

PERSONAL DATA

Title	Dr.
First name	Mitra
Last name	Ghotbi
Current position	Postdoctoral Fellow
Current institution	Institute of Botanical Institute, and Plant Nutrition and Soil Science, Kiel University, Am Botanischen Garten 1–9, 24118 Kiel, Germany
Identifiers / orcid	0000-0001-9185-9993
Github	github.com/mghotbi

QUALIFICATIONS & CAREER

Stages	PERIODS & DETAILS
Degree programme	2001 – 2006 B.Sc. Crop Production and Plant/Seed Breeding IAU, East Azerbaijan, Iran Thesis Tissue culture of carrot cells
	2007 – 2009 M.Sc. Crop Production and Weed Biocontrol Shahed University, Tehran, Iran Thesis Biology and efficacy of <i>Fusarium oxysporum</i> isolates for biocontrol of <i>Orobanche aegyptiaca</i>
	2016 – 2022 Dr. agr., Agricultural Sciences Soil Microbial Ecology and Biogeochemistry Joint doctoral program, University of Bonn, Germany & University of California, Davis, USA Advisors Prof. Claudia Knief and Prof. William R. Horwath Thesis <i>Implication of topography and agronomic practices for soil biogeochemical and microbiological properties in a hilly farmland</i> Oral examination 6 January 2022; degree awarded 7 February 2022.
Professional career	2012 – 2015 Junior Researcher ZEF Center for Development Research, University of Bonn, Germany Climate-change impacts on plant performance, soil organic-matter dynamics, and N ₂ O and CO ₂ emissions.
	2022 – 2023 Postdoctoral Research Associate University of Illinois Urbana-Champaign (UIUC), USA Rhizosphere nitrogen cycling, biological nitrification inhibition (BNI) and plant–microbe interactions under herbivory and flooding (USDA-NIFA).
	2024 – 2026 Postdoctoral Research Associate Department of Biology, Middle Tennessee State University (MTSU), USA Host-associated microbiomes, genomics, metagenomics and synthetic-microbiome experiments; fungal–bacterial interactions (NSF-funded).

Stages	PERIODS & DETAILS
	2026 – present Postdoctoral Fellow Institute of Plant Nutrition and Soil Science and Botanical Institute, Kiel University, Germany Soil–plant–microbiome redox ecology; independent development of HYDROREDOX and predictive-framework development.

RESEARCH INTEREST

I am a soil biogeochemist and microbial ecologist studying how hydrological extremes, plant–microbe interactions and environmental heterogeneity regulate soil carbon, nitrogen and redox cycling, and how these processes reshape plant and associated microbiome function and recovery after hydrological stress. My work integrates process measurements, stable isotopes and microbial community data with reproducible computation and data-driven modelling to link microscale mechanisms to ecosystem-scale biogeochemical responses. A central focus is holobiont redox resilience and predicting how terrestrial carbon and nutrient cycling recover under climate change.

INDEPENDENT RESEARCH DIRECTION

DFG Individual Research Grant with Temporary Position for Principal Investigator (Eigene Stelle) (GH 429/1-1-Holobiont redox resilience and elemental coupling across the maize domestication gradient); Lead applicant; submitted Dec 2025; currently under review.

HYDROREDOX. Lead applicant and concept developer of a five-year interdisciplinary programme testing whether event-accessible electron-transfer architecture predicts soil–plant–microbiome recovery after flood–drought cycles. The programme links controlled experiments, electrochemistry, stable isotopes, microbial measurements and hierarchical Bayesian predictive models, and is designed to lead two doctoral researchers together with an external modelling collaboration. Short proposal in preparation for the Volkswagen Foundation “Pioneering Research – Exploring the Unknown Unknown” initiative.

ACTIVITIES IN THE RESEARCH SYSTEM

Memberships ISME, MSA, ASA, CSSA, SSSA and FEMS.

Mentoring Undergraduate, graduate and early-career researchers.

Teaching Bioinformatics and statistics workshops; microbial informatics.

Community ISME community mentor; reviewer for journals including The ISME Journal and Applied Soil Ecology; developer of open-source R packages (DspikeIn, NicEuc and RedoxRRI).

Invited talks Climate Change Reshapes Soil–Plant–Microbe Interactions, Cumberland University (2024). Absolute Abundance Analysis with DspikeIn, University of Hawai‘i at Mānoa (2024).

SUPERVISION OF EARLY-CAREER RESEARCHERS

Supervision and mentoring of at least eight undergraduate and graduate researchers at UIUC, MTSU and Kiel in microbial ecology, computational biology and experimental design. This mentoring is complemented by teaching in microbial ecology and computational biology at Middle Tennessee State University, and by the development and forthcoming delivery of an elective Agrigenomics module on soil–plant–microbe interactions in redox resilience and bioinformatics at Kiel University.

SCIENTIFIC RESULTS

SELECTED

1. **Ghotbi**, M., Ghotbi, M., Kuzyakov, Y. & Horwath, W.R. (2025). Management and rhizosphere microbial associations modulate genetic-driven nitrogen fate. *Agriculture, Ecosystems & Environment* 378, 109308. <https://doi.org/10.1016/j.agee.2024.109308>
2. **Ghotbi**, M., Taghizadeh-Mehrjardi, R., Knief, C., Ghotbi, M., Kent, A.D. & Horwath, W.R. (2023). The patchiness of soil ¹³C versus the uniformity of ¹⁵N distribution with geomorphic position provides evidence of erosion and accelerated organic matter turnover. *Agriculture, Ecosystems & Environment* 356, 108616. <https://doi.org/10.1016/j.agee.2023.108616>
3. **Ghotbi**, M., Durrer, A., Frindte, K. et al. (2022). Topographic attributes override impacts of agronomic practices on prokaryotic community structure. *Applied Soil Ecology* 175, 104446. <https://doi.org/10.1016/j.apsoil.2022.104446>
4. **Ghotbi**, M., Stajich, J.E., Dallas, J.W. et al. (2025). Absolute abundance unveils *Basidiobolus* as a cross-domain bridge indirectly bolstering gut microbiome homeostasis. *The ISME Journal* 19, wrf150. <https://doi.org/10.1093/ismejo/wrf150>
5. Ghotbi, M., **Ghotbi**, M., D'Agostino, E., Kanitz, M. & Needham, D.M. (2025). From microscale to microbial insights: validating high-throughput microvolume extraction (HiMEx) methods for marine microbial ecology. *ISME Communications* 5, ycaf218. <https://doi.org/10.1093/ismeco/ycaf218>
6. Dallas, J.W., **Ghotbi**, M., Rurik, A.J. et al. (2026). Oo-No: *Ophidiomyces ophidiicola*-bacterial interactions and the role of skin lipids in development of ophidiomycosis. *PLOS Pathogens* 22, e1013875. <https://doi.org/10.1371/journal.ppat.1013875>
7. Ghotbi, M., Bonthond, G., **Ghotbi**, M., Künzel, S., Needham, D.M. & Weinberger, F. (2025). Greater host influence and promiscuity: how an invasive seaweed host has advantages over co-occurring natives. *ISME Communications* 5, ycaf120. <https://doi.org/10.1093/ismeco/ycaf120>
8. Cummins, C., Sutton, W., McLeod, T. et al., including **Ghotbi**, M. (2026). Effects of environmental setting and diet on the gut microbial ecology of eastern hellbenders. *Animal Microbiome*. <https://doi.org/10.1186/s42523-026-00537-w>
9. Dallas, J.W., Murphy, K.M., Ghotbi, M. et al. (2026). Skin lipid chemistry influences host-microbiome-pathogen interactions in snake fungal disease (ophidiomycosis). *Communications Biology*. <https://doi.org/10.1038/s42003-026-10820-w>
10. Wahsha, M., Al-Omari, A.M., Mostafavi, K. et al., including **Ghotbi**, M. (2012). Modellistic approach for land suitability: an application to maize. *Journal of American Science* 8, 139–149.
11. Wahsha, M., Al-Omari, A., Hassan, M. et al., including **Ghotbi**, M. (2012). Protective action of flavonoids extracted from different Jordanian plants against oxidative stress. *International Journal of Biological and Pharmaceutical Research* 3, 450–456.

SOFTWARE & OTHER OUTPUTS

1. **Ghotbi, M.** (2025). DspikeIn: estimating absolute abundance from microbial spike-in controls. Bioconductor R package, version 1.0.0. <https://doi.org/10.18129/B9.bioc.DspikeIn>
2. Additional open-source R packages: NicEuc (github.com/mghotbi/NicEuc) and RedoxRRI (github.com/mghotbi/RedoxRRI).
3. **Ghotbi, M., Dehghan, M.A. & Ghotbi, M.** (2011). Effect of nutritional regime on expression of pathogenicity of *Fusarium oxysporum* against *Orobanche aegyptiaca*. International Journal of AgriScience 4, 210–231.
4. **Ghotbi, M., Dehaghi, M., Khamseh, M. & Rouhi, H.R.** (2012). Mitigating *Phelipanche aegyptiaca* infestation while considering natural-environment conservation. International Journal of AgriScience 2, 62–77.
5. **Ghotbi, M., Ghotbi, M. & Takami, G.A.** (2011). Contribution of beta-carotene to survival and flesh colour of rainbow trout compared with astaxanthin. International Journal of Biological, Biomolecular, Agricultural, Food and Biotechnological Engineering 5, 709–714.
6. **Ghotbi, M., Ghotbi, M., Dehaghi, M.A. et al.** (2013). *Fusarium oxysporum* against *Orobanche aegyptiaca*. World Academy of Science, Engineering and Technology.

ACADEMIC DISTINCTIONS

ISME19 Travel Grant (2024) — 19th International Symposium on Microbial Ecology, Cape Town, South Africa.

FEMS Congress Grant (2023) — FEMS Congress of Microbiology, Hamburg, Germany.

PhD Project Scholarship, UC Davis (2015–2017) — doctoral research in soil biogeochemistry and rhizosphere molecular biology.

WASCAL Scholarship, University of Bonn (2012–2014) — West African Science Service Center on Climate Change and Adapted Land Use.

Earlier honours — IFOAM Bursary Award (2011);

NAAEE Diversity Scholars Award (2010);

ICM9 Bursary Award (2010); EWRS Travel Bursary (2010);

Best Presenter Award (2008); IWSS Travel Award (2008).

OTHER INFORMATION

Workshops & training JGI-LBNL Microbial Genomics & Metagenomics Workshop; Wellcome Connecting Science Fungal Pathogen Genomics Course; hands-on pipeline development for metabarcoding and shotgun metagenomics; R programming and package development; Linux/Unix.

Advanced microscopy AFM, SEM, TEM, XRD, DSC, Raman and XPS (UIUC training).

Certifications CITI training in research ethics, conflict of interest, grant-proposal writing, and animal-care and herptile research.

Computational tools TASSEL, Cytoscape, Gephi, SigmaPlot and GenGIS.

Languages Persian/Farsi (native); English (fluent); German (B1).