HEATHER FAIR <u>hfair@umn.edu;</u> https://heatherfair.com

Education

The Ohio State University (Ohio, USA)	Environmental Science	Ph.D.
The Ohio State University (Ohio, USA)	Environmental Science	M.S.
University of Miami (FL, USA)	International Business Mgt.	M.B.A.
The Ohio State University (Ohio, USA)	Marketing	B.S.B.A

Scientific Research and Higher Education Appointments

National Science Foundation (NSF) Postdoctoral Research Fellow in Biology, University of Minnesota, Chinese Academy of Sciences, and USDA Agricultural Research Services, Columbus, OH

- Researching microbial and invertebrate communities of glacier cryoconite holes, supraglacial moss balls, proglacial thixotropic mud, and proglacial soil development.
- Invited to collaborate with Chinese Academy of Sciences, "Ecosystem evolution mechanism and health of glacier retreat areas under the background of global warming" to examine anti-microbial resistant genes of glacier ecosystems in Italy, China, and US.
- Led a proof-of-concept special session to assess effectiveness of AI interpretation of scientific talks presented in Spanish, Portuguese, Mandarin, and Cantonese at Ecological Society of America.
- Examining the role of sulfur-reducing bacteria and methanogens of proglacial thixotropic mud over subglacial ice to determine pyrite formation potential in an ephemeral ecosystem of glaciated Alaska.
- Studying supraglacial moss balls in multiple developmental stages for epiphytic microbiome and invertebrate communities on an Alaskan glacier medial moraine and terminal moraine.
- Comparing microbial communities of Alaskan cryoconite holes in rain forest and subarctic dry climate.
- Developed and conducted field research examining *Trentepohlia*, moss, and lichen blooms of the temperate monsoonal and plateau climates of Mt. Gongga, Tibet.
- Developed and conducted a survey to understand experiences and challenges of mentoring programs within professional ecological organizations in serving Deaf and hard-of-hearing participants.
- Mentored undergraduate students to perform independent aquatic ecology research projects in the NSF Research Experience for Undergraduates (REU) program in a wetland mesocosm study.

Instructor, Ohio Wesleyan University, Biology Department, Delaware, OH

- Taught evolution, ecology, and physiology of plants, animals, protists, and fungi. Guided students in hypothesis generation, experimental design, data collection, and data analysis.
- Developed online content during COVID-19 pandemic, mentored student presentations on international responses to COVID-19 in a course open to the public which was well-received by the audience.

Visiting Assistant Professor, Kenyon College, Biology Department, `Gambier, OH

• Taught experimental biology incorporating biodiversity, RStudio statistical coding and analysis, DNA extraction, PCR, bioinformatics, and gene expression of plant roots.

Visiting Professor, Middlebury College School of the Environment, Yunnan, China

- Developed and taught aquatic ecology and guided student projects in conducting fieldwork, scientific process, analysis, and scientific writing. I was invited for year two, but Covid cancelled the program.
- Co-developed environmental studies course. Taught concepts of water resources, life cycle analysis (LCA), and water policy. Guided students in developing and presenting projects using LCA, time lapse photography, and interviews using water footprint questionnaire interviews with expats and local Chinese.

Public Policy Appointment

Sea Grant Knauss Fellow, US Geological Survey, Water Mission Area, Reston, VA (2018-2019)

• Developed initial Value of Information (VOI) project for USGS water quality modeling.

- Served as lead author on Water Mission area chapter in VOI circular "The Value of USGS Science: Information Analysis of Select Information Products."
- Analyzed USGS research and presented it at Sea Grant/WRRI regional leadership meetings.
- Served as reviewer on National Water Resources Research Institute funding panel.
- Assisted in development and implementation of USGS employee survey.

Graduate Teaching Assistant, Master's and Ph.D. programs, The Ohio State University

1) Human Physiology; 2) Introductory Biology (x2); 3) Neurobiology of Animal Behavior (x2); 4) Field Zoology at Stone Laboratory, Lake Erie; Lecturer: 5) bilingual Chinese interpersonal relations course; and 6) Intensive beginning Chinese.

Chinese Flagship Program, Chinese Department, The Ohio State University

- Co-taught bilingual interpersonal relationships course for US Flagship program.
- Developed global language summit with international companies in Columbus, Ohio

Corporate Experience

WalMart Stores, Inc. Headquarters, Bentonville, AR

Business Strategy Analyst, Global Procurement Division Finance & Strategy Team

- Developed collaborative relationships with NGOs to determine key environmental projects to drive economic shareholder value while maintaining EDLP (everyday low price) cost structure. Founding team member of Corporate Waste and China networks.
- Initiated a Green Bag Luncheon series to educate associates about environmental issues.
- Developed balanced scorecard and marketing program for \$12 billion division that set the stage for corporate-wide supply chain proposal. Completed 40% ahead of schedule through teamwork, focus, exceptional organization, and urgency.

Global Systems Training Manager, Global Procurement and Information Systems

- Mapped and analyzed purchase order (PO) process and reconfigured using Six-Sigma techniques and developing cross-cutting teams from different divisions to reduce PO creation time by 75%.
- Led multi-division effort to revise supplier agreement system to achieve Sarbanes-Oxley Act compliance. Reduced manual work by 50% and coordinated legal, customs, and IS team to implement in 25 offices with 2,000 suppliers in five months.
- Selected by Executive VP to automate digital catalog to leverage US buying decisions to international buy teams. Conceptualized initial platform for an e-bay type of system to enhance ROI.
- Selected by Seiyu conversion team to lead transition training program and was immediately recruited by newly formed sourcing division to lead global systems training program for the Americas, Asia, Europe, Middle East, and India regions.
- Initiated the unifying big picture processes for supplier and private label product specification, supplier quotation, and purchase order system. Provided vision to team, and analytical skills to level the field for suppliers and buy teams. Presented at Global Sourcing summits with 800 suppliers in attendance.

Expatriate position -Retail Link Training Manager - Tsim Shat Tsui, Hong Kong

- Served on expatriate assignment during key acquisition period of sourcing division. Expanded supplier development program from 3-months to entire year program.
- Utilized methods to gather marketing data from systems utilized by 25,000 suppliers.

Retail Link Trainer, Information Systems

- Developed and delivered Retail Link (teradata) analysis (Sales Analysis, Retail Math, Market Basket, replenishment, and forecasting) and business-critical courses to over 4,500 US, Asian, Indian Sub-Continent, and Middle Eastern suppliers. Taught some classes in Mandarin Chinese.
- Managed the rollout of systems programs in Korea and China retail markets and delivered corporate value by bringing suppliers into the supply-chain analysis partnership. Supplier involvement increased 0% to 75% within the first year.

Grant writing

Meeting and Travel Grants Awarded

- Invited participant of the Polar Early Career World Summit (PECWS) in Boulder, CO.
- Full funding for National Center for Ecological Analysis and Synthesis "Fundamentals of Qualitative and Quantitative Arctic Research Using R Application", Arctic Data Center.
- National Postdoctoral Association Annual Conference and Workshop Award

Fellowships and Grants, (Graduate - \$242,000, Post doctoral - \$328,000)

- 1) National Science Foundation (NSF) Postdoctoral Research Fellow in Biology
- 2) Sea Grant Knauss Fellowship, US Geological Survey, Reston, VA
- 3) **Fulbright-Hays Doctoral Dissertation Research Abroad Grant**: Glacier Stream Conceptual Model and Physiological Mechanisms of Aquatic Insects, Tibetan Autonomous Regions, China.
- 4) Robert H. Edgerley Toxicology Fellowship: Salinity effects on glacial meltwater invertebrates
- 5) Department of Education Foreign Language Area Studies fellowship
- 6) Helen M. and Milton O. Lee Aquatic Sciences Fellowship
- 7) Fulbright Research Fellow: Conducted international aquatic ecology field research in Tibet
- 8) NSF GK-12 Teaching & Research Fellow, Sugarcreek Watershed at Hiland High school
- 9) NSF Yunnan IGERT fellowship, University of Wisconsin
- 10) NSF East Asian Pacific Summer Institute Fellow (China and Taiwan)

Research Funding Awarded as Student Principal Investigator/Grant Writer (\$137,200)

- Columbus Zoo Biodiversity Conservation Grant (3x) (\$19,000)
- Ohio State Office of International Affairs Travel Grant (\$8,000)
- Sophie Danforth Conservation Award (\$1,200)
- University of Wisconsin NSF Yunnan IGERT grant (2x) (\$9,000)
- OARDC Seeds grant (\$100,000).

Field Research Experience and Relevant Skills

• Successfully designed and conducted glacial meltwater fieldwork campaigns in southeastern Tibet and Alaska. Invited by Chinese Academy of Sciences to conduct fieldwork and lead expedition in Washington State in 2025. Served in a group of the first scientists to conduct fieldwork post-Moxi earthquake in Mt. Gongga, Ganze Tibetan Autonomous Region, October 2023. Worked with indigenous Tibetans and Chinese scientists and the University of Alaska to design field experiments, collect supraglacial microbial samples, periglacial boulder *Trentepohlia* algae, moss, and lichen microbial communities, hot spring microbial communities, insects and habitat data in physically demanding terrain of glaciers, glacial-melt streams, and alpine streams in remote high-altitude circum-Himalayan mountains.

Scientific Publications

Fair, H., T. Hamilton, R. Smiley, Q. Liu. (2024). Determinants of microbial community structure in supraglacial pool sediments of monsoonal Tibetan Plateau. *Microbiology Spectrum*. doi:10.1128/spectrum.00754-24.

Fair, H., O. A. Medina-Báez, B. Spiecker, Q. Gan, Y. Y. Cheung, E. D'Bastiani, G.R. Goldsmith. (2024) Can AI interpretation increase inclusivity? Frontiers in Ecology and the Environment. doi:10.1002/fee.2821.

Goliber, S., J. Coenen, **H. Fair**, A.R. Szesciorka et al. (2024). Postdoc Perspectives on Leadership and Matters of Equity and Inclusion in Polar Science. *Perspectives of Earth and Space Scientists 5, 1-9*. doi:10.1029/2024CN000252.

Fair, H., T. Hamilton, R. Klips, P.C. Smiley Jr. (*In Prep*). Epiphytic Microbiomes of Growing Alaskan Moss Balls of the Matanuska Glacier and habitat to holometabolous invertebrate colonizers.

Fair, H., T. Hamilton, E. Hood, J. Fellman. (*In Prep*). How climate differences shape autotrophic and heterotrophic microbial communities in cryoconite holes of the Matanuska and Mendenhall Glaciers, Alaska.

Hu, Y., A. Franzetti, Q. Liu, F. Pittino, **H. Fair**, Z. Wang, Y. Luo, B. Duan, X. Lu. *In Prep*. Dramatic shift in microbial taxonomic diversity and nitrogen metabolism potential with glacier retreat and plant colonization of the debris-covered Hailuogou glacier.

Fair, H., P.C. Smiley, and R. Lanno. (*In Revision*). Hydraulic characteristics determine the distribution of organic matter, substrate, and invertebrates in a glacial-melt stream. *Hydrobiologia*.

Yang, H., **H. Fair**, Q. Liu, Z.W. Wang, B.L. Duan, X.Y. Lu. (2023) Diversity and co-occurrence networks of bacterial and fungal communities on two typical debris-covered glaciers, southeastern Tibetan Plateau. *Microbiological Research* 273, 1-12. doi: 10.1016/j.micres.2023.127409.

Lu, X.X., T. Zhang, B.L. Hsia, D.F. Li, **H. Fair**, S. Chua, L. Li, S.J. Li. Proglacial river sediment fluxes in the south-eastern Tibetan Plateau: Ming Yong Glacier in the Upper Mekong River. *Hydrological Processes*. March 28, 2022. DOI: 10.22541/au.164847433.35996858/v1

Fair, H., P.C. Smiley Jr., R. Lanno. (2022) Tolerance of glacial-melt stoneflies (Plecoptera) and morphological responses of chloride cells to stream salinity. *Chemosphere* 293. 1-10. 10.1016/j.chemosphere.2022.133655.

Fair, H., P.C. Smiley Jr., R. Lanno. (2021). Determinants of invertebrate community structure in glacial-melt streams of southeast Tibet. *Freshwater Biology* 66, 1282–1295. DOI: 10.1111/fwb.13716

Fair, H., P.C. Smiley Jr., and L. Qiao. (2020) Physical, chemical, and biological characteristics of supraglacial pools on a debris-covered glacier in Mt. Gongga, Tibetan Plateau. *Arctic, Antarctic, and Alpine Research* 52, 635-649. 10.1128/spectrum.00754-24.

Fair, H., L. Bair, and E.A. Greene. 2018. The Value of Water Quality Information for Targeting Agricultural Best Management Practices. United States Geological Survey (USGS) Circular.

Fair, H. 2017. Environmental and physiological factors influencing the distribution of aquatic insects in glacier melt streams. Ph.D. Dissertation. The Ohio State University.

Fair, H. 2010. Headwater landscape variations and biodiversity: applicability of Ohio habitat evaluation indices in a glacier catchment of the Mekong River. Master's Thesis, The Ohio State University.

Invited Presentations (*)

Fair, H.L.* April 2019. Introduction to Stream Ecology, Purdue University, Ft. Wayne, Indiana.

Fair, H.L.* June 2018. A departure from the Milner and Petts model and cryoconite hole study in Hailuogou. CAS Institute of Mountain Hazards and Environment, Chengdu, China.

Fair, H.* 2016. Fulbright life and research in a Tibetan Village. Fulbright Reception with President Michael Drake, Ohio State University.

Fair, H.*. 2015. Glacier stream conceptual model and physiological mechanisms of aquatic insects in southeast Tibet. Hong Kong University, Hong Kong, SAR.

Fair, H.* 2012. Distribution of aquatic invertebrate nymphs in glacier watersheds of southeast Tibet. Univ. of Wisconsin NSF Yunnan IGERT meeting, Madison, Wisconsin.

Fair, H.* 2009. Headwater Ecology in Taiwan. Academia Sinica, Taipei, Taiwan.

Presentations and Special Sessions

Fair, H. (organizer), B. Spiecker (co-organizer), O. Medina-Baez, H..G. Ortiz. Towards Equity in the Communication of Science: Harnessing the Power of AI for an Inclusive Tomorrow, Ecological Society of America 2024, Long Beach, CA.

Fair, H., T. Hamilton, P.C. Smiley Jr., and C. Hansen. How stability and maturity of Alaskan glacier moss balls influence their microbial and invertebrate communities. Ecological Society of America 2024.

Fair, H. and P.C. Smiley Jr. August 2022. Takeaways from assessing abilities and experiences of Ecology and Environmental Science Mentoring Programs in mentoring Deaf and hard of hearing students. Ecological Society of America.

Schultz, M., H. Fair, and W. Mitsch. (*mentored student*) April 2022. *An Initial Investigation of the role of wetland age, hydrology, and physiochemical factors on nitrogen-fixing microbial communities in experimental wetlaculture mesocosms at Buckeye Lake, Ohio.* The Ohio Academy of Science.

Fair, H., T. Hamilton, P.C. Smiley Jr., and Q. Liu. December 2021. Environmental Predictors of Invertebrate and Microbial Communities within Supraglacial Pools on a Debris Covered Glacier in Tibet. American Geophysical Union.

Fair, H. October 2021. Assessing the Experiences, Abilities, and Challenges that Mentoring Programs in Ecology and Environmental Sciences have in Serving Deaf and Hard of Hearing Individuals. Society for the Advancement of Chicanos/Hispanics and Native Americans in Science.

Surikova, P and H. Fair. (*mentored student*) August 2021. Influence of Wetlaculture Mesocosm age and hydrology on Macrophyte, chironomid, and mosquito populations. National Science Foundation Research Experience for Undergraduates.

Sloane, C., A. Bonn, T. Gray, H. Fair. (*mentored students*) 2017. Primary Producers as an Indicator of Biodiversity in Glacial Streams. Denman Undergraduate Research Forum.

Fair, H., R. Lanno, D. Dean. 2016. Osmotic regulation as a potential factor in distribution of aquatic nymphs in glacier watersheds. Society for Freshwater Science, Sacramento, CA.

Gibson, J., H. Fair, R. Lanno. (*mentored student*) 2014. The long-term impacts of disturbance on insect biodiversity in a Chinese mountain stream. OSU Denman Undergraduate Research Forum.

Fair, H.L. R. Lanno, T.D. Yao, L. Zhang. 2012. Conservation in southeastern Tibet Hengduan Mountain range. 4th International Ecological Sustainability Summit, Columbus, Ohio.

Mentoring

- Mentored student researcher to examine moss ball invertebrates and meiofauna.
- Mentored Ph.D. student at Ecological Society of America meeting. Provided career advice, guided student in applying for Presidential Management fellow to which she was awarded.
- Mentored Ohio Wesleyan University undergraduate in writing successful grant proposal
- Mentored DHH student in presenting NSF REU research results at the Ohio Academy of Science
- Mentored NSF REU students one DHH biology major and one speech and hearing major with research projects examining effect of wetland mesocosm hydrology on cyanobacteria and aquatic insects.
- Mentored two undergraduate Kenyon College students in Fulbright applications to Laos & Taiwan and served on Fulbright review panel committee.
- Mentored twelve undergraduate volunteers in the laboratory with four conducting independent research under my guidance with presentations at undergraduate research forums.

Grant and Journal Article Reviewer

- Ecological Society of America Excellence in Ecology (EEE) Scholarship selection committee.
- USGS Water Resources Research Act Program National Competitive Grant Reviewer.
- Journal reviews: EGUsphere (1 manuscript), Microbiology Spectrum (1 manuscript), BMC Microbiology (1 manuscript), Frontiers (1 manuscript), International Journal of Environmental Research and Public Health (2 manuscripts), Limnology (2 manuscripts), Land Processes (1 manuscript), Ecological Indicators (8 manuscripts), Journal of Environmental Protection (1 manuscript), Science of the Total Environment (1 manuscript).

Other Skills

- **Statistics**: Proficiency in R Studio statistical coding, Dada2, Phyloseq, SPSS, PCORD multivariate statistical package, Sigma Plot statistical graphing software, and Minitab.
- **Computer program skills**: Microsoft Project Management, Supercomputing, bioinformatics, Fiji (ImageJ), Visio process flow software, Adobe InDesign, ERDAS Remote Sensing.
- **Field and laboratory skills:** eDNA sampling methods, qPCR techniques, scanning electron microscopy (SEM), transmission electron microscopy (TEM), chironomid mounting and identification.
- Language skills: Mandarin Chinese advanced level (ACTFL Oral Proficiency Review); Spanish, beginner, American Sign Language (ASL) beginning. Chinese Sign Language (beginning)

Professional Societies

- Fulbright Alumni Association
- Committee member, Ecological Society of America
- Society for Advancement of Chicanos/Hispanics & Native Americans in Science
- American Geophysical Union

Service to Professional Societies, Universities/Colleges, and Community

- NSF Polar Science Early Career Community Office Polar Postdoctoral Leadership Workshop planning committee member and participant, Boulder, Colorado
- Committee Member, Ecological Society of America
- Volunteer, Friends of Lower Olentangy Watershed (FLOW) conducting stream bioassessments.
- Sustainable Grandview planning committee
- Friends of the Lower Olentangy (FLOW) volunteer
- Marble Cliff Community Garden Club member
- Audubon Society Native Plant Backyard Challenge
- Ecological Society of America volunteer mentor and undergraduate poster judge
- Abstract Judge, Society for Advancement of Chicanos/Hispanics & Native Americans in Science
- Poster Judge, National Postdoctoral Association Annual Conference
- Research Poster Judge, Undergraduate Research Posters, Society for the Advancement of Chicanos/Hispanics, and Native Americans in Science
- Volunteer Reviewer, Kenyon Fulbright applicants and served on Fulbright review panel committee.
- Outreach team for Museum of Biological Diversity Open House
- Served as judge for The Ohio State Univ. Denman Undergraduate Research Forum
- Volunteered at Ohio Stadium for "Zero Waste" football events, performed waste stream audit.

Outreach

• Led interactive ESA annual meeting special session and survey to examine the potential of using artificial intelligence (AI) to translate scientific talks from native languages into English.

- Wrote and submitted opinion piece with Polar postdoctoral workshop colleagues to put out our vision for increasingly inclusive Polar research community leadership to scientific journal.
- Conducted a survey examining experiences of Ecology and Environmental Science Mentoring Programs in serving Deaf and Hard-of-hearing participants.
- Presented "Values and Your Career" to University of Minnesota Hamilton Lab group.
- Learning American Sign Language and coordinated Chinese Sign Language online course.
- Professional Recognition
- Fulbright Hays DDRA brochure
- Article in BusinessMiami
- "Your Contribution Made a Difference" award, Wal-Mart Stores, Inc.