Gulnara Tagirdzhanova

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metalichen.github.io

Research Interests

I study the evolution of fungal-algal symbioses, known as lichens. For my current project, I apply cutting-edge bioinformatics methods combined with wet-lab techniques to try to understand how microbial partners communicate in the symbiotic setting and what each of them contributes to the system.

Academic Appointments

2022–	**PostDoctoral Scientist,** Nick Talbot Group, The Sainsbury Laboratory (UK)

Education

2022 **University of Alberta** *Edmonton AB, Canada*	**PhD** in Systematics and Evolution GPA 3.9 (4.0 max). Advisor: Toby Spribille Thesis title: How Lichens Work: Functional Aspects of Symbiosis Viewed through Metagenomics and other Culture-Free Methods
2017 **St. Petersburg University** *St. Petersburg, Russia*	**MSc** in Biology GPA 4.0 (4.0 max). *Diploma cum laude* Advisor: Irina Stepanchikova Thesis title: Globally endangered lichen Erioderma pedicellatum in Kamchatka
2015 **St. Petersburg University** *St. Petersburg, Russia*	**BSc** in Biology GPA 3.9 (4.0 max). *Diploma cum laude* Advisor: Irina Stepanchikova Thesis title: Lichens epiphytic on aspen in the old growth forests of the Valday upland

Awards and Funding (total ~$102,000)

Scholarships:

2021–2022	Alberta Graduate Excellence Scholarship (UAlberta, $12,000)
2020–2021	Alberta Innovate Graduate Student Scholarship (UAlberta, $62,000)
2020	Alberta Graduate Excellence Scholarship (UAlberta, $12,000)
2013–2017	Increased State Scholarship for Academic Excellence (St.PU, $10,000)

Awards:

2023	University of Alberta nominee for the CAGS/ProQuest Distinguished Dissertation Award
2022	Andrew Stewart Memorial Graduate Prize ($5,000)
2020	Lionel Cinq-Mars Award for the best oral presentation ($500)
2018	St. Petersburg Naturalist Society Award for the best MSc. thesis ($100)

Selected Publications (see the full list at the end of the document)

1. **Tagirdzhanova G.,** Saary P., Cameron E.S., … & Spribille T. 2023. Evidence for a core set of microbial lichen symbionts from a global survey of metagenomes. *bioRxiv* doi.org/10.1101/2023.02.02.524463
2. **Tagirdzhanova G.,** Saary P., Tingley J., Diaz Escandon D., Abbott W., Finn R., Spribille T. 2021. Predicted input of uncultured fungal symbionts to a lichen symbiosis from metagenome-assembled genomes. *Genome Biology and Evolution* 13(4): evab047.
3. **Tagirdzhanova G.,** Scharnagl K., Yan X., Talbot N. J. 2023. Genomic analysis of Coccomyxa viridis, a common low-abundance alga associated with lichen symbioses. *Scientific Reports* 13: 21285.
4. **Tagirdzhanova G.,** McCutcheon J. P., Spribille T. 2021. Lichen fungi do not depend on the alga for ATP production: a comment on Pogoda et al. (2018). *Molecular Ecology* 30(17): 4155–4159.
5. Díaz-Escandón D., **Tagirdzhanova G.,** Vanderpool D., … & Spribille T. 2022. Genome-level analyses resolve an ancient lineage of symbiotic ascomycetes. *Current Biology* 32: 1–10.

Invited Talks

2023	Seminar series of Oslo Mycology Group (University of Oslo)
2022	Seminar series of Royal Botanic Gardens in Kew (London, UK)
2022	Seminar series of the Finnish Museum of Natural History (University of Helsinki)
2021	Students Mycology Colloquium (Mycological Society of America)

Selected Conferences

2023	EMBL Symposium: The cellular mechanics of symbiosis (oral presentation)
2022	Canadian Fungal Research Network Meeting (oral presentation)
2021	IX Symposium of the International Association for Lichenology (oral presentation)
2021	Canadian Fungal Research Network Meeting (oral presentation)
2021	The British Lichen Society Annual General Meeting (oral presentation)
2020	Canadian Botanical Association Virtual Meeting (oral presentation)
2019	3rd International Conference “Bioinformatics: from Algorithms to Applications” (poster presentation)
2019	30th Fungal Genetics Conference (poster presentation)
2018	International Symbiosis Society Congress (poster presentation)
2016	VIII Symposium of the International Association for Lichenology (poster presentation)
2014	XIX Symposium of the Baltic Mycologists and Lichenologists (poster presentation)

Teaching Experience

2023–2024	Data Science (MSc course), The Sainsbury Laboratory. **Co-Instructor**
2018	BOT306: Biology of the Fungi (BSc course), UAlberta. **Teaching assistant**
2018, 2019	BIO108: Introduction to Biodiversity (BSc course),UAlberta. **Teaching assistant**
2014, 2016	Fungi, Lichens, and Algae (BSc course), St. Petersburg University. **Teaching assistant**

Guest lectures:

2021	BIO46: Introduction to research in ecology and evolutionary biology (Stanford University)
2020	BOT306: Biology of the Fungi (UAlberta), MATH322: Introduction to Graph Theory (UAlberta)
2019	BOT306: Biology of the Fungi (UAlberta), BIOL322: Microbial Diversity and Evolution (UAlberta), BIOL430: Experimental Biology (UAlberta)

Supervising and Mentoring

2023	**Supervising** a MSc student (Flurin Lauchli) working on a research project during an internship (TSL)
2020–2021	**Supervising** a BSc student (Samantha Pedersen) working on two term research projects and a summer internship (UAlberta)
2020–	**Mentor, Speaker** at The Science Mentors**,** a career mentorship program for STEM undergraduate students. Mentored four students

Service and Board Membership

2023–2024	**Postdoc Committee,** The Sainsbury Laboratory, *Member*
2021–2022	CanFunNet 2022 **Conference Organizing Committee,** *Member*
2020–2021	**Department Council,** UAlberta Department of Biological Sciences, *Member*
2020–2021	**Working Group for Respect, Equity, Accountability and Departmental Culture,** UAlberta Department of Biological Sciences, *Member*
2019–2021	**Biology Graduate Students' Association UAlberta:** *President* (2020-2021)*, Co-organizer* of R.E. Peter Biology Conference, *Member* of EDI (Equity Diversity Inclusion) Committee
2019–	**Journal peer reviewer** for eLife, Nature Communications, New Phytologist, FEMS Microbiology Ecology, The Lichenologist, Symbiosis, American Journal of Botany

Additional Education

2023	**Instructor Training Program with The Carpentries.** Covers evidence-based teaching practices applied to the teaching of data science and programming
2017	**Data Analysis.** Online certificate program, St. Petersburg Academic University

Science Communication

2019	Member of Research Zone **Science Communication Program**, Telus World of Science
2019	**Invited speaker** at The Great Alberta Mushroom Foray
2018	**Lichen expert** at the Tombstone Park BioBlitz in Yukon, Canada (BioBlitz is an event bringing together biologists and nature enthusiasts from public, and focused on describing biodiversity of a certain area)
2017	Presented at the **workshop** "Lichen Revival III: Rediscovering Macrolichens in the Canadian Rockies"
2017	Co-teacher at the **field seminar** for students and NGO volunteers "Nature Conservation and biologically valuable forests"
2011–2017	Co-organizer and judge for **biological conferences** and contests for high school students (Student conference "Future Scientists" 2011, 2017; Biology Olympiad 2011–2017; Youth Biology Tournament 2011–2013).

Nature Conservation Efforts

2017	**Contributed** to project of Valhalla Wilderness Society dedicated to the protection of Inland Temperate Rainforests in British Columbia
2012–2017	Participated in research leading to establishment of several **Nature Reserves** in Russia, Participated in monitoring of **endangered species**

Publications

I. Preprints

1. **Tagirdzhanova G.,** Saary P., Cameron E.S., … & Spribille T. 2023. Evidence for a core set of microbial lichen symbionts from a global survey of metagenomes. *bioRxiv* doi.org/10.1101/2023.02.02.524463.

II. Peer-reviewed Papers

1. **Tagirdzhanova G.,** Scharnagl K., Yan X., Talbot N. J. 2023. Genomic analysis of Coccomyxa viridis, a common low-abundance alga associated with lichen symbioses. *Scientific Reports* 13: 21285.
2. Scharnagl K., **Tagirdzhanova G.,** Talbot N. J. 2023. The coming golden age for lichen biology. *Current Biology* 33(11): PR512–R518. doi.org/10.1016/j.cub.2023.03.054.
3. Díaz-Escandón D., **Tagirdzhanova G.,** Vanderpool D., … & Spribille T. 2022. Genome-level analyses resolve an ancient lineage of symbiotic ascomycetes. *Current Biology* 32: 1–10. doi.org/10.1016/j.cub.2022.11.014.

4. Resl P., Bujold A. R., **Tagirdzhanova G.,** … & Spribille T. 2022. Large differences in carbohydrate degradation and transport potential in the genomes of lichen fungal symbionts. *Nature Communications* 13: 2634 doi.org/10.1038/s41467-022-30218-6.
5. Spribille T., Resl P., Stanton D., **Tagirdzhanova G.** 2022. Evolutionary biology of lichen symbioses. *New Phytologist* 234(5): 1566–1582. doi.org/10.1111/nph.18048.
6. **Tagirdzhanova G.,** McCutcheon J. P., Spribille T. 2021. Lichen fungi do not depend on the alga for ATP production: a comment on Pogoda et al. (2018). *Molecular Ecology* 30(17): 4155–4159 doi.org/10.1111/mec.16010.
7. **Tagirdzhanova G.,** Saary P., Tingley J., Diaz Escandon D., Abbott W., Finn R., Spribille T. 2021. Predicted input of uncultured fungal symbionts to a lichen symbiosis from metagenome-assembled genomes. *Genome Biology and Evolution* 13(4): evab047, doi.org/10.1093/gbe/evab047.
8. Spribille T., **Tagirdzhanova G.,** Goyette S., Tuovinen V., Case R., Zandberg W. 2020. 3D biofilms: in search of the polysaccharides holding together lichen symbioses. *FEMS Microbiology Letters* 367(5): p.fnaa023.
9. **Tagirdzhanova G.,** Stepanchikova I., Himelbrant D., Vyatkina M., Dyomina A., Dirksen V., Scheidegger C. 2019. Distribution and assessment of the conservation status of Erioderma pedicellatum in Asia. *Lichenologist* 51(6): 575–585.
10. Himelbrant D. E., Stepanchikova I. S., Motiejūnaitė J., Kuznetsova E. S., **Tagirdzhanova G.,** Frolov I. V. 2019. New records of lichens and allied fungi from the Leningrad Region, Russia. X. *Folia Cryptogamica Estonica* 56: 23–29.
11. Motiejunaite J., Chesnokov S. V., Czarnota P., …, **Tagirdzhanova G.,** Thell A., Stepanchikova, I. 2016. Ninety-One Species of Lichens and Allied Fungi New to Latvia with a List of Additional Records from Kurzeme. *Herzogia* 29(1): 143–163.
12. Himelbrant D. E., Stepanchikova I. S., **Tagirdzhanova G. M.** 2016. The lichens and allied fungi of the Oranienbaumsky Prospective Protected Area (St. Petersburg). *Novitates systematicae plantarum non vascularum* 50: 210–230.
13. Himelbrant D. E., Stepanchikova I. S., Motiejūnaitė J., Vondrak J., **Tagirdzhanova G. M.,** Gagarina L. V., Kuznetsova E. S. 2015. New records of lichens and allied fungi from the Leningrad Region, Russia. VI. *Folia Cryptogamica Estonica* 52: 21–28.
14. Stepanchikova I. S., Gagarina L. V., **Tagirdzhanova G. M.,** Himelbrant D. E. 2015. The lichens of juniper communities of Shuryagsky Cape (Leningrad Region). *Vestnik Tverskogo Gosudarstvennogo Universiteta, Biology and Ecology series* 34: 121–126.
15. Stepanchikova I. S., Himelbrant D. E., Dyomina A. V., **Tagirdzhanova G. M**. 2015. The lichens and allied fungi of the Zapadny Kotlin protected area and its vicinities (Saint Petersburg). *Novitates systematicae plantarum non vascularum* 49: 265–281.

16. **Tagirdzhanova G. M.,** Kataeva O. A., Stepanchikova I. S. 2014. New lichen records from the Novgorod Region, Russia. *Folia Cryptogamica Estonica* 51: 103–107.
17. Himelbrant D. E., Motiejūnaitė J., Stepanchikova I. S., **Tagirdzhanova G. M.** 2014. New records of lichens and allied fungi from the Leningrad Region, Russia. V. *Folia Cryptogamica Estonica* 51: 49–55.
18. Sorokina I. A., Himelbrant D. E., Stepanchikova I. S., … & **Tagirdzhanova G. M.** 2013. Forest certification as a tool for detection and conservation of biologically valuable forests and scientific research in the eastern part of Leningrad Region. *Vestnik Tverskogo Gosudarstvennogo Universiteta, Biology and Ecology series* 32: 246–264.
19. Stepanchikova I. S., **Tagirdzhanova G. M.,** Himelbrant D. E. 2013. The lichens and allied fungi of the Smorodinka River valley (Leningrad Region). *Novitates systematicae plantarum non vascularum* 47: 262–278.

III. Book Chapters

1. **Tagirdzhanova G.** 2022. Boreal Felt Lichen, an endangered cyanolichen Erioderma pedicellatum. In: DiPaolo D., Villella J. (Eds.). Imperiled: The Encyclopedia of Conservation.
2. **Tagirdzhanova G. M.** 2018. Lobaria scrobiculata. In Geltman D. (Ed.). Red Data Book of Leningrad Region: Plants. P. 519–520.
3. **Tagirdzhanova G. M.** 2018. Lobaria pulmonaria. In Geltman D. (Ed.). Red Data Book of Leningrad Region: Plants. P. 781–782.