

Hamed Azarbad, Ph.D.

Jagiellonian University • Institute of Environmental Sciences
Ul. Gronostajowa 7 • 30-387 Krakow, Poland
Tel.: +48 795-081-454 • E-mail: Azarbad.Hamed@gmail.com

Overview

- Double PhDs in the fields of biology and microbial ecology
- Postdoc experience on soil-plant-microbe interactions
- Total working experience of 10 years in different laboratories in Europe, USA and Canada
- Interdisciplinary skill sets in advanced molecular methods, plant microbiology, soil biogeochemistry and multivariate statistics

Appointments

Postdoctoral fellow (plant–insect–microbes interactions) 09/2019 – present

Location: Jagiellonian University, Kraków, Poland

Supervisor: Dr. Piotr Łukasik

Project: The main goal is to better understand the link between microbiome diversity in soil, plant and insects under changing climate in the Arctic, and to describe their possible environmental transmission routes.

Postdoctoral fellow (plant holobiont response to drought stress) 02/2016 – 08/2019

Location: INRS–Institut Armand Frappier (Laval, Canada)

Supervisor: Dr. Étienne Yergeau

Project: My research focuses on understanding the power of the soil and rhizosphere microbiome to protect crops against biotic and abiotic stresses. The goal of my project was to find microbial genes and organisms that would promote crop adaptation to abiotic stress.

Education

PhD in Biology "dissertation defended with honors" 11/2010 – 03/2015

Location: Jagiellonian University, Kraków, Poland

Advisors: Dr. Maria Niklinska and Professor Ryszard Laskowski

Thesis: Relationship between the diversity of soil microbial communities and their resistance to different stressors

PhD in Microbial Ecology 11/2010 – 12/2014

Location: VU University of Amsterdam, Netherlands

Advisors: Professor Nico M. van Straalen and Dr. Wilfred F.M. Röling

Thesis: Relationship between the diversity of soil microbial communities and their resistance to different stressors

Master in Natural Science – University of Tehran, Iran. 10/2007 – 09/2010

Bachelor in Natural Science – University of Zabol, Iran. 10/2002 – 09/2006

Skills

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- **Molecular analyses:** amplicon libraries preparation using group-specific primers (bacterial 16S rRNA gene and fungal ITS region) and data analysis using high-throughput 'omics platforms', quantitative real-time PCR (qPCR), functional gene analysis and bioinformatics pipelines.
 - **Other techniques:** the determination of phospholipid fatty acid (PLFA) patterns, Biolog plate–based determination of community-level physiological profiles (CLPPs), preparation of sterile culture media and plates, nutrient analysis for soil, flame and graphite furnace atomic absorption

spectrophotometer and GC-MS, trace gas analyser for CO₂, N₂O, H₂ and CO, well-equipped to work with different plant hosts (under greenhouse and field conditions).

- **Statistics packages:** R, PAST and Statgraphics.

Prizes and Awards

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| • Travel grant from ISME to attend ISME17 (1500 CAD ≈ 1139 USD). | 07/2018 |
| • Scientific achievement award from Institute of Environmental Sciences (Jagiellonian University, Kraków, Poland). | 11/2017 |
| • Nomination for PhD thesis award from the Environmental Chemistry section of the Royal Netherlands Chemical Society and the Environmental Toxicology section of the Dutch Toxicology Society. | 05/2016 |
| • Travel grant from Québec Centre for Biodiversity Science (QCBS) to attend ISME16 (475 CAD ≈ 360 USD). | 04/2016 |
| • Poster Award at a conference (protection of soil functions – challenges for the future, Puławy, Poland). | 10/2013 |
| • Young researcher awards for an outstanding student presentation at a congress of Trace Elements, Iran. University of Medical Sciences, Tehran, Iran. | 11/2009 |

Funding

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| • Postdoctoral fellowship from Institut Armand Frappier, Laval–Canada (41,000 CAD ≈ 31,150 USD). | 03/2018 – 03/2019 |
| • Postdoctoral fellowship from The Fonds de recherche du Québec – Nature et technologies (35,000 CAD ≈ 26,590 USD). | 02/2017 – 02/2018 |
| • Doctoral student research grant from Jagiellonian University (11,000 PLN ≈ 2,800 USD) | 10/2014 – 10/2015 |
| • Research grant from Polish National Science Center, PRELUDIUM, No, UMO–2012/05/N/NZ8/00925 (98,000 PLN ≈ 24,950 USD). | 04/2013 – 04/2015 |
| • Doctoral student research grant from Jagiellonian University, Kraków, Poland. (5,000 PLN ≈ 1,280 USD). | 10/2013 – 10/2014 |
| • Doctoral student research grant from Jagiellonian University, Kraków, Poland. (5,000 PLN ≈ 1,270 USD). | 10/2012 – 10/2013 |
| • PhD scholarship from Foundation for Polish Science (MPD, International PhD program). Jagiellonian University, Kraków, Poland. | 11/2010 – 03/2015 |

Publications

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1. Giard–Laliberté, C., Tremblay, J., **Azarbad, H.**, Bainard D.L., Yergeau, E. Natural genetic transformation of the wheat rhizosphere microbial communities through DNA inoculations. Submitted to ISME J.
 2. Bouyoucef, L.S., **Azarbad, H.**, Hamidechi, M.A., Yergeau, E. The effects of inorganic nitrogen fertilizers application on bacterial and archaeal community structures of durum wheat rhizosphere and bulk soil. Submitted to Applied and Environmental Microbiology journal.
 3. **Azarbad, H.**, Tremblay, J., Giard–Laliberté, C., Bainard D.L., Yergeau, E. Soil water stress history and host genotype constrain the response of the wheat microbiome to decreasing soil moisture. *FEMS Microbiology Ecology*. Accepted pending major revision.
 4. Giard–Laliberté, C., **Azarbad, H.**, Tremblay, J., Bainard, D.L., Yergeau, E. (2019). Soil extracts with a water stress history modifies the rhizosphere fungal communities of wheat plants under a subsequent water stress. *FEMS Microbiology Ecology* 1: 95(7).
 5. **Azarbad, H.**, Constant, P., Giard–Laliberté, C., Bainard D.L., Yergeau, E. (2018). Water stress history and wheat genotype modulate rhizosphere microbial response to drought. *Soil Biology and Biochemistry*, 126: 228–236.
 6. Klimek, B., Chodak, M., Jaźwa, M., **Azarbad, H.**, Niklińska, M. (2017). Soil physicochemical and microbial drivers of boreal forest soils temperature sensitivity. *Pedosphere* doi:10.1016/S1002–0160(17)60400–4.
 7. **Azarbad, H.**, van Gestel, C.A.M., Niklińska, M., Laskowski, R., Röling, W.F.M., van Straalen, N.M. (2016). Resilience of Soil Microbial Communities to Metals and Additional Stressors: DNA–Based

Approaches for Assessing “Stress-on-Stress” Responses. *International Journal of Molecular Sciences*, 17, 933.

8. **Azarbad, H.**, Laskowski, R., van Gestel, C.A.M., van Straalen, N.M., Nikiel, K., Röling, W.F.M., Niklińska, M. (2016). Susceptibility to additional stressors in metal-tolerant soil microbial communities from two pollution gradients. *Applied soil ecology*, 98: 233–242
9. **Azarbad, H.**, Niklińska, M., Nikiel, K., van Straalen, N.M., Röling, W.F.M. (2015). Functional and compositional responses in soil microbial communities from two metal pollution gradients: does the level of historical pollution affect resistance against secondary stress? *Biology and Fertility of Soils*, 51: 879–890.
10. Chodak, M., Klimek, B., **Azarbad, H.**, Jaźwa, M. (2015). Functional diversity of soil microbial communities under Scots pine, Norway spruce, silver birch and mixed boreal forest stands. *Pedobiologia*, 58: 81–88.
11. **Azarbad, H.**, Niklińska, M., Laskowski, R., van Straalen, N. M., van Gestel, C.A.M., Zhou, J., He, Z., Wen, C and Röling, W. F.M. (2015). Microbial community structure and functions are resilient to metal pollution along two forest soil gradients. *FEMS Microbiology Ecology*, 91: 1–11.
12. **Azarbad, H.**, Niklińska, M., van Gestel, C.A.M., van Straalen, N. M., Röling, W. F.M. and Laskowski, R. (2013). Microbial community structure and functioning along metal pollution gradients. *Environmental Toxicology and Chemistry*, 32: 1992–2002.
13. **Azarbad, H.**, Niklińska, M., van Straalen, N. M., van Gestel, C. A. M. (2012). Effect of long term exposure to different mixture of heavy metals on soil microbial index. *Acta environment*, 20: 7–10.
14. **Azarbad, H.**, Javanshir, A., Mir-Vaghefi, A., Daneh-Kar, A., Shapoori, M. (2010). Biosorption and bioaccumulation of heavy metals by Rock Oyster *Saccostrea cucullata* in the Persian Gulf. *International Aquatic Research*, 2: 39–44.

Presentations

Invited Seminars

1. **Azarbad, H.** Novel holobiont-based approaches to rapidly adapt wheat to drought stress. Institute of Environmental Sciences, Jagiellonian University. 10 January 2019.

Selected Conference Presentations

*Denote oral presentation

1. ***Azarbad, H.**, Agoussar, A., Tremblay, J., Yergeau, E. Response of the wheat microbiome to three years of rainfall manipulations. The second international conference on holobionts, Montréal, Canada. 8–10 May 2019.
2. ***Azarbad, H.**, Yergeau, E. Soil water stress history defines the wheat microbiome responses to drought. The annual Quebec Centre for Biodiversity Science (QCBS) symposium, Montreal, Canada. 10–12 December 2018.
3. **Azarbad, H.**, Constant, P., Tremblay, J., Giard-Laliberté, C., Bainard, L., Yergeau, E. Soil water stress history defines the wheat microbiome responses to a subsequent water stress. 17th International Symposium on Microbial Ecology (ISME17), Leipzig, Germany. 12–17 August 2018.
4. **Azarbad, H.**, Yergeau, E. Microbial factors involved in improved plant resistance to abiotic stresses. 16th International Symposium on Microbial Ecology (ISME16), Montreal, Canada. 21–26 August 2016.
5. ***Azarbad, H.**, Laskowski, R., Niklińska, M., van Straalen, N.M., Röling, W.F.M. Stability of (metal-tolerant) microbial communities towards additional stressors. 16th International Symposium on Microbial Ecology (ISME16), Montreal, Canada. 21–26 August 2016.
6. **Azarbad, H.**, Laskowski, R., Niklińska, M., Nikiel, K., van Straalen, N.M., van Gestel, C.A.M., and Röling, W.F.M. Functional and structural response of soil microbial communities to additional stressors, does historical pollution matter? Integrating ecological knowledge into nature conservation and ecosystem management. Hildesheim, Germany. September 2014.
7. Chodak, M., Klimek, K., **Azarbad, H.**, Jaźwa, M. Functional diversity of soil microbial communities under different boreal forests. First Global Soil Biodiversity Conference, Assessing soil biodiversity and its role for ecosystem services, Dijon, France. 2–5 December 2014.
8. **Azarbad, H.**, Niklińska, M., Nikiel, K. PLFA profiles of soil microbial communities subjected to addition stressors along two metal pollution gradients. First Global Soil Biodiversity Conference, Assessing soil biodiversity and its role for ecosystem services, Dijon, France. 2–5 December 2014.
9. ***Azarbad, H.**, Niklińska, M., Röling, W.F.M., van Straalen, N. M., van Gestel, C.A.M and Laskowski, R. Microbial community structures and functions are resilient in metal pollution gradients as revealed

by Illumina Sequencing and Microarray–Based Assessment, 43rd Annual Meeting of the Ecological Society of Germany, Austria and Switzerland. Potsdam, Germany. 8–15 September 2013.

10. **Azarbad, H.**, Niklińska, M., Nikiel, K., Röling, W.F.M., van Straalen, N.M., van Gestel, C.A.M., Laskowski, R. Exposure of soil microbial communities to the mixture of toxic metals change their structure, Protection of soil functions – challenges for the future, Puławy, Poland. 16–18 October 2013.
11. ***Azarbad, H.**, Niklińska, M., Röling, W.F.M., van Straalen, N.M., van Gestel, C.A.M., Laskowski, R. Functional and structural diversity of the soil microbial community in metal–polluted ecosystems, SETAC Central & East Europe Branch (SETAC CEE), Krakow, Poland. 17–19 September 2012.
12. **Azarbad, H.**, Niklińska, M., Laskowski, R., van Gestel, C.A.M., van Straalen, N. M., Röling, W.F.M and Zhou, J. Decreased functional gene diversity of soil microbial communities in soils polluted with metals, SETAC Central & East Europe Branch (SETAC CEE), Krakow, Poland. 17–19 September 2012.
13. **Azarbad, H.**, Niklińska, M., Laskowski, R., van Gestel, C.A.M., van Straalen, N. M. The Mechanisms behind Stability of Soil Microbial Community toward Stressors, IV International Conference on Environmental, Industrial and Applied Microbiology, Torremolinos (Spain). 14–16 September 2011.

Teaching Experience

- Teaching Assistant, Jagiellonian University. Course Title: Environmental Microbiology. Course Level: Undergraduate. **2014**
- Teaching Assistant, Jagiellonian University. Course Title: Ecology. Course Level: Undergraduate. **2014**
- Teaching Assistant, Jagiellonian University. Course Title: Introduction to Ecology. Course Level: Graduate. **2013**
- Teaching assistant, Free University, Amsterdam – Vrije Universiteit. Course Title: Molecular Ecology. Prepared and taught laboratory exercises, including DNA–based molecular analyses: DNA extractions, DNA purification, high–throughput quantitative–PCR and DGGE. **2012**

Mentoring and Supervising Experience

Co–supervising students at INRS – Principal supervisor: Dr. Etienne Yergeau

- Pranav Pande (PhD student) **09/2017 – 08/2019**
- Asmaa Agoussar (PhD student) **09/2018 – 08/2019**
- Charlotte Giard–Laliberté (Master student) **11/2016 – 11/2018**
- Éloïse Adam–Granger (Summer student) **05/2016 – 08/2016**
- Deanna Chinerman (Summer student) **05/2016 – 08/2016**

Co–supervising students at Jagiellonian University – Principal supervisor: Dr. Maria Niklinska

- Karolina Nikiel (Master student) **10/2012 – 07/2014**
- Przemyslaw Dyrda (Master student) **01/2011 – 12/2012**
- Alicja Kleszcz (Master student) **01/2011 – 12/2012**

Conference Organization

- Member of the local organizing committee for the 2nd International Conference on Holobionts, Montréal, Canada. 8–10 May 2019.
- Member of the local organizing committee and judge the posters for the poster competition for 16th International Symposium on Microbial Ecology (ISME16), Montréal, Canada. 21–26 August 2016.
- Member of organizing committee for SETAC Central & East Europe Branch (SETAC CEE), Kraków, Poland. 17–19 September 2012.
- Scientific and the local organizing committee for the 3rd Young Environmental Scientists (YES) Meeting, Kraków, Poland. 11–13 February 2013.

Journal Review Activities

- The ISME Journal (4), Frontiers in Microbiology (9), PLoS ONE (2), Science of the Total Environment (1), Environmental Science and Pollution Research (1), Scientific Reports (2), Canadian Journal of Microbiology (2), Microbial Ecology (2), Soil Biology and Biochemistry (3), Applied Soil Ecology (1).
- I am part of the Frontiers Community as Review Editor in Terrestrial Microbiology, part of the journal(s) Frontiers in Earth Science and Microbiology.

International Collaborative Activities

- Researcher, Oulanka National Park, Finland **07/2013 – 08/2013**
European project funded from European Union Seventh Framework Programme (INTERACT).
Project duties: planned and implemented field and laboratory experiments to assess soil microbial communities from uppermost soil horizons under boreal forests differing in plant diversity.
- Researcher, University of Oklahoma, USA **03/2012 – 04/2012**
Performed a high throughput functional gene array (Geochip) for analysis of functional gene diversity of soil microbiome.

Additional Information

- **Spoken and Written Languages:** Farsi (mother tongue), English (fluent), French (beginner), Polish (beginner).
- A valid driving licence.