

Zunaira Afzal, Assistant Professor

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Links

Google Scholar <https://scholar.google.com/citations?user=45pg1ulAAAAJ&hl=en>

Linkedin <https://www.linkedin.com/in/zunaira-afzal-012a4094/>

Profile

Dr. Zunaira Afzal is a dedicated Plant Scientist and Assistant Professor with a specialization in Plant Pathology, Molecular Biology, and Bioinformatics. Leading the Plant Health Genomics and Bioinformatics Laboratories at the CAS-AFS, University of Agriculture Faisalabad, she focuses on unraveling plant-pathogen interactions via genomics and engineering disease resistance through cutting-edge techniques, including CRISPR/Cas based genome editing. Dr. Afzal has spearheaded multiple national and international research projects, significantly contributing to building a disease diagnostic network in Pakistan. With a strong publication record and collaborations with top-tier universities in the USA, her work not only advances scientific knowledge but also directly impacts sustainable agriculture and plant health management.

Employment History

March 2022 – present	Assistant Professor, University of Agriculture Faisalabad Pakistan <ul style="list-style-type: none">• Teaching graduate and undergraduate courses• Mentoring and supervising graduate students• Leading and managing research projects• Serving as the Biosafety Coordinator
August 2016 – December 2019	Graduate Research Assistant, University of Florida USA <ul style="list-style-type: none">• Conducted Ph.D. research• Assisted in managing lab, growth rooms and green house.• Assisted and mentored undergraduate and graduate students• Collaborated on multiple research projects
April 2012 – August 2015	Research Associate, National Institute for Biotechnology and Genetic Engineering Pakistan <ul style="list-style-type: none">• Worked on genetic engineering of cotton• Managed laboratory operations• Organized and participated in training• Prepared technical reports, project documentation, and presentations• Actively contributed to project meetings

Education

August 2016 – December 2019	Ph.D., University of Florida, USA Dissertation: "Investigating Plant- <i>Phytophthora</i> Interactions Using Transcriptomics and Determining the Significance of Ca ²⁺ Signaling in Host Defense." Grade/CGPA: 3.95/4
January 2010 – January 2012	M. Phil. Biotechnology, Pakistan Institute of Engineering and Applied Sciences (PIEAS), Pakistan Dissertation: "Diversity of begomoviruses from perennial hosts and establishment of tissue culture independent transformation in elite cotton cultivars." Grade/CGPA 3.96/4
September 2005 – June 2009	B.Sc., Plant Breeding and Genetics, University of Agriculture Faisalabad (UAF), Pakistan Grade/CGPA 3.99/4

Certificate Courses

• Fundamentals of Machine Learning	2024
• Microsoft Azure Artificial Intelligence Fundamentals	2023
• Fundamentals of Azure AI	2023
• Genomic Data Science Specialization Johns Hopkins University (Coursera)	2023

Awards and Scholarships

- **Fulbright Ph.D. Scholarship**
Awarded for Ph.D. studies in the United States.
- **PPGSO Travel Awards 2018**
Awarded for attending APS conference.
- **PPGSO Travel Awards 2019**
Awarded for attending Plant Health meeting.
- **Silver Water Oaks Scholarship Award**
From Garden Club, Orlando, Florida, USA,
- **University Merit Scholarship**
University of Agriculture Faisalabad, Pakistan

Funded Projects

- Building the Foundations for a National Plant Diagnostic Network (NPDN) in Pakistan
(Role: PI - Funded by USDA)
- Biotechnology and Data Science for Crop Health; a step forward for National Plant Diagnostic and Disease Surveillance Network

(Role: PI - Funded by AWB-USA)

- Development of Cost-Effective System for Early Detection of Wheat Rust

(Role: PI - Funded by Endowment Fund Secretariat UAF)

- Gene Editing of Biological agents for Nutritional, Biochemicals and Therapeutic Purposes

(Role: CoPI - Funded by Ministry of Science and Technology Pakistan)

Publications

- Shahid, M.H., Sahi G.M., **Naveed, Z.A.**, Ali, S., Wahab, M., Sagheer, M., Mustafa, A. Prevalence and genetic diversity of potato virus Y strains in Pakistani potato fields: insights from partial sequence analysis. *Journal of Plant Diseases and Protection*. **2025**, 132 (1), 1-10
- Saleem, M.S., Khan, S.H., Ahmad, A., Rana, I.A., **Naveed, Z.A.**, and Khan, A.I., The 4Fs of cotton: Genome editing of cotton for food, feed, fiber, and fuel to achieve zero hunger. *Frontiers in Genome Editing*. **2024**, 6, p 1401088.
- **Naveed, Z.A.**, Jamil, M., Asif, N., Waqas, M., Ajaz, S., Khan, S.H. et al., Cross-regulation of cytoskeleton and calcium signaling at plant-pathogen interface. *Cellular Signaling*. **2024**: p. 111100.
- Suarez, S. **Naveed, Z.A.**, Ali, G.S. Transcriptional profiling of *Impatiens walleriana* genes through different stages of downy mildew infection reveals novel genes involved in disease susceptibility. *Ornamental Plant Research* **2024**
- Sarwar, M. A., Khan, S. H., Faridi, R., Jamil, M., Norman, D.J., Ali, G.S. **Naveed, Z.A.** Bulk segregant analysis of tomato to identify polymorphism associated with tomato-*Phytoplasma solani* interaction using RNA-sequencing data. **2024** *Research Square*
- **Naveed, Z.A.**, Bibi S, Ali GS. The Phytophthora Effector Avrblb2 Suppresses Plant Immunity by Interfering with Calmodulin. *Frontiers in Plant Science*. **2019**, 10, 374.
- **Naveed, Z.A.**, Wei, X., Chen, J., Mubeen, H., and Ali, G.S. The PTI to ETI Continuum in *Phytophthora*-Plant Interactions. *Frontiers in Plant Science*. **2020**, 11, 2030.
- **Naveed, Z.A.**, Huguet-Tapia JC, Ali GS. Transcriptome profile of Carrizo citrange roots in response to *Phytophthora parasitica* infection. *Journal of Plant Interactions*. **2019**, 14, 187-204.
- **Naveed, Z.A.**, Ali, G.S. Comparative Transcriptome Analysis between a Resistant and a Susceptible Wild Tomato Accession in Response to *Phytophthora parasitica*. *Int. J. Mol. Sci.* **2018**, 19, 3735.
- Kahan A, El-Sayed A, Mangravita-Novo A, Akbar A, Bibi S, **Afzal Z**, Norman D, Ali GS. A Highly Efficient Ligation-independent Cloning system for CRISPR/Cas9 based Genome Editing in Plants. *Plant Methods*. **2017**, 13:86.
- **Afzal Z**, Howton T.C, Sun Y, Mukhtar M.S. The Roles of Aquaporins in Plant Stress Responses. *J. Dev. Biol.* **2016**, 4, 9.

- Bibi S, Huguet-Tapia JC, **Naveed ZA**, El-Sayed AS, Jones JB. Study of silver nanoparticle effects on some molecular responses and metabolic pathways of *Phytophthora parasitica*. *Int J Nanomater Nanotechnol Nanomed*. **2021**; 7(2):047-56.
- **Naveed, Z.A.**, Sarwar, M. A., Ali, G.S., Goss, E. Exploring Genomic Variation and Adaptive Strategies in *Ceratocystis* through Comparative Genomics. (In preparation)

Workshops and Trainings

- **Training Course on Tissue Culture Technology of Tropical Crops for Developing Countries**
Chinese Academy of Tropical Agricultural Sciences
Hainan, China
(August 1st – August 20th 2023)
- **National Faculty Development Program 2021**
National Academy of Higher Education
Islamabad, Pakistan
(July 27th – August 31st 2021)
- **Passport to Great Teaching**
University of Florida
Gainesville, Florida, USA
- **The Plant Root System: Gateway to Plant-Beneficial Rhizosphere Microbiome Interactions.**
Cleveland, Ohio, USA.
(August 3rd, 2019)
- **Analysis of Microbiome Community Data in R.**
Boston, Massachusetts, USA.
(July 29th, 2018)
- **LI-COR Photosynthesis Workshop**
Mid-Florida Research and Education Center
Apopka, Florida, USA
(February 21st, 2019)
- **MREC Resume Workshop**
Mid-Florida Research and Education Center
Apopka, Florida, USA
(March 22nd, 2019)
- **Accelerate to industry (A2i)**
University of Florida
Gainesville, Florida, USA
(August 13-15, 2018)
- **Transgene Expression and Analysis in Plants.**
National Institute for Biotechnology and Genetic Engineering
Faisalabad, Pakistan
(October 02-05, 2012)
- **Genotyping by Sequencing: Overview and Application in Crop Improvement.**
National Institute for Biotechnology and Genetic Engineering
Faisalabad, Pakistan
(February 7, 2013)

Oral Presentations

- **Naveed, Z.A.**; Ali, G.S. Comparative Transcriptome Analysis between a Resistant and a Susceptible Wild Tomato Accession in Response to *Phytophthora parasitica*. Southern Division APS. 2019

- Gainesville, Florida, USA.
- **Naveed, Z.A.**; Ali, G.S. Comparative Transcriptome Analysis between a Resistant and a Susceptible Wild Tomato Accession in Response to *Phytophthora parasitica*. The second international conference on soilborne Oomycetes. 2018
Islamorada, Florida, USA.
 - **Naveed, Z.A.**, Bibi S, Kahan A, Norman D, Brennan M, Ali GS. *Phytophthora* effectors suppresses plant immunity by interfering with the Ca²⁺- signaling pathway. Plant Molecular and Cellular Biology Annual Workshop.2017
Daytona Beach, Florida, USA
 - **Naveed, Z.A.**, Huguet-Tapia JC, Ali GS. Citrus root transcriptome in response to *Phytophthora parasitica* infection. Florida Pathological Society Meeting. 2017
University of Florida, Quincy, Florida, USA

Poster Presentations

- **Naveed, Z.A.**; Ali, G.S. Comparative Transcriptome Analysis between a Resistant and a Susceptible Wild Tomato Accession in Response to *Phytophthora parasitica*.
Plant Health. 2019
Cleveland, Ohio, USA.
- **Naveed, Z.A.**, Huguet-Tapia JC, Ali GS. Transcriptome profile of Carrizo citrange roots in response to *Phytophthora parasitica* infection. The second international conference on soilborne Oomycetes. 2018
Islamorada, Florida, USA.
- **Naveed, Z.A.**, Huguet-Tapia JC, Ali GS. Transcriptome profile of Carrizo citrange roots in response to *Phytophthora parasitica* infection. ICPP. 2018
Boston, Massachusetts, USA.
- Ali GS., **Naveed, Z.A.**, Huguet-Tapia JC. Transcriptome profile of Carrizo citrange roots in response to *Phytophthora parasitica* infection. Plant and Animal Genome Conference XXVI. 2018
San Diego, CA, USA.
- **Afzal Z**, Rasul F, Naqvi RZ, Ajaz S, Arshad M, Asif M, Amin I, Mukhtar Z, Asad S and Mansoor S. Development of gene constructs and genetically engineered germplasm resources resistant against Cotton leaf curl virus disease and its insect vector. International Cotton Genome Initiative Research Conference. 2014
Huazhong Agricultural University
Wuhan, Hubei province, China
- **Afzal Z**, Rasul F, Ajaz S, Arshad M, Amin I, Mukhtar Z, Bashir A, Mansoor S and Asad S. Development of RNAi-Amplicon based resistance against cotton leaf curl disease. International Conference on Biotechnology, Prospects & Challenges in Agriculture, Industry, Health and Environment. 2013
NIBGE, Faisalabad, Pakistan
- Rasul F, **Afzal Z**, Ajaz S, Arshad M, Amin I, Mukhtar Z, Bashir A, Mansoor S and Asad S. Development of pathogen driven broad spectrum resistance against cotton leaf curl disease International Conference on Biotechnology, Prospects & Challenges in Agriculture, Industry, Health and Environment.2013
NIBGE, Faisalabad, Pakistan
- **Afzal Z**, Amin I, Arshad M, Asad S, Mansoor S. Diversity of begomoviruses from perennial hosts and development of broad spectrum resistance. SAARC Regional Conference on New Frontiers in Agricultural Genomics and Biotechnology.2012
NIGAB, Islamabad, Pakistan

Leadership Experience

- Graduate Student Representative for the whole College of Agriculture and Life Sciences (Selected by the Dean) in CALS Curriculum Committee. 2019
- Chair of Social Committee of Plant Pathology Graduate Student Organization. 2019
- Member of Professional Development Committee of Plant Pathology Graduate Student Organization. 2019
- Member of Outreach Committee of Plant Pathology Graduate Student Organization. 2019
- Graduate Student Representative for MREC in Plant Pathology Graduate Student Organization. 2017

Voluntary Professional Services

- Served as a reviewer for Scientific Reports, Protoplasma, Agronomy, Forests
- Served as Science Fair Judge for District level competitions in High Schools. November-December 2019 Gainesville, Florida, USA
- Served as Judge for selecting Graduate Student for Seminar Exchange between UF and Ohio State University. November 2019 Gainesville, Florida, USA
- Managed MREC Booth at Sweetwater Oaks Garden Fair. March 2nd, 2019. Gainesville, Florida, USA
- Volunteered as a Guide at Registration Desk in Plant Health. 2019. Cleveland, Ohio, USA.
- Managed Fund-Raising Booth in Plant Health. 2019. Cleveland, Ohio, USA.
- Session Moderator in the second international conference on soilborne Oomycetes. December 6th, 2018. Islamorada, Florida, USA.

Professional Affiliations

- Member of American Phytopathological Society (APS)
- Member of Genetics Society of America (GSA)
- Secretary Ethics Committee, Biotechnology Society of Pakistan (BSP)

Professional References

- **Prof. Dr. Sultan Habibullah Khan**
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