Beth A. Fisher

1426 North 25th Avenue | Minneapolis, MN 55411
952.797.3872 | beth.fisher001@gmail.com

I solve environmental problems using a range of methods from several disciplinary fields.

ENVIRONMENTAL MONITORING

- Constructed and programmed **open source Arduino-framework** environmental monitoring stations using research-grade sensors to monitor soil and water quality parameters including water level, temperature, dissolved oxygen, conductivity, redox potential, moisture, distance, air pressure, and more.
- Programmed data logging and **wireless telemetry** over the cellular data network to log to an open source data repository for secure storage and near real-time display of data.
- **Developed and facilitated training** to introduce end-users to open-source monitoring to build and program monitoring stations: https://envirodiy.github.io/LearnEnviroDIY.

ENVIRONMENTAL CHEMISTRY

- Devised study to determine which iron minerals in iron-enhanced sand filters remove **phosphorous from stormwater** runoff using monitoring, rock magnetic methods, and microscopy.
- Performed laboratory analysis and **data interpretation** for specific surface area by N_2 adsorption, soil texture hydrometer method, elemental and isotope chemistry (rock forming elements plus C, N), and mineralogy by x-ray diffraction.
- Used **clean laboratory methods** to isolate meteoric ^{10}Be using a series of acidification and ion exchange chromatography. Measured ^{210}Pb and ^{137}Cs in soil samples.
- Devised sampling strategy to efficiently capture **watershed scale** changes in soil properties leveraging geomorphic properties.

FIELDWORK

- **Sampled for chemically sensitive analytical methods**, including isotopic analyses such as ^{14}C and ^{10}Be, which have cross-contamination risk.
- **Coordinated drilling and sampling campaign** in forested nature preserve where extremely minimal chemical and physical disruption was mandatory.
- Described and sampled soils using **USDA methods** for morphologic horizons, color, texture, and other pedogenic features. Collected cores using soil recovery probes for laboratory characterization.

PROFESSIONAL PREPARATION

Doctor of Philosophy in Land and Atmospheric Science, minor in Earth Sciences, 2011-2016
University of Minnesota-Twin Cities: St. Paul, MN, October 2016, GPA 3.81

Bachelor of Science in Geology-Hydrogeology Emphasis, 1996-1999
UW-Eau Claire, Excellence in Geology Award, Magna Cum Laude, GPA 3.75

TECHNICAL PROFICIENCIES

R, PlatformIO, GitHub, Arduino, Jade (XRD), Word, Excel (extensive functions), Illustrator, Photoshop

PROFESSIONAL EXPERIENCE

Research Associate at Institute for Rock Magnetism, UMN-Earth Sciences, 2017-present

- Characterized the chemistry of iron-enhanced sand filters through open source Arduino-framework monitoring network, mineral characterization, and literature review
- Awarded grant: *Determining which iron minerals in iron-enhanced sand filters remove phosphorous from stormwater runoff*, Minnesota Stormwater Research Council, $40,000
- Awarded funding: *Shingle Creek Watershed iron enhanced sand filter characterization*, Wenck Associates, $39,000

Adjunct Faculty at U. of St. Thomas, Metropolitan State University, Concordia University, 2017-2018

- Developed and taught *Introduction to Earth Science*, *Environmental Geology*, and *Senior Research Seminar*

Postdoctoral Researcher at UMN Dept. of Soil, Water, and Climate, 2016-2017

- Assessed the framework and data needs for establishing a soil-based horticultural productivity and suitability index for Minnesota using statistical and GIS methods

Graduate Research Assistant at UMN Dept. of Soil, Water, and Climate, 2011-2016

- Determined the potential for organic carbon stability within landscapes by characterizing the full life cycle of mineral surface area production, weathering, and transport
- Contributed to five peer-reviewed publications (plus one in revision) and one technical report
- Collected drill cores and soil samples and performed physical and chemical analyses of more than 400 sample intervals

Retail Manager at Starbucks (2010-2011), Starbucks in Target (2008-2010)

- Motivated team to connect with customers, learn their names, and feel welcome
- Decreased payroll hours 22% while simultaneously increasing customer service scores and corporate safety scores

Graphic Designer at Choice Printing, Ft. Dodge, IA and Freelance, 2002-2008

- Provided high quality design for nonprofits and small organizations

Research Assistant at UWEC Departments of Geology and Geography, 1997-1999

- Assessed geomorphology of dunes and beach ridges using Ground Penetrating Radar, Global Positioning System (GPS), geodetic total station, and laser leveler
- Published and presented research in professional venues including the Geological Society of America Annual Meeting and the Journal of Coastal Research
- Instructed faculty and students at multiple institutions in use of GPR equipment

SERVICE HIGHLIGHTS

Ways of Knowing Water, Institute for Advanced Study Collaborative, Nov. 2018-present

Diversity Alliance, UMN College of Science and Engineering, Nov. 2018-present

Faculty search committee, UMN, Dept. of Soil, Water, & Climate, Oct. 2012-March 2013

Graduate Student President, UMN Land and Atmospheric Science program, 2012-2013.