Sciences
- Jingji Guo, PhD Candidate in Plant Physiology, 2009-2014. Thesis *"The influence of tall fescue cultivar and endophyte genotype on root exudate chemistry and rhizosphere processes."*
- Rebecca Sims, M.S. Candidate in Integrated Plant and Soil Sciences. Aug. 2010-Dec. 2012 Thesis *"Examining the metal defense hypothesis for the evolutionary adaptation of plants to metal rich soils."*
- Sarah Baltzley, M.S. Student in Integrated Plant and Soil Sciences. Aug. 2010-Aug.2012. Thesis *"Effectiveness of Plant Growth Promoting Rhizobacteria (PGPR) at enhancing metal uptake in the Ni hyperaccumulator Alyssum murale"*
- Rick Lewis, MS in Integrated Plant and Soil Sciences. 2009-2011. Thesis *"Zn responses in medicago truncatula: a study of miRNA expression, root growth, metal uptake and nodulation in M. truncatula WT and RAZ (requires additional Zn)."*
- Kativa Mizin, M.S. Candidate in Plant and Soil Sciences, 2012-present. Co-adviser with Krista Jacobsen. Thesis *"Nitrogen cycling in high tunnel production systems"*

b. Committee Member

- daf
- Derek Law, PhD. In Geography, Univ. of KY, Degree in Progress
- Diana Miller, M.S. in Entomology, Univ. of KY, Completed Sp15
- Laura Mitchel, M.S. in Plant and Soil Sciences, Completed Sp14

- Kavita Mizin, M.S. Integrated Plant and Soil Sciences, Univ. of KY. Completed Sp14
- Shawn Lucas - PhD in Integrated Plant and Soil Sciences, Univ. of KY. *Completed Sp13*
- Jon Judy - PhD in Integrated Plant and Soil Sciences, Univ. of KY. *Completed Sp13*
- Sewwandi Rathnayake – M.S in Plant and Soil Sciences, Univ. of KY. *Completed Sp13*
- Anne Koontz, PhD in Animal Science, Univ. of KY, *Completed Sp 12*
- Bhavana Singh Agrawal - PhD in Plant and Soil Science, Univ. of Del. *Completed Sp11*
- Sagarika Banarjee – M.S. in Plant and Soil Sciences, Univ. of KY. Completed Sp 10

c. Visiting Students Advised

- Ana Pradas del Real, visiting PhD. Candidate from Department of Agroenvironmental research in IMIDRA (Madrid, Spain) Oct 2011-March 2012
- Maria Morrogh-Bernard, visiting B.S. candidate from the University of Buenos Aires, Argentina, April 29th, 2015 - April 29th, 2016.

4. POST-DOCTORAL SCHOLARS ADVISED (5):

- **Dr. Usha Balasundaram** (2009-2010), **Dr. Allison Monsanto** (2013-2014), **Dr. Mohamad Babar Ali** (2010-2013), **Dr. Haichao Guo** (2014-2015), **Dr. Na Ding** (2013-2016),

5. UNDERGRADUATE STUDENT ADVISING/MENTORING:

- Rick Lewis – Thesis advisor – B.S. 2008 - U.KY. Inter. Environmental Studies program
- Ryan Quire – B.S. NRES 2010 - received MS degree at Montana State University
- Sally Chambers – B.S. NRES 2009 - received PhD at Purdue University now postdoc at UF
- Rebecca Sims – B.S. NRES , 2008; M.S. IPSS 2012 - now pursuing PhD at Univ. of Minn.
- Ryan Hammond – B.S. ABT 2012
- Janet Chappell – B.S. ABT 2012 – Currently pursuing M.S. at NCSU
- Julie Lambers – B.S. ABT 2014 – Currently lab technician at Northern Kentucky University
- Olivia Jones – B.S. ABT 2015 – Currently pursuing M.S. at University of Illinois
- Mentored 9 Undergrad TA's in GEN 300 Supervised Experience in College Teaching (SECT); a course I started in Fall of 2008
- Academic advisor for 9 students in the Natural Resource and Environmental Sciences (NRES) program

6. ACTIVITIES TO IMPROVE TEACHING AND LEARNING

- Participation in training seminar from Turning Point Technologies on the incorporation of audience response software/equipment into the teaching classroom. June 6, 2009.
- Peer review by Dr. Mark Williams, March 2009
- Participated in TASC directed seminar on how to write good multiple choice questions as part of the Teaching + Technology Innovation Grant
- Participation in training seminar from Turning Point Technologies on the incorporation of audience response software/equipment into the teaching classroom. June 6, 2008.

F. SERVICE AND RECOGNITION

1. OUTREACH:

- Mentor for two (2) Dunbar High School junior-seniors (Orsolya Hegyi and Debbie Furgeson) who worked/work in my lab on a research project as part of the Kentucky Young Researchers Program (KYRP)
- Working with Lexington Montessori High School students to develop protocols for evaluating soils and composts used for year-long unit on food production
- Coordinated efforts with Paul Kamps (SSSA Development officer), Wilbur Frye (Retired UKY faculty), Steve Blanford (NRCS) and others in the state of KY to raise awareness and funds to support the inclusion of the Crider Soil Series (KY State Soil) in the National Soils Exhibit at the Smithsonian Institute in Washington, D.C.
- Tour guide for Ag day event at Spindletop Farm
- Worked with Carol Hanley and the teachers of Lebanon Middle School as part of an NSF ITEST workshop to help develop instructional plans related to soils for 6-8th graders

2. AWARDS AND HONORS:

- Selected as a National Academy of Sciences **Kavli Frontiers Fellow**, 2010
- **Presidential Early Career Award for Scientists and Engineers (PECASE)**. 2009.
- *The PECASE Award is the highest honor bestowed by the U.S. government on outstanding scientists and engineers beginning their independent careers.*
- Recipient of the UK Ag Student Council **Early Career Teaching Award**. 2009.
- **Best student paper award** Geochemistry division, 227th American Chemical Society National Meetings Anaheim, Ca, March 2004
- **First Place:** Graduate student oral presentation competition. Second Annual Plant and Soil Sciences Graduate Student Research Symposium. University of Delaware, Newark, Delaware, June 2004
- **First Place:** Graduate student oral presentation competition. First Annual Plant and Soil Sciences Graduate Student Research Symposium. University of Delaware, Newark, Delaware, June 2003
- **Second Place:** Graduate student oral presentation competition. Second Annual Environmental Chemistry Symposium. Pennsylvania State University, University Park, Pennsylvania, March 2000
- **Second Place:** Graduate student oral presentation competition. Third Annual Environmental Chemistry Symposium. Pennsylvania State University, University Park, Pennsylvania, March 1999

3. REVIEWER SERVICES:

- Annals of Botany, Soil Science Society of America Journal, Plant and Soil, Environmental Chemistry, Australian journal of Environmental Chemistry, Geochemica Cosmochimica Acta, Environmental Science and Technology, Canadian Light Source Proposal Review

4. COMMITTEES:

a. College

NRES Director of Undergraduate Studies (2014-present), Natural Resources/Environmental Sciences Planning Initiative (2007), Undergraduate Curriculum Committee (2015-present), Precision Resource Management Proposal Committee (2007-2009), NRCM Curriculum

Development Committee, Ag North Lab Space Allocation and Use Committee, College Committee on GEN100/200, Ad-Hoc Committee on Teaching Evaluation

b. Department

Departmental Display Committee, Departmental Web Page Committee, Chair/Co-Chair Departmental Seminar Committee 2007-2008, HPLSS

G. PROFESSIONAL DEVELOPMENT

1. PROFESSIONAL MEETINGS ATTENDED:

- 21st Annual International Congress on X-ray Optics and Microanalysis (ICXOM21), Campinas, Brazil. Sept 3-7, 2011.
- SSSA-CSA-ASA-GSA Joint Meetings, San Antonio, TX Oct 15-19, 2011
- AFRI-Project Directors meetings, 2009 (East Lansing, MI), 2010 (Washington, D.C.), 2011 (Asheville, N.C.)
- National Academy of Sciences 12th Japanese-American Kavali Frontiers of Science symposium December 2-6, 2010. Chiba, Japan.
- *The symposium is co-sponsored by the Japan Society for the Promotion of Science and the U.S. National Academy of Sciences and is the Academy's premiere activity for distinguished young scientists.*
- SSSA-CSA-ASA-GSA Joint Meetings, Houston, TX Oct 5-8, 2008
- SSSA-CSA-ASA Annual Meetings, New Orleans, LA Nov 4-9, 2007
- From Dialog to Action – Changing teaching and learning: First Steps from the Summit. June 11-13, 2007. College Station, TX.

2. PROFESSIONAL MEETINGS/SESSIONS ORGANIZED:

- From Sorption to Bioavailability, S2/S11 Cosponsored. 2011. *73rd International Annual Meeting of the Soil Science Society of America*, San Antonio, TX.
- Frontiers of Rhizosphere Science. NSF sponsored symposium. March 2011.
- Japanese-American Frontiers of Science Symposium (JAFoS), Earth and Environmental Sciences division organizing Co-Chair 2011-2014
- Integrated research, education and extension to enable sustainable bioenergy production: A workshop to organize research efforts in the Southeast U.S. Lexington, KY, May 11th – 14th, 2010.
- Integrated research, education and extension to enable sustainable bioenergy production: Core site selection and performance metrics. Lexington, KY, June 14th -15th, 2010.
- It's About Interfaces: Plant-Soil-Microbe Interactions that Influence Contaminant Cycling in the Critical Zone. 2009. *71st International Annual Meeting of the Soil Science Society of America*, Pittsburgh, PA.

3. SOCIETY AFFILIATIONS

- Soil Science Society of America (SSSA), Crop Science Society of America (CSSA), American Society of Agronomy (ASA), North American Colleges and Teachers of Agriculture (NACTA)