

Zawar Hussain

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Research Interests

Agriculture, Horticulture, Plant cell wall biology, plant stress biology, plant physiology, plant biochemistry

Academic Background

Postdoc., Dept. of Forest Genetics and Plant Physiology, UPSC, SLU (Present)

Ph.D., Plant Biology, Department of Environmental & Plant Biology, (May 2026),
Ohio University, Athens, Ohio (*cGPA* 3.71)

MSc (Hons) Agriculture "Horticulture" (March 2019)
The University of Agriculture Peshawar, Peshawar Pakistan (*cGPA* 3.98)

BSc (Hons) Agriculture "Horticulture" (February 2017)
University of Agriculture Peshawar, Peshawar Pakistan (*cGPA* 3.90)

Professional experience

2025-2026	Teaching Assistant, Department of Environmental and Plant Biology, Ohio University, Athens, Ohio. <u>Courses Taught:</u> P BIO1140 (Foundations of Plant Biology), P BIO5280 (Laboratory in Genomics Techniques), P BIO3240 (Plant Physiology).
2020-2024	Research Assistant, Department of Environmental and Plant Biology, Ohio University, Athens, Ohio.
2018-2019	Visiting lecturer, Department of Agriculture, Hazara University, Mansehra, Pakistan
2016-2018	Research Assistant, Project: Employing plant growth-promoting bacteria in phytoremediation of foodborne pathogens and toxic metals from wastewater.
2014-2015	Research Assistant, Project: Microbial status of irrigation water in Peshawar.

Peer-Reviewed Publications

1. **Hussain** et al., 2025. Structural insights reveal TomEP affinity towards Tyrosine-X-Tyrosine motifs of extensin protein (Under review: *Journal of Experimental Botany*).
2. **Hussain** et al., 2026. Mutation in *TomEP*, (extensin peroxidase from tomato) enhances cell elongation in tomato roots with minimal changes in cell wall structure. (Under review: *The Plant Cell*).
3. Bhattarai, M., Wang, Q., **Hussain, Z.**, Tanim-Al-Hassan, M., Chen, H. and Faik, A., 2024. New insights on β -glycan synthases using in vitro GT-array (i-GT-ray) platform. *Plant Physiology and Biochemistry*, 215, p.109052.
4. **Hussain, Z.**, Alam, M., Khan, M.A., Asif, M., Shah, M.A., Khan, S., Khan, S. and Nawab, J., 2020. Bioaccumulation of potentially toxic elements in spinach grown on contaminated soils amended with organic fertilizers and their subsequent human health risk. *Arabian Journal of Geosciences*, 13, pp.1-9.
5. **Hussain, Z.**, Alam, M., Ullah, I., Ahmad, I., Sajid, M., Alam, I., Rehman, A.U., Shah, M.A. and Asif, M., 2020. Effect of organic and inorganic regimes on growth, production and quality characteristics of cauliflower.
6. Alam, M., **Hussain, Z.**, Khan, A., Khan, M. A., Rab, A., Asif, M., Muhammad, A. (2020). The effects of organic amendments on heavy metals bioavailability in mine-impacted soil and associated human health risk. *Scientia Horticulture*, 262 (2020) <https://doi.org/10.1016/j.scienta.2019.109067>
7. Alam, M., Hayat, K., Ullah, I., Sajid, M., Ahmad, M., Basit, A., Ahmad, I., Muhammad, A., Akbar, S., **Hussain, Z.** (2020). Improving Okra (*Abelmoschus esculentus* L.) growth and yield by mitigating drought through exogenous application of Salicylic acid. *Fresenius Environmental Bulletin*. 29, 529-535.
8. Rehman, A.U., Dang, T., Qamar, S., Ilyas, A., Fatema, R., Kafle, M., **Hussain, Z.**, Masood, S., Iqbal, S. and Shahzad, K., 2021. Revisiting Plant Heterosis. From Field Scale to Molecules. *Genes*, 12(11), p.1688.
9. Rehman, A.U., Masood, S., Khan, N.U., Abbasi, M.E., **Hussain, Z.** and Ali, I., 2021. Molecular basis of Iron Biofortification in crop plants; A step towards sustainability. *Plant Breeding*, 140(1), pp.12-22.

10. Ghanim, A.A.J., Shah, M.A., Alam, M., Khan, A., Khan, M.A., Rahman, S., Alsaiani, M.A., Jalalah, M., Khan, M.K.A., Irfan, M. and **Hussain, Z.**, 2023. The influence of compost amendments on bioaccumulation of potentially toxic elements by pea plants cultivated in mine degraded soils. *Arabian Journal of Geosciences*, 16(1), p.46.
11. Jalal, A., Shah, S., Teixeira Filho, M., Carvalho, M., Khan, A., Shah, T., **Hussain, Z.**, Younis, M. and Ilyas, M., 2020. Yield and phenological indices of wheat as affected by exogenous fertilization of zinc and iron. *Brazilian Journal of Agricultural Sciences/Revista Brasileira de Ciências Agrárias*, 15(1).
12. Alam, Mehboob, **Zawar Hussain**, Izhar Ullah, and Johar Raza Khan. Effect of growing media on rooting response of tomato (*Lycopersicum esculentum* L.) stem cuttings. *Pure and Applied Biology (PAB)* 9, no. 1 (2020): 884-896.
13. Alam, B., Ali, S., Jadoon, S.A., Ahmad, M., Muhammad, A., Shah, S.T., Ahmad, I., Rab, A., Hussain, Z. and Ali, L., 2023. Effect of chitosan on post-harvest shelf life of persimmon (*Diospyros kaki* L.). *Acta Scientiarum Polonorum. Hortorum Cultus*, 22(2), pp.27-43.

Conference Presentations

- **Zawar Hussain**, John W. Mishler-Elmore, Abhijit Sukul, Ahmed Faik, and Michael A. Held Structural and Functional Characterization of TomEP, an Extensin Peroxidase From Tomato. 89th Annual Northeastern ASPB Meeting, The College of New Jersey. April 25-26, 2026.
- **Zawar Hussain**, John W. Mishler-Elmore, Abhijit Sukul, Ahmed Faik, and Michael A. Held Structural and Functional Characterization of TomEP, an Extensin Peroxidase From Tomato. Presented at 10th International Horticulture Conference, The University of Agriculture Peshawar, Pakistan. April 7-9, 2026.
- **Zawar Hussain**, John W. Mishler-Elmore, Abhijit Sukul, Ahmed Faik, and Michael A. Held. Characterization of tomato extensin peroxidase *in-vivo*. Presented at 24th Penn State Symposium in Plant Biology, Plant Specialized Metabolites: Synthesis, Regulation & Function., University Park, PA. June 24-26, 2025.
- **Zawar Hussain**, John W. Mishler-Elmore, Abhijit Sukul, Ahmed Faik, and Michael A. Held. Characterization of tomato extensin peroxidase *in-vivo*. Presented at PBio colloquium. Ohio University Athens Ohio, October 17, 2025.
- **Zawar Hussain**, Mehboob Alam. Effect of planting space and fertilizer sources on growth and yield of french beans (*Phaseolus vulgaris*). 7th International and 16th National Conference on “Plant Resources: Current Trends, Challenges, and Solution” Pakistan Journal of Botany, Islamia College University Peshawar. (March 23 - 26, 2018).

Posters presentation

- **Zawar Hussain**, John W. Mishler-Elmore, Abhijit Sukul, Ahmed Faik, and Michael A. Hel. Characterization of tomato extensin peroxidase *in-vivo*. Presented at the student research and creativity expo, Ohio University in April 2026.

- **Zawar Hussain**, John W. Mishler-Elmore, Abhijit Sukul, Ahmed Faik, and Michael A. Held. Characterization of tomato extensin peroxidase *in-vivo*. Presented at The Ohio State University plant sciences symposium, Ohio State University in February 2026.
- **Zawar Hussain**, John W. Mishler-Elmore, Abhijit Sukul, Ahmed Faik, and Michael A. Hel. Characterization of tomato extensin peroxidase *in-vivo*. Presented at the, Annual Meeting, American Society of Plant Biologists, July 2025.
- **Zawar Hussain**, John W. Mishler-Elmore, Abhijit Sukul, Ahmed Faik, and Michael A. Hel. Characterization of tomato extensin peroxidase *in-vivo*. Presented at the student research and creativity expo, Ohio University in April 2025.
- **Zawar Hussain**, John W. Mishler-Elmore, Abhijit Sukul, Ahmed Faik, and Michael A. Held. Characterization of tomato extensin peroxidase *in-vivo*. Presented at The Ohio State University plant sciences symposium, Ohio State University in March 2024.
- **Zawar Hussain**, John W. Mishler-Elmore, Abhijit Sukul, Ahmed Faik, and Michael A. Held. Characterization of tomato extensin peroxidase *in-vivo*. Presented at the student research and creativity expo, Ohio University in April 2024.
- **Zawar Hussain**, John W. Mishler-Elmore, Abhijit Sukul, Ahmed Faik, and Michael A. Held. Characterization of tomato extensin peroxidase *in-vivo*. Presented at the, Annual Meeting Midwestern Section, American Society of Plant Biologists, Summer, 2023.
- **Zawar Hussain**, John W. Mishler-Elmore, Abhijit Sukul, Ahmed Faik, and Michael A. Held. Characterization of tomato extensin peroxidase *in-vivo*. Presented at the student research and creativity expo, Ohio University, April 2023.

Honors and Awards

- Gold medal in MSc (Hons) Agriculture "Horticulture"
- Gold medal in BSc (Hons) Agriculture "Horticulture"
- Welson Travel Award (\$600) to attend conferences (Spring, 2026)
- CAS travel grant (\$500) and Welson Travel Award (\$600) to attend conferences (Summer, 2025)
- Graduate Student Research Fund (\$1000), College of Arts and Sciences (Fall, 2025).
- Original work grant (\$750), Ohio University (Spring, 2025).
- Travel award (\$750), Ohio University (Spring, 2025).
- Original work grant (\$1000), Ohio University (Fall, 2024).
- Graduate Student Research Fund (\$1000), College of Arts and Sciences (Fall, 2022).
- First place at Ohio University Student and Research Creativity Expo (Spring 2024).
- CAS travel grant (\$500) and Welson travel Award (200\$) to attend Annual Meeting Midwestern Section, American Society of Plant Biologists (Summer, 2023)

Technical skills

Computational Skills

- **AlphaFold** for protein structure prediction.
- **Avogadro and Chemdraw** for ligands drawing and energy optimization.
- **Dali** for structural comparison

- Visualization platforms such as **PyMOL**, **ChimeraX**, **Maestro** and **Discovery Studio**.
- **AutoDock Vina**, **AutoDock 4.0**, and **PyRx** for ligand preparation and molecular docking studies.
- **Schrödinger Maestro** and **Desmond** for molecular dynamics simulations.

Molecular Biology

- Gene cloning, overlap PCR, RT PCR, RT qPCR
- Co-expression of protein constructs in Tobacco epidermal cells
- Agrobacterium-mediated genetic transformation
- Bacterial and plant DNA isolation
- Generation of CRISPR and Overexpression Constructs, Floral Dip
- Genotyping and Phenotyping in Tomato, Rice and Arabidopsis

Microscopy and Biochemistry

- Confocal Microscopy
- Plant tissues sectioning and staining, compound microscopy
- Cell wall Extraction (AIR Preparation)
- Invitro Enzymes Activity Assays
- Protein, Protein interaction assays
- Agarose gel electrophoresis, western, southern and northern blot analysis

Analytical

- Colorimetry
- UV-Visible spectrophotometry
- Thin Layer Chromatography
- High Performance Anion Exchange chromatography.

Extra-curricular activities

- Former President Pakistani Student Association (Ohio University)
- Former President Society for Horticulture Development (The University of Agriculture Peshawar)
- Hobbies: Cricket, Reading books, Hiking

References

1. **Dr Ahmed Faik**
Professor: Molecular Cellular Biology
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2. **Dr Michael Held**

Professor: Biochemistry Research Facility, Chemistry and Biochemistry, Molecular Cellular Biology,

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3. **Dr David Rosenthal**

Associate Professor and OHIO Student Farm Coordinator

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