

**Larry Matthew York**  
*Curriculum Vitae*

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**RESEARCH INTERESTS**

Functional phenomics, roots, soil, ecology, physiology, simulations, R statistics, open science

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**EDUCATION**

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

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**PROFESSIONAL POSITIONS**

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

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**FELLOWSHIPS, AWARDS, AND HONORS**

2020	AoB Plants (AoBP) - <a href="#">Early Career Open Science Award</a>
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

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**SERVICE AND LEADERSHIP**

2022–	Editor-in-Chief, <i>Plant Direct</i>
2022–	Chair, Root Phenotyping Working Group of the IPPN
2021–	ORNL representative to International Plant Phenotyping Network (IPPN)

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**PUBLICATIONS**

**Peer-reviewed Journal Articles** (43 articles, 2568 citations, h-index: 23, 14 corresponding author\*, co-first authors †)

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.**, McCormack, M. L. (In Press). The importance of trait selection in ecology: Roots redefine the global spectrum of plant form and function. *Nature*.
42. O’Leary, B. M., Scafaro, A. P., **York, L. M.** (In Press). High-throughput, dynamic, multi-dimensional: an expanding repertoire of plant respiration measurements. *Plant Physiology*. DOI: [10.1093/plphys/kiac580](https://doi.org/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., 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](https://doi.org/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., 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](https://doi.org/10.3389/fpls.2022.795011)
39. Xu, Z, **York, L. M.\***, Seethepalli, A., Bucciarelli, B., Cheng, H., 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](https://doi.org/10.34133/2022/9879610)
38. Maqbool, S., Hassan, M., Xia, X., **York, L. M.**, Rasheed, A., He, Z. (2022). Root system architecture in cereals: progress, challenges, and perspective. *The Plant Journal* **110**, 23–42. DOI: [10.1111/tpj.15669](https://doi.org/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., 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](https://doi.org/10.1002/ppj2.20036)
36. **York, L. M.\***, Griffiths, M., 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](https://doi.org/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., 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](https://doi.org/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., 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](https://doi.org/10.1002/ppj2.20028)
33. Griffiths, M., Wang, X., Dhakal, K., Guo, H., Seethepalli, A., Kang, Y., **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., **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](https://doi.org/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](https://doi.org/10.21769/BioProtoc.4181)
30. Weigelt, A., Mommer, L., Andrzejek, 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.**, 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](https://doi.org/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., Čuštěrevska, 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., Schrod, F., Velázquez, E., 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., Wurzbarger, N., **York, L. M.**, Batterman, S. A., Gomes de

- Moraes, M., Janeček, Š., Lambers, H., Salmon, V., Tharayil, N., 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., 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](https://doi.org/10.1371/journal.pone.0242472)
  25. Guo, H., Ayalew, H., Seethepalli, A., Dhakal, K., Griffiths, M., Ma, X., **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., **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., 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](https://doi.org/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., Wurzbürger, 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.**, 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. Burrige, J. D., Black, C. K., Nord, E. A., Postma, J. A., Sidhu, J. S., **York, L. M.**, 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**. DOI: [10.34133/2020/3252703](https://doi.org/10.34133/2020/3252703)
  19. Fonseca, J. P., Lee, H-K., Boschiero, C., Griffiths, M., Lee, S., Zhao, P. X., **York, L. M.**, 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](https://doi.org/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.,

Weigelt, A. (2020). Global root traits (GRooT) database. *Global Ecology and Biogeography* **30**, 25-37. DOI: [10.1111/geb.13179](https://doi.org/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.**, Mommer, L. (2020). The fungal collaboration gradient dominates the root economics space in plants. *Science Advances* **6**. DOI: [10.1126/sciadv.aba37](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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.

## Data and Software Products

- 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.5281/zenodo.4095629)
- 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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

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- 2023– DOE BRC, “Center for Bioenergy Innovation.” co-PI.
- 2023– DOE SFA, “Plant Microbe Interfaces.” co-PI.
- 2022– ORNL LDRD, “AI-enabled association of plant physiology and phenotypes.” co-PI.
- 2018–2020 OCAST (\$99,247), “Unraveling genes underlying dual-purpose wheat seedling drought and heat tolerance using automated phenotyping platforms.” co-PI.
- 2016–2020 USDA-NIFA EAGER (\$290,000), “High-throughput phenotyping of multiple ion uptake kinetics in maize roots.” PI.

## INVITED SEMINARS

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- 2023 Seminar: Iowa State University, Ames, IA, Jan. 17
- 2022 Seminar: University of Tennessee, 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**

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### **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

### **Postdoctoral Fellows and Staff Managed**

- 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**

- 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

### **LEADERSHIP TRAINING**

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- 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)

## SERVICE AND OUTREACH

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### Editorial Service

- 2022– Editor-in-Chief, *Plant Direct*  
 2020– 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

- 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](http://www.rootbiologynews.com) to blog about trends in root science
- 2013– @RootBiologyNews on Twitter to tweet about new root research (still active)
- 2012– Taught R and basic statistics to South African college interns at URBC
- 2013
- 2008– Maintained, expanded, and transitioned CMS Lynch lab website ([roots.psu.edu](http://roots.psu.edu))
- 2013
- 2011 Life of Plants badge demonstration for Girl Scouts, The Roots of Plant Growth

### **Oak Ridge National Laboratory Service**

- 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– Member of Data Management Committee (DMC)  
2021  
2017 Initiated live streaming and recording of the Research Seminar Series  
2017– Organizational representative to the International Plant Phenotyping Network  
2021  
2017– Faculty coordinator for Research Seminar Series  
2021

## PROFESSIONAL AFFILIATIONS

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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

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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  $\mu$ CT 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. Cincinnati, 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.