Larry Matthew York
Curriculum Vitae

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RESEARCH INTERESTS

Autonomous discovery, phenomics, roots, soil, ecophysiology, AI, simulations, open science

EDUCATION

2014	Pennsylvania State University Advisor: Jonathan Lynch	Ph.D.	Ecology
2006	University of Kentucky	B.S.	Biology

PROFESSIONAL POSITIONS

2024–	Senior Staff Scientist	Oak Ridge National Laboratory
2021–2024	Staff Scientist	Oak Ridge National Laboratory
2017–2021	Assistant Professor	Noble Research Institute, LLC
2016–2017	Postdoctoral Research Fellow Supervisors: Felix Fritschi and Robert Sharp	University of Missouri
2014–2016	Postdoctoral Research Fellow Supervisors: John Foulkes and Malcolm Bennett	University of Nottingham

FELLOWSHIPS, AWARDS, AND HONORS

2024	Biosciences Division Distinguished Achievement Award for Outreach Excellence
2020	AoB Plants (AoBP) - Early Career Open Science Award
2016	UK Plant Phenotyping Network Travel Award
2010–2013	Walter Thomas Memorial Scholarship, PSU
2010	Root Biology Center Scholarship, South China Agricultural University
2009	China Root Biology Fellowship, PSU
2008	University Graduate Fellowship and Award for Excellence, PSU

SERVICE AND LEADERSHIP

2022–2025	Editor-in-Chief, *Plant Direct* (dual-society journal, ASPB and SEB)
2022–	Chair, Root Phenotyping Working Group of the IPPN
2023–	Member, Biosciences Division Extended Leadership Team
2021–	ORNL representative to International Plant Phenotyping Network (IPPN)

PUBLICATIONS

Peer-reviewed Journal Articles (51 articles, 5366 citations, h-index: 28, 15 corresponding author*, co-first authors †)

51. Seethepalli, A., Ottley, C., Childs, J., Cope, K., Fine, A. K., Lagergren, J., Kalluri, U., Iversen, C. M., **York, L. M.*** (2024). Divide and conquer: Using RhizoVision Explorer to aggregate data from multiple root scans using image concatenation and statistical methods. *New Phytologist* **224**, 2101-2108. DOI: 10.1111/nph.20151

50. Weihs, B. J., Tang, Z., Tian, Z., Heuschele, D. J., Siddique, A., Terrill, T. H., Zhang, Z., **York, L. M.**, Samac, D., Zhang, Z., and Xu, Z. (2024). Phenotyping alfalfa (*Medicago sativa* L.) root structure architecture via integrating confident machine learning with ResNet-18. *Plant Phenomics*. DOI: 10.34133/plantphenomics.0251

49. Truong, N. Q., **York, L. M.**, Decker, A., Douglas, M. R. (2024) Cover Crops in a Changing Climate: Can Mixtures Reduce Water Stress? *AoB Plants.* DOI: 10.1093/aobpla/plae039

48. Fusi, R., Milner, S. G., Rosignoli, S., Bovina, R., Vieira Teixeira, C. J., Lou, H., Brian S. Atkinson, B. S., Borkar, A. N., **York, L. M.**, Jones, D. H., Sturrock, C. J., Stein, N., Mascher, M., Tuberosa, R., O'Connor, D., Bennett, M. J., Bishopp, A., Salvi, S., and Bhosale, R. (2024). The auxin efflux carrier PIN1a regulates vascular patterning in cereal roots. *New Phytologist*. DOI: 10.1111/nph.19777

47. Weihs, B. J., Heuschele, D. J., Tang, Z., **York, L. M.**, Zhang, Z., and Xu, Z. (2024). The State of the Art in Root System Architecture Image Analysis Using Artificial Intelligence: A Review. *Plant Phenomics* **6**. DOI: 10.34133/plantphenomics.0178

46. Lynch, J. P., Galindo-Castañeda, T., Schneider, H. M., Sidhu, J. S., Rangarajan, H., **York, L. M.** (2023). Root phenotypes for improved nitrogen capture. *Plant and Soil*. DOI: 10.1007/s11104-023-06301-2

45. Lagergren, J., Pavicic, M., Chhetri, H. B., **York, L. M.**, Hyatt, P. D., Kainer, D., Rutter, E. M., Flores, K., Bailey-Bale, J., Klein, M., Taylor, G., Jacobson, D., Streich, J. (2023). Few-shot learning enables population-scale analysis of leaf traits in *Populus trichocarpa*. *Plant Phenomics* **5**. 0072. DOI: 10.34133/plantphenomics.0072

44. Yao, T., Zhan, J., Yates, T. B., Shrestha, H. K., Engle, N. L., Ployet, R., John, C., Feng, K., Bewg, W. P., Chen, M., Lu, H., Harding, S. A., Qiao, Z., Jawdy, S. S., Shu, M., Harman-Ware, A. E., Happs, R. M., **York, L. M.**, Binder, B. M., Yoshinaga, Y., Daum, C., Tschaplinski, T. J., Abraham, P. E., Tsai, C. J., Barry, K., Lipzen, A., Schmutz, J., Tuskan,G. A., Chen, J. G., and Muchero, W. (2023). eQTL mapping identified PtrXB38 as a key hub gene in adventitious root development in *Populus*. *New Phytologist* **239**, 2248–2264. DOI: 10.1111/nph.19126

43. Weigelt, A., Mommer, L., Andraczek, K., Iversen, C. M., Bergmann, J., Bruelheide, H., Fan, Y., Freschet, G. T, Guerrero-Ramírez, N. R., Kattge, J., Kuyper, T. W., Laughlin, D. C., Meier, I. C., van der Plas, F., Poorter, H., Roumet, C., van Ruijven, J., Sabatini, F. M., Semchenko, M., Sweeney, C. J., Valverde-Barrantes, O. J., **York, L. M.**, and McCormack, M. L. (2023). The importance of trait selection in ecology: Roots redefine the global spectrum of plant form and function. *Nature* **618**, E29-E30. DOI: 10.1038/s41586-023-06148-8

42. O'Leary, B. M., Scafaro, A. P., and **York, L. M.** (2023). High-throughput, dynamic, multi-dimensional: an expanding repertoire of plant respiration measurements. *Plant Physiology* **191**, 2070–2083. DOI: 10.1093/plphys/kiac580

41. Fusi, R., Rosignoli, S., Lou, H., Giuseppe Sangiorgi, G., Bovina, R., Pattem, J. K., Borkar, A. N., Lombardi, M., Forestan, C., Milner, S. G., Davis, J. L., Lale, A., Kirschner, G. K., Swarup, R., Tassinari, A., Pandey, B. K., **York, L. M.,** Atkinson, B. S., Sturrock, C. J., Mooney, S. J., Hochholdinger, F., Tucker, M. R., Himmelbach, A., Stein, N., Mascher, M., Nagel, K. A., De Gara, L., Simmonds, J., Uauy, C., Tuberosa, R., Lynch, J. P., Yakubov, G. E., Bennett, M. J., Bhosale, R., and Salvi, S. (2022). Root angle is controlled by EGT1 in cereal crops employing a novel anti-gravitropic mechanism. *Proceedings of the National Academy of Sciences*. **119**: e2201350119. DOI: 10.1073/pnas.2201350119

40. Prince, S., Anower, M. R., Motes, C. M., Hernandez, T. D., Liao, F., Putman, L., Mattson, R., Seethepalli, A., Shah, K., Komp, M., Mehta, P., **York, L. M.**, Young, C., and Monteros, M. J. (2022). Intraspecific variation for leaf physiological and root morphological adaptation to drought stress in Alfalfa (*Medicago sativa* L.). *Frontiers in Plant Science.* **13**:795011. DOI: 10.3389/fpls.2022.795011

39. Xu, Z, **York, L. M.***, Seethepalli, A., Bucciarelli, B., Cheng, H., and Samac, D. A. (2022). Objective phenotyping of root system architecture using image augmentation and machine learning in alfalfa (*Medicago sativa* L.). *Plant Phenomics. 9879610.* DOI: 10.34133/2022/9879610

38. Maqbool, S., Hassan, M., Xia, X., **York, L. M.**, Rasheed, A., and He, Z. (2022). Root system architecture in cereals: progress, challenges, and perspective. *The Plant Journal* **110**, 23–42. DOI: 10.1111/tpj.15669

37. Griffiths, M., Mellor, N., Sturrock, C. J., Atkinson, B. S., Johnson, J., Mairhofer, S., **York, L. M.**, Atkinson, J. A., Soltaninejad, M., Foulkes, J. F., Pound, M. P., Mooney, S. J., Pridmore, T. P., Bennett, M. J., and Wells, D. M. (2022). X-ray CT reveals 4D root system development and lateral root responses to nitrate in soil. *The Plant Phenome Journal*. 5: e20036. DOI: 10.1002/ppj2.20036

36. **York, L. M.***, Griffiths, M., and Maaz, T. M. (2022). Whole-plant phenotypic engineering: Moving beyond ratios for multi-objective optimization of nutrient use efficiency. *Current Opinion in Biotechnology.* **75**:102682. DOI: 10.1016/j.copbio.2022.102682

35. Roy, S., Griffiths, M., Torres-Jerez, I., Sanchez, B., Antonelli, E., Jain, D., Krom, N., Zhang, S., **York, L. M.**, Scheible, W., and Udvardi, M. K. (2022). Application of synthetic peptide CEP1 increases nutrient uptake rates along plant roots. *Frontiers in Plant Science.* **12**:793145. DOI: 10.3389/fpls.2021.793145

34. **York, L. M.***, Cumming, J. R., Trusiak, A., Bonito, G., von Haden, A. C., Kalluri, U. C., Tiemann, L. K., Andeer, P. F., Blanc-Betes, E., Diab, J. H., Favela, A., Germon, A., Gomez-Casanovas, N., Hyde, C. A., Kent, A. D., Ko, D. K., Lamb, A., Missaoui, A., Northern, T. R., Pu, Y., Ragauskas, A. J., Raglin, S., Scheller, H. V., Ware, A., Washington, L., and Yang, W. H. (2022). Bioenergy Underground: challenges and opportunities for phenotyping roots and the microbiome for sustainable bioenergy crop production. *The Plant Phenome Journal.* 5: e20028. DOI: 10.1002/ppj2.20028

33. Griffiths, M., Wang, X., Dhakal, K., Guo, H., Seethepalli, A., Kang, Y., and **York, L. M.*** (2022). Interactions among rooting traits for deep water and nitrogen uptake in upland and lowland ecotypes of switchgrass (*Panicum virgatum* L.). *Journal of Experimental Botany* **73**, 967–979.

32. Seethepalli, A., Dhakal, K., Griffiths, M., Guo, H., Freschet, G. T., and **York, L. M.*** (2021). RhizoVision Explorer: Open-source software for root image analysis and measurement standardization. *AoB Plants* **13**, plab056. DOI: 10.1093/aobpla/plab056

31. Fonseca, J. P., Griffiths, M., **York, L.M.*** and Mysore, K. S. (2021). Dark respiration measurement from shoots in Arabidopsis. *Bio-protocol* **111**(19), e4181 DOI: 10.21769/BioProtoc.4181

30. Weigelt, A., Mommer, L., Andraczek, K., Iversen, C. M., Bergmann, J., Bruelheide, H., Freschet, G. T., Guerrero-Ramirez, N. R., Kattge, J., Kuyper, T. W., Laughlin, D.C., Meier, I. C., van der Plas, F., Poorter, H., Fan, Y., Roumet, C., van Ruijven, J., Sabatini, F. M., Semchenko, M., Sweeney, C. J., Valverde-Barrantes, O. J., **York, L. M.**, and McCormack, M. L. (2021). An integrated framework of plant form and function: The belowground perspective. *New Phytologist* **232**, 42-59.

29. Udvardi, M., Below, F. E., Castellano, M. J., Eagle, A., Giller, K. E., Ladha, J. K.,Liu, X., Maaz, T. M., Nova-Franco, B., Raghuram, N., Robertson, G. P., Saha, M., Roy, S., Schmidt, S., Tegeder, M., **York, L. M.**, and Peters J. W. (2021). A research road map for responsible use of agricultural nitrogen. *Frontiers in Sustainable Food Systems.* **5**:660155 DOI: 10.3389/fsufs.2021.660155

28. Laughlin, D.C., Mommer, L., Sabatini, F. M., Bruelheide, H., Kuyper, T. W., McCormack, M. L., Bergmann, J., Freschet, G. T., Guerrero-Ramirez, N. R., Iversen, C. M., Kattge, J., Meier, I. C., Poorter, H., Roumet, C., Semchenko, M., Sweeney, C. J., Valverde-Barrantes, O. J., van der Plas, F., van Ruijven, J., **York, L. M.**, Aubin, I., Burge, O. R., Byun, C., Ćušterevska, R. Dengler, J., Forey, E., Guerin, G. R., Hérault, B., Jackson, R., Karger, D. N., Lenoir, J., Lysenko, T., Meier, P., Niinemets, U., Ozinga, W. A., Penuelas, J., Reich, P. B., Schmidt, M., Schrodt, F., Velázquez, E., and Weigelt, A. (2021). Root traits explain plant species distributions along climatic gradients yet challenge the nature of ecological trade-offs. *Nature Ecology and Evolution* **5**, 1123-1134.

27. Freschet, G. T., Pagès, L., Iversen, C. M., Comas, L. H., Rewald, B., Roumet, C., Klimešová, J., Zadworny, M., Poorter, H., Postma, J. A., Adams, T. S., Bagniewska-Zadworna, A., Bengough, A. G., Blancaflor, E. B., Brunner, I., Cornelissen, J. H. C., Garnier, E., Gessler, A., Hobbie, S. E., Meier, I. C., Mommer, L., Picon-Cochard, C., Rose, L., Ryser, P., Scherer-Lorenzen, M., Soudzilovskaia, N. A., Stokes, A., Sun, T., Valverde-Barrantes, O. J., Weemstra, M., Weigelt, A., Wurzburger, N., **York, L. M.**, Batterman, S. A., Gomes de Moraes, M., Janeček, Š., Lambers, H., Salmon, V., Tharayil, N., and McCormack, M. L. (2021). A starting guide to root ecology: strengthening ecological concepts and standardizing root classification, sampling, processing and trait measurements. *New Phytologist* **232**, 973-1122.

26. Nehe, A. S., Foulkes, M. J., Ozturk, I., Rasheed, A., **York, L. M.**, Kefauver, S. C., Ozdemir, F., and Morgounov, A. (2021). Root and canopy traits and adaptability genes explain drought tolerance mechanism in winter wheat. *PLOS One.* DOI: 10.1371/journal.pone.0242472

25. Guo, H., Ayalew, H., Seethepalli, A., Dhakal, K., Griffiths, M., Ma, X., and **York, L. M.*** (2021). Functional phenomics and genetics of the root economics space in winter wheat using high-throughput phenotyping of respiration and architecture. *New Phytologist* **232**, 91-112.

24. Bardhan, K. †, **York, L. M.** †, Hasanuzzaman, M., Parekh, V., Jena, S., and Pandya, M. N. (2021). Can smart nutrient applications optimize the plant's hidden half to improve drought resistance? *Physiologia Plantarum* **172**, 1007-1015.

23. Griffiths, M., Roy, S., Guo, H., Seethepalli, A., Huhman, D., Ge, Y., Sharp, R. E., Fritschi, F. B., and **York, L. M.*** (2021). A multiple ion-uptake phenotyping platform reveals shared mechanisms affecting nutrient uptake by roots. *Plant Physiology* **185**, 781-795.

22. Dhanapal, A. P., **York, L. M.**, Hames, K. A., and Fritschi, F. B. (2021). Genome-wide association study of topsoil root system architecture in field-grown soybean [*Glycine max* (L.) Merr.]. *Frontiers in Plant Science*. **11**:590179. DOI: 10.3389/fpls.2020.590179

21. Freschet, G. T., Roumet, C., Comas, L. H., Weemstra, M., Bengough, A. G., Rewald, B., Bardgett, R. D., De Deyn, G. B., Johnson, D., Klimešová, J., Lukac, M., McCormack, M. L., Meier, I. C., Pagès, L., Poorter, H., Prieto, I., Wurzburger, N., Zadworny, M., Bagniewska-Zadworna, A., Blancaflor, E. B., Brunner, I., Gessler, A., Hobbie, S. E., Iversen, C. M., Mommer, L., Picon-Cochard, C., Postma, J. A., Rose, L., Ryser, P., Scherer-Lorenzen, M., Soudzilovskaia, N. A., Sun, T., Valverde-Barrantes, O. J., Weigelt, A., **York, L. M.**, and Stokes, A. (2021). Root traits as drivers of plant and ecosystem functioning: current understanding, pitfalls and future research needs. *New Phytologist* **232,** 1123-1158.

20. Burridge, J. D., Black, C. K., Nord, E. A., Postma, J. A., Sidhu, J. S., **York, L. M.**, and Lynch, J. P. (2020). An analysis of soil coring strategies to estimate root depth in maize (*Zea mays*) and common bean (*Phaseolus vulgaris*). *Plant Phenomics* **2020**. 3252703 DOI: 10.34133/2020/3252703

19. Fonseca, J. P., Lee, H-K., Boschiero, C., Griffiths, M., Lee, S., Zhao, P. X., **York, L. M.**, and Mysore, K. S. (2020). Iron-sulfur cluster protein NITROGEN FIXATION S-LIKE 1 and its interactor FRATAXIN function in plant immunity. *Plant Physiology* **184**, 1532-1548. DOI: 10.1104/pp.20.00950

18. Guerrero-Ramírez, N. R., Mommer, L., Freschet, G. T., Iversen, C. M., McCormack, M. L., Kattge, J., Poorter, H., van der Plas, F., Bergmann, J., Kuyper, T. W., **York, L. M.**, Bruelheide, H., Laughlin, D.C., Meier, I.C., Roumet, C., Semchenko, M., Sweeney, C. J., van Ruijven, J., Valverde-Barrantes, O. J., Aubin, I., Catford, J. A., Manning, P., Martin, A., Milla, R., Minden, V., Pausas, J. G., Smith, S. W., Soudzilovskaia, N. A., Ammer, C., Butterfield, B., Craine, J., Cornelissen, J. H. C., de Vries, F. T., Isaac, M. E., Kramer, K., König, C., Lamb, E. G., Onipchenko, V. G., Peñuelas, J., Reich, P. B., Rillig, M. C., Sack, L., Shipley, B., Tedersoo, L., Valladares, F., van Bodegom, P., Weigelt, P., Wright, J. P., and Weigelt, A. (2020). Global root traits (GRooT) database. *Global Ecology and Biogeography* **30**, 25-37. DOI: 10.1111/geb.13179

17. Bergmann, J., Weigelt, A., van der Plas, F., Laughlin, D. C., Kuyper, T. W., Guerrero-Ramirez, N., Valverde-Barrantes, O. J., Bruelheide, H., Freschet, G. T., Iversen, C.M., Kattge, J., McCormack, M.L., Meier, I.C., Rillig, M.C., Roumet, C., Semchenko, M., Sweeney, C.J., van Ruijven, J., **York, L. M.**, and Mommer, L. (2020). The fungal collaboration gradient

dominates the root economics space in plants. *Science Advances* ***6****. DOI: 10.1126/sciadv.aba37*

16. Griffiths, M. G. and **York, L. M.*** (2020). Targeting root ion uptake kinetics for increasing plant productivity and nutrient use efficiency. *Plant Physiology* **182**, 1854-1868.

15. Seethepalli, A., Guo, H., Liu, X., Griffiths. M. G., Almtarfi, H., Li, Z., Liu, S., Zare, A., Fritschi, F., Blancaflor, E., Ma, X., and **York, L. M.*** (2020). RhizoVision Crown: An integrated hardware and software platform for root crown phenotyping. *Plant Phenomics* **2020**. DOI:10.34133/2020/3074916

14. Le Marié, C. A., **York, L. M.**, Strigens, A., Malosetti, M., Camp, K. H., Giuliani, S, Lynch, J. P., and Hund, A. (2019). Shovelomics root traits assessed on the EURoot maize panel are highly heritable across environments but show low genotype-by-nitrogen interaction. *Euphytica.* **215** (173). DOI: 10.1007/s10681-019-2472-8

13. Guo, H., and **York, L. M.*** (2019). Maize with fewer nodal roots allocates mass to more lateral and deep roots that improve nitrogen uptake and shoot growth. *Journal of Experimental Botany* **70**, 5299-5309.

12. Mattupalli, C., Seethepalli, A., **York, L. M.***, and Young, C. A. (2019). Digital imaging to evaluate root system architectural changes associated with soil biotic factors. *Phytobiomes Journal*. DOI: 10.1094/pbiomes-12-18-0062-r.

11. **York, L. M.*** (2019). Functional phenomics: an emerging field integrating high-throughput phenotyping, physiology, and bioinformatics. *Journal of Experimental Botany* **70**, 379-386.

10. Huang, H., Liang, L., Sturrock, C. J., Pandey, B. K., Giri, J., Mairhofer, S., Wang, D., Muller, L., Tan, H., **York, L. M.**, Yang, J., Song, Y., Kim, Y-J, Qiao, Y., Xu, J., Kepinski, S., Bennett, M. J., and Zhang, D. (2018). Rice actin binding protein RMD controls crown root angle in response to external phosphate. *Nature Communications*, 9, 2346. DOI: 10.1038/s41467-018-04710-x.

9. **York, L. M.** and Lobet, G. (2017). Phenomics of root system architecture: Measuring and analyzing root phenes. Teaching Tools in Plant Biology: Lecture Notes. *The Plant Cell (online).* DOI: 10.1105/tpc.117.tt0917.

8. **York, L. M.**, Silberbush, M., and Lynch, J. P. (2016). Spatiotemporal variation of nitrate uptake kinetics within the maize (*Zea mays* L.) root system is associated with greater nitrate uptake and interactions with architectural phenes. *Journal of Experimental Botany* **67**, 3763-3775.

7. **York, L. M.***, Carminati, A., Mooney, S. J., Ritz, K., and Bennett, M. J. (2016). The holistic rhizosphere: integrating zones, processes, and semantics in the soil influenced by roots. *Journal of Experimental Botany* **67**, 3629-3643.

6. **York, L. M.** and Lynch, J. P. (2015). Intensive field phenotyping of maize (*Zea mays* L.) root crowns identifies phenes and phene integration associated with plant growth and nitrogen acquisition. *Journal of Experimental Botany* **66**, 5493-5505.

5. **York, L. M.**, Galindo-Castañeda, T., Schussler, J., and Lynch, J. P. (2015). Evolution of US maize (*Zea mays* L.) root system architectural and anatomical phenes over the past 100

years corresponds to increased tolerance of nitrogen stress. *Journal of Experimental Botany* **66**, 2347-2358.

4. Colombi, T., Kirchgessner, N., Le Marie, C., **York, L. M.**, Lynch, J. P., and Hund, A. (2015). Next generation shovelomics: set up a tent and REST. *Plant and Soil* **388**, 1-20.

3. Zhang, C., Postma, J. A., **York, L. M.**, and Lynch, J. P. (2014). Root foraging elicits niche complementarity-dependent overyielding in the ancient “three sisters” (maize, bean, squash) polycultures. *Annals of Botany* **114**, 1719-1733.

2. Bucksch, A., Burridge, J., **York, L. M.**, Das, A., Nord, E. A., Weitz, J. S., and Lynch, J. P. (2014). Image-based high-throughput field phenotyping of crop roots. *Plant Physiology* **166**, 470-486.

1. **York, L. M.**, Nord, E. A., and Lynch, J. P. (2013). Integration of root phenes for soil resource acquisition. *Frontiers in Plant Science* **4**:355. DOI: 10.3389/fpls.2013.00355

Book Chapters

York, L.M. (2021). Phenotyping Root System Architecture, Anatomy, and Physiology to Understand Soil Foraging. In: Zhou J., Nguyen H. (eds). High-throughput Crop Phenotyping. Concepts and Strategies in Plant Sciences. Springer. Switzerland.

York, L.M. (2018). Phenotyping Crop Root Crowns: General Guidance and Specific Protocols for Maize, Wheat, and Soybean. In: Ristova D., Barbez E. (eds). Root Development. Methods in Molecular Biology, vol 1761. Humana Press, New York, NY.

Datasets, Software, and Protocols

Seethepalli, A., Ottley, C., Childs, J., Cope, K., Fine, A., Lagergren, J., Kalluri, U., Iversen, C., and **York, L. M.** (2024). Root images for testing concatenation and statistical analysis with RhizoVision Explorer [Data set]. *Zenodo*. DOI: 10.5281/zenodo.12667583

Seethepalli, A., Ottley, C., Lagergren, J., & **York, L. M.** (2024). Python script for root image concatenation for RhizoVision Explorer [Software]. *Zenodo*. DOI: 10.5281/zenodo.12668073

Seethepalli, A., Ottley, C., Lagergren, J., & **York, L. M.** (2024). Statistical aggregation in R for RhizoVision Explorer and manuscript figure code. [Software]. *Zenodo*. DOI: 10.5281/zenodo.12668177

Lagergren, J., Pavicic, M., Chhetri, H., **York, L. M.**, Hyatt, D., Kainer, D., Rutter, E., Flores, K., Bailey-Bale, J., Klein, M., Taylor, G., Jacobson, D., & Streich, J. (2023). Supporting information for "Few-Shot Learning Enables Population-Scale Analysis of Leaf Traits in *Populus trichocarpa*" (1.1.0) [Data set]. *Zenodo*. DOI: 10.5281/zenodo.7908197

York, L. M. (2023). Setting the scale for scanner or camera-based imaging platforms [Data set]. *Zenodo*. DOI: 10.5281/zenodo.7825934

York, L. M. (2023). Root scanning using a flatbed scanner with transparency unit [Protocol]. *Zenodo*. DOI: 10.5281/zenodo.7926796

York, L. M. (2023). Setting up the Epson Expression 12000XL for root scanning [Protocol]. *Zenodo*. DOI: 10.5281/zenodo.7925991

Xu, Z, **York, L. M.**, Seethepalli, A., Bucciarelli, B., Cheng, H., Samac, D. A. (2022). Data for manuscript on objective phenotyping of alfalfa roots [Data set]. *Zenodo*. DOI: 10.5281/zenodo.5879779

Dhakal, K., Seethepalli, A., Griffiths, M., Guo, H., Freschet, G. T., and **York, L. M.** (2021). Data and statistical code for the manuscript on RhizoVision Explorer for root image analysis [Data set]. *Zenodo*. DOI: 10.5281/zenodo.4677552

Dhakal, K., Seethepalli, A., Griffiths, M., Guo, H., Freschet, G. T., and **York, L. M.** (2021). Images of copper wires with various diameters for validating root image analysis [Data set]. *Zenodo*. DOI: 10.5281/zenodo.4677545

Dhakal, K., Seethepalli, A., Griffiths, M., Guo, H., Freschet, G. T., and **York, L. M.** (2021). Scanned images of roots from wild herbaceous species, trees, maize, and wheat [Data set]. *Zenodo*. DOI: 10.5281/zenodo.4677750

Griffiths, M., Seethepalli, A., and **York, L. M.** (2021). Data and statistical analysis scripts for manuscript on switchgrass roots in nitrogen and water stresses [Data set]. *Zenodo.* DOI: 10.5281/zenodo.4281436

Seethepalli, A. and **York, L. M.** (2020). RhizoVision Explorer - Interactive software for generalized root image analysis designed for everyone (Version 2.0.2) [Software]. *Zenodo.* DOI: 10.5281/zenodo.4095629

York, L. M. (2020). Plans for root scanning trays to use on flatbed scanners [Data set]. Zenodo. DOI: 10.5281/zenodo.4122423

Guo, H., Griffiths, M., Seethepalli, A., Dhakal, K., and **York, L. M.** (2020). Protocol and data analysis scripts for high-throughput phenotyping of specific root respiration [Data set]. *Zenodo.* DOI: 10.5281/zenodo.4247872

Guo, H., Ayalew, H., Seethepalli, A., Dhakal, K., Griffiths, M., Ma, X., and **York, L. M.** (2020). Data and statistical analysis scripts for manuscript on high-throughput phenotyping of root economics in wheat [Data set]. Zenodo. DOI: 10.5281/zenodo.4247893

Griffiths, M. and **York, L. M.** (2020). Root multiple ion uptake kinetics data for maize NAM founders, statistical code, and RhizoFlux hardware plans [Data set]. *Zenodo*. DOI: 10.5281/zenodo.4474523

Griffiths, M. and **York, L. M.** (2020). Meta-analysis of multiple ion uptake kinetics in crop roots [Data set]. *Zenodo*. DOI: 10.5281/zenodo.3605654

Seethepalli, A., Guo, H., and **York, L. M.** (2019). Root crown images of soybean and wheat and statistical analysis for RhizoVision Crown [Data set]. *Zenodo*. DOI:10.5281/zenodo.3598638

Seethepalli A. and **York L. M.** (2019). RhizoVision Analyzer: Software for high-throughput measurements from images of crop root crowns [Software]. *Zenodo*. DOI: 10.5281/zenodo.2585892

Seethepalli A. and **York L. M.** (2019). RhizoVision Imager: Software to control machine vision cameras for plant phenotyping [Software]. *Zenodo*. DOI: 10.5281/zenodo.2585882

York L. M., Young C. A., Mattupalli, C., and Seethepalli, A. (2018). Images and statistical analysis of alfalfa root crowns from inside and outside disease rings caused by cotton root rot [Data set]. *Zenodo*. DOI:10.5281/zenodo.2172832

Science Communication and Extension Articles

York, L. M. (2021). Manage belowground starch for healthy pastures. *Hay & Forage Grower*, **36** (2), 22.

York, L. M. and Goodwin, D. J. (2020). Building soil organic carbon with plant roots. *Noble News & Views*, **38** (11), 4-6.

York, L. M. and Hayes, A. E. (2020). 5 myths people believe about roots. *Noble News & Views*, **38** (11), 6-8.

Blancaflor, E. B. & **York, L. M.** (2019). Measuring the hidden half of forages. *Noble News & Views*, **37** (8), 9-11.

York, L. M. & Seethepalli, A. (2019). Plants in the spotlight: measuring shoots from images. *Noble News & Views*, **37** (8), 5-7.

York, L. M. (2018). Why roots matter to soil, plants and you. *Noble News & Views*, **36** (6), 8-9.

York, L. M. (2014). In the sky, on land, and under the sea: High-tech ecological research at Penn State. *Notes from the Field* (Ecology Newsletter, PSU) **11** (2), 4-5.

York, L. M. (2013). Open access software for ecology and other sciences. *Notes from the Field* (Ecology Newsletter, PSU) **11** (1), 5-6.

York, L. M. (2013). Online lab repositories: Solving the problem of sad messes of drives and cables. *Notes from the Field* (Ecology Newsletter, PSU) **10** (2), 4.

York, L. M. (2012). Development of the US agriculture and seed industries: 1850–2012. Translated by WU Man (吴满) as 美国种业发展史: 1850-2012. *Agricultural Wealth Magazine* (农财宝典) **1**, 81–82.

York, L. M. (2012). OneNote as a digital lab notebook. *Notes from the Field* (Ecology Newsletter, PSU) **10** (1), 4.

RESEARCH GRANTS

2024– ORNL LDRD, “Bringing a Digital Underground to the Advanced Plant Phenotyping Laboratory.” PI.

2024– ORNL LDRD, “Pioneering multi-scale biological and environmental solutions for a sustainable Earth.” co-PI.

2023– ORNL LDRD, “SoilCosm phenotyping to counteract priming for sequestration.” PI.

2023– DOE BRC, “Center for Bioenergy Innovation.” co-PI.

2023– DOE SFA, “Plant Microbe Interfaces.” co-PI.

2021–2023 ORNL LDRD, “AI-enabled association of plant physiology and phenotypes.” co-PI.

2018–2020 OCAST, “Unraveling genes underlying dual-purpose wheat seedling drought and heat tolerance using automated phenotyping platforms.” co-PI.

2016–2020 USDA-NIFA EAGER, “High-throughput phenotyping of multiple ion uptake kinetics in maize roots.” PI.

INVITED SEMINARS

2024 Invited: International Plant Phenotyping Symposium, Lincoln, NE, Oct. 7

2024 Keynote: International Society for Root Research, Leipzig, Germany, Jun. 4

2024 Seminar: Pacific Northwest National Laboratory, EMSL, Richland, WA, Feb. 22

2024 Seminar: Washington State University, Computer Science, Pullman, WA, Feb. 20

2024 Seminar: Washington State University, Biochemistry, Pullman, WA, Feb. 19

2023 Seminar: University of Tennessee, Biochemistry, Knoxville, TN, Sept. 6

2023 Seminar: Pennsylvania State University, State College, PA, Apr. 7

2023 Seminar: Iowa State University, Ames, IA, Jan. 17

2022 Seminar: University of Tennessee, Plant Science, Knoxville, TN, Aug. 24

2022 Seminar: Yunnan University, China, Virtual, Jun. 17

2022 Seminar: CIMMYT, Mexico, Virtual, May 9

2021 Invited: International Soil Carbon Network, Virtual, Oct. 19

2021 Seminar: Lawrence Berkeley National Laboratory, Virtual, Oct. 5

2021 Seminar: University of Hawaii at Manoa, Virtual, Sept. 17

2021 Seminar: Pennsylvania State University, Virtual, Sept. 8

2021 Invited: Root Architecture Imaging and Analysis, Visayas State University, Philippines, Virtual, Aug. 19

2021 Invited: International Workshop on Root and Tuber Crops, Indian Council of Agricultural Research, India, Virtual, Jan. 21

2020 Invited: Agri-X Forum Series, PhenoTrait Co. China, Virtual, Dec. 7

2020 Seminar: University of Florida, Virtual, Oct. 10

2020 Seminar: University of Texas-Austin, Virtual, Sept. 14

2020 Invited: Ecology Society of America meeting, Virtual, Aug. 3

2020 Invited: ASPB Plant Biology meeting, Virtual, Jul. 28

2020 Invited: Phenome meeting, Tucson, AZ, Feb. 27
2020 Seminar: Purdue University, West Lafayette, IN, Feb. 13
2019 Invited: Plantae Webinar Series. Online. Dec. 17
2019 Invited: ASA, CSSA & SSSA Annual International Meeting, San Antonio, TX, Nov. 13
2019 Seminar: Northwest Ag. and Forestry University, Yangling, China, Oct. 28
2019 Invited: International Plant Phenotyping Symposium, Nanjing, China, Oct. 23
2019 Seminar: China Agricultural University, Beijing, China, Oct. 16
2019 Invited: Root-Microbiome Workshop, APS annual meeting, Aug. 10.
2018 Seminar: University of Nebraska, Lincoln, NE, Sep. 26.
2018 Invited: Plant Phenome Journal Webinar Series. Online. Jun. 4
2017 Invited: International Workshop on Field Phenotyping and Modeling for Cultivation, Tokyo, Japan, Dec. 8
2017 Seminar: Nagoya University, Japan, Dec. 7
2016 Seminar: University of Iowa, Ames, IA, Dec. 7
2016 Invited: Illinois Ag Masters, Springfield, IL, USA, Dec. 2
2016 Invited: Soil Science Society of America, Phoenix, AZ, USA, Nov. 8
2016 Seminar: University of Missouri, USA, May 17
2016 Seminar: Michigan State University, USA, Feb. 15
2015 Keynote: International Society of Root Research 9, Canberra, Australia, Oct. 9
2014 Seminar: University of Nottingham, UK, Nov. 21

TEACHING EXPERIENCE

Guest Lectures

2023 “Phenomics for Plant Pathology,” Techniques in Plant Pathology, North Dakota SU
2022 “Introduction to Root Ecophysiology,” University of Tennessee - Knoxville
2022 “Careers in a National Lab,” Purdue University
2021 “Root Phenomics,” Soil-Plant-Microbe Interactions, Washington State University
2021 “Phenomics for Plant Pathology,” Techniques in Plant Pathology, North Dakota SU
2019 “Root Traits for Nutrient Use,” Plant Nutrition, China Agricultural University
2019 “Root Phenomics,” Soil-Plant-Microbe Interactions, Washington State University
2018 “Root Biology,” AGRON 935, Kansas State University
2016 “Root Phenotyping,” Crop Research Techniques, UN
2011 “Rhizosphere Modification,” Plant Nutrition, PSU
2010 “Intro to Ecology” and “Diversity/Niche,” Concepts in Ecology, PSU

Courses

2013 Teaching Assistant: Crop Management, PSU
2012 Teaching Assistant: Horticulture Senior Seminar, PSU
2011 Teaching Assistant: Plant Nutrition, PSU

2010 Co-Instructor: Concepts in Ecology, PSU

2010 Co-Instructor: Plant Nutrition, South China Agricultural University

MANAGEMENT AND MENTOR EXPERIENCE

Postdoctoral Fellows and Staff Managed

2025– Yangyang Song, Postdoctoral Fellow
2024– Anand Seethepalli, Computer Vision Developer (staff)
2024– Aubrey Fine, Postdoctoral Fellow
2020–2021 Kundan Dhakal, Postdoctoral Fellow
2019–2021 Michael Cloyde, Research Technician (staff)
2018–2020 Marcus Griffiths, Postdoctoral Fellow
2018–2021 Yaxin Ge, Senior Research Associate (staff)
2017–2021 Haichao Guo, Postdoctoral Fellow
2017–2021 Anand Seethepalli, Computer Vision Analyst (staff)

Students Mentored

2025– Janou Milligan, Intern, CBI
2024– Jack Orebaugh, ECO Intern, PMI
2023 Chanae Ottley, ORNL GEM intern, PhD student NCSU
2022 Semilore Abiodun-Adeniyi, ORNL summer intern
2021–2022 Nhu Truong, undergraduate honors committee, Dickinson College, PA
2019 Bailey Christie, summer scholar on root nutrient uptake, Noble
2019 Liza Antonelli, summer scholar on peptide root effects, Noble
2014–2016 Shaunagh Keating, phenotyping methods for wheat roots, UN
2013 Greg Hoover, undergraduate project on quinoa roots, PSU
2012 Marisa Ciamacca, validation of qPCR method, PSU
2011 Mardziah Ab Rahman, qPCR to differentiate species roots, PSU

SERVICE AND OUTREACH

Editorial Service

2022–2025 Editor-in-Chief, *Plant Direct*

2020–2023 Reviews Editor, *Plant Methods*

2019–2020 Associate Editor, *Plant Methods*

2017– Associate Editor, *Plant Phenomics*

Ad Hoc Article Review (46 journals)

Acta Agriculturae Scandinavica, Acta Physiologiae Plantarum, Agronomy J., American J. of Botany, Annals of Botany, AoB Plants, Canadian J. of Botany, Computers and Electronics in Agriculture, Crop Science, eLife, Environmental and Experimental Botany, Environmental Science

and Pollution, Euphytica, European J. of Agronomy, Field Crops Research, Frontiers in Plant Science, Functional Ecology, Functional Plant Biology, G3: Genes | Genomes | Genetics, Gigascience, iScience, J. of Ecology, J. of Integrative Plant Biology, J. of Experimental Botany, J. of Plant Growth Regulation, Molecular Plant, New Biotechnology, New Phytologist, Oikos, Phytobiomes, Planta, Plant Cell & Environment, Plant Cell Reports, Plant Direct, Plant Ecology, Plant Methods, Plant and Soil, Plant Phenome Journal, Plant Phenomics, Plant Physiology, Proceedings of the National Academy of Sciences, Proceedings of the Royal Society B, Scientific Reports, Soil Use and Management, The Plant Cell, The Plant J.

Community Service and Outreach

2024 Hosted workshop and minisymposium on roots, IPPS, Lincoln, NE, Oct. 7
2024 Training: RhizoVision Explorer, Washington State University, Pullman, WA, Day
2023 Training: RhizoVision Explorer, University of Tennessee, Knoxville, TN, September 6
2023 Hosted workshop on impacts of AI in publication for ASPB, Savannah, GA, August 6
2023 Networking into a career, Panelist, Plant Biology ASPB Meeting, virtual, August 4
2023 Training: RhizoVision Explorer, Pennsylvania State Univ., State College, PA, Apr. 7
2023 Root phenotyping workshop, NAPPN meeting, St. Louis, MO, February 13
2022 Panel on “Damage done: overinterpretation of data,” ASPB, virtual, September 21
2022 Elected Chair of Root Phenotyping Working Group of IPPN
2022 Panel on publication process, ASA, CSSA & SSSA Student Webinar, May 10
2022 Root phenotyping virtual workshop on RhizoVision, NAPPN meeting, February 24
2021 Hosted Plantae webinar panel on translational plant science, November 16
2021 Root phenotyping virtual workshop, ISRR / Rooting 2021 joint meeting, May 28
2021 Root phenotyping virtual workshop, Bioenergy Research Centers – DOE, March 5
2020 Root phenotyping virtual workshop, PhenomeForce, November 20
2020 Co-organized root simulation session for ASA, CSSA & SSSA meeting, San Antonio, TX, November 13
2020 Root phenotyping virtual workshop, American Phytopathological Society, October 20
2019 Served on program committee for the Phenome 2020 conference in Tucson, Arizona
2019 Organized root phenotyping session for Int. Plant Phenotyping Symposium, Nanjing
2019 Oklahoma Agricultural Leadership Encounter, research overview and demo, November 21
2019 OSU visiting students from India, research overview and demo, June 28
2019 Botanical Research Institute of Texas boot camp, research overview and demo, June 17
2019 Hosted international root phenotyping workshop with IPPN, April 30–May 1
2018 University of Arkansas Graduate Students, research overview, demo, lab tour, August 16
2018 Oklahoma Conservation Leadership, soil health discussion, July 24

2018 Texas AgriLife Extension Horticulture agents training, research overview and demo, July 5
2018 Botanical Research Institute of Texas boot camp, research overview and demo, June 18
2017 TCU ranch management, research overview and demo, November 13
2017 Missouri NCRS Soil Health, research overview and discussion, October 2
2017– Member of Executive Committee of Root Phenotyping Working Group IPPN, 2017
2016 Coordinated field demos for the UK Plant Phenomics Network meeting, Nottingham
2013– www.rootbiologynews.com to blog about trends in root science
2013– @RootBiologyNews on Twitter to tweet about new root research (still active)
2012–2013 Taught R and basic statistics to South African college interns at URBC
2008–2013 Maintained, expanded, and transitioned CMS Lynch lab website (roots.psu.edu)
2011 Life of Plants badge demonstration for Girl Scouts, The Roots of Plant Growth

Oak Ridge National Laboratory Service

2023– Member, Extended Leadership Team
2023–2024 Member, Strategic Planning Committee for BESS Directorate (released 10 year vision)
2022 Organized Digital Underground workshops across ORNL
2022– APPL Science Lead: facilitate new experiments, give tours to visitors
2021– Organizational representative to the International Plant Phenotyping Network

Noble Research Institute Service

2020 Computational training – Root measurements from scanners and cameras, December 18
2020 Transitioned internal seminars to virtual format after COVID remote working, March
2019 Volunteered to evaluate services for an institutional repository, July
2019 Volunteered to evaluate Pivot online service for grant discovery, June
2019 Co-wrote an open science document from DMC for leadership team to consider
2018 Computational training – Intro to R and Plotting (2 day course), September 20 – 21
2018 Computational training – Plotting in R (1 day course), July 31
2018 Computational training – Intro to R (1 day course), April 26
2017 Social media for postdoctoral fellows training
2017–2021 Member of Data Management Committee (DMC)
2017 Initiated live streaming and recording of the Research Seminar Series

2017–2021 Organizational representative to the International Plant Phenotyping Network

2017–2021 Faculty coordinator for Research Seminar Series

LEADERSHIP TRAINING

2020 Developing an outward mindset (workshop, Scott Schultz, Arbinger Institute)

2020 Building resilience (E-learning)

2019 Unlocking high performance leadership (workshop, Jason Lauritsen)

2019 Trust education (workshop, Greg Hawks)

2019 Managing organizational training for managers (E-learning)

2019 Leading for employee engagement (workshop, Jason Lauritsen)

2019 Effective listening (E-learning)

2019 DiSC facilitation (workshop, Linda Boyce)

2019 Building trust (E-learning)

PROFESSIONAL AFFILIATIONS

Agronomy, Crop Science, and Soil Science Societies of America

American Society of Plant Biologists

International Society of Root Research

Society of Experimental Biology

MEETING ABSTRACTS

Guo, H., **York, L. M.** (2021). Phenotyping root proliferation in nitrate-rich patches among diverse winter wheat genotypes. Oral. NAPPN Meeting. Virtual.

Griffiths, M., Guo, H., Seethepalli, A., **York, L. M.** (2020). Phenotyping multiple ion uptake rates by roots across the diverse maize NAM population founders. Oral. Phenome Conference. Tucson, AZ, USA.

Guo, H., Tamir, H. A., Seethepalli, A., Ge, Y., Dhakal, K., Ma, X. F., **York, L. M.** (2020). High-throughput phenotyping of root respiration in a wheat diversity panel to investigate reducing metabolic burden. Poster. Phenome Conference. Tucson, AZ, USA.

Griffiths, M., Guo, H., Seethepalli, A., **York, L. M.** (2019). High-throughput phenotyping of multiple ion uptake kinetics in maize. Oral. Rhizosphere 5. Saskatoon, Canada.

Griffiths, M., Guo, H., Seethepalli, A., **York, L. M.** (2019). Developing a high-throughput phenotyping platform for multiple ion uptake kinetics. Poster. Phenome Conference. Tucson, AZ, USA.

Seethepalli, A., Guo, H., Griffiths, M., **York, L. M.** (2019). RhizoVision Crown: An integrated hardware and software platform for root crown phenotyping. Poster. Phenome Conference. Tucson, AZ, USA.

Guo, H., Seethepalli, A., **York, L. M.** (2018). Decreasing nodal root number in maize enhances nodal and lateral root length while increasing shoot biomass when nitrogen is limiting. Poster. Phenome Conference. Tucson, AZ, USA.

York, L. M., Seethepalli, A., Guo, H., Griffiths, M. (2018). RhizoVision-Crown: An open hardware and software phenotyping platform for root crowns using a backlight, a machine vision camera, and a new C++ image analysis program. Oral. Phenome Conference. Tucson, AZ, USA.

York, L. M., Seethepalli, A., Zare, A., Fritschi, F. (2017). A novel multi-perspective imaging platform for phenotyping soybean root crowns in the field increases throughput and separation ability of genotype root properties. Poster. IPG Root Biology Symposium. Columbia, MO, USA.

York, L. M. (2017). Functional phenomics: Relating phenes to function using high-throughput phenotyping and data analytics. Poster. Phenome Conference. Tucson, AZ, USA.

York, L. M., Fritschi, F., Bennett, M. J., Foulkes, M. J. (2016). Rhizosphere functional phenomics: Using high-throughput phenotyping to understand root-soil interactions. Oral. ASA, CSSA, SSSA International Meeting. Phoenix, AZ, USA.

York, L. M., Carvalho, P., Russel, J., Foulkes, M. J. (2016). Root phenotyping of barley chromosome substitution lines using X-ray computed tomography. Oral. Society for Experimental Biology Annual Meeting. Brighton, UK.

York, L. M., Carvalho, P., Russel, J., Foulkes, M. J. (2016). Root phenotyping of barley chromosome substitution lines using X-ray computed tomography. Oral. Association of Applied Biologists, Novel Sensors. Nottingham, UK.

Bennett, M. J., **York, L. M.** (2015). Systems analysis of roots: bridging molecular, rhizosphere, and field scales. Oral. International Society for Root Research. Canberra, Australia.

York, L. M., Keating, S. L., Atkinson, J. A., Johnson, J., Fuente Canto, C.,Waugh, R., Russell, J. R., Wells, D. M., Bennett, M. J., Foulkes, M. J. (2015). Root phene identification and linkage to agronomic utility in cereals using X-ray µCT and field phenotyping. Poster. International Society for Root Research. Canberra, Australia.

York, L. M. and John Foulkes. (2015). Integration of root phenes revealed by intensive phenotyping of root system architecture and anatomy. Oral. Monogram Conference. Harpenden, UK.

York, L. M., Malcolm Bennett, John Foulkes, and Lynch, J. P. (2015). Integration of root phenes revealed by intensive phenotyping of root system architecture and anatomy. Poster. European Geosciences Union. Vienna, Austria.

York, L. M. and Lynch, J. P. (2013). Nodal root growth angle and number influence nitrogen acquisition in maize (*Zea mays*). Poster. Interdisciplinary Plant Group Symposium. UM. Columbia, MO, USA.

York, L. M. and Lynch, J. P. (2012). Nodal root growth angle influences nitrogen acquisition and competition in maize (*Zea mays).* Oral. Ecology Society of America International Meeting. Portland, OR, USA.

York, L. M. and Lynch, J. P. (2012). Nodal root growth angle and number influence nitrogen acquisition in maize (*Zea mays*). Poster. ASA, CSSA, SSSA International Meeting. Cincinatti, OH, USA.

Nord, E. A., **York, L. M.**, Postma, J. A., and Lynch, J. P. (2012). Interaction of root architectural and anatomical phenes in maize. Poster. International Society for Root Research. Dundee, Scotland.

Postma, J. A., Zhang, C., **York, L. M.**, and Lynch, J. P. (2012). Complementarity in root architecture for nutrient uptake in ancient maize / bean and maize / bean / squash polycultures. Oral. German Society of Plant Nutrition Meeting. Bonn, Germany.

Nord, E. A., Postma, J. A., **York, L. M.**, and Lynch, J.P. (2011). Synergism of root architectural and anatomical phenes in maize. Oral. ASA, CSSA, SSSA International Meeting. San Antonio, TX, USA.

York, L. M., Henry, A., and Lynch, J. P. (2009). Utility of mixed root architecture stands in changing climates. Poster. Plant Biology Symposium. PSU. University Park, PA, USA.