Xuemei (Missi) Zhang

EDUCATION

Virginia Polytechnic Institute and State University
Degree: Ph.D. in Plant and Environmental Sciences (Jan, 2021)

University of Maine
Degree: Master of Science in Plant, Soil and Environmental Sciences (Dec, 2016)

Southwest University
Degree: Bachelor of Science in Agriculture (June, 2013)

SKILLS & EXPERTISE

Bioinformatic, image, and statistical data analysis and visualization:
- Python, R, Bash Scripting, Julia, JMP, SAS, SQL, and Tableau.
- Machine learning and deep learning on cloud high-performance computing platforms.

Interdisciplinary teamwork
- Extensive experience in collaborating with engineers on robotics and automation projects.

Effective communication, teaching, public speaking, and instructional design.
Independent problem solving and self-learning.

PROFESSIONAL EXPERIENCE

***Data Scientist*, the Center for Biostatistics and Health Data Science (CBHDS), Virginia Tech**
09/2023 – present
- Building and leading a data science team to collaborate on multidisciplinary research design, grant proposal writing, data pipelines, data analysis and visualization, presentation, report writing, etc.
- Developing pipelines and establish good standard practices for reproducible data analysis including containerizing bioinformatics and image analysis tools and performing data analysis.
- Developing cloud High Performance Computing (HPC) Genomics, Transcriptomics, Epigenomics, and Proteomics data analysis workflows for clients and internal team members.
- Developing data science related courses, and bioinformatics workshops and guidance documents to explain major analysis pipelines/workflows and client-tailored collaboration approaches to meet different client needs.
- Developing and Maintaining CBHDS Bioinformatics Webpages.

***Postdoc Research Associate*, SPES, Virginia Tech, 05/2021 – 09/2023**
Collaborating with mechanic, biological, and chemical engineers in developing a cyber-physical system to automate tomato disease detection. Bridging experts and knowledges from different disciplines while providing plant research results yielded from genomic and image data analysis.

- Applied machine learning algorithms to analyze RGB and hyperspectral image data and build classification models that differentiate diseased plants from healthy plants.
- Utilized bioinformatic tools to build customized genome databases, perform pan-genome analysis, phylogeny analysis, metagenomic sequence assembly, and RNA-seq differential expression analysis for bacterial pathogens.

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- Performed experimental design and statistical data analysis (using Python, R, and JMP): Applying descriptive and inferential statistics to test scientific hypotheses.
- Provided bioinformatic data analysis, statistical analysis, and machine learning training workshops to postdocs, undergrad and graduate students. Led undergrad and graduate students to conduct research.
- Wrote grant proposals, scientific reports, manuscripts, and presented research work at conferences, seminars, stakeholder meetings, and 4-H congress workshops.
- Reviewed manuscripts for scientific journals including *Biological Control*, *Plant Disease*, *Plant Health Progress*, and *Crop Protection*.

Graduate Research Assistant at Plant Pathology Lab, SPAREC, Virginia Tech, 01/2017 – 01/2021

- Performed experimental design and statistical data analysis (using Python, R, and JMP): Applying descriptive and inferential statistics to test scientific hypotheses; Conducted survey research and data analysis.
- Provided outreach services (providing disease diagnosis service and workshops) to Ag industry, growers, and home gardeners, as well as communicating with stakeholders.
- Wrote grant proposals, scientific reports, manuscripts, and presented at conferences.
- Trained and led undergrad and graduate students to conduct research.

RECEIVED GRANTS

2022 *Development of a CRISPR-Cas12a assay for sensitive and specific detection of Xylella fastidiosa sub-species*. Proposal to USDA-APHIS.

2020 *Tobacco disease management research*. Proposal to Virginia Tobacco Board.

2018 *Understanding the interactions among Pythium species affecting root rot in a hydroponic environment*. Graduate Research Development Proposal grant, Virginia Tech.

SELECTED RECENT PUBLICATIONS (https://orcid.org/0000-0002-3912-5295)

Zhang, X., Vinatzer, B., & Li, S. (in review) *Hyperspectral Imaging Analysis for the Early Detection of Tomato Bacterial Leaf Spot Disease*.

Dewberry, R. J., Sharma, P., Prom, J. L., Kinscherf, N.A., Lowe-Power, T., Mazloom, R., **Zhang, X.**, Arif, M., Stulberg, M., Heath, L. S., Eversole, K., Beattie, G. A., Vinatzer, B., & Allen, C. (in review) *Genotypic and Phenotypic Analysis Shows Ralstonia solanacearum Cool Virulence is a Quantitative Trait Not Restricted to "Race 3 biovar 2"*.

Dhakal, K., Sivaramakrishnan, U., **Zhang, X.,** Belay, K., Oakes, J., Wei, X., & Li, S. (2023). *Machine Learning Analysis of Hyperspectral Images of Damaged Wheat Kernels*. Sensors, 23(7), 3523.

Liu, D., Samtani, J., Johnson, C., **Zhang, X.**, Butler, D.M., & Derr, J. (2023) *Brewer's Spent Grain with Yeast Amendment Shows Potential for Anaerobic Soil Disinfestation of Weeds and Pythium irregulare*. Agronomy. https://doi.org/10.3390/agronomy13082081

Zhang, X., Johnson, C., & Reed, D. (2022) *Diversity of Pythium Species Recovered from Float-bed Tobacco Transplant Production Greenhouses*. Plant Dis. https://doi.org/10.1094/PDIS-06-22-1438.

Zhang, X., Johnson, C., & Reed, D. (2021) *Management of Pythium myriotylum in Tobacco Transplant Production Greenhouses*. Plant Health Prog. https://doi.org/10.1094/PHP-03-21-0062-FI

Zhang, X., Jiang, H., & Hao, J. (2019). *Evaluation of the Risk of Development of Fluopicolide*

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Resistance in Phytophthora erythroseptica. Plant Dis. 103(2), 284-288.

RECENT PRESENTATIONS

Subspecies-Specific Detection of Xylella fastidiosa with CRISPR-Cas12a. 2023 CeZAP Infectious Disease Research Symposium. Oct 06, 2023. Virginia Tech, Blacksburg, VA.

Introduction to Data Science in Automated Plant Disease Detection. School of Data Science at the University of Virginia. May 11, 2023. Charlottesville, VA.

PROFESSIONAL SERVICES & MEMBERSHIPS

Reviewing for peer-reviewed journal published by the American Phytopathological Society, *Plant Health Progress*, 09/26/2022 – present.

Reviewing for peer-reviewed journal published by Elsevier, *Crop Protection*, 09/16/2022 – present.

Reviewing for peer-reviewed journal published by the American Phytopathological Society, *Plant Disease*, 10/15/2021 – present.

Reviewing for peer-reviewed journal published by Elsevier, *Biological Control*, 01/23/2017 – present.

Member, International Biometric Society, 12/2023 – present.

Member, Whole Health Consortium at Virginia Tech, 04/2024 – present.

TEACHING & MENTORING

STAT 2274: Basic Python for Statistics

Spring 2024 CMDA capstone: Alex Vidal, Ian Sekelsky, and Yelebe Desta, Virginia Tech Computational Modeling and Data Analytics (CMDA).

Fall 2023 CMDA capstone: Siddarth Ravikanti, Judson Powers, and Nicholas Emig, Virginia Tech Computational Modeling and Data Analytics (CMDA).

Research Data Analysis: Yawen He, PhD candidate, Virginia Tech Biological Systems Engineering (BSE) (Spring 2024 - present)

Research Data Analysis: David Ogburn, medical student, Virginia Tech Carilion School of Medicine (Fall 2023 - present)

Research Data Analysis: Caroline de Jager, PhD candidate, Virginia Tech Translational Biology, Medicine, and Health (TBMH) (Fall 2023 - present)