

Profiles



Department of Soil Science
UNIVERSITY OF WISCONSIN-MADISON

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MESSAGE FROM THE DEPARTMENT CHAIR

Soil science is an expanding and rapidly changing field. Most of that is driven by the enhanced understanding of the importance of soils for a range of environmental challenges. Society at large has questions about soil conditions in inner-cities, the status of soil health across agricultural fields, or the effect of a changing climate on droughts, floods, or food security. We translate those big questions in sizeable research such as, for example, methodology development for lead availability, spatial and temporal analysis of soil heat fluxes, or unravelling the role of microbes in carbon cycling. In all that, we walk the line between the tradition of seeking excellence and the revolution of doing something completely new. We also recognize the need to work in teams and with different disciplines.



Teaching is probably one of the best ways to apprehend one's limitations. Students - in their keenness to capture the complexity of the soil system - have a wonderful ability to ask questions for which the answers would keep most of us busy for years. Many students are driven to find solutions, and over the course of one semester, they may realize that soil science has much to offer in tackling the grand environmental challenges. Once they see it, they cannot unsee it.

In addition to our research, teaching, and outreach, we are in the process of selecting candidates for an environmental soil chemist faculty position. We are welcoming our newest faculty member, biogeochemist Dr. Xia Zhu-Barker. Given the upsurge of soil science we consider growth is good. If you are around Madison this summer, please do not hesitate to stop by. As always, we are extremely grateful for your support; we grow from your gifts and it keeps us grounded in the soil.

Alfred Hartemink
Chair

NEW FACULTY PROFILE: XIA ZHU-BARKER



I am a soil biogeochemist whose main interests are biogeochemical cycles and land management practices. My research is directed towards understanding how natural processes control the sustainability of agroecosystems in terms of carbon and nitrogen cycling, water movement, resource use efficiency, food production and quality, and the fate of pollutants. Within these areas, I have pursued the development of novel methodological approaches using stable isotopes, molecular biology techniques, quantitative exploration of soil, plant, and microbial interactions, and mechanistic assessments of land management practices that affect how ecosystems function. My vision is to contribute to the sustainability of agroecosystems by integrating biogeochemical, ecological, environmental, agronomic, economic, and social knowledge into the food, energy, and water aspects of management decisions. Dairy production in Wisconsin is a particularly vital area in which to investigate how agroecosystems respond to a changing environment. I am currently looking for graduate students and postdocs who are eager to engage in fundamental research on the following topics: 1) Microbial and abiotic processes involved in the production and consumption of atmospheric trace gases; 2) Land management practices (e.g., compost, fertilizer, cover crops, irrigation, and tillage) that change soil health, nitrogen use efficiency, crop productivity, nitrogen losses, carbon turnover; 3) Process-oriented modelling of carbon/nitrogen turnover in agricultural ecosystems; 4) Environmental impacts on the sustainability and resilience of agricultural ecosystems, especially dairy production.

I am originally from Chongqing, and my work has taken me through diverse environments from Northeast China to Southwest China to agricultural systems in the western US. Along the way I have had the privilege of meeting people from many different backgrounds, and look forward to beginning a rewarding career at UW Madison. Yoga, especially Bikram yoga, hiking, and gardening are my treats.

ANTIGO SILT LOAM

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DEPARTMENT NEWS

Francisco Arriaga, Doug Soldat, Zac Freedman, and Geoff Siemerling received funding for their Minority Serving Institution (MSI) Partnership Program proposal. This program focuses on creating long-term, mutually beneficial relationships in areas such as research collaborations, faculty professional development, creation of collaborative activities, and exchange programs for faculty, staff, and students. Their proposal establishes a partnership with the University of Puerto Rico-Mayaguez, where Francisco is an alum, and its faculty member, Mario Flores-Mangual, is an alum of our Soil Science PhD program. The project seeks to establish week-long, field-based classes in Wisconsin and Puerto Rico, where students will be able to determine differences between ecosystems in both locations.

Jingyi Huang's proposal titled, "Real-time soil nitrate leaching sensing for sustainable dairy production," has been selected as one of 13 short-term, high-impact projects funded by the Dairy Innovation Hub initiative. This project will address concerns about nitrate levels in groundwater using novel nanotechnologies and 3-D printing to manufacture soil sensors. They will then use soil and water samples to evaluate the accuracy of the sensors in the field under different nutrient management practices.



Soil profile by King Hall loading dock during tunnel construction upgrade.

Matt Ruark with his former postdoc Yichao Rui and others published a detailed analysis on soil carbon in Mollisols in the prestigious *Proceedings of the National Academy of Sciences* (PNAS).

Alfred Hartemink's new book, "*Soil Science Americana*," (Springer Publishing) narrates how the study of soil became a science, combining human history with scientific progressions. People who are featured include van Hise, King, Chamberlin, and extensively Truog, plus the agricultural program and the seventh International Congress of Soil Science that was held in Madison in 1960.

The department elected **Nick Balster** to receive the William A. Rothermel Bascom Professorship in Soil Science. Nick proposes to use the supporting funds to pivot back to his disciplinary expertise, namely in physiological ecology and forest soils, and he has increasing interest in the investigations of wintertime processes (e.g., changes in aggregate stability).

Jingyi Huang has been selected for an Associate Editor Excellence Award for the Soil Science Society of America Journal. These awards recognize the outstanding professional commitment and dedication of volunteer reviewers and/or editors who, through their excellent insights and comments have helped maintain the high standard and quality of papers published in the journal.

The William F. Vilas Trust Estate provides funding each year for a number of awards. This year **Jingyi Huang** was selected to receive the Vilas Early Career Award and **Erika Marin-Spiotta** received the Vilas Distinguished Achievement Professorship. Congratulations to both on receiving these prestigious awards.

The **Whitman Lab's** journal article, "Pyrolyzed substrates induce aromatic compound metabolism in the post-fire fungus, *Pyronema domesticum*" was covered in the New York Times article, "This Fire-Loving Fungus Eats Charcoal, if It Must."

STAFF PROFILE: NICK BERO



L-r: Nick, Zeus, and Simba

Nick grew up in Green Bay and spent most of his time playing baseball, golf, or generally being the only one that came home muddy after a day at the local creek. After a brief false start studying physics, and while being a big fan of the planet Earth, he finished a degree in Geology and Geophysics from UW-Madison in 2002. He then spent some time living in Milwaukee and working at a large wholesale greenhouse fostering his interest in growing plants and understanding soil, the closest layer of Earth. He returned to UW-Madison to complete a MS in Soil Science under Drs. Matt Ruark and Birl Lowery. His research focused on reducing nutrient loss to groundwater in potato production. As a naturally curious person, research was a very enjoyable daily task and shortly after graduating in 2012, he accepted a position with Drs. Soldat and Arriaga as a Research Specialist in their laboratories. He assists Dr. Soldat's lab with field, greenhouse, and laboratory experiments in pursuit of optimizing resource inputs in turfgrass systems and understanding and improving urban soils. For Dr. Arriaga's lab, he establishes and performs research that addresses forage and grain production management systems to improve productivity and soil health while reducing impacts to water quality. After work, Nick enjoys time spent vegetable gardening, hiking amongst nature with his partner April and their two dogs (Zeus and Simba), tending to their backyard chickens, building many things out of wood, and relaxing by a fire pit.

WELCOME

Hannah Anderson

Research Assistant, Freedman

Thomas Bodden

Research Specialist, Ruark Lab

Grace Cagle

Research Associate, Freedman Lab

Tanner Judd

Research Assistant, Freedman

Beata Labaz

Visiting Scholar, Hartemink

Travis Miller

Research Assistant, Soldat

Stephen Owusu

H. Massey Visiting Scholar, Hartemink

Gwen Pipes

Research Assistant, Freedman

Caleb Stevens

Research Assistant, Huang

TRAVEL AWARDS

C. Tanner Agric. Physics

Jie Hu | Sumanta Chatterjee
Dana Johnson | Nayela Zeba

C. & A. Ream Soil and Water Protection

Michael Bekken | Walker Crane
Dana Johnson | Ashmita Rawal
Jaimi West | Qiyu Zhou

M.L. Jackson Memorial

Ashmita Rawal | Monica Schauer
Anna Stevenson | Britta Welsch

LEO M. WALSH DISTINGUISHED LECTURESHIP

Dr. Julie Jastrow, group leader/Argonne Distinguished Fellow at the Argonne National Laboratory, was the guest presenter at this year's **Leo M. Walsh Distinguished Lectureship**. Her presentation titled, *Through a Ped, Not Quite so Darkly: Art, History, Missions, Revelations, and New Adventures*, was popular and very well received by faculty, staff, students, and guests in attendance.

The lectureship is made possible by the generosity of Leo Walsh and the Leo M. Walsh Distinguished Lectureship in Soil Science Fund.



l-r: 2022 guest presenter Dr. Julie Jastrow, Emeritus Professor
Leo Walsh

STUDENT PROFILE: NAYELA ZEB



Have you ever wondered what microbes in the soil are doing in the aftermath of a wildfire? Nayela sure has! Currently a 5th year PhD candidate at the department, she first became interested in the world of microbes and their undeniably cool capabilities during her undergraduate studies. Also keen on exploring the biogeochemical side of things, she joined the master's program at the Center for Earth Sciences at IISC, Bangalore. Here she became a fan of stable isotopes. She was blown away by their application as tracers to help understand microbial ecology and metabolism, and they're a key part of her research even today. Here at UW-Madison, she works with

Prof. Thea Whitman to understand the soil microbial ecology in post-fire forest soils in the western US. A key aspect of her project is identifying microbes that consume the pyrogenic organic matter (PyOM) produced during wildfires using ^{13}C isotope enriched PyOM. With her research Nayela hopes to contribute to our understanding of how microbes will affect the carbon dynamics in post-fire forest soils. In the future, she hopes to continue exploring the link between microbes and biogeochemical processes. When she's not in the lab, Nayela is passionate about historical nonfiction and women's rights (if a book combines the two, you won't see her for a couple days).

RECENT GRADUATES

Fischer, Kristin J. - BS, 2022

Bekken, Micahel A.H. - PhD, 2022

Soil Science (Soldat)
Quantifying the Efficiency of Golf Course Resource Use

Chatterjee, Sumanta - PhD, 2022

Soil Science (Huang)
Investigating the Role of Soil and Land Surface Properties in Agricultural and Ecosystem Modeling

Zhou, Qiyu - PhD, 2021

Soil Science (Soldat)
Developing and Evaluating Turfgrass Growth Prediction Models with Machine Learning Techniques for Precision Nitrogen Management on Golf Course Greens

Department News cont. from pg. 2

We wished farewell to **Carrie Laboski** who left the department recently to accept a position with USDA-ARS in Pennsylvania.

Spring PhD graduate, **Sumanta Chatterjee** (RA, Huang) had part of his research featured in the February 2022 issue of *Remote Sensing of the Environment* (a prestigious journal with an impact factor of 10.16). His paper is titled, "Soil moisture as an essential component for delineating and forecasting agricultural rather than meteorological drought."

Summer PhD graduate, **Michael Bekken** (RA, Soldat) was selected to be the flag bearer at the Spring Commencement ceremony and therefore was featured in a Graduate School article. Michael worked three years in Scotland for the Golf Environment Organization (GEO), which lead him to pursue a PhD here studying scientific measurement systems for golf course resource use. He has received a Fulbright fellow to the University of Oslo in Norway where he will study the effect of climate change on carbon cycling in arctic landscapes. Similarly, his maternal grandparents graduated from UW-Madison, with his grandfather's graduation exactly 70 years prior in 1952. He, too, held a Fulbright-funded project in Norway.

Jaya Suneja, a sophomore in Biological Systems Engineering who is working in the Balster Lab was recently awarded a Hilldale Fellowship. She will be studying the environmental controls of a fungal pathogen in forest nurseries in Wisconsin.

Department of Soil Science at the University of Wisconsin-Madison

The Department of Soil Science is deeply grateful to its alumni and friends. Your generous support is appreciated, and we thank you! To join other students, alumni, industry, and friends in enhancing the teaching, research, and outreach programs in the Department of Soil Science, please consider donating to one of our various funds. A complete list of funds available can be found on our website (<https://soils.wisc.edu/giving/>).

If paying by check, please make your check payable to the **UW Foundation-Department of Soil Science** and mail to:

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US Bank Lockbox
P.O. Box 78807
Milwaukee, WI 53278-0807

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SCHOLARSHIPS

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Allison O'Brien

Oscar Magistad Memorial
Evan Freed

Oscar Magistad Memorial
Brady Mandella

C.L. Ream Memorial
Cole Koffron

Wisc. Agri-Business Association
Cole Koffron

Henry Steenbock
Walker Crane

R.D. Powell Memorial
Daniela Orjuela-Diaz

OUR SUPPORTERS

11/16/2021 to 5/31/2022

Dr. Beaver
Mrs. and Dr. Bowling

Mr. and Mrs. Brooks

Dr. and Ms. Cates

Dr. and Ms. Checkai

Ms. and Dr. Comfort

Ms. Conlin-Marx and Mr. Marx

Mr. Daniels

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National Turfgrass Evaluation Program

Nufarm Americas Inc.

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Mr. and Mrs. Stellato

Dr. and Prof. Swan

Dr. Szatalowicz

Ms. Tanner

Prof. Ventura and Ms. Krome

Wisconsin Turfgrass Assn.

Alumni Update

We'd love to hear from you! Please complete and return this form
or send your updates via email to: jgarvin2@wisc.edu

Name: _____

Degree(s) and Year(s): BS () MS () PhD () _____

Home Address: _____

Email: _____ Phone No.: _____

Position: _____ Employer: _____

News to share: _____

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Profiles

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