CURRICULUM VITAE

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Personal Information

Educational Background

Ph.D. University of Delaware, Department of Plant and Soil Sciences. 2004. Advisor: Dr. J. Thomas Sims. Dissertation: Modifying broiler diets and managing broiler litter storage: effects on phosphorus in litter, litter amended soils, and runoff. Ph.D. diss. Univ. of Delaware, Newark.

B.A. Johns Hopkins University. 1997. Environmental Earth Sciences. Administered jointly by the Department of Earth and Planetary Sciences, Krieger School of Arts and Sciences and the Department of Geography and Environmental Engineering, Whiting School of Engineering.

Employment Background

Associate Extension Professor Soil Management (July 2014 - present). Department of Plant and Soil Sciences, College of Agriculture, Food, and Environment, University of Kentucky, Lexington, KY. Extension/research (80%/20%) appointment with statewide responsibilities for agronomic production, nutrient management, and soil resource protection.

Associate Professor and Soil Fertility and Nutrient Management Specialist (July 2012 – July 2014). Department of Environmental Science and Technology, College of Agricultural and Natural Resources, University of Maryland, College Park, MD. Extension/research (60%/40%) appointment with statewide responsibilities for soil fertility and efficient nutrient management for agronomic production and environmental protection.

Assistant Professor and Soil Fertility and Nutrient Management Specialist (July 2006 – June 2012). Department of Environmental Science and Technology, College of Agricultural and Natural Resources, University of Maryland, College Park, MD. Extension/research (60%/40%) appointment with statewide responsibilities for soil fertility and efficient nutrient management for agronomic production and environmental protection.

Post-doctoral researcher (April 2006 – July 2006). Department of Plant and Soil Sciences, College of Agriculture and Natural Resources, University of Delaware, Newark, DE. Responsible for constructing a statewide nutrient balance for agriculture.

Post-doctoral researcher (April 2004 – April 2006). Department of Crop and Soil Environmental Sciences, College of Agriculture and Life Sciences, Virginia Polytechnic Institute and State University, Blacksburg, VA. Responsible for conducting field research and spatial analysis to determine forest restoration potential of post-SMCRA coal-mined lands in the Appalachian region.

Graduate Research Assistant (January 1999 – April 2004). Department of Plant and Soil Sciences, College of Agriculture and Natural Resources, University of Delaware, Newark, DE. Ph.D. dissertation title: Modifying broiler diets and managing broiler litter storage: effects on phosphorus in litter, litter amended soils, and runoff.

Field Technician (March 1998 – April 1999). DuPont Co., Chesapeake Farms, Chestertown, MD. Responsible for sample collection and cropping system management associated with Chesapeake Farms Sustainable Agriculture project.

Technician (November 1997 – May 1998). Stephens Environmental Consulting, Inc. Rising Sun, MD. Responsible for data management, site evaluation, sample collection, and report preparation associated with varied environmental consulting projects.

Research, Scholarly, & Creative Activities

IMPACT: My integrated research and extension programs focus on agricultural productivity and environmental quality, with special emphasis on precision agriculture, nitrogen and phosphorus use efficiency, livestock and manure management to reduce environmental impact of nutrients and emerging contaminants, and environmental policy as applied in agricultural systems. My expertise in these subject areas has been recognized nationally and internationally, and I am sought after as a speaker and collaborator.

Invited Refereed Book Chapters (n = 6)

Jaisi, D.P., Mingus, K.A., Joshi, S.R., Upreti, K., Sun, M., McGrath, J., and Massudieh, A. 2020. Linking sources, transformation, and loss of phosphorus in the soil-water continuum in a coastal environment. *In Multi-Scale Biogeochemical Processes in Soil Ecosystems - Critical Reactions and Resilience to Climate Changes.* John Wiley & Sons, Incorporated.

McGrath, J.M., Spargo, J., Penn, C.J. 2014. Soil Fertility and Plant Nutrition, *Encyclopedia of Agriculture and Food Systems* (pp. 166--184) Elsevier. http://linkinghub.elsevier.com/retrieve/pii/B9780444525123002497

Penn, C., McGrath, J. 2014. Chemistry and Application of Industrial By-products to Animal Manure for Reducing Phosphorus Losses to Surface Waters, *Applied Manure and Nutrient Chemistry for Sustainable Agriculture and Environment* (pp. 211--238) Springer Netherlands. http://dx.doi.org/10.1007/978-94-017-8807-6_11

Sims, J. T., McGrath, J. M. 2011. Soil fertility evaluation, *Handbook of Soil Sciences: Resource Management and Environmental Impacts, Second Edition* Boca Raton, FL: CRC Press. https://books.google.com/books?id=Ni3NBQAAQBAJ

Wolf, A. and J.M. McGrath. 2011. Introduction: Soil testing in the Northeastern United States. In: Recommended soil testing procedures for the Northeastern United States. 3rd Edition. Northeastern Regional Publication No. 493. (Eds.) Agricultural Experiment Stations of Connecticut, Delaware, Main, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia. Available online: http://ag.udel.edu/extension/agnr/soiltesting.htm. (In addition to co-authoring the introductory chapter, I also represented Maryland on the regional editorial board responsible for updating this methods manual)

Penn, C., McGrath, J., Bryant, R. 2010. Ditch drainage management for water quality improvement: ditch drainage treatment structures, *Agricultural Drainage Ditches: Mitigation Wetlands for the 21st Century* (pp. 151--172) Keerla, India: Research Signpost. https://books.google.com/books?id=9j-loAEACAAJ

Articles in Refereed Journals (n = 38)

Lucas[1], E.R., G.S. Toor, and J.M. McGrath. 2021. Agronomic and environmental phosphorus decline in coastal plain soils after cessation of manure application. Agriculture, Ecosystems & Environment 311: 107337. doi: 10.1016/j.agee.2021.107337.

Bolster, C.H., J.M. McGrath, E. Rosso[1], and K. Blombäck. 2020. Evaluating the effectiveness of the phosphorus sorption index for estimating maximum phosphorus sorption capacity. Soil Science Society of America Journal 84(3): 994–1005. doi: 10.1002/saj2.20078.

Duke, J.M., H. Liu, T. Monteith, J. McGrath, and N.M. Fiorellino. 2020. A method for predicting participation in a performance-based water quality trading program. Ecological Economics 177: 106762. doi: 10.1016/j.ecolecon.2020.106762.

Lyons, S.E., D.L. Osmond, N.A. Slaton, J.T. Spargo, P.J.A. Kleinman, et al. 2020. FRST: A national soil testing database to improve fertility recommendations. Agricultural & Environmental Letters 5(1): e20008. doi: 10.1002/ael2.20008.

Wade, J., S.W. Culman, J.A.R. Logan, H. Poffenbarger, M.S. Demyan, et al. 2020. Improved soil biological health increases corn grain yield in N fertilized systems across the Corn Belt. Scientific Reports 10(1): 3917. doi: 10.1038/s41598-020-60987-3.

Peterson, H., M. Williams, J. Frankenberger, K. King, J.M. McGrath, L. Moody, M. Ribaudo, J. Strock, K. Johnson, and N. Nelson. 2019. Reducing the impacts of agricultural nutrients on water quality across a changing landscape. Issue Paper - Council for Agricultural Science and Technology (No.64). https://www.cabdirect.org/cabdirect/abstract/20193223758.

Vadas, P.A., N.M. Fiorellino[1], F.J. Coale, R. Kratochvil, A.S. Mulkey[2], and J.M. McGrath. 2018. Estimating Legacy Soil Phosphorus Impacts on Phosphorus Loss in the Chesapeake Bay Watershed. Journal of Environment Quality 47(3): 480. doi: 10.2134/jeq2017.12.0481.

Morris, T.F., T.S. Murrell, D.B. Beegle, J.J. Camberato, R.B. Ferguson, J. Grove, Q. Ketterings, P.M. Kyveryga, C.A.M. Laboski, J.M. McGrath, J.J. Meisinger, J. Melkonian, B.N. Moebius-Clune, E.D. Nafziger, D. Osmond, J.E. Sawyer, P.C. Scharf, W. Smith, J.T. Spargo, H.M. van Es, and H. Yang. 2018. Strengths and Limitations of Nitrogen Rate Recommendations for Corn and Opportunities for Improvement. Agronomy Journal 110(1): 1-37. doi:10.2134/agronj2017.02.0112

Smith, D.R., R.S. Wilson, K.W. King, M. Zwonitzer, J.M. McGrath, R.D. Harmel, R.L. Haney, and L.T. Johnson. 2018. Lake Erie, phosphorus, and microcystin: Is it really the farmer's fault? Journal of Soil and Water Conservation 73(1): 48–57. doi:10.2489/jswc.73.1.48

Fiorellino, N.M.[1], J.M. McGrath, P.A. Vadas, C.H. Bolster, and F.J. Coale. 2017. Use of Annual Phosphorus Loss Estimator (APLE) Model to Evaluate a Phosphorus Index. Journal of Environmental Quality. http://dx.doi.org/10.2134/jeq2016.05.0203.

Shober, Amy L., A. R. Buda, K. C. Turner, N. M. Fiorellino[1], A. S. Andres, J. M. McGrath, and J. Thomas Sims. 2017. Assessing coastal plain risk indices for subsurface phosphorus loss. Journal of Environmental Quality. http://dx.doi.org/10.2134/jeq2017.03.0102.

Penn, C, J. Bowen[1], J.M. McGrath, R. Nairn, G. Fox, G. Brown, S. Wilson, and C. Gill. 2016. Evaluation of a universal flow-through model for predicting and designing phosphorus removal structures. Chemosphere 151: 345-355.

Miller, J.O., S. Dill, J. Rhodes, N. Fiorellino, and J. McGrath. 2016. An Annual Precision Agriculture Field Day on the Delmarva. Journal of the NACAA 9(1) Available at http://www.nacaa.com/journal/index.php?jid=600 (verified 7 June 2016).

Han, K., P.J.A. Kleinman, L.S. Saporito, C. Church, J.M. McGrath, M.S. Reiter, S.C. Tingle, A.L. Allen, L.Q. Wang, and R.B. Bryant. 2015. Phosphorus and Nitrogen Leaching Before and After Tillage and Urea Application. J. Environ. Qual. 44(2): 560–571.

Kleinman, P.J.A., C. Church, L.S. Saporito, J.M. McGrath, M.S. Reiter, A.L. Allen, S. Tingle, G.D. Binford, K. Han, and B.C. Joern. 2015. Phosphorus Leaching from Agricultural Soils of the Delmarva Peninsula, USA. Journal of Environmental Quality 44(2): 524–534.

Upreti, K., S.R. Joshi[2], J. McGrath, and D.P. Jaisi. 2015. Factors Controlling Phosphorus Mobilization in a Coastal Plain Tributary to the Chesapeake Bay. Soil Science Society of America Journal 79(3): 826–837.

Penn, C.J., J.M. McGrath, J. Bowen, and S. Wilson. 2014. Phosphorus Removal Structures: A Management Option for Legacy Phosphorus. Journal of Soil and Water Conservation 69, no. 2: 51A – 56A. doi:10.2489/jswc.69.2.51A.

Fiorellino[1], N.M., J.M. McGrath, B. Momen, S.K. Kariuki[1], M.J. Calkins, and A.O. Burk. 2014. Use of best management practices and pasture and soil quality on Maryland horse farms. J Equine Vet. Sci. 34:257-264.

McGrath, J.M., C.J. Penn, and F.J. Coale. 2013. A modelling approach to design of *in situ* agricultural drainage filters. Soil Use and Management. doi: 10.1111/j.1475-2743.2011.00381.x

Biswas[1], S., J.M. McGrath, and A. Sapkota. 2012. Quantification of ionophores in aged poultry litter using liquid chromatography tandem mass spectrometry. Journal of Environmental Science and Health. 47 (10): 959 – 966. doi:10.1080/03601234.2012.706564

Kleinman, P., K. Saacke Blunk, R. Bryant, L. Saporito, D. Beegle, K. Czymmek, Q. Ketterings, T. Sims, J. Shortle, J. McGrath, F. Coale, M. Dubin, D. Dostie, R. Maguire, R. Meinen, A. Allen, K. O'Neill, L. Garber, M. Davis, B. Clark, K. Sellner, and M. Smith. 2012. Managing manure for sustainable livestock production in the Chesapeake Bay Watershed. Journal of Soil and Water Conservation. 67 (2): 54A – 61A.

Leslie, A. W.; Smith, R. F.; Ruppert, D. E.; Bejleri, K.; McGrath, J. M.; Needelman, B. A.; Lamp, W. O. 2012. Environmental Factors Structuring Benthic Macroinvertebrate Communities of Agricultural Ditches in Maryland. Environmental Entomology, 41 (4), 802-812.

McGrath, J.M. and G.D. Binford. 2012. Corn response to starter fertilizer with and without AVAIL®. Online. Crop Management. doi: 10.1094/CM-2012-0320-02-RS.

Penn, C. J., J. M. McGrath, E. Rounds, G. Fox, and D. Heeren. 2012. Trapping phosphorus in runoff with a phosphorus removal structure. Journal of Environment Quality. doi:10.2134/jeq2011.0045.

Stoner[2], D., C.J. Penn, and J.M. McGrath. 2012. Phosphorus removal with by-products in a flow-through setting. Journal of Environmental Quality. doi: 10.2134/jeq2011.0049.

Grubb[1], K.L., J.M. McGrath, C.J. Penn, and R.B. Bryant. 2011. Effect of land application of phosphorus-saturated gypsum on soil phosphorus in a laboratory incubation. Applied and Environmental Soil Science. 2012:1 – 7. doi: 10.1155/2012/506951.

Grubb[1], K.L., J.M. McGrath, C.J. Penn, and R.B. Bryant. 2011. Land application of spent gypsum from ditch filters: Phosphorus source or sink? Agricultural Sciences. 2(3): 364-374.

Maguire, R.O., P.J.A. Kleinman, C. Dell, D.B. Beegle, R.C. Brandt, J.M. McGrath, and Q.M. Ketterings. 2011. Manure application technology in reduced tillage and forage systems: A review. J. Environ. Quality. 40: 292-301.

Penn, C.J. and J.M. McGrath. 2011. Predicting phosphorus sorption onto steel slag using a flow-through approach with application to a pilot scale system. Journal of Water Resource and Protection. 3:235 – 244.

Penn, C.J., R. Bryant, M. Callahan, J. McGrath. 2011. Use of industrial byproducts to sorb and retain phosphorus. Commun. Soil Sci. Plant Anal. 42(6): 633-644.

Zipper, C.E., J.A. Burger, J.M. McGrath, J.A. Rodrigue, and G.I. Holtzman. 2011. Forest restoration potentials of Post-SMCRA coal-mined lands in eastern USA. Journal of Environmental Quality. 40: 1567 – 1577.

Kariuki[1], S.K., H. Zhang, J. McGrath, and J. Schroder. 2010 Temporal variability of soil property dynamics in a grazed pasture. Commun. Soil Sci. Plant. Anal. 41: 2744-2754.

Maguire, R.O., P.J.A. Kleinman, C. Dell, D.B. Beegle, R.C. Brandt, Q.M Ketterings, and J.M. McGrath. 2010. Managing manure in reduced tillage systems. Crops and Soils 43(5): 16-17.

McGrath, J.M., J.T. Sims, R.O. Maguire, W.W. Saylor, and R. Angel. 2010. Modifying Broiler Diets with Phytase and Vitamin D Metabolite (25-OH D3): Impact on Phosphorus in Litter, Amended Soils, and Runoff. J Environ Quality. 39: 324-332.

Warren, J.G., C.J. Penn, J.M. McGrath, and K. Sistani. 2008. The impact of alum addition on organic P transformations in poultry litter and litter-amended soil. J. Environ. Quality. 37 (2).

McGrath, J.M., J.T. Sims, and R.O. Maguire, W.W. Saylor, C.R. Angel, and B. Turner. 2005. Broiler diet modification and litter storage: impacts on phosphorus in litters, soils, and runoff. J. Environ. Quality. 34: 1896-1909.

Penn, C.J., G.L. Mullins, L.W. Zelazny, J.G. Warren, and J.M. McGrath. 2004. Surface Runoff Losses of Phosphorus from Virginia Soils Amended with Turkey Manure using Phytase and HAP Corn Diets. J. Environ. Quality. 33: 1431-1439.

Maguire, R.O., J.T. Sims, J.M. McGrath, and C.R. Angel. 2003. Effect of phytase and vitamin D metabolite (25OH-D3) in turkey diets on phosphorus solubility in manure amended soils. Soil Sci. 168:421-433.

Monographs, Reports, and Extension Publications (n = 34)

In addition to the specific publications listed below, I was responsible for maintaining current information in the University of Maryland Nutrient Management Series (1-8) and Soil Fertility Management Series (1-7) from 2006 - 2014. These documents served as the technical foundation of the State of Maryland's Agricultural Nutrient Management Program. Several of these Extension publications were incorporated directly into State regulations governing agricultural nutrient management and water quality protection. Similarly, in Kentucky I served as co-chair with Edwin Ritchey of the committee responsible for revising the comprehensive lime and fertilizer recommendations bi-annually.

Ritchey, E. L., Pearce, R. C., McGrath, J. M., Gehring, D. (2020). 4-H Land Judging and Home Site Evaluation in Kentucky.

Grove, J. H., Ritchey, E. L., McGrath, J. M. (2020). Field Yield Checking? Look for 'Out-of-Cycle' Soil Testing Needs. Corn & Soybean News. https://graincrops.ca.uky.edu/files/cornsoynewsletter2020vol2_iss3_aug_0.pdf

Ritchey, E. L., McGrath, J. M. (2020). AGR-1 Lime and Fertilizer Recommendations, 2020-2021 (pp. 29). Lexington, KY: University of Kentucky Agricultural Communications Service. http://www2.ca.uky.edu/agc/pubs/AGR/AGR1/AGR1.pdf

Ritchey, E. L., Grove, J. H., McGrath, J. M. (2020). *Phosphorus and Potassium for Winter Wheat, and What About Nitrogen*. https://www.kygrains.info/blog/2020/9/15/phosphorus-and-potassium-for-winter-wheat-and-what-about-nitrogen

McGrath, J. M., Ritchey, E. L., Grove, J. H., Sikora, F. J. (2019). Adjusting Nutrient Recommendations for High Yielding Corn. Corn and Soybean News (2nd ed., vol. 1, pp. 5 pages). https://static1.squarespace.com/static/58d96874b3db2bf10b58f5aa/t/5dbc6bc83a64145cf2f75339/1572629456839/CSN2019vol1_iss2_Oct+Article03.pdf

Ritchey, E. L., Grove, J. H., McGrath, J. M. (2019). Soil Sampling - Why, When, How and What to Expect. Corn & Soybean News (1st ed., vol. 1, pp. 2 pages). https://graincrops.ca.uky.edu/files/cornsoynewsletter2019vol1_iss1_sep.pdf

Ritchey, E. L., Grove, J. H., McGrath, J. M. (2019). Soil Nitrogen and Fall Wheat N Nutrition. Wheat Science Newsletter (4th ed., vol. 23, pp. 2 pages). https://www.kygrains.info/blog/2019/8/29/soil-nitrogen-and-fall-wheat-n-nutrition

Ritchey, E. L., Grove, J. H., McGrath, J. M. (2018). Soybean Nutrition Management *In:* Knott, C. A., Lee, C. D., Green, J. D., Haramoto, E. R., Legleiter, T. R., McGrath, J. M., Reyes, J., Ritchey, E. L., Salmeron Cortasa, M., Venard, C., Wendroth, O. O.B., Zhang, X., Bradley, C., Wise, K., Villanueva, R. T., Bessin, R. T., Johnson, D. W., Halich, G. S., Shockley, J. M., McNeill, S. G. (2018). ID-249- A Comprehensive Guide to Soybean Management in Kentucky, (pp. 84) Lexington, KY: University of Kentucky Agricultural Communications Service. http://www2.ca.uky.edu/agc/pubs/ID/ID249/ID249.pdf

Shockley, J. M., Ritchey, E. L., McGrath, J. M. (2016). AEC 2016-14-Economic Value of Poultry Litter Tool: Pasture, Hay, and Silage, Lexington, KY: University of Kentucky Department of Agricultural Economics. www.uky.edu/Ag/AgEcon/pubs/extPLtoolPasture25.xlsx

Shockley, J. M., Ritchey, E. L., McGrath, J. M. (2016). AEC 2016-13- Economic Value of Poultry Litter Tool: Grain Crops, Lexington, KY: University of Kentucky Department of Agricultural Economics. www.uky.edu/Ag/AgEcon/pubs/extPLtoolGrain48.xlsx

Ritchey, E., L. Murdock, D. Ditsch, J. McGrath, and F. Sikora. 2016. ID-163. Agricultural lime recommendations based on lime quality. UK Cooperative Extension Publication. (Revision)

Ritchey, E., J. McGrath, and J.M. Shockley. 2016. "How Does the Value of Poultry Litter Compare to Commercial Fertilizer?" Forage News, University of Kentucky Cooperative Extension Service, April 2016.

McGrath, J.M., and E. Ritchey. 2015. Grain Crops Update: Buyer beware when it comes to "alternatives" to ag lime. Grain Crops Update. https://graincrops.blogspot.com/2015/04/buyer-beware-when-it-comes-to_8.html (accessed 28 January 2021).

McGrath, J.M. and E.D. Ritchey. 2015. Alternative liming materials [Online]. APS Crop Protection and Management Collection, Plant Management Network. Available at http://www.plantmanagementnetwork.org/edcenter/seminars/soybean/LimingMaterials/ (2355 views as of 31 Dec. 2016; posted 11 Sep. 2015; verified 15 Sep. 2015).

Duke, J., J.M. McGrath, N.M. Fiorellino, T.S. Monteith, and E. Rosso. 2014. Additionality in water quality trading: evidence from Maryland's nutrient offset program. APEC Research Report. Department of Applied Economics and Statistics, College of Agriculture and Natural Resources, University of Delaware. APEC RR14-06. Available at: (http://udspace.udel.edu/bitstream/handle/19716/17129/RR14-06.pdf?sequence=1).

Ritchey, E. D. Ditsch, B. Pearce, J.M. McGrath, D. Gehring. 2015. 4BA-08MG 4-H Land Judging in Kentucky. (Revision)

Ritchey, E., D. Ditsch, B. Pearce, J. McGrath, and D. Gehring. 2015. 4BA-09SE. Land Judging Score Card. Accompanies 4-H Land Judging publication. (Revision)

Ritchey, E., L. Murdock, and J.M. McGrath. 2015. Grain Crops Update: Fall Nitrogen Considerations for Wheat in 2015. Grain Crops Update. https://graincrops.blogspot.com/2015/10/fall-nitrogen-considerations-for-wheat.html (accessed 28 January 2021).

Ritchey, E.L., J.M. McGrath, and D.A. Gehring. 2014. AGR-217. Determining soil texture by feel.

Stephenson, K., A. Latane, G. Evanylo, J.A. Ogejo, D. Beegle, C. Abdalla, J. Pease, J. McGrath, J. Ignosh, and T. Richard. 2013. Technical Analysis for Nutrient Crediting of Manure Conversion Technologies. Mid-Atlantic Regional Water Program. Available at: http://www.aaec.vt.edu/people/faculty/URLs/Kurt_Paper.pdf

Penn, C., J. Payne, J.M. McGrath, and J. Vitale. 2013. Designing structures to remove phosphorus from drainage waters. Waste to Worth: Spreading Science and Solutions. Denver, CO. 1-5 April 2013. Available Online: http://www.extension.org/pages/67669/designing-structures-to-remove-phosphorus-from-drainage-waters

McGrath, J.M., F.J. Coale, and N. Fiorellino. 2013. University of Maryland Phosphorus Management Tool: Technical users guide. SFM-7. University of Maryland Extension Bulletin EB-405.

Penn, C., G. Bell, J. Warren, and J. McGrath. 2012. Improving water quality with phosphorus removal structures. USGA Turfgrass and environmental research online. 11(2):1-6.

Penn, C., G. Bell, J. Warren, and J. McGrath. 2012. Phosphorus remediation. United States Golf Course Association Green Record. 50(10):1-4.

McGrath, J.M. 2011. Comments prepared on behalf of ASA-SSSA-CSA on the *Final Recommendations of the Interagency Ocean Policy Task Force*. Presented to the National Ocean Council at the National Coastal and Marine Spatial Planning Workshop 21 June 2011, Washington, D.C.

McGrath, J.M. 2010. Agronomic crop nutrient recommendations based on soil tests and yield goals. Soil Fertility Management 1. Originally prepared by F.J. Coale. Department of Environmental Science and Technology, University of Maryland, College Park. April 2010.

Steinhilber, P., J.M. McGrath, and J. Salak. 2010. Cornstalk nitrate test. Nutrient Management 8. Department of Environmental Science and Technology, University of Maryland, College Park.

McGrath, J.M. 2009. Affidavit of Joshua M. McGrath, Ph.D. Review of the science pertinent to field storage of poultry litter and its potential impact on water quality. In Maryland Department of the Environment's Opposition to Petitioners' Motion for Summary Decision and Exhibits. Case No. MDE-WMA-053-09-03514. April 13, 2009. *(Based on materials presented the administrative law judge accepted petioners' motion to dismiss).*

Maguire, R.O. and J.M. McGrath. 2009. Manure management in no-till and pasture systems. Mid-Atlantic Water Program. College Park, MD. Available online at http://mawaterquality.org/publications/documents/ManureInjectioninNo-TillSystem.pdf (verified 13 Aug. 2010).

Binford, G., T. Daniel, D. Hansen, B. Malone, J. McGrath, J. Meisinger, T. Pilkowski, C. Ritz, J. Timmons, and A. Torbert. 2008. Summary of Chesapeake Research Consortium – Maryland Environmental Finance Center Science Forum. October 29, 2008.

Sims, J.T., J.M. McGrath, and A.L. Shober. 2008. Nutrient mass balances for the State of Delaware 1996 to 2006. Final project report to the Delaware Nutrient Management Commission. University of Delaware, Newark, DE.

McGrath, J.M. 2006. Converting among soil test analyses frequently used in Maryland. Soil Fertility Management 4. Originally prepared by F.J. Coale. Department of Environmental Science and Technology, University of Maryland, College Park. August 2006.

Applegate, T.J., J.T. Sims, W. Saylor, J. McGrath, W. Powers, and R. Angel. 2005. Phytase in poultry diets: further evidence for reducing water-soluble phosphorus in the environment. Multi-state poultry meeting. 24 – 25 May 2005.

McGrath, J.M. and J.T. Sims. 2000. Effect of cropping system on nutrient losses in runoff: The Sustainable Agriculture Project at Chesapeake Farms. Final Project Report to the DuPont Company. University of Delaware, Newark, DE.

Invited Abstracts (n = 33)

Refereed invited abstracts (n = 1)

McGrath, J.M., W. Thomason, and G. Binford. 2010. Real world (on-farm) implementation of sensor based variable rate nitrogen in Mid-Atlantic corn production. *In* Conference Abstracts 10th International Conference on Precision Agriculture. 18 – 21 July 2010. Denver, CO.

Un-refereed invited abstracts (n = 32)

Bolster, C.H., P.A. Vadas, C.J. Penn, V.S. Shedekar, J.M. McGrath. 2020. Improving edge-of-field phosphorus transport models and their use. ASA-CSSA-SSSA International Annual Meetings. 9 - 13 November 2020. Virtual.

McGrath, Joshua M., J.T. Spargo, C.J. Penn, C.H. Bolster, P.A. Vadas. 2020. Soil test recommendations are models too – they just haven't evolved much in 60 years. ASA-CSSA-SSSA International Annual Meetings. 9 - 13 November 2020. Virtual.

McGrath, J.M. and Joshua Duke. 2020. Understanding manure relocation from the perspective of fertilizer only grain farmer. ASA-CSSA-SSSA International Annual Meetings. 9 - 13 November 2020. Virtual.

Penn, Chad J., C.H. Bolster, J.M. McGrath, P.A. Vadas. 2020. Getting back to basics: Tapping into soil processes for improving nutrient transport and fertilizer recommendation models. ASA-CSSA-SSSA International Annual Meetings. 9 - 13 November 2020. Virtual.

Slaton, Nathan A., J.T. Spargo, D.L. Osmond, D.B. Arnall, T.W. Bruulsema, B.S. Farmaha, J. Grove, P.J.A. Kleinman, S.E. Lyons, J.M. McGrath, M.S. Reiter, A.L. Shober, G. Toor. 2019. Developing a minimum data protocol for soil testing research in the U.S. ASA-CSSA-SSSA International Annual Meetings. 11 – 13 November 2019. San Antonio, TX.

McGrath, JM. 2018. Developing Precise Nutrient Recommendations: Gaps between Practice and Research. ASABE Agricultural Equipment Technology Conference. 12 February 2018. Louisville, KY.

McGrath, J.M. 2016. The Mid-Atlantic Perspective. In Nutrient Management Laws and Regulation: Where We Are and Where We're Going Symposium. ASA-CSSA-SSSA International Annual Meetings. 6-9 November 2016. Phoenix, AZ.

McGrath, J.M. 2016. Understanding spatial and temporal variability in phosphorus response. SERA-17 Annual Meeting. 9-10 November 2016. Phoenix, AZ.

McGrath, J.M. and J. Spargo. 2016. An open access database of soil test calibration to support better fertilizer decisions? SERA-17 Annual Meeting 9 – 10 November 2016. Phoenix, AZ.

McGrath, J.M. 2016. Status and Future of Real-Time Sensing in Crop Production. American Society of Agricultural and Biological Engineering Annual International Meeting. 17 – 20 August 2016. Orlando, Florida. Invited speaker for Marvin Stone Memorial Symposium.

Coale, Frank, N.M. Fiorellino[1]. J.M. McGrath, and P. Vadas. 2015. Evolution of agricultural P-loss risk assessment tools. International Interdisciplinary Conference on Land Use and Water Quality. 21 – 24 Sep 2015. Vienna, Austria. Invited Keynote Address.

McGrath, J.M., M. Reiter, and W. Thomason. 2013. Incorporating adaptive approaches such as sensor-based nitrogen management in the Chesapeake Bay TMDL process. ASA-CSSA-SSSA International Annual Meetings. November 3 – 6. Tampa, FL.

P. Kleinman, Z. Easton., J.M. McGrath, R. Bryant, A. Allen, A. Buda, J.T. Sims, C. Kennedy, A. Shober, D. Osmond. 2013. Phosphorus in drainage water of the Mid-Atlantic Coastal Plain. ASA-CSSA-SSSA International Annual Meetings. November 3 – 6. Tampa, FL.

Sims, J.T., J.M. McGrath, A. Shober, and F. Coale. 2013. Managing legacy phosphorus in artificially drained soils. ASA-CSSA-SSSA International Annual Meetings. November 3 – 6. Tampa, FL.

Bowen, J. C. Penn, D. Smith, G. Feyereisen, J. Strock, and J.M. McGrath. 2013. Treatment of phosphorus transported from tile and ditch drained agricultural fields using sorption materials. ASA-CSSA-SSSA International Annual Meetings. November 3 – 6. Tampa, FL.

Penn, C.J., and J.M. McGrath. 2012. Using steel slag to remove phosphorus in runoff: design considerations, field results, and challenges. National Slag Association Annual Meeting. October 1-3, Isle of Palms, SC.

Penn, C.J., J. M. McGrath, C. Kjaergaard, H.C.B. Hansen, and R. Bryant. 2012. Designing structures to remove phosphorus from drainage waters. *In* Special Symposium: The beneficial re-use of wastes and environmental implications of waste recycling. ASA-CSSA-SSSA International Annual Meetings. October 21-24. Cincinnati, OH.

Scharf, P. and J.M. McGrath. 2012. Plant tissue tests and use of sensors for nitrogen recommendations for corn. *In* Special Symposium: Strengths and limitations of methods, tests and models for making nitrogen recommendations for corn and a framework for improving recommendations. ASA-CSSA-SSSA International Annual Meetings. October 21-24. Cincinnati, OH.

McGrath, J.M., F. Coale, J.T. Sims. 2011. Constructing a revised Maryland-Delaware Phosphorus Site Index: Lessons learned. ASA-CSSA-SSSA International Annual Meetings, October 16 – 19, San Antonio, TX.

McGrath, J.M. 2011. Managing agricultural drainage waters to protect water quality. 4th International Nutrient Management Symposium. 21 – 24 August 2011. Newark, DE.

McGrath, J.M. 2011. Spatial variability of the right rate and how it affects timing and placement. *In* Special Symposia: Utilizing the 4R Nutrient Stewardship Framework. Soil and Water Conservation Society 2011 Annual Conference 18 – 19 July 2011. Washington, D.C.

McGrath, J.M. 2011. Rapid adoption of variable rate nitrogen using active optical sensors – The Mid-Atlantic example. InfoAg 2011 Conference, 12 – 14 July 2011. Springfield, IL.

Penn, C.J., R.B. Bryant, and J. McGrath. 2011. Reducing phosphorus losses from agriculture to surface waters through manure management and use of industrial by-products. ASA-CSSA-SSSA International Annual Meetings, October 16 – 19, San Antonio, TX.

McGrath, J.M. 2010. Using Active Optical Sensors to Guide Variable Rate Nitrogen Application in Corn. *In* Ag-Connect Expo. 11 – 14 January 2010. Orlando, FL. (International agricultural exposition organized by Association of Equipment Manufacturers).

McGrath, J.M. 2010. Manure application in no-till. *In* Manure Expo: Balancing Production and Conservation. 15 July 2010. State College, PA.

Bryant, R.B., A. Buda, P. Kleinman, C. Church, J.M. McGrath, K. Grubb, and S. Bose. 2010. Using FGD Gypsum to remove soluble phosphorus from agricultural drainage waters. ASA-

CSSA-SSSA 2010 International Annual Meetings, 31 October – 4 November 2010, Long Beach, CA.

Grubb[1], K., J.M. McGrath, C.J. Penn, R.B. Bryant. 2010. Phosphorus removal from agricultural drainage ditches using gypsum filter structures: Changes in soil phosphorus forms due to application of phosphorus saturated gypsum. ASA-CSSA-SSSA 2010 International Annual Meetings, 31 October – 4 November 2010, Long Beach, CA.

Penn, C.J., J.M. McGrath, G. Bell, and D. Martin. 2010. Treatment of golf course runoff using a phosphorus removal structure. ASA-CSSA-SSSA 2010 International Annual Meetings, 31 October – 4 November 2010, Long Beach, CA.

McGrath, J.M. 2009. Advanced Nutrient Management in No-till. *In* National no-till conference hosted by Lessiter Publications. Indianapolis, Indiana (January 14 – 17, 2009)

McGrath, J.M. 2009. Managing Manure in No-till. *In* National no-till conference hosted by Lessiter Publications. Indianapolis, Indiana (January 14 – 17, 2009)

Sims, J.T. and J.M. McGrath. 2008. Beyond environmental soil tests for phosphorus – entering the regulatory arena. ASA-CSSA-SSSA, October 5 – 9, Houston, TX.

Beegle, D., Q. Ketterings, R. Maguire, J.M. McGrath. 2007. Nutrient Management in the Chesapeake Bay Watershed. ASA-CSSA-SSSA, Nov. 4 – 8, New Orleans, LA.

Volunteered Abstracts (n = 76)

Refereed volunteered abstracts (n = 3)

Fiorellino[1], N.M., S.K. Kariuki[1], J.M. McGrath, M.J. Calkins, B. Momen, and A.O. Burk. Use of best management practices and pasture and soil quality on Maryland horse farms. 2011 Biannual Meeting of the Equine Science Society. J. Equine. Vet. Med. 31: 289 – 290.

McGrath, J.M., C.J. Penn, and F.J. Coale. 2010. In-situ treatment of agricultural drainage water using industrial by-products phosphorus sorbing materials. In 6th International Phosphorus Workshop: Towards a sustainable control of diffuse P loss: risk, monitoring, modeling, and mitigation options. 27 September – 1 October 2010. Sevilla, Spain.

Zipper, C.E., J.A. Burger, J.M. McGrath, and B. Amichev. 2006. Carbon accumulation potentials of post-SMCRA coal-mined lands. In June 2-7, 2007. Gillette, WY. R.I. Barnhisel (ed.). 30 years of SMCRA and beyond. ASMR. Lexington, KY.

Un-refereed Volunteered Abstracts (n = 80)

National/International (n = 73)

Bolster, C.H. J. M. McGrath, E. Rosso, and K. Blombäck. 2020. Evaluating the effectiveness of the P sorption index for estimating P sorption capacity. ASA-CSSA-SSSA International Annual Meetings. 9 - 13 November 2020. Virtual.

Penn, C. J., J.J. Camberato, C.H. Bolster, and J.M. McGrath. 2020. Development of semi-empirical tool for making crop nutrient recommendations: How much phosphorus is needed to achieve maximum yield? ASA-CSSA-SSSA International Annual Meetings. 9 - 13 November 2020. Virtual.

Slaton, Nathan A., S.E. Lyons, J.T. Spargo, D.L. Osmond, J.M. McGrath, P.J.A. Kleinman, and D. Arthur. 2020. Advancing soil-test correlation and calibration research with a minimum data set. ASA-CSSA-SSSA International Annual Meetings. 9 - 13 November 2020. Virtual.

Lyons, S.E., D.L. Osmond, N.A. Slaton, J.T. Spargo, D.K. Arthur, J.M. McGrath. 2020 Fertilizer recommendation tool (FRST) legacy data and database update. ASA-CSSA-SSSA International Annual Meetings. 9 - 13 November 2020. Virtual.

Sadeghpour, Amir, O. Adeymi, A. Widhuner, J.M. McGrath. 2020. Precision nitrogen management of corn. ASA-CSSA-SSSA International Annual Meetings. 9 - 13 November 2020. Virtual.

Thomason, Wade E., R.O. Maguire, M. Swoish, Jose Franco Da Cunha Leme Filho, and Joshua M. McGrath. 2020. Spatial variation in corn response to starter phosphorus fertilizer. ASA-CSSA-SSSA International Annual Meetings. 9 - 13 November 2020. Virtual.

Peterson, Heidi M., M. Williams, J. Frankenberger, K. King, J.M. McGrath, L.B. Moody. 2019. Reducing the impacts of agricultural nutrients on water quality across a changing landscape. ASA-CSSA-SSSA International Annual Meetings 11 – 13 November 2019. San Antonio, TX.

Wade, Jordon, S. Culman, J.A.R. Logan, M.S. Demyan, M.D. Ruark, A.P. Mallarino, J.J. Camberato, H. Poffenbarger, J.H. Grove, J.M. McGrath, and D.E. Kaiser. 2019. Does a healthy soil really require less N and P fertilizer in corn-soybean agroecosystems? Moving from correlation to causation. ASA-CSSA-SSSA International Annual Meetings 11 – 13 November 2019. San Antonio, TX.

Bowen[1], James and J.M. McGrath. 2018. Spatial variability in phosphorus critical level. ASA-CSSA-SSSA International Annual Meetings. November 4 - 7. Baltimore, MD.

Wade[2], S., Shockley, J. M., Dillon, C. R., McGrath, J. M. 2018. Evaluating the Profitability and Environmental Impacts of Poultry Litter Sub-Surfer Technology. Southern Agricultural Economics Association Annual Meeting, February 4. Jacksonville, FL.

Bowen[1], James and J.M. McGrath. 2017. Relating soil properties to spatial variation of phosphorus critical level. ASA-CSSA-SSSA International Annual Meetings. October 22 - 25. Tampa, FL.

Goff, B. M., Aller, D., Lee, C. D., McGrath, J. M., Moore, K. J., Grove, J. H. 2017. Forages in corn rotations: A meta-analytical perspective. ASA-CSSA-SSSA International Annual Meetings. October 22 - 25. Tampa, FL.

Rosso-Lucas[1], E., J.M. McGrath, F.J. Coale, R. Kratochvil, P.M. Steinhilber. 2017. Soil phosphorus persistence after manure phosphorus loading. ASA-CSSA-SSSA International Annual Meetings. October 22 - 25. Tampa, FL.

Rosso-Lucas[1], E. J. M. McGrath, F.J. Coale, N.M. Fiorellino, P.M. Steinhilber, and R. Kratochvil. 2017. Effect of mandatory nutrient management planning on soil phosphorus status. ASA-CSSA-SSSA International Annual Meetings. October 22 - 25. Tampa, FL.

Bowen[1], J., McGrath, J. M., Goff, B. M., Ritchey, E. L., Matocha, C. J., McNear, D. H. 2016. Assessing spatial variation of soil phosphorus critical level. ASA-CSSA-SSSA International Annual Meetings. November 7. Phoenix, AZ.

Mulkey[2], A., F.J. Coale, J.M. McGrath, and P. Vadas. 2014. Alternative simulation of soil phosphorus for agricultural land uses in the Chesapeake Bay Watershed Model. ASA-CSSA-SSSA International Annual Meetings. November 2 – 5. Long Beach, CA.

Fiorellino[1], N., J.M. McGrath, and F. Coale. 2014. Effect of methodology on the interpretation of degree of phosphorus saturation. ASA-CSSA-SSSA International Annual Meetings. November 2- 5. Long Beach, CA.

Rosso, E.[1], J.M. McGrath, F. Coale, and R. Kratochvil. 2013. Nutrient management planning and soil phosphorus status in Maryland soils. ASA-CSSA-SSSA International Annual Meetings. November 3 – 6. Tampa, FL.

Fiorellino[1], N., J.M. McGrath, F. Coale, P. Vadas, and C. Bolster. 2013. Using the annual phosphorus loss estimator (APLE) model to evaluate the University of Maryland Phosphorus Management Tool. ASA-CSSA-SSSA International Annual Meetings. November 3 – 6. Tampa, FL.

Biswas[1], S., J.M. McGrath, and A. Sapkota. 2013. Ionophore sorption and desorption in coastal plain soils of Mid-Atlantic region of the United States. ASA-CSSA-SSSA International Annual Meetings. November 3 – 6. Tampa, FL.

Biswas[1], S., J.M. McGrath, and A. Sapkota. 2012 Ionophore sorption and desorption in coastal plain soils. ASA-CSSA-SSSA International Annual Meetings. October 21-24. Cincinnati, OH.

Fiorellino[1], N., J.M. McGrath, F.J. Coale, E. Rosso[2], and P. Steinhilber. 2012. Revising the Maryland P Index: Direction and magnitude of changes. ASA-CSSA-SSSA International Annual Meetings. October 21-24. Cincinnati, OH.

Rosso[1], E., J.M. McGrath, F.J. Coale, N. Fiorellino[1], and P. Steinhilber. 2012. Revising the Maryland P Index: Current statewide distribution of field characteristics. ASA-CSSA-SSSA International Annual Meetings. October 21-24. Cincinnati, OH.

Gill[1], C.J., J.M. McGrath, and C.J. Penn. 2012. Phosphorus sorbing material filters effective at reducing phosphorus loading rates from agricultural ditches. *In* Special Symposium: The beneficial re-use of wastes and environmental implications of waste recycling. ASA-CSSA-SSSA International Annual Meetings. October 21-24. Cincinnati, OH.

Han, K. P. Kleinman, R. Bryant, M.S. Reiter, J.M. McGrath, C. Church, and A. Allen. 2012. Effect of tillage on phosphorus leaching through coastal plain soils. ASA-CSSA-SSSA International Annual Meetings. October 21-24. Cincinnati, OH.

Kariuki, S., J.M. McGrath, and G.D. Binford. 2012. Soil sulfur extraction methods optimizing plant sulfur levels. ASA-CSSA-SSSA International Annual Meetings. October 21-24. Cincinnati, OH.

Lowman[1], J.K., J.M. McGrath, R. Casey, S.M. Lev, and S.A. Yarwood. Evaluation of floating treatment wetlands in stormwater retention ponds on poultry farms to reduce nutrient loading. ASA-CSSA-SSSA International Annual Meetings. October 21-24. Cincinnati, OH.

Biswas[1] S., McGrath J.M., Sapkota A. 2011. Quantification of Ionophores in Poultry litter using Liquid Chromatograph Tandem Mass Spectrometric technique. Poster presentation at 7th Annual LC/MS/MS workshop on Env. Appl. and Food Safety, Buffalo, June 13-14.

Fiorellino[1], N., A.O. Burk, J.M. McGrath, S. Kariuki, and B. Momen. 2011. Assessing best management practice implementation and pasture quality on Maryland (USA) horse farms. ASA-CSSA-SSSA International Annual Meetings, October 16 – 19, San Antonio, TX.

Kariuki[1], S. J.M. McGrath, and G. Binford. Corn production response to sulfur in the Mid-Atlantic Region. ASA-CSSA-SSSA International Annual Meetings, October 16 – 19, San Antonio, TX.

Bejleri[1], K., J.M. McGrath, Y. Fouli, F.J. Coale, R.O. Maguire, and G.D. Binford. 2010. Effect of conservation tillage and poultry litter application on soil nutrient stratification and runoff losses in a continuous corn system. ASA-CSSA-SSSA 2010 International Annual Meetings, October 31 – November 4, Long Beach, CA.

Biswas[1], S., J.M. McGrath, and A. Sapkota. 2010. Quantification of aged veterinary anticoccidials in poultry manure using LC/MS-MS. ASA-CSSA-SSSA 2010 International Annual Meetings, October 31 – November 4, Long Beach, CA.

Kariuki[1], S., J.M. McGrath, K. Bejleri, and S. Close. 2010. Ammonia volatilization from surface applied poultry manure and synthetic fertilizers on selected mid-Atlantic soils. ASA-CSSA-SSSA 2010 International Annual Meetings, October 31 – November 4, Long Beach, CA.

Kariuki[1], S., and J.M. McGrath. 2010. Dynamics of nitrogen balance under the influence of N-stabilizers. ASA-CSSA-SSSA 2010 International Annual Meetings, October 31 – November 4, Long Beach, CA.

Stoner[2], D., C. Penn, and J. McGrath. 2010. Material characterization for designing phosphorus removal structures: Consideration of kinetics. ASA-CSSA-SSSA 2010 International Annual Meetings, October 31 – November 4, Long Beach, CA.

Biswas[1], S., J.M. McGrath, and A. Sapkota. 2009. Characterization of Ionophores in Poultry Litter and Litter Amended Soils Using Liquid Chromatograph Tandem Mass Spectrometer. ASA-CSSA-SSSA, November 1 – 5. Pittsburgh, PA.

Brosch[2,] C., R. Hill, J.M. McGrath, P. Steinhilber, and A. Shirmohammadi. 2009. Nutrient Management Planning Effects On Runoff Losses of Phosphorus and Nitrogen. ASA-CSSA-SSSA, November 1 – 5. Pittsburgh, PA.

Carmona[1], C., J.M. McGrath, and S. Kariuki. 2009. Sequential fractionation of phosphorus in soils amended by fresh and pelletized poultry litter. ASA-CSSA-SSSA, November 1 – 5. Pittsburgh, PA.

Fouli[1], Y., J.M. McGrath, K. Bejleri, F.J. Coale, G. Binford, and R. Maguire. 2009. Conservation Tillage to Reduce Nutrient Losses from Surface Applied Poultry Litter on the Delmarva Peninsula. ASA-CSSA-SSSA, November 1 – 5. Pittsburgh, PA.

Grubb[1], K., J.M. McGrath, C.J. Penn, R. Bryant. 2009. Phosphorus Removal from Agricultural Drainage Ditches Using Gypsum Filter Structures. ASA-CSSA-SSSA, November 1 – 5. Pittsburgh, PA.

Grubb[1], K., J.M. McGrath, C.J. Penn, R. Bryant. 2009. Changes in Soil Phosphorus Forms Due to Application of Phosphorus Saturated Gypsum. ASA-CSSA-SSSA, November 1 – 5. Pittsburgh, PA.

Kariuki[1], S. and J.M. McGrath. 2009. Efficacy of Nitrogen Stabilizers on Mitigating Fertilizer Ammonia Loss. ASA-CSSA-SSSA, November 1 – 5. Pittsburgh, PA.

Penn, C.J., G. Bell[2], and J.M. McGrath. 2009. Improving Surface Water Quality through Use of Industrial By-Products in Constructed Filter Structures. ASA-CSSA-SSSA, November 1 – 5. Pittsburgh, PA.

Stoner[2], D., C.J. Penn, and J. McGrath. 2009. Kinetics of Phosphorus Removal by Industrial By-Products. ASA-CSSA-SSSA, November 1 – 5. Pittsburgh, PA.

Tingle, S., G.D. Binford, and J.M. McGrath. 2009. Corn response to AVAIL in starter fertilizer. ASA-CSSA-SSSA, November 1 – 5. Pittsburgh, PA.

Terlizzi, D.E., Patricia Steinhilber, Richard Nottingham, Joshua McGrath, Marcia Guedes, Anastasia Vvedenskaya. 2009. Does ammonia in precipitation inhibit nitrate removal by cover crops? ASA-CSSA-SSSA, November 1 – 5. Pittsburgh, PA.

Baranyai[1], V., J.M. McGrath, and S. Bradley. 2008. Using excess poultry litter to generate energy: an analysis of the impediments and feasibility in the Chesapeake Bay watershed. ASA-CSSA-SSSA, October 5 – 9, Houston, TX.

Carmona[1], C., J.M. McGrath, S. Kariuki, A. Collins, and J.T. Sims. 2008. Agri-environmental assessment of pelletized broiler litter in corn production: laboratory studies. ASA-CSSA-SSSA, October 5 – 9, Houston, TX.

Collins, A., J.T. Sims, J.M. McGrath. 2008. Agri-environmental assessment of pelletized broiler litter in corn production: field studies. ASA-CSSA-SSSA, October 5 – 9, Houston, TX.

Grubb[1], K., J.M. McGrath, R. Bryant, and C. Penn. 2008. Phosphorus removal from agricultural drainage ditches using gypsum filter structures. ASA-CSSA-SSSA, October 5 – 9, Houston, TX.

Kariuki[1], S., H. Zhang, J.L. Schroder, J.M. McGrath, and J. Mundy. 2008. Grazed pasture soil temporal variability. ASA-CSSA-SSSA, October 5 – 9, Houston, TX.

Sims, J.T., J.M. McGrath, A. Shober. 2008. Assessing progress in nutrient management with large-scale nutrient mass balances: Ten Year Case Study in Delaware USA. ASA-CSSA-SSSA, October 5 – 9, Houston, TX.

Bejleri[1], K. J.M. McGrath, and F. Coale. 2007. Utilizing Conservation Tillage to Minimize Nutrient Losses from Poultry Litter Applied in Grain Production Systems. ASA-CSSA-SSSA, Nov. 4 – 8, New Orleans, LA.

Carmona[1], C., J.M. McGrath, and J.T. Sims. 2007. Utilizing Value-Added Manure Products in Commercial Agriculture on the Delmarva Peninsula. ASA-CSSA-SSSA, Nov. 4 – 8, New Orleans, LA.

Grubb[1], K. J.M. McGrath, C. Penn, R. Bryant, P.J.A. Kleinman, and A. Allen. 2007. In-Situ Treatment of Non-Point Source Pollution Part 2: Field Results from Two Different Treatment Structures. ASA-CSSA-SSSA, Nov. 4 – 8, New Orleans, LA.

McGrath, J.M., F. Coale, and K. Bejleri. 2007. Five Years after the Accelerated Deployment of Maryland's Phosphorus Site Index: A Progress Report. ASA-CSSA-SSSA, Nov. 4 – 8, New Orleans, LA.

Penn, C., R. Bryant, P. Kleinman, J.M. McGrath, and A. Allen. In-Situ Treatment of Non-Point Source Pollution Part 1: Concepts and Chemistry. ASA-CSSA-SSSA, Nov. 4 – 8, New Orleans, LA.

White, S. and J.M. McGrath. 2007 Effectiveness of Variable Rate Nitrogen Application to Corn Grown in the Mid-Atlantic. ASA-CSSA-SSSA, Nov. 4 – 8, New Orleans, LA.

Shober, A., J.M. McGrath, and J.T. Sims. 2006. Developing accurate nutrient mass balances for Delaware agriculture. ASA-CSSA-SSSA, Nov. 12 – Nov. 16, Indianapolis, IN.

Warren, J.G., J.M. McGrath, and C.J. Penn. 2006. The role of organic phosphorus in alum's ability to reduce phosphorus solubility in poultry litter and litter amended soils. ASA-CSSA-SSSA, Nov. 12 – Nov. 16, Indianapolis, IN.

McGrath, J.M., C.E. Zipper, and J.A. Burger. 2005. Carbon sequestration potential of surface mined lands. ASA-CSSA-SSSA, Nov. 6 – Nov. 10, Salt Lake City, UT.

McGrath, J.M., J.T. Sims, and R.O. Maguire, W.W. Saylor, C.R. Angel, and B. Turner. 2005. Impact of dietary phytase on broiler litter phosphorus forms before and after storage. ASA-CSSA-SSSA, Nov. 6 – Nov. 10, Salt Lake City, UT.

Sims, J.T., G.S. Toor, and J.M. McGrath. 2005. Water quality implications of the links between animal nutrition and phosphorus speciation in poultry and dairy manures. ASA-CSSA-SSSA, Nov. 6 – Nov. 10, Salt Lake City, UT.

McGrath, J.M., C.E. Zipper, and R.H. Wynne. 2004. Distribution and status of reclaimed surface mine lands in the eastern coal region of the United States after implementation of the Surface Mining Control and Reclamation Act. ASA-CSSA-SSSA, Oct. 31 – Nov. 4, Seattle, WA.

McGrath, J.M., J.T. Sims, R.O. Maguire, W.W. Saylor, and C.R. Angel. 2003. Effect of phytase and vitamin D metabolite in poultry diets on phosphorus in broiler litter, litter amended soils, and runoff. ASA-CSSA-SSSA, November 2-6, Denver, CO.

Maguire, R.O., J.M. McGrath, and J.T. Sims. 2003. Effect of dietary modification on phosphorus solubility in manures and manure-amended soils. Northeastern Branch of the American Society of Agronomy, Burlington, VT.

McGrath, J.M., J.T. Sims, R.O. Maguire, W.W. Saylor, and C.R. Angel. 2003. Effect of dietary phytase on the forms of phosphorus in stored broiler litter. ASA-CSSA-SSSA, November 2-6, Denver, CO.

McGrath, J.M. and J.T. Sims. 2003. Effect of broiler diet modification on phosphorus forms in manures, soils, and runoff: Implications to water quality. First Annual Plant and Soil Sciences Graduate Student Symposium, June 10, Newark, DE.

Maguire, R.O., J.T. Sims, W.W. Saylor, J.M. McGrath, and C.R. Angel. 2002. Phosphorus solubility in soils amended with manure containing phytase and 25OH-D3. ASA-CSSA-SSSA, November 10-14, Indianapolis, IN.

McGrath, J.M., R.O. Maguire, J.T. Sims, W.W. Saylor, C.R. Angel. 2002. Effect of storage and dietary phytase on phosphorus in poultry litter. ASA-CSSA-SSSA, November 10-14, Indianapolis, IN.

McGrath, J.M., J.T. Sims, W.J. Gburek, and V. Lariccia. 2001. Long-term, field-scale comparison of phosphorus losses in runoff from four cropping systems. ASA-CSSA-SSSA, October 21-25, Charlotte, NC.

McGrath, J.M. and J.T. Sims. 2000. Effect of poultry diets using phytase enzymes and high available phosphorus corn on phosphorus in poultry litter, soils, and runoff. ASA-CSSA-SSSA, November 5-9, Minneapolis, MN.

McGrath, J.M. and J.T. Sims. 1999. Long-term cropping system effects on soil phosphorus in the Chesapeake Bay watershed. ASA-CSSA-SSSA, October 31-November 4, Salt Lake City, UT.

<u>Regional</u> (n = 7)

Biswas[1] S., McGrath J.M., Sapkota A. 2011.Quantification of Ionophores in Poultry litter using Liquid Chromatograph Tandem Mass Spectrometric technique. Oral presentation at ASA-CSSA-SSA NE Branch Meeting, Maryland, June 26-29.

Biswas[1] S., McGrath J.M., Sapkota A. 2011. Identifying Ionophores in Fresh Poultry Manure. Poster presentation at ASA-CSSA-SSA NE Branch Meeting, Maryland, June 26-29.

Fiorellino[1], N.M., S.K. Kariuki[1], J.M. McGrath, M.J. Calkins, B. Momen, and A.O. Burk. 2011. Use of best management practices and pasture and soil quality on Maryland horse farms. Northeastern Branch ASA-CSA-SSSA 2011 Regional Meetings, 26 – 29 June 2011.

Biswas[1], S., J.M. McGrath, and A. Sapkota. 2010. Characterization and Quantification of Veterinary Anticoccidials in Poultry Manure using LC/MS/MS. Poster Presentation at Annual Bioscience Day, University of Maryland, College Park, MD.

Carmona[1], C., J.M. McGrath, and S. Kariuki. 2009. Agri-environmental assessment of pelletized broiler litter. Northeastern Branch ASA-CSSA-SSSA Regional Meetings, 12 – 15 July 2009, Portland, ME.

Grubb[1], K., J.M. McGrath, C.J. Penn, R. Bryant. 2009. Phosphorus removal from agricultural drainage ditches using gypsum filter structures. Northeastern ASA-CSSA-SSSA Branch Regional Meetings, 12 – 15 July 2009, Portland, ME.

McGrath, J.M., R.O. Maguire, J.T. Sims, W.W. Saylor, and C.R. Angel. 2003. Phytase and storage: their impact on soluble phosphorus in broiler litter. Northeastern Branch of the American Society of Agronomy, Burlington, VT.

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1. Post-doctoral researcher, technician or graduate student under my primary supervision.
2. Graduate student on whose committee I served.

Editorships, Editorial Boards, and Reviewing Activities for Journals and Other Learned Publications

Associate Editor, Agrosystems, Geosciences, & Environment, American Society of Agronomy (July 2018 – present)

USDA-AFRI Grant review panel for Sustainable Agricultural Systems program. (December 2018 – February 2019)

Associate Editor, Soil Science Society of America Journal, Soil Science Society of America (January 2013 – December 2018)

Associate Editor, Agronomy Journal, American Society of Agronomy (2012 – 2013)

Associate Editor, Journal of Environmental Quality (January 2009 – January 2011).

CICEET Grant Advisor “Direct incorporation of poultry litter into no-till soils to minimize nutrient runoff to Chesapeake Bay.” Kleinman, Peter J.A., T. Way, D. Pote, and A. Allen.

Reviewer for:

- International Journal of Environmental Analytical Chemistry
- Crop Management
- Journal of Environmental Quality
- Soil Science Society of America Journal
- Agronomy Journal
- Journal of Soil and Water Conservation
- Soil Science
- Transactions of the ASAE
- Soil Use and Management

Contracts and Grants ($11,335,333)

IMPACT: I have maintained consistent external funding to support my integrated extension and research program. I have led major, multi-institutional grant teams and been invited to join multi-institutional grants, demonstrating my ability to work with diverse teams. In addition, I have consistently secured significant support from agriculture industry and farmer led checkoff programs, indicating the relevance of my activities to my constituents. These funds have delivered new knowledge and solutions to my clientele and resulted in improved soil, nutrient, and environmental management.

National Competitive Grants ($7,779,361)

McGrath, J. M, "Modifying starter fertilizer placement to increase effectiveness", Fluid Fertilizer Foundation, $45,000.00, (January 1, 2020 -- December 31, 2022).

McNear, D. H., Grove, J. H., McGrath, J. M., "Rhizosphere Priming Effects on Legacy Organic Phosphorus (Po) in a Winter Wheat/corn Rotation," Sponsored by National Institute of Food and Agriculture, $499,400 (May 15, 2016 - May 14, 2020).

McGrath, J. M., "Do Critical Soil Phosphorus Concentrations Vary in Space and if so Why?" Sponsored by Foundation for Agronomic Research, $279,784. (January 1, 2016 - December 31, 2020).

Project: Using Precision Technology in On-farm Field Trials to Enable Data-Intensive Fertilizer Management. Funding Agency: USDA-NIFA. Participation: Co-Principal Investigator; five member Project Management Team (Jan. 2016 – Dec. 2019). Amount: $4,000,000 ($184,541 to UK)

Project: Achieving Subsurface Application of Manures in the Chesapeake Bay Basin. Funding Agency: USDA-NRCS. Participation: Principal Investigator (Oct. 2013 - Sep. 2017). Amount: $821,383.

Project: Ditch management to reduce nutrient losses. Funding Agency: USDA-NRCS. Participation: Principal Investigator (May. 2012 - Dec. 2014). Amount: $281,000

Project: Demonstrating sustainable integration of value-added manure products into 21st century farming. Funding Agency: USDA-NRCS. Participation: Co-Principal Investigator (April 2006 – December 2010). Amount: $213,768

Project: Utilizing conservation tillage to minimize nutrient losses from poultry litter applied in grain production systems. Funding Agency: USDA-NRCS. Participation: Co-Principal Investigator (December 2006 – December 2009). Amount: $352,566

Project: Enhancing nutrient efficiencies on dairy farms in the Monocacy watershed. Funding Agency: National Fish and Wildlife Foundation. Participation: Co-Principal Investigator (April 2007 – April 2009). Amount: $177,780

Project: Removal of nutrients and other pollutants from agricultural drainage ditch water. Funding Agency: USDA-NRCS. Participation: Principal Investigator (September 2007 – October 2011). Amount: $999,683

Project: New subsurface applicator for dry poultry and dairy manures. Funding Agency: National Fish and Wildlife Foundation. Participation: Co-Principal Investigator (July 2009 – July 2012). Amount: $108,997

Regional or State Competitive Grants ($3,370,654)

Sadeghpour, A. and McGrath, J. M., "Precision Nitrogen Management of Corn for Improving Farm Profitability and Water Quality in Southern Illinois," Sponsored by Illinois Nutrient Research and Education Council subcontract through Southern Illinois University. Total project budget contingent on annual renewal $763,414. Roughly half to University of Kentucky (January 2019 – December 2024).

McGrath, J. M. (Principal), Poffenbarger, H. J., Shockley, J. M., Sama, M., Ritchey, E. L.), "Nitrogen Rate Decision Support for Kentucky Corn Grain Production", Kentucky Corn growers Association. Four annual awards totaling $338,336 (January 2018 – December 31, 2021).

McGrath, Joshua Michael (Principal), Ritchey, Edwin Louis (Co-Investigator), "Providing Guidance to Kentucky Farmers for Grid and Zone Based Crop Management," Sponsored by Kentucky Small Grain Growers Association. Two annual awards totaling $50,000 (September 1, 2019 - December 31, 2021).

Ritchey, Edwin Louis (Principal), Grove, John H (Co-Investigator), McGrath, Joshua Michael (Co-Investigator), Shockley, Jordan M (Co-Investigator), "Reevaluating the University of Kentucky's Soil Fertility Recommendations for Soybean Production," Sponsored by Kentucky Soybean Promotion Board, Total Funding $34,500.00 (April 1, 2020 - March 31, 2021).

Ritchey, E. L., Coyne, M. S., Haramoto, E. R., Lee, B. D., McGrath, J. M., Shockley, J. M., "Providing a better understanding of cover crop-soil interactions," Sponsored by Natural Resources Conservation Service, $75,000.00 granted. (September 13, 2016 - September 30, 2019).

Shockley, J. M., McGrath, J. M., Ritchey, E. L., "Determining the Economic Value of Poultry Litter for Kentucky Corn Producers," Sponsored by Kentucky Corn Growers Association, $18,469.00 granted (September 1, 2016 - August 31, 2017).

Shockley, J. M., McGrath, J. M., Ritchey, E. L., "Determining the Economic Value of Poultry Litter for Kentucky Soybean Producers," Sponsored by Kentucky Soybean Promotion Board, $18,469.00 requested, $18,469.00 granted (July 1, 2016 - June 30, 2017).

Lee, C. D., Knott, C. A., McGrath, J. M., Ritchey, E. L., "Determining the Effect of Additional Fertilizer Nitrogen on Irrigated Soybean Yield," Sponsored by Kentucky Soybean Promotion Board, $6,000.00 granted. (April 1, 2015 - March 31, 2017).

Project: Integrating soil sensing with veris, yield mapping, and GreenSeeker technologies to improve nitrogen management in Maryland. Funding Agency: Maryland Grain Producers Utilization Board. Participation: Principal Investigator (Jan. 2013 - Dec. 2014). Amount: $25,237

Project: Prediction of subsurface phosphorus losses by site and soil characteristics. Funding Agency: Maryland Grain Producers Utilization Board. Participation: Principal Investigator (Jan. 2013 - Dec. 2014). Amount: $20,690

Project: Evaluating soil phosphorus trends over time. Funding Agency: Maryland Grain Producers Utilization Board. Participation: Principal Investigator (Jan. 2013 - Dec. 2014). Amount: $12,985

Project: Subsurface poultry litter injection in the Sassafras Watershed. Funding Agency: 2012 Trust Fund. Participation: Principal Investigator (Dec. 2011 - Dec. 2013). Amount: $65,628

Project: Re-engineering the poultry litter "Subsurfer". Funding Agency: Mid-Atlantic Water Program. Participation: Principal Investigator (Sep. 2013 - Aug. 2013). Amount: $50,000

Project: Quantification and persistence of ionophore antimicrobials associated with poultry litter. Funding Agency: Northeast SARE. Participation: Principal Investigator (Aug. 2012 - Aug. 2013). Amount: $14,754

Project: Achieving Subsurface Application of Manures in the Chesapeake Bay Basin. Funding Agency: 2010 Trust Fund. Participation: Principal Investigator (June 2013 - August 2017). Amount: $250,000.

Project: Variable rate nitrogen application in the Mid-Atlantic to increase nitrogen use efficiency. Funding Agency: Chesapeake Bay Foundation. Participation: Co-Principal Investigator (July 2006 – January 2009). Amount: $108,500

Project: Sustainable use of pelletized broiler litter in the Chesapeake Bay watershed. Funding Agency: Agro-Ecology, Inc. Participation: Principal Investigator (February 2007 – December 2010). Amount: $117,416

Project: Bioassessment of ecological function of agricultural ditches on the Delmarva Peninsula. Funding Agency: Maryland Agricultural Experiment Station. Participation: Co-Principal Investigator (July 2007 – July 2008). Amount: $25,000

Project: Coordinating regional efforts involving manure management in reduced tillage and pasture systems. Funding Agency: Mid-Atlantic Regional Water Program. Participation: Co-Principal Investigator (September 2007 – September 2008). Amount: $15,000

Project: Utilization of variable rate nitrogen application in the Mid-Atlantic to increase nitrogen use efficiency. Funding Agency: Maryland NRCS. Participation: Principal Investigator (September 2007 – September 2010). Amount: $106,574

Project: In-situ removal of nitrogen and phosphorus from agricultural drainage ditch water. Funding Agency: Chesapeake Bay Trust. Participation: Principal Investigator (March 2008 – March 2012). Amount: $143,814

Project: Utilization of yield monitors, aerial imagery, and active optical sensors for variable rate nitrogen application in Maryland to increase nitrogen use efficiency in corn. Funding Agency: Maryland Grain Producers' Utilization Board. Participation: Principal Investigator (July 2008 – October 2009). Amount: $27,000

Project: Utilization of yield monitors, aerial imagery, and active optical sensors for variable rate nitrogen application in Maryland to increase nitrogen use efficiency in corn. Funding Agency: Maryland Agriculture Experiment Station. Participation: Principal Investigator (September 2008 – September 2009). Amount: $25,000

Project: Utilization of yield monitors, aerial imagery, and active optical sensors for variable rate nitrogen application in Maryland to increase nitrogen use efficiency in wheat. Funding Agency: Maryland Grain Producers' Utilization Board. Participation: Principal Investigator (January 2009 – January 2010). Amount: $27,000

Project: Purchase of active optical sensors and sprayer. Funding Agency: Maryland Grain Producers' Utilization Board. Participation: Principal Investigator (January 2009 – January 2010). Amount: $26,400

Project: Calculating a statewide nutrient mass balance to guide strategic nutrient management planning in Maryland. Funding Agency: Agro-Ecology, Inc. Participation: Principal Investigator (August 2009 – August 2012). Amount: $360,160

Project: Utilization of yield monitors, aerial imagery, and active optical sensors for variable rate nitrogen application in Maryland to increase nitrogen use efficiency in wheat. Funding Agency: Maryland NRCS. Participation: Principal Investigator (September 2009 – September 2010). Amount: $71,000

Project: Middle Chester Partners local implementation project. Funding Agency: Maryland 2010 Trust Fund. Participation: Principal Investigator (December 2009 – December 2012). Amount: $189,000

Project: Sulfur deficiency detection and correction in Mid-Atlantic corn production to improve overall nutrient use efficiency. Funding Agency: Maryland Grain Producers' Utilization Board. Participation: Principal Investigator (March 2010 – December 2011). Amount: $23,216

Project: Floating treatment wetlands in CAFO waste lagoons. Funding Agency: Maryland Industrial Partnerships. Participation: Principal Investigator (July 2010 – July 2012). Amount: $87,300

Non-Competitive Funding ($185,318)

McGrath, Joshua Michael (Principal), "Evaluating Boron Fertilizer in Kentucky No-till Corn Production," Sponsored by US Borax, Total Funding $60,818.00, Total Projected Funding $60,818 (April 27, 2020 - March 31, 2022).

Project: Evaluation of phosphorus and nitrogen fertilizer enhancing products. Funding Agency: Verdesian. Participation: Principal Investigator (March 2016 – Dec 2016). Amount: $16,000

Project: Evaluation of foliar and in-furrow fertilizer. Funding Agency: Wilbur-Ellis. Participation: Principal Investigator (March 2015 – Dec 2015). Amount: $18,000

Project: Cost-share for Removal of nutrients and other pollutants from agricultural drainage ditch water. Funding Agency: College of Agriculture and Natural Resources, University of Maryland. Participation: Principal Investigator (September 2007 – October 2011). Amount: $85,000

Project: USDA-ARS research support agreement. Funding Agency: USDA-ARS. Participation: Principal Investigator (March 2010 – March 2011). Amount: $5,500

Extension Program

IMPACT: I have consistently delivered innovative practices and practical solutions to diverse clientele (including agriculture industry, farmers, policy makers, and non-government organizations) using multiple modes of delivery. My objective has been not just education, but ultimately implementation. One of my proudest achievements was being recognized by peers at other Land Grant Universities who successfully nominated me for the Agronomic Education and Extension Award, American Society of Agronomy. When I left the University of Maryland I delivered the news to the Maryland Grain Producers' Utilization Board in person and one board member told me that he "didn't always want to hear what I had to say, but he always had to hear what I had to say." This has been a guiding principle of mine since.

International, national, and regional activities

"Mule Barn" meeting (2006 – present)

- Group consists of research and extension professionals from Land Grant Universities, federal and state agencies, and agriculture industry across the country
- The Mule Barn meets regularly to evaluate and develop action plans for addressing national and regional crop management issues. The Mule Barn provides and reviews scientific recommendations that influence state and federal policy and has set a national model for regional collaboration to solve complex agri-environmental issues.
- I am responsible for setting meeting agenda and inviting Mule Barn participants. I have secured funding to cover meeting and travel costs for Mule Barn participants.
- Meetings held:
  - December 12 – 18, 2018: 34 participants
  - December 13 – 14, 2016: 25 participants
  - March 29 – 30, 2016: 21 participants
  - December 16 - 17, 2013: 24 participants
  - December 12 – 13, 2011: 14 participants from the Chesapeake Bay Region
  - December 9 – 10, 2010: 15 participants from six states and seven agencies
  - November 5, 2007: 9 participants from six states and eight agencies
  - May 22, 2007: 28 participants from seven states and 20 agencies
  - Nov. 1, 2006: 13 participants from six states

Modernizing Fertilizer Recommendations: Fertilizer Recommendation Support Tool, or "FRST"
Core leadership team (2017 – present)

- Part of the five-member core leadership team responsible for directing national efforts. The core team typically meets bi-weekly with additional meetings for sub-committees and quarterly national meetings.

- National effort to collect historic soil test calibration and correlation data from across the United States into one database and continue to add new data going forward. This database will provide the data underpinning soil test-based fertilizer recommendations in a transparent format along with web-based tools that allow end users to evaluate their recommendations against this data. The database will also allow advanced interrogation of data by soil fertility researchers.
- The FRST project is comprised of over 80 individuals representing 36 land-grant universities, one state university, one private university, nine Agricultural Research Service scientists, one Natural Resources Conservation Service and one Farm Service Agency personnel, two private not-for-profit individuals, and one State Department of Agriculture employee.

NRCS Technical Note Committee (2020). Committee of 15 scientists led by Dr. Andrew Sharpley to write a Technical Note titled "Conservation practice tradeoffs related to phosphorus losses."

International Certified Crop Advisor Program. Developed Performance Objectives, Proficiency Areas, and test questions for new CCA Specialties. Participated in bi-weekly conference calls for test revision. The 4R Nutrient Management and Precision Agriculture Specialties were new programs and we developed both programs and exams from the ground up.
- 4R Nutrient Management Specialty committee (2015-2016)
- Precision Agriculture Specialty (May 2017-present).
- Kentucky Exam Committee (May 2017 – present)

Phosphorus Transport Modeling Group, Sustainable Phosphorus Alliance.
- Supported by the National Science Foundation's Phosphorus Sustainability Research Coordination Network. Small group of researchers organized to discuss and develop better connections between field phosphorus soil tests, crop response, and watershed phosphorus models. In person meeting with regular follow up conference calls.
- Workshops: 23-24 August 2018, Columbus, OH.; 14 – 15 November 2019, San Antonio, TX.

Purdue University, Agronomy e-Learning's Precision Agriculture course (2016) and Nutrient Management course (2017).
- Overall more than 1,200 students from 22 countries and 39 states in the three courses: Agronomy Essentials, Precision Agriculture, and Nutrient Management.
- Provided content and was centerpiece presenter for HD video classroom for Precision Agriculture and Nutrient Management online courses.
- In exchange for presentations Purdue provided videos and online material for me to use in Kentucky course development.
- The Precision agriculture course won an award for excellence in online education in 2017 and in 2018 the Crop Professional Certificate, for those who complete all three courses, received an award for excellence in online education.
- Purdue University Excellence in Digital Education: 2018, for Agronomy e-Learning's Crop Professional Certificate Program.
- Purdue University Excellence in Digital Education, 2017, for Agronomy e-Learning's Precision Agriculture course.

Precision Nutrient Management Roundtable (December 8 and 9, 2015).
- Organized and hosted multi-disciplinary team of research scientists and extension faculty from Universities and USDA-ARS to meet with IPNI scientists including Dr. Paul Fixen (Senior Vice President, Americas and Oceanic Group, and Director of Research) to develop interdisciplinary, national approach to answering most pressing precision nutrient management challenges facing producers.
- **Major outcome was initiative to develop national soil testing correlation and calibration database with public facing interface for transparent evaluation of soil test-based fertilizer recommendations, which has evolved in the FRST project (see above).**

The State of the Science Phosphorus Symposium (January 30, 2015)

- Organized symposium covering current state of science surrounding phosphorus transport, soil dynamics, modeling, and its impact on water quality. Experts on the science of phosphorus from across the country were featured on the program (available online http://www.phosphorussymposium.com/).
- Attracted 350 attendees receiving national attention. We have been asked to package the symposium for other regions and to prepare a proceedings paper.

Mid-Atlantic Precision Agriculture Equipment Day (2011 - 2014)
- First event of its kind for the Mid-Atlantic focused improved agricultural efficiency, decreased nutrient use, and protecting environmental quality through cutting edge agricultural equipment. Due to its success we have continued to host this event, now in its third year.
- Organized extension professionals from Maryland, Delaware, Pennsylvania, Virginia, and West Virginia to plan and execute one-day event with five concurrent sessions, equipment dealer demonstrations, and vendor midway
- Target audience farmers and agriculture professionals from the five-state region
- Contracted nationally known speakers in machinery engineering and precision agriculture from across the U.S. to headline program each year
- Secured (to-date) >$20,000 in funding from industry sources to make this a free event for attendees

4th International Nutrient Management Symposium: Global Issues in Nutrient Management Science, Technology, and Policy (August 21 – 24, 2011)
- Organizing Committee
- Invited speaker: “Managing Agricultural Drainage Waters to Protect Water Quality”
- Organized Plenary Session “Nutrient Management Challenges and Progress in the Chesapeake Bay Watershed”
- Organized field tour of the Chesapeake Bay watershed

Mid-Atlantic Crop Management School (2006 – 2014)
- Co-chair (2009-2010, 2012 - 2014), responsible for organizing program schedule for three-day school with five concurrent sessions and speakers of national renown. Approximately 200 participants.
- Co-chair, Nutrient Management Section (2007 – 2008, 2011 - 2014), responsible for selecting and recruiting speakers of national renown in the Nutrient Management Section.

Phosphorus Site Index committee (Chair; 2009 – 2014)
- Led the effort to revise the phosphorus site index for both Delaware and Maryland and the greater Chesapeake Bay Watershed.
- This phosphorus site index is the primary regulatory device that guides nutrient application to farm fields.
- As chair I have hosted several meetings in 2010 to revise the index to include the newest science. Representation from the Universities of Delaware and Maryland and representation from NRCS and Departments of Agriculture in each state.

Precision Agriculture Equipment Training Event (Chair; January 27, 2011)
- Organized event designed to inform producers, consultants, and state personnel on the implementation of precision agriculture techniques to increase efficiency.
- The event was held during a major snow event and still drew 80 participants from Maryland, Delaware, Pennsylvania, and Virginia

Organizing Committee Chesapeake Manure Summit. July 14, 2010.
- Workshop for experts and stakeholders in manure management and water quality to engage in discourse on manure management in the Chesapeake Bay region.

Chesapeake Bay Program Technical Advisory Committee on BMP efficiencies for the Bay Model (2006 – 2014)

- Panel of regional scientists who provide the USEPA Chesapeake Bay Program scientific input on the Chesapeake Bay Model. This committee's primary responsibility is to determine nutrient load reductions achieved by implementing specific agricultural practices. These "efficiencies" are then incorporated into the Chesapeake Bay Model.
- The Chesapeake Bay Model is the primary tool used by state and federal agencies to guide Chesapeake Bay agriculture policy relative to agricultural nutrient load reductions and to assess compliance by individual states with the newly promulgated Total Maximum Daily Load (TMDL) limits to the Chesapeake Bay set by the USEPA.
- ***MAJOR IMPACT***: Each state in the Chesapeake Bay Watershed must reduce nutrient loading below the limit set by the USEPA's TMDL. The Chesapeake Bay Model is used to determine compliance with these limits. This is the largest TMDL in the United States. The Obama administration has identified the Chesapeake Bay as a "national treasure" and has identified improving its water quality as a national priority. The process being implemented to achieve this TMDL is being looked to as a national model.

Poultry Litter Experts Science Forum (October 29, 2008)
- At the request of the Eastern Shore Agriculture Collaborative and the University of Maryland Environmental Finance Center, ten national and regional experts in poultry waste management were assembled and provided relevant literature and data accumulated for review to inform a response to the CAFO regulation promulgated by the USEPA and enforced by the Maryland Department of the Environment.
- A report was written by participating scientists based on available data and best professional judgment making consensus recommendations on poultry litter storage times and methods. This report was published and distributed and has been referenced widely in implementation of the CAFO regulation by state and federal agencies.

Mid-Atlantic Soil Testing and Plant Analysis Work Group (2006 – present; Chair 2011 – 2012)
- Comprised of private and public laboratories from across the mid-Atlantic and Southeastern USA.
- Meets annually to provide technology transfer from research scientists to private and public analytical laboratories.
- Provides uniform application of science to analytical service industry throughout the Mid-Atlantic and Southeast regions.
- Chair responsibilities: organize program and invited speakers and secure external funding to support meeting.

Hosted visiting scientists from China's Agriculture University (August 17, 2010)
- Provided field tour of current research activities of my research group
- Developed relationship with Chinese visiting scientists to support future research collaboration

Statewide activities

Kentucky Fruit and Vegetable Conference. "Managing manure and compost nutrients." (January 26, 2021).

Kentucky site-specific management farmer group (November 2018 – present). I have worked with approximately 10 farmers across the state (number fluctuates) over the past four years directly on developing strategies to delineate in-field management zones. I recently decided to bring the farmers together virtually to share ideas, tips, and tricks. The group has been communicating almost daily by email and text. We plan to meet biannually in person. They are all providing one field and we are using multiple data layers along with MZA software (USDA-ARS). My team will provide 30 m grid sampling and Veris and DualEM mapping.

Kentucky Master Haymaker program (2017 – present). Multi-week event designed to cover all aspects of hay and forage production in Kentucky. Each event typically covers 3 – 4 counties and is held at local extension offices. Each week covers a different topic. I provide training on

"Soils and Soil Fertility" in a two-hour session. I have now provided training to Master Haymaker events dozens of times covering more than 30 counties.

Kentucky Corn-Soy-Tobacco Field Day (2014 – present). Present annually at Kentucky's annual statewide commodity conference. Princeton, KY.

Kentucky Certified Crop Advisors board (2014 – present). Represent University of Kentucky on statewide board responsible for administering Kentucky's CCA program.

Kentucky CCA Exam committee (2017 – present). Revising and updating Kentucky CCA Performance Objectives, Proficiency Areas, and exam question bank.

Agri-business Association of Kentucky (2015 – present). Served as technical advisor on behalf of the University of Kentucky.

"Scoop on Poop" Multi-County Extension Programming conducted in cooperation with Dr. Shockley and Dr. Ritchey to inform growers on economic, agronomic, and environmental management of poultry litter (2016 – 2018). Brought in farmers for peer to peer programming with Kentucky farmers and provided training for multiple counties on proper management of poultry manure nutrients.

Consulting with Bluegrass Army Depot on phosphorus runoff issues (2016 – 2018)

Precision Agriculture Farm Management Software and Field Hardware Training for Kentucky Soybean, Corn, and Wheat Producers. Training funded by Kentucky Soybean Association, Wheat Growers, and Kentucky Corn Growers. Conducted by myself and Dr. Joe Luck over two days to provide hands-on experience in preparing prescriptions and evaluating data. Took over leadership of program in 2016. Held January 28-29, 2016 in Princeton, KY and December 15 and 16, 2016 in Owensboro, KY.

Participated in three segments of "AGLIFE" produced for local access TV and YouTube with 30,000 viewers. Available online at

- https://www.youtube.com/watch?v=_-vnIFG5enA
- https://www.youtube.com/watch?v=wQ8ZyP4V26Y
- https://www.youtube.com/watch?v=G1nlhs6qSlY&feature=youtu.be

Managing Poo meetings. Joint Training Sponsored by NRCS, KDDC, and UK for Dairy Producers. Held in Taylor, Barren, and Fleming Counties. January 2016.

University of Kentucky Corn, Soy, Tobacco Field Day. July 30, 2015. July 28, 2016

Kentucky AgriBusiness Association. Provided two talks for annual meeting. July 29, 2015.

Kentucky Cooperative Extension ANR Lync Training on Manure Management. April 22, 2015.

Turf Management Short Course. February 26, 2015. Louisville, KY.

Kentucky Fruit and Vegetable Conference. January 6, 2015. Lexington, KY.

Organized "Advanced P Management" Workshop (Jan. 24, 2007). Presented in and brought national speakers to address advanced phosphorus management in Maryland.

Organized "Advanced N Management" Workshop (Aug. 6, 2008)

- Brought national speakers to address advanced N management in Maryland

Maryland Department of Agriculture – Agricultural Nutrient Management Technical Advisory Committee (2006 – 2014)

- Advise Maryland Department of Agriculture in Revisions to Nutrient Application Guidelines Maryland USDA-NRCS Nutrient Management Sub-committee (2008 – present)
- Provide USDA-NRCS technical guidance on nutrient management practices to reduce environmental impact and increase production efficiency

Maryland USDA-NRCS State Technical Committee (2006 – 2014)
- Provide USDA-NRCS technical guidance on implementation of national practices and standards related to agricultural productivity and environmental protection

Maryland Department of Environment. Technical advice on MAFO/CAFO regulation (2008 - 2014)
- Primary source for science-based guidance on implementation of Confined Animal Feeding Operation regulation promulgated by the USEPA and administered by MDE
- Consult regularly with MDE personnel through meetings, training sessions, and electronic correspondence

Governor's BayStat Committee (2008 – 2014)
- Provide science-based consultation to Governor's BayStat Committee on practices to reduce nutrient loading from agriculture

Maryland Department of Agriculture – committee to revise cover crop cost share practices (2009-2014)
- Panel of regional experts on cover crops and nitrogen management and transport who provide science-based information on cover crop practices and effectiveness at reducing nitrogen loading to groundwater
- Provide scientific basis for Maryland Department of Agriculture cost-share program covering 400,000 acres in 2010

Middle Chester Partnership (2009 – 2014)
- Provide technical expertise on agriculture and water quality to partnership of stakeholders in the Middle Chester Watershed on 2010 Trust Fund Grant activities

USEPA Chesapeake Bay Program Technical Advisory Committee (2006 – 2014)
- Advise the CBP on agricultural best management practice efficiencies for inclusion in the Chesapeake Bay Model

Maryland Governor's Agricultural Commission
- Provide scientific updates on agricultural nutrient management issues in the State of Maryland.

Regional/National/International Extension Presentations

McGrath, J.M., Integrating Soil Biogeochemistry and Fertilizer Sciences to Improve Ecosystem Services across Agricultural Landscapes – A virtual private-public partnership exploration. Hosted by FFAR. "Enhanced efficiency fertilizer, precision management, and ecosystem services. (January 15, 2021)

McGrath, J.M. Michigan Agri-Business Association Winter Conference. "Precision management in an imprecise world." (January 12, 2021)

McGrath, J. M. Kentuckiana, Kentucky and Indiana CCA, "Precision nitrogen and phosphorus management." (December 2020).

McGrath, J. M. InfoAg, The Fertilizer Institute, "Managing spatial variability in nitrogen requirement." (December 17, 2020).

McGrath, J. M. Indiana CCA Conference, Indiana CCA, "Strategies to address variability in nitrogen requirement." (December 15, 2020).

McGrath, J. M. 2020 Illinois CCA Conference, Illinois CCA, "Working towards more precise nutrient management." (December 9, 2020).

McGrath, J. M. Northern Maryland Field Crops Day, University of Maryland Extension, "Precision nutrient management." (December 3, 2020).

McGrath, J. M. National CAFO Roundtable, Association of Clean Water Administrators, "Technology and Innovation: Precision Agriculture." (September 24, 2020).

McGrath, J. M., Managing your P on the farm, Sustainable Phosphorus Alliance, "Precision phosphorus management." (August 10, 2020).

McGrath, J. M., 2020 Milan No-Till Field Day, University of Tennessee, "Soil sampling for precision nutrient management." (July 23, 2020).

McGrath, J. M., Mid-Ohio Valley Grain Conference, WVU, "Precision Ag, Soil Testing, and Nutrient Management: Getting Started." (March 6, 2020).

McGrath, J. M., Ohio Conservation Tillage Conference, Ohio State University, "Precision application of nutrients." (March 3, 2020).

McGrath, J. M. (Presenter & Author), Sadeghour, A. (Presenter & Author), NREC Investment Insight Live, NREC, "Precision nitrogen management of corn for improving farm profitability and water quality." (February 13, 2020).

McGrath, J. M., Kentucky-Tennessee Grain Conference, UK and UT, "Soil Fertility - How to get the most from your investment." (February 7, 2020).

McGrath, J. M., West Tennessee Grain Conference, University of Tennessee, "Soil testing for precision ag." (February 5, 2020).

McGrath, J. M., Middle Tennessee Grain Conference, University of Tennessee, "Soil testing for precision ag: What we know and what we don’t." (February 4, 2020).

McGrath, J. M., Ohio Agribusiness Association 2020 Industry Conference, OABA, "Getting the best bang for your buck out of manure nutrients." (January 30, 2020).

McGrath, J. M., Kentucky Ag Expo, UK Extension, "Adjusting Nitrogen for Wet Summers." (January 29, 2020).

McGrath, J. M., National Association of State Conservation Agencies Annual Meeting, NASCA, "Precision Management: Science, substance, or soundbite." (October 2, 2019).

McGrath, J. M., SIU Carbondale University Farms 2019 Field Day, Illinois NREC, "On-farm precision nitrogen research." (June 26, 2019).

McGrath, J. M., East Tennessee Grains Conference, University of Tennessee, "Soil test philosophies and recommendations: Why can't we all just get along?" (January 24, 2019).

McGrath, J. M., Pennsylvania Agronomic Education Society Conference, Pennsylvania Agronomic Education Society, "Micronutrients: What do we really know?" (January 18, 2019).

McGrath, J. M., Delaware Ag Week - On Farm Research Workshop, University of Delaware, "Tips, Tricks, Trials, and Tribulations of on-farm nutrient research." (January 15, 2019).

McGrath, J. M. Servi-Tech Professional Development Conference, Servi-Tech, Inc, "*Nitrogen Management for Economic and Environmental Benefit*." (January 9, 2019).

IPM Masterclass: Nutrient Management and Soil Fertility. Description: Invited to Australia to conduct trainings for producers and ag retail professionals related to soil fertility and precision agriculture. Provided five hours of training 24 – 25 September 2018. Swan Hill, VIC, Australia.

IPM Masterclass: Nutrient Management and Soil Fertility. Description: Invited to Australia to conduct trainings for producers and ag retail professionals related to soil fertility and precision agriculture. Provided 16 hours of training 29 Aug – 6 Sep 2019. Dubbo, Wagga Wagga, Swan Hill, and Adelaide, Australia

Corteva Agriscience™ Agriculture Division of DowDuPont. Presented on “Vision for Future Areas of Nutrient Management Research” at their headquarters. Presentation was also broadcast as webinar to other Corteva locations. 5 September 2018. Indianapolis, IN.

Tennessee Agriculture Production Association. “Precision Nutrient Management and Water Quality.” 2 August 2018. Gatlinburg, TN.

National Strip Till Conference. Invited keynote speaker to present at conference banquet “Precision Nutrient Management and Water Quality.” Approximately 300 Industry professionals. Hosted by Lessiter Publications. 26 – 27 July 2018. Iowa City, Iowa

InfoAg “Do we have soil test recommendations precise enough to support precision agriculture?” Premier precision agriculture educational meeting in North America with international participation hosted by IPNI.18 July 2018. St. Louis, MO.

PARM webinar. Moving forward with sensor-based nitrogen management. Partnership for Ag Resource Management is a project of the non-profit IPM Institute out of Madison, Wisconsin. 304 Webinar participants 7 March 2018

University of Georgia UAV Training. Presented on precision nutrient management. University of Georgia organized two statewide precision agriculture trainings for county agents. The training objectives were to prepare agents to answer grower questions and provide guidance related to precision nutrient management and the use of UAV's in agriculture. 12 – 15 March 2018. Athens and Tifton, GA.

Nebraska Ag Tech Association Conference. NEATA is a farmer initiated and led organization focused on improved practices through ag technology. The University of Nebraska - Lincoln provides guidance to the organization. I was invited to make two presentations at their annual meeting. “Precision Nitrogen Management” and “Precision P and K Management.” 7 – 8 February 2018. Kearney, NE.

Subsurface application of manure - Project Spotlight. NFWF sponsored this webinar and posted recording of presentation online to highlight accomplishments and lessons learned during three-year project demonstrating cutting edge technologies to manage manure. 19 December 2017.

UW Discovery Farms conference keynote speaker. Navigating nutrients in a world of competing interests. 11 – 13 December 2017. Wisconsin Dell, WI.

Kentuckiana Crops Conference. Precision Nitrogen Management. Presented to CCA's and industry professionals from Kentucky and Indiana (with minor participation from surrounding states). 28 November 2017. French Lick, IN.

Chesapeake College. Precision Agriculture Today. Chesapeake College Agronomy Seminar. 21 November 2017. Wye Mills, MD.

Mid-Atlantic Crop Management School (2006 – 2017). Spoke annually on various topics. Premier educational event for agricultural professionals in the Mid-Atlantic (attendance ~ 200 – 300) seeking CCA, pesticide voucher, and nutrient management credits. Provide update on latest soil fertility research pertinent to the Mid-Atlantic.

Planter Research Workshop. At what scale should we conduct precision ag research. 7-9 November 2017. Burr Ridge, IL.

InfoAg Conference. Variable Rate Phosphorus – What do we really know? Premier precision agriculture educational meeting in North America with international participation hosted by IPNI.25-27 July 2017. St. Louis, MO.

Poultry litter injector forum. Moderated and made presentation in multi-state meeting reporting on findings from three-year multi-state research project. Over 100 producers and stakeholders attended. 6 July 2017. Wye Mills, MD.

De Soil Health and Water Quality Forum. Nutrient Management, Soil Health, and Water Quality. Workshop to discuss soil health and water quality. Participants included NGO, policy makers, farmers, and policy shapers. 17 March 2017. Georgetown, DE.

Ohio State University Conservation Tillage and Technology Conference. Precision nutrient management. 7 March 2017. Ada, Ohio

Ohio Corn College. Advances in nitrogen management. 22 January 2017. Wilmington, OH.

Kentuckiana Crops Conference. Manure nutrient management. Presented to CCA's and industry professionals from Kentucky and Indiana (with minor participation from surrounding states). 29 November 2016. French Lick, IN.

InfoAg Conference. Soil Test Recommendations and Variable Rate Fertilizer. Invited speaker and panelist. Premier precision agriculture educational meeting in North America with international participation hosted by IPNI. 2-4 August 2016. St. Louis, MO.

Variable Rate P & K – Is It Really Possible? Brookside Laboratories, Inc. International Consultants Conference. 7-9 August 2016. Lexington, Kentucky.

Field to Market 4R Phosphorus Scientific Experts Roundtable. Invited participant in meeting organized by IPNI, TFI, and Field to Market to prepare national 4R guidelines for phosphorus management and Field to Market Model. 1 – 2 June 2016. Washington DC

Multi-state evaluation of PSNT. Mid-Atlantic Soil Testing and Plant Analysis Workgroup. February 9, 2016. Richmond, VA

Variable rate nitrogen management. Ohio Agribusiness Association Conference. February 2, 2016. Columbus, OH

The World Food Prize. Invited to speak and participate in panel discussion on sustainable nutrient management. October 15, 2015. Des Moines, Iowa.

McGrath, J.M. 2015. Today’s nitrogen is tomorrow’s yield. Top Producer Conference. January 21. Chicago, IL.

McGrath, J.M. 2015. Managing manure in no-till production. Oklahoma No-Till Conference. March 3. Norman, OK.

Phosphorus management science and policy. Ohio Agribusiness Association Conference. February 4, 2015. Columbus, OH.

McGrath, J.M. 2013. Sensor-guided variable rate nitrogen. Northern Regional CCA Conference. Syracuse, NY. December 3 -5.

McGrath, J.M. 2013. Real world experiences with variable rate nitrogen. Keystone Crops Conference. Hershey, PA. October 30.

McGrath, J.M. 2013. Demystifying sensor based variable rate nitrogen. Keystone Crops Conference. Hershey, PA. October 30.

McGrath, J.M. 2013. Nutrient management and precision agriculture in the Chesapeake Bay watershed. Kansas Agricultural Research and Technology Association Conference. 17 – 18 January 2013. Salina, KS.

McGrath, J.M. 2013. Nutrient management in the Chesapeake Bay watershed. Minnesota Ag Expo. 28 January 2013. Mankato, MN.

McGrath, J.M. 2013. Managing phosphorus loss with tillage. Ohio AgriBusiness Association 2013 Crop Production and Seed Technology Conference. 30 January 2013. Columbus, OH.

McGrath, J.M. 2013. Keynote Speaker: Variable Rate N: Potential of prescription and sensor-based application rates. Pennsylvania Professional Crop Producers Conference. 19 – 21 February 2013. Lancaster, PA.

McGrath, J.M. 2013. Water Quality: Not just “Their” problem. National Corn Growers Association Commodity Classic Learning Center Session. 2 March 2013. Kissimmee, FL.

McGrath, J.M. 2012. Sensor guided variable rate nitrogen. Indiana CCA Conference. 18 – 19 December. Indianapolis, Indiana.

Penn, C.J., and J.M. McGrath. 2012. Using steel slag to remove phosphorus in runoff: design considerations, field results, and challenges. (45-minute keynote address split between two presenters) National Slag Association Annual Meeting. October 1-3, Isle of Palms, SC.

McGrath, J.M. 2012. Using conservation tillage to conserve nutrients. Pennsylvania Agronomic Education Conference. 17 – 18 January 2012. State College, PA.

McGrath, J.M. 2012. Challenges and solutions for managing biosolids nutrients. Mid-Atlantic Biosolids Association. 20 November 2012. Baltimore, MD.

McGrath, J.M. 2011. Managing Agricultural Drainage Waters to Protect Water Quality. 4th International Nutrient Management Symposium: Global Issues in Nutrient Management Science, Technology, and Policy. 21 – 24 August 2011. Newark, DE.

McGrath, J.M. 2011. Spatial variability of the right rate and how it affects timing and placement. In Special Symposia: Utilizing the 4R Nutrient Stewardship Framework. Soil and Water Conservation Society 2011 Annual Conference 18 – 19 July 2011. Washington, D.C.

McGrath, J.M. 2011. Rapid adoption of variable rate nitrogen using active optical sensors – The Mid-Atlantic example. Info-Ag 2011 Conference. 12 – 14 July 2011. Springfield, IL.

National Ocean Council, National Coastal and Marine Spatial Planning Workshop. Presented official comments on behalf of American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America to the National Ocean Council led by the White House Office of Science and Technology Policy. 21 June 2011, Washington, D.C.

McGrath, J.M. 2011. Agricultural policy and production to protect water quality in the Chesapeake Bay Watershed. Minnesota Soybean Board. February 16, 2011. Approximately 75 members

of the Minnesota Soybean Board. Presented the approach taken in the Chesapeake Bay Watershed to address non-point source pollution from agriculture.

McGrath, J.M. 2010. Advancements in sustainable agriculture. Presented to visiting scientists from Arvalis Institute du végétal hosted by DuPont Company. May 27, 2010.

McGrath, J.M., W. Thomason, and G. Binford. 2010. Real world (on-farm) implementation of sensor based variable rate nitrogen in Mid-Atlantic corn production. Conference Abstracts 10th International Conference on Precision Agriculture. 18 – 21 July 2010. Denver, CO.

McGrath, J.M., 2010. Manure application in no-till. In Manure Expo: Balancing Production and Conservation. State College, PA. July 15, 2010.

McGrath, J.M. Using active sensors to guide VRA nitrogen in corn. In Ag-Connect Expo. Orlando, FL. International agricultural exposition organized by Association of Equipment Manufacturers. (January 11 – 14, 2010).

Chesapeake Manure Summit. July 14, 2010. Workshop for experts and stakeholders in manure management and water quality to engage in discourse on manure management in the Chesapeake Bay region. “Best management practices for manure management: How far have we come and how far can we go.”

West Virginia University Precision Agriculture Conference. March 9, 2010. “Use of active optical sensing to guide variable rate nitrogen in corn and wheat.”

Chesapeake Bay Commission. November 12, 2009. Provided Commission with scientific basis for phosphorus management in Maryland.

Southern States Board Leadership Conference. December 2, 2009.

Frontiers in Nutrient Management Conference: Sources and solutions in the Inland Bays Watershed. January 28, 2009. Organized by the Delaware Center for the Inland Bays and University of Delaware. The conference initiated an effort to develop recommendations for nutrient management and policy in Delaware for Delaware’s new administration. Three more workshops will be held in 2009 to develop policy guidance and I have been asked to participate in this effort.

Delaware Ag Week (approximately 350 attendees)
- Adaptive nitrogen management in Mid-Atlantic corn production. January 8, 2009.
- Managing variable rate nitrogen in corn with active optical sensors. January 21, 2010
- No-till grain production and poultry litter: Potential environmental impacts and future solutions. January 21, 2010

Maryland Old Line Chapter, Soil and Water Conservation Society. Spring Tour – Innovative Agricultural Best Management Practices and Strategies with the Choptank River Watershed. April 3, 2008.

Delaware State University, College of Agriculture and Related Sciences Seminar Series. “Soil Science and water quality: where extension, research, and policy intersect in Maryland.” April 2, 2008.

National no-till conference hosted by Lessiter Publications. Indianapolis, Indiana (January 14 – 17, 2009) General session “Advanced Nutrient Management in No-till” Approximate attendance 855. Break-out session “Managing Manure in No-till” Approximate attendance 100.

Statewide Extension Presentations

Note: More recent statewide extension presentations are covered under "Statewide Activities."

University of Maryland Extension Agricultural Nutrient Management Program Winter Webinar Series. Interactive winter webinar series hosted by the UME-ANMP using Adobe Connect provides remote training for certified nutrient management consultants, certified farmers, and MDA and USDA staffers (100 – 200 participants annually, each provided with two hours of continuing education credits).

- 2013: Introduction to the revised Maryland Phosphorus Site Index: The University of Maryland Phosphorus Management Tool
- 2012: In-situ treatment of agricultural drainage to remove nutrients
- 2011: Advanced nitrogen management

Maryland Association of Soil Conservation Districts – Technical Committee. July 20, 2011. Reducing agricultural non-point source pollution through agronomic practices and new technology.

- Attendance approximately 50 – state and federal conservation staff and district supervisors.

Maryland Association of Soil Conservation Districts – State Soil Conservation Committee (SSCC). July 20, 2011. Update on the revised phosphorus site index.

- Attendance approximately 25. The SSCC coordinates the activities of Maryland's 24 soil conservation districts and appoints district supervisors. SSCC also develops, reviews, and refines policies on soil conservation and water quality issues, while advising the Secretary of Agriculture on these matters. Importantly, the Committee serves as a forum for all agencies involved in protecting natural resources.

Center for Watershed Protection. October 25, 2010. Invited Speaker: Agricultural Watershed Management.

Sigma Alpha Sorority, University of Maryland Chapter.

- March 29, 2010. Presentation: Sustainable Agriculture in Maryland.
- November 7, 2011. Presentation: Preparing for a career in agriculture.

Maryland Asia Environmental Partnership: Environmental Leadership Forum on Emerging Water and Wastewater Technologies (March 23, 2010) Easton, MD. Made presentation on new technologies in agricultural drainage water management.

AGNR MCE In-Service Day. Nutrient management update. (2010)

Maryland Department of Agriculture nutrient management training (2007 – Present). Annual training for nutrient management certification held by MDA.

Maryland Grain Producers Utilization Board Commodity Classic (2007 - Present)

Statewide Phosphorus site index training (2006 – Present)

Maryland Department of Agriculture, Public Drainage Association Annual Breakfasts (Mid and Lower shore 2007 - Present)

Agronomy training at AGNR MCE In-service Day. (2008)

County-based Extension Presentations

I have maintained a consistent track record of consulting with county agents to provide expertise on soil, water, and crop management, precision agriculture, and nutrient management. I routine speak at county meetings in my home state and neighboring states to provide current research and production recommendations.

- 2021: 3
- 2020: 15
- 2019: 15
- 2018: 8
- 2017: 11
- 2016: 13
- 2015: 19
- 2014: 15
- 2013: 4
- 2012: 12
- 2011: 10
- 2010: 14
- 2009: 7
- 2008: 10
- 2007: 13
- 2006: 3

Teaching and Mentoring

IMPACT: My sustained efforts in the area of graduate and undergraduate mentoring as well as periodic volunteer teaching activities have added new scientists in an underserved field of study and prepared the future generation of professionals in the areas of agronomy, nutrient management, soil fertility, and water quality protection.

Graduate Advising

Primary advisor not completed or in progress (2 M.S. and 1 Ph.D.)

James Bowen, Ph.D. ABT. Factors contributing to spatial and temporal variation in soil phosphorus critical thresholds. Department of Plant and Soil Science, College of Agriculture, Food, and Environment, University of Kentucky.

Clinton Gill. M.S. ABT. Department of Environmental Science and Technology, College of Agriculture and Natural Resources, University of Maryland. All but thesis.

Cheryl Carmona. M.S. ABT. Department of Environmental Science and Technology, College of Agriculture and Natural Resources, University of Maryland. All but thesis.

Primary advisor completed (n = 4 M.S. and 2 Ph.D.)

Lydia Fitzgerald. M.S. 2020. Not all litter is created equal: differences in nitrogen mineralization among broiler litter types. Department of Plant and Soil Sciences, College of Agriculture, Food, and the Environment, University of Kentucky. *Co-advisor*

Emileigh Rosso. M.S. 2017. Evaluating soil phosphorus dynamics over time. Department of Environmental Science and Technology, College of Agriculture and Natural Resources, University of Maryland.

Nicole Fiorellino. Ph.D. 2015. Evaluation of the accuracy and sensitivity of the University of Maryland phosphorus management tool and investigation of subsurface phosphorus dynamics in the Maryland coastal plain region. Department of Environmental Science and Technology, College of Agriculture and Natural Resources, University of Maryland.

Saptashati Biswas. Ph.D. 2014. Quantification of ionophore antimicrobials associated with poultry litter and their dynamics in the soils of the mid-Atlantic USA. Department of Environmental Science and Technology, College of Agriculture and Natural Resources, University of Maryland.

Joshua Lowman. M.S. 2013. Evaluation of floating treatment wetlands in stormwater retention ponds on poultry farms to reduce nutrient loading. Environmental Sciences Program, Towson University.

Karen Grubb. 2010. Utilization of gypsum as a filter material in agricultural drainage ditches: Impacts of land application on soil fertility conditions. M.S. Department of Environmental Science and Technology, College of Agriculture and Natural Resources, University of Maryland.

Vitalia Baranyai. M.S. 2011. Evaluation of base liners to reduce nitrogen and salt leaching from poultry litter storage stockpiles to the underlying soil – A field column study. Department of Environmental Science and Technology, College of Agriculture and Natural Resources, University of Maryland.

Committee member (Completed; n = 7 M.S. and 1 Ph.D.)

Sunendra Joshi. Ph.D. 2016. Biogeochemical cycling of phosphorus in the Chesapeake Bay and its watershed: Insights from phosphate oxygen isotope ratios. Department of Plant and Soil Sciences, University of Delaware.

Patrick Watkins. M.S. 2013. Nitrogen management in corn: influences of urea ammonium nitrate (UAN) applications with and without nitrogen stabilizer products. Department of Plant Sciences and Landscape Architecture, College of Agriculture and Natural Resources, University of Maryland.

Dustin Stoner. M.S. 2011. Industrial by-product characterization for phosphorus removal in environmental contaminant filters. Department of Plant and Soil Sciences, Oklahoma State University.

Jennifer Brundage. M.S. 2010. Grazing as a management tool for controlling Phragmites australis and restoring native plant biodiversity in wetlands. Department of Environmental Science and Technology, College of Agriculture and Natural Resources, University of Maryland.

Christine Bevacqua. M.S. 2010. Steroid hormones in biosolids and poultry litter: A comparison of potential environmental inputs. Department of Civil and Environmental Engineering, A. James Clark School of Engineering, University of Maryland.

Nicole Fiorellino. M.S. 2010. Characterizing the use of best management practices and measurements of pasture and soil quality on Maryland horse farms. Department of Animal and Avian Science, College of Agriculture and Natural Resources, University of Maryland.

Sean O'Neill. M.S. 2010. Use of drinking water treatment residuals as a soil amendment for stormwater nutrient treatment. Department of Civil and Environmental Engineering, A. James Clark School of Engineering, University of Maryland.

Guannan Qiu. M.S. 2008. Effective setbacks for controlling nutrient runoff losses from land-applied poultry litter. Department of Agriculture and Natural Resources, Delaware State University.

Committee member in progress (n = 3 M.S. and 1 Ph.D.)

Rebecca McGrail. Ph.D. Expected 2021. Rhizosphere Priming Effects on Legacy Organic Phosphorus in a Managed Agroecosystem. Department of Plant and Soil Sciences, College of Agriculture, Food, and the Environment, University of Kentucky.

Chris Brosch. M.S. ABT. Department of Environmental Science and Technology, College of Agriculture and Natural Resources, University of Maryland.

David Hamrum. M.S. ABT. Department of Environmental Science and Technology, College of Agriculture and Natural Resources, University of Maryland.

Undergraduate Advising (n = 6)

Faculty mentor for undergraduate independent study (PLS 395) for Morgan Vogt. Objectives: 1) Understand factors influencing phosphorus (P) fertilizer response. 2) Learn how to plan, execute, and report results from advanced soil fertility laboratory experiments., Status: In-Process, (January 15, 2020 - Present).

Capstone project mentor (Academic year 2013-2014). Advised five seniors for their required Capstone project. They evaluated soil nitrogen transformations related to nitrapyrin use with poultry litter and inorganic fertilizer.

Capstone project mentor (Academic year 2012-2013). Advised three seniors for their required Capstone project. They are incorporating Maryland nutrient recommendations into a user-friendly cell phone application for the Android operating system.

Devon Welsh. Undergraduate internship. Natural Resources Management: Land and Water Management major (June – August 2007)

Joshua Lowman. Undergraduate internship. Natural Resources Sciences: Conservation of Soil, Water, and Environment major (January 2008 – 2010)

Emileigh Rosso. Undergraduate internship. Environmental Science and Policy (June – August 2010)

Teaching

Prefix & Number	Credit Hours	No. Enrolled	Semester/Yr.
PLS 470G - 001	3.00000 - 3.00000	15	30 Spring 2017-2018
NRE 470G - 001	3.00000 - 3.00000	9	30 Spring 2016-2017
PLS 470G - 001	3.00000 - 3.00000	12	30 Spring 2016-2017

Pre-Undergraduate

Technical advisor: Lakewood High School, St. Petersburg, FL. Internet Science and Technology Fair.

Service

IMPACT: I am doing my part to serve professional organizations in my field, the campus community, and my local community. Elected positions demonstrate international peer recognition of leadership in the field of soil fertility and nutrient management. I believe that strong professional societies (e.g. ASA-CSSA-SSSA and ISPA) provide broad benefit to our disciplines and I therefore contribute significant time to their operation.

Offices and committee memberships held in professional organizations

Gamma Sigma Delta –National Capital Area Chapter (2008 – 2014)

- Past President (2013 – 2014)
- President (2011-2013)
- President-Elect (2010)
- Treasurer (2009)

International Society of Precision Agriculture. (2010 – Present).

Soil Science Society of America and American Society of Agronomy (1999 – Present)
Elected positions

- Past Chair, Nutrient Management and Soil and Plant Analysis Division, Soil Science Society of America (2016)
- Chair, Nutrient Management and Soil and Plant Analysis Division, Soil Science Society of America (2015)
- Chair Elect, Nutrient Management and Soil and Plant Analysis Division, Soil Science Society of America (2014)
- Vice Chair Adaptive Nutrient Management Community, American Society of Agronomy (2012 – 2014)
- Nominee Vice Chair, Precision Agriculture Community, Agronomic Production Systems, Agronomy Society of America (2014, declined)
- Nominee Section Vice Chair, Agronomic Production Systems, Agronomy Society of America (2012, declined)

Appointed committees and other service

- North American Proficiency Testing (NAPT) Program Board (2015)
- ASA President's Membership Task Force (2014 – 2016)
- ACS 237 Membership and Identity Committee (2012 – 2014). Special committee representing ASA, SSSA, CSA, and CCA tasked with addressing needs of the membership of all three societies, both for recruitment and retention.
- Rapid Response Team representative for North East Branch to ASA-CSA-SSSA Policy office (2007 – 2011)
- Represented and presented comments for ASA-SSSA-CSA at the "National Coastal and Marine Spatial Planning Workshop" 21 June 2011. U.S. Department of the Interior. Washington, D.C.
  - Organized committee and authored official comments representing the expertise of ASA-SSSA-CSA
- Early Career Members Committee (2007 – 2010)
  - Responsible for monthly column in CSA News (2009)
- Participant in the inaugural ASA Leader Development Program (2007)
- Participant in the inaugural ASA Leader Development Program II (2008)
- Chair (2006), Emil Troug Soil Science Award Committee (2004 – 2006)
- Training and Continuing Education for Soil Scientists Committee (2004 – 2007)

North East Branch Crop Soil and Agronomy Societies

- SSSA Representative to board of directors (2007 – 2010)
- Co-organizer, 2011 Annual Meeting (June 26 – 28, 2011)

Other committees, commissions, panels, etc. outside of University of Kentucky

USDA-NIFA Sustainable Agriculture Systems Grant Review Panel (FY 2018). First time offering for Coordinated Agricultural Projects up to $10 million total per project. Assigned principal reviewer for 12 proposals. Contributed review on over 50 proposals in total.

USEPA and USDA Joint Committee on Enhanced Efficiency Fertilizers, Discuss and provide guidance for challenge grant by USDA-USEPA to develop innovative enhanced fertilizer products., Washington, DC, (September 2019 - present).

Philadelphia Society for Promoting Agriculture (January 2004 – present). Oldest continually operating agriculture information exchange group in the country. Assistant Treasurer (2008 – 2011)

Center for Integrated Biological and Environmental Research – External Advisory Board (2014 – 2016). Regional research networking hub for Delaware's higher education institutions

Campus

Steering Committee for the Graduate program (MS) in Science Translation and Outreach in the College of Agriculture, Food and Environment, University of Kentucky, Agriculture Food and Environment. Provide oversight and guidance to the online MS program for CAFE Committee's Accomplishments: Launched successful online degree program in short timeframe. (January 2018 - Present)

Agribusiness Association of Kentucky, University of Kentucky, College of Agriculture, Food, And Environment. Serve as University of Kentucky representative to the ABAK Board of Directors. (August 2017 - Present)

Department of Plant and Soil Sciences, University of Kentucky

- Soil Fertility Teaching and Research Assistant Professor Search Committee (2017 – 2018)
- Ad hoc committee to review polices for research farm (2018)
- Ad hoc committee to establish guidelines for Blevins Long Term No-till Plots (Chair, 2017)
- Forage Extension Specialist Search Committee (Chair, 2015-2016)
- AGR-1 (Co-Chair, 2014-present)
- Spindletop Land Use Committee (2014-present)
- Farm Safety Committee (Chair, 2014-present)

College of Agriculture and Natural Resources, University of Maryland

- Faculty Advisor – AGNR Student Council (2008 – 2014). The AGNR Student Council has representation from each club within the College of Agriculture and Natural Resources. The Council provides leadership and is responsible for the Fall Bash, Ag Day, and hosts an award banquet each year. I provide faculty supervision at their meetings (bi-weekly during the academic year) and act as a resource to this student run organization.
- Chair, Eastern Shore Regional Nutrient Management Coordinator Search Committee (2007)

Department of Environmental Science and Technology, University of Maryland

- Marketing Committee (2006 – 2008)
- Faculty Review and Salary Committee (2009 – 2010)
- Chair's Faculty Advisory Committee (2011 – present)
- Environmental Microbiology Faculty Search Committee (2011)
- Analytical Lab Committee (2006 – 2014)

Multistate Research Coordinating Committees and Information Exchange Groups

Organization to Minimize Phosphorus Losses from Agriculture - South Extension, Regional Activity 17 (SERA-17)

- Host of the 2008 meeting in Maryland: Organized three-day conference for over 100 participants (national international) that included two days of talks and one day of visiting research sites on the Delmarva Peninsula
  - Raised approximately $2,000 in support
  - Organized program containing 12 speakers of national reputation (Including one international speaker)

SERA 6 Southeast Regional Committee on soil, plant, byproduct, and water analysis

NEERA 1402 Reporting Guidelines and Data Handling Protocols for Databases of Nitrogen Response Trials in Corn

NCERA 180: Precision Agriculture Technologies for Food, Fiber, and Energy Production

NEERA1002: Adaptive Management for Improved Nutrient Management

NEC-1007/1012/1312 Northeast Regional Committee on Soil Testing (2006 – present)

- Group meets annually and consists of Land Grant University Soil Fertility Specialists and Soil Testing Lab Managers
- Reviews important advances in soil testing and fertility science to:
  - Provide uniform application of science to soil testing industry
  - Provide technology transfer to private laboratories
- Maintains the publication “Recommended Soil Testing Procedures for the Northeastern United States.”

Community, State, National

Boy Scouts of America
- Eagle Scout (1992)
- Assistant Scoutmaster (1993 – 2006)

Citizens’ Hose Company, No. 1, Inc. Volunteer fire department (1991 – present)
- Fire line officer (appointed, 2002 and 2003)
- Board of Directors (elected; 2002 and 2003)
- Life Member Status (November 2007)

Ducks Unlimited Committee Member, Kent County, Delaware (January 2003 – April 2004).

Ruritan International, Catawba, Virginia (September 2004 – April 2006).

Awards and Honors

National Awards and Honors

Agronomic Education and Extension Award, American Society of Agronomy. 2019. The Agronomic Education and Extension Award recognizes excellence in extension, with emphasis on the individual's educational innovations or unique approaches developed and used successfully to encourage learning, with demonstrated ability to communicate ideas clearly, influence attitudes, and motivate change in audience action.

Young Scholar Award, Soil and Water Management and Conservation Division, Soil Science Society of America. 2011. The Young Scholar Award recognizes young scientists who have made an outstanding contribution in Soil and Water Management and Conservation within seven years of completing their Ph.D.

Distinguished Young Alumni Award. 2011. University of Delaware, College of Agriculture and Natural Resources.

Inspiring Young Scientist Award. 2010. The American Society of Agronomy, Division A-5 Environmental Quality.

Regional Awards and Honors

Excellence in Extension Award. 2013. Northeast Branch of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America.

Mid-Atlantic Regional Educational Institution and Federal Laboratory Partnership Award. 2011. Recognizes the efforts of agency and laboratory employees who have collaboratively accomplished outstanding work in the process of transferring subsurface manure application technology. Awarded to: Peter Kleinman (USDA-ARS), Douglas Beegle (PSU), Heather Karsten (PSU), Robin Brandt (PSU), Rory Maguire (VPI), Arthur Allen (UMES), Joshua McGrath (UMD), Quirine Ketterings (Cornell), Greg Binford (UD), and Daniel Pote (USDA-ARS).

Excellence in Research Award. 2010. Northeast Branch of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America.

Excellence in Research Award. 2009. Gamma Sigma Delta, University of Maryland - National Capital Area Chapter.

Local Awards and Honors

2011 Excellence in Extension Award. University of Maryland, College of Agriculture and Natural Resources Alumni Association.

2011 Excellence in Extension Award. University of Maryland, College of Agriculture and Natural Resources, Department of Environmental Science and Technology.

On Campus Junior Faculty Award. 2010. College of Agriculture and Natural Resources, University of Maryland Excellence Awards.

Honoree at Annual University-Wide Celebration of Scholarship and Research by the Vice President of Research and the Provost for Scholarly and Research Accomplishments: 2008, 2009, 2010, 2011, 2012, and 2013.

Honoree at Annual Research Leaders Luncheon, University of Maryland, Division of Research: 2008 and 2010