FresH2O PFAS Breakout

10/9/2026

Anya Jeninga-Nehls, MS
Wisconsin Department of Natural Resources
Brian Pompeii, PhD
University of Wisconsin-La Crosse

Agenda

Welcome

Lightning Talks

Break

Research Deep Dive

Welcome

PFAS Collaboration Group Objectives

Lightning talks

Order of Speakers (Lightning Talks)

PFAS in our Environment

1. Yin Wang
2. Inna Popova
3. Christy Remucal
4. Tisha King-Heiden
5. Pat Gorski

PFAS Treatment

1. Yin Wang
2. Junjie Niu
3. Seyed Javad Amirfakhri

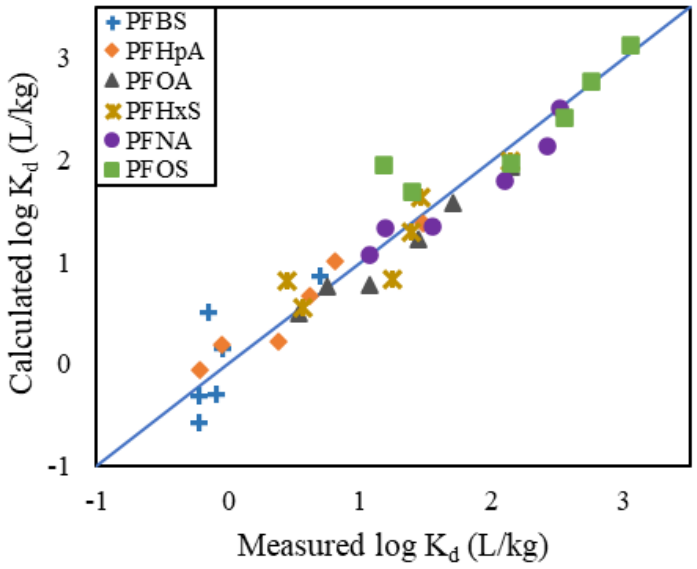
PFAS Policy and Outreach

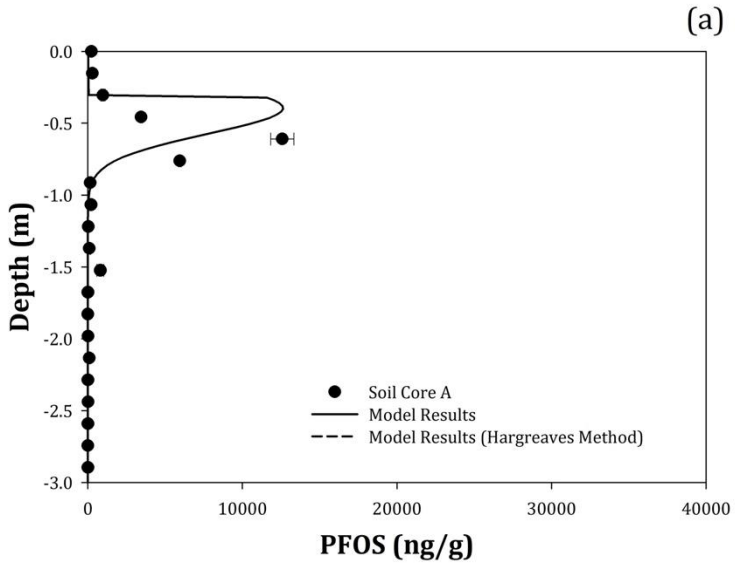
1. Thomas Dunbar
2. Lyn van Swol

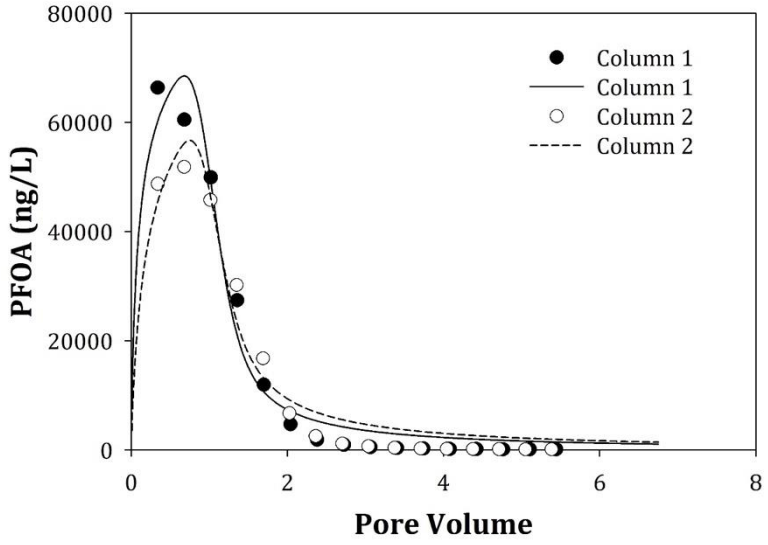
PFAS in our Environment

PFAS Behavior in the Environment

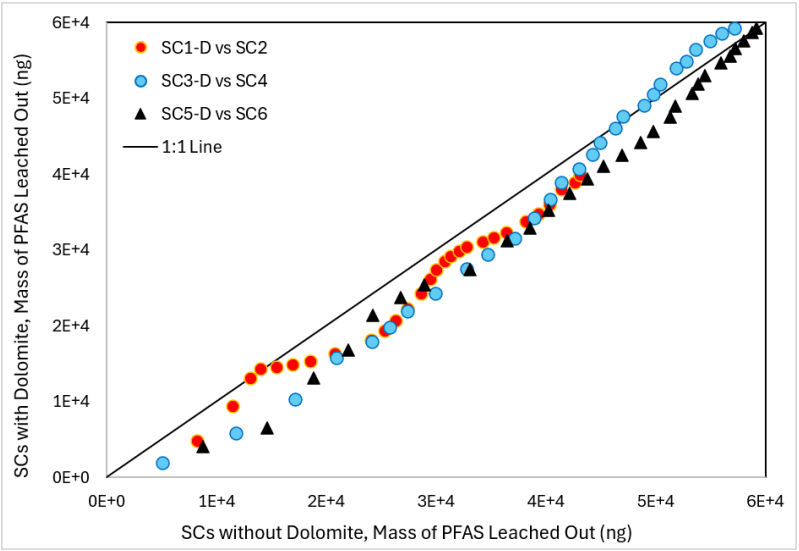
Shangping Xu
Yin Wang
UW-Milwaukee







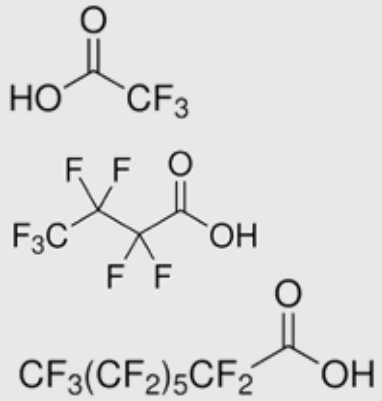
- Adsorption of PFAS by aquifer materials collected from Wisconsin
- High resolution profile of PFAS in Truax Field
- Release kinetics of PFAS from contaminated soil/sediment
- Effects of colloidal activated carbon on PFAS migration within the subsurface
- Effects of dolomite amendment on PFAS leaching through unsaturated soil



Molecular interactions of PFAS with soil minerals

Inna Popova
Soil and Environmental Sciences Dept, UW-Madison

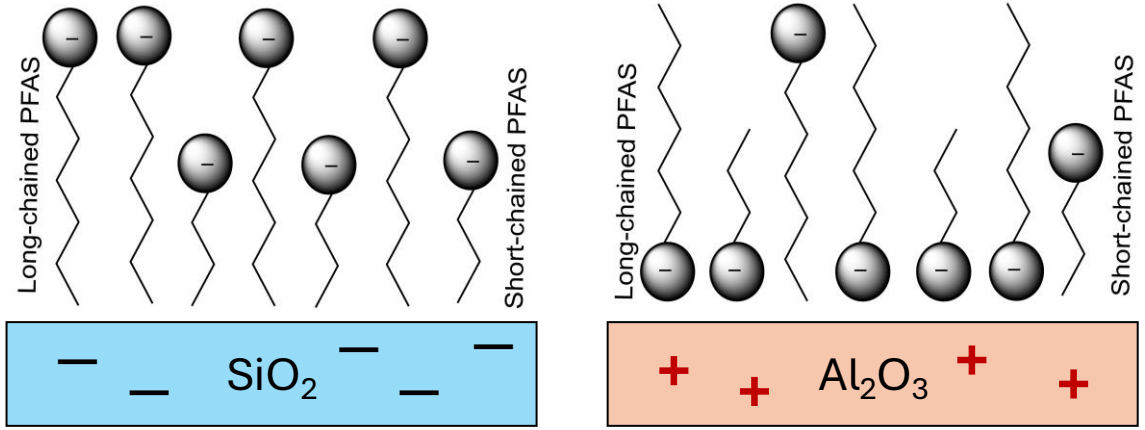
Research question: How do PFAS chain length, mineral surface charge, and solution chemistry control PFAS-mineral interactions?



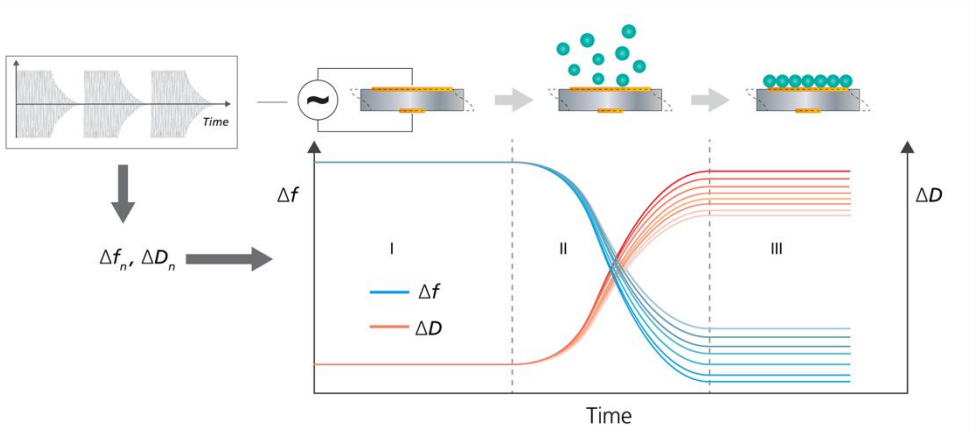
Trifluoroacetic acid **TFA**

Heptafluorobutyric **HFBA**

Perfluorooctanoic acid **PFOA**



Quartz Crystal Microbalance with Dissipation monitoring **(QCM-D)**

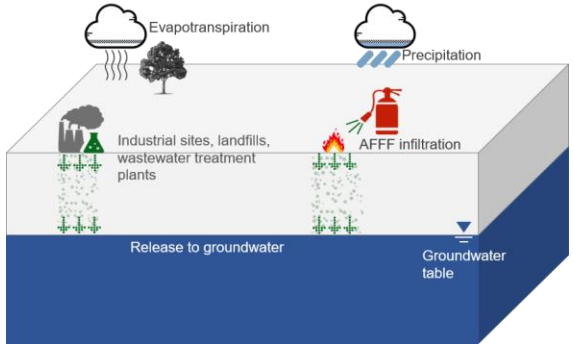


Environmental Factor	TFA	HFBA	PFOA
pH	○	○	○
Temperature	○	○	○
Na^+	○	○	●
Ca^{2+}	●	○	●
Mg^{2+}	●	○	●

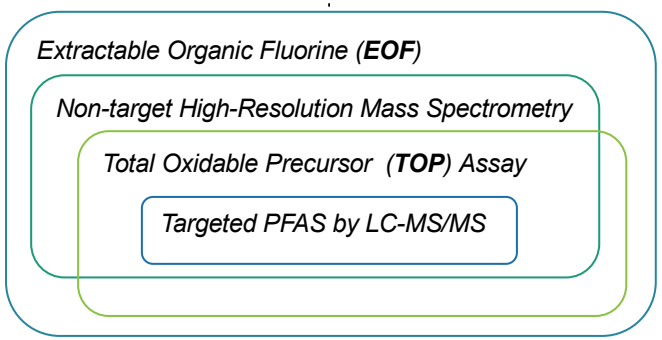
adsorption/interaction ● = increased ● = decreased ○ = no measurable effect

Remucal: PFAS in aquatic systems

- PFAS sources to aquatic systems
  - Loadings to the Great Lakes
  - Transport in air and precipitation
  - Inputs to groundwater
  - Partitioning to sediment, foam, ice…



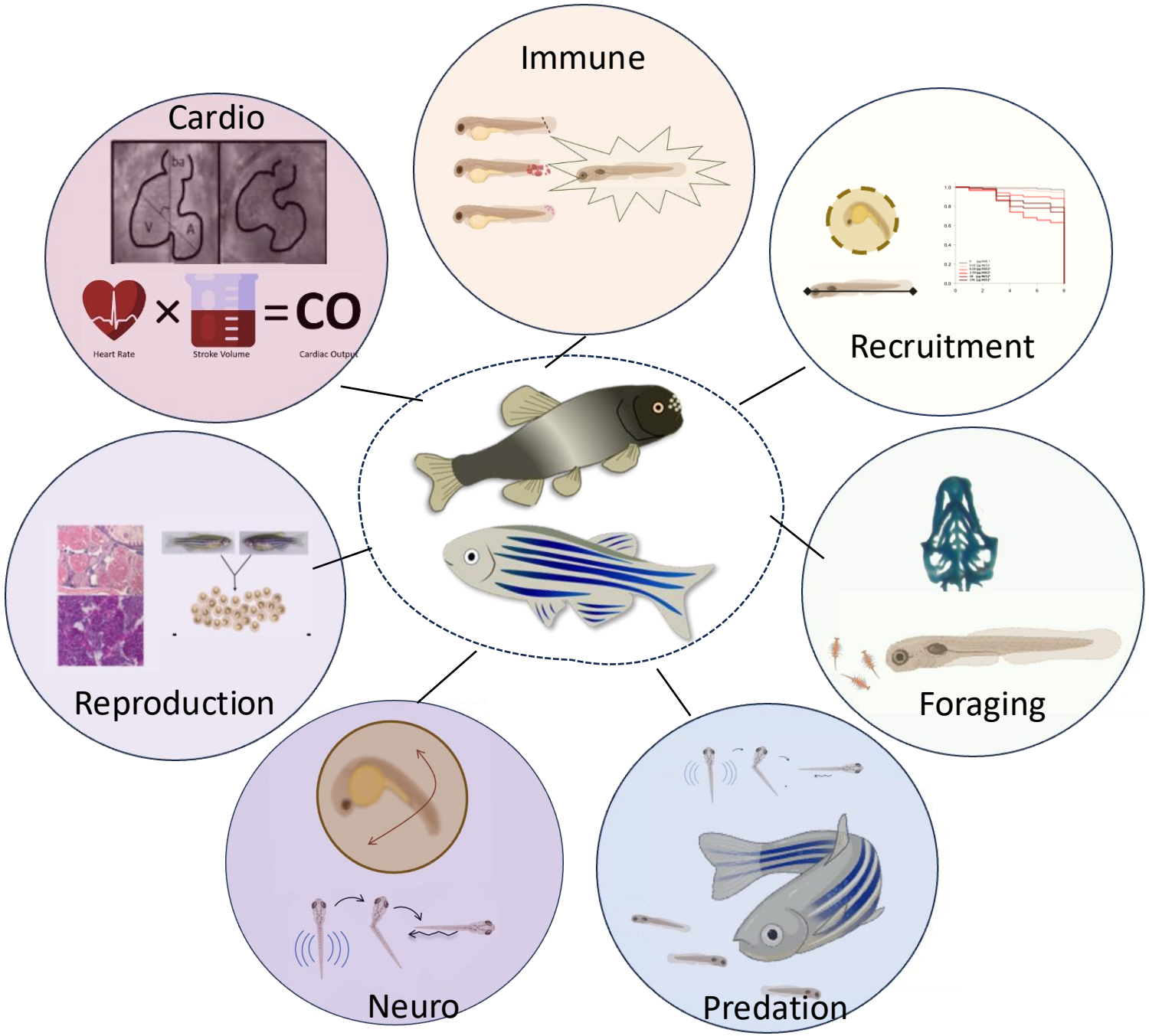
- PFAS forensics & high-resolution mass spectrometry
  - What PFAS are we missing?



- Human exposure
  - Paired serum and water sample measurements in an impacted community

KING-HEIDEN – Dev Tox/DBAD

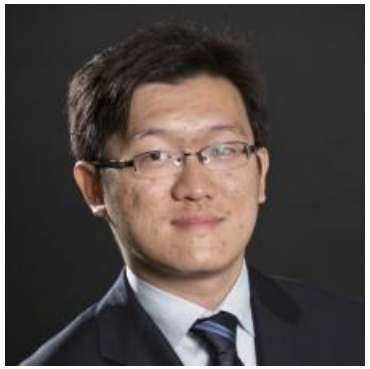
UNIVERSITY OF WISCONSIN-LA CROSSE
RIVER STUDIES CENTER



WDNR Water Quality PFAS initiatives/studies:

- Statewide sampling of surface water (SW) PFAS (>400 sites)
  - Lakes, rivers (large and small), reservoirs, “background” and contaminated sites
  - https://dnr.wisconsin.gov/topic/PFAS/DataViewer
- Pair-wise collection of SW PFAS and Fish Tissue (n=~3,800 samples)
  - 41 fish species, 185 sites, 3 states (WI, MN, CO), range of PFOS concentrations
  - Williams, Shupryt, Gorski, Streets. 2026. *Environ Tox Chem*. https://doi.org/10.1093/etojnl/vgag169
- Assessment of vertical water column PFAS concentrations and seasonality
  - Lk Monona during summer stratification, SML, SW grab to 1 m above sediment, Go-Fow sampler
  - Gorski. 2025.*Environments* 12(2): 48. https://doi:10.3390/environments12020048
- Filtration method of SW PFAS for particulate and “dissolved” PFAS
  - Lab study of 5 membranes (PES, GFF, PP, CA, nylon) and field validation.
  - *Gorski and Hannon (in prep)*.
- Biota and food web study of PFAS in Monona and Mendota
  - Non-sport fish, YOY bass/BG, algae, zoops, macro inverts, aquatic plants, mussels.
  - Developed analytical method for “organic matter” PFAS with SLH
- PFAS in lake sediment from waterbodies across a range of PFAS SW concentrations
  - Sediment cores and grabs, sediment and porewater/elutriate.
  - Worked with SLH on centrifugation of bulk sediment to obtain PW from bulk sediments

PFAS Treatment



Yin Wang, PhD

Associate Professor

Department of Civil and Environmental Engineering

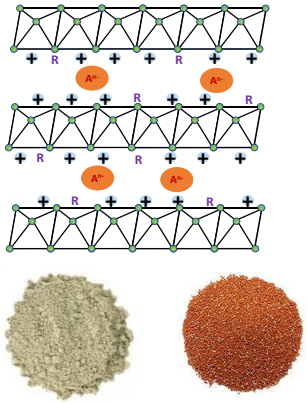
University of Wisconsin - Milwaukee

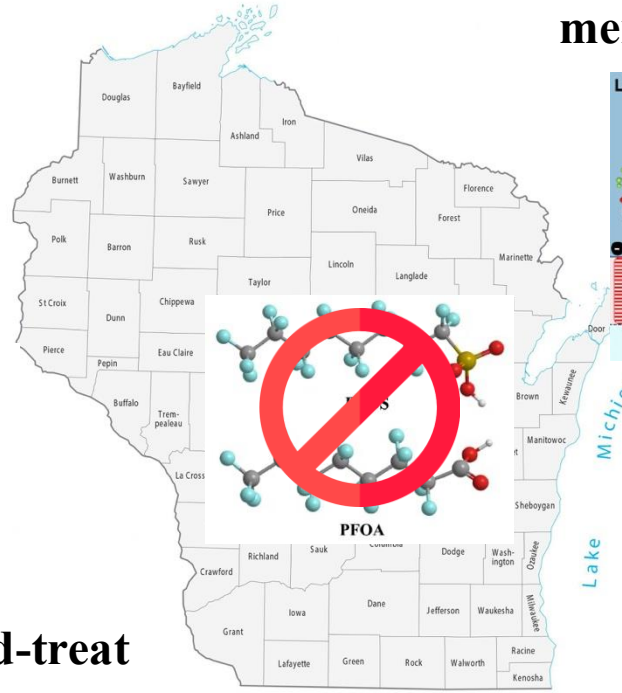
- B.S., 2008, Environmental Sciences, Peking University.
- Ph.D., 2012, Energy, Environmental and Chemical Engineering, Washington University in St. Louis.

Research interests related to PFAS

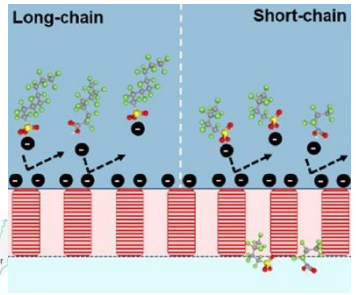
- **Technology development and evaluation for PFAS treatment**
- Fate and transport of PFAS in the environment
- PFAS chemistry and environmental monitoring

new adsorbent

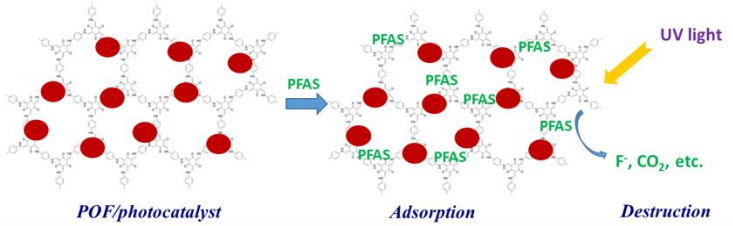




membrane separation



concentrate-and-treat



degradation

Junjie Niu, Richard & Joanne Grigg Professor
University of Wisconsin-Milwaukee (UWM)
Email: niu@uwm.edu

PFAS Remediation and Detection Research in Niu Group

UNIVERSITY of WISCONSIN UWMILWAUKEE

A. Physical removal PFAS from water:

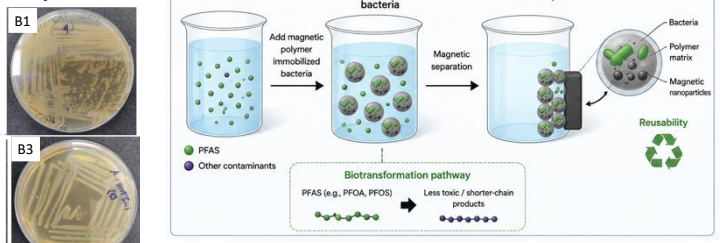
Project 1: Short- and long- chain PFAS removal by a high-capacity carbon dot hydrogel adsorbent.

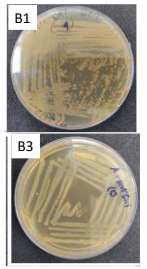
Project 2: Deployable removal of PFAS by applying a biotransformation process via a MPB design.

Design a field-deployable, low-cost, scalable biotransformation process through magnetic separate polymer well immobilized bacteria.

Develop a field-applicable PFAS removal process in water. The designed adsorbent has 3-5 times higher adsorption capacity compared to activated carbon. The project specific objectives:

1) Scalable synthesize and characterize C dot doped cationic hydrogel
2) Performance analysis of the synthesized material in batch scale
3) PFAS filtration using a designed lab-scale semi-fluidized bed reactor and filtration system

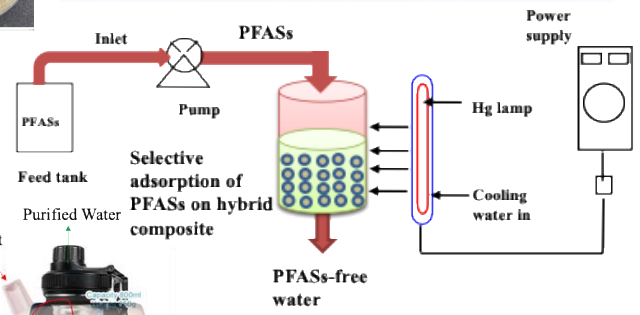




B. Permanent destruction of PFAS from water:

Project 3: Photocatalytic degradation of PFAS.

Develop an efficient, ambient degradation process that possesses a synergistic interaction by multi-radicals from trio-metallic-oxide hybrid catalyst. The goals include: 1) High degradation capacity and kinetics (destructive); degrade recalcitrant sulfonic acids. 2) Much less frequent catalyst replacement and easy regeneration. 3)High structure stability; Zero leakage; Less energy consumption; Zero carbon emission. 4) Demonstrate a pilot-scale treatment at Milwaukee.

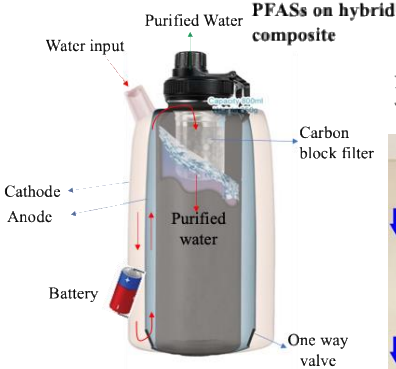


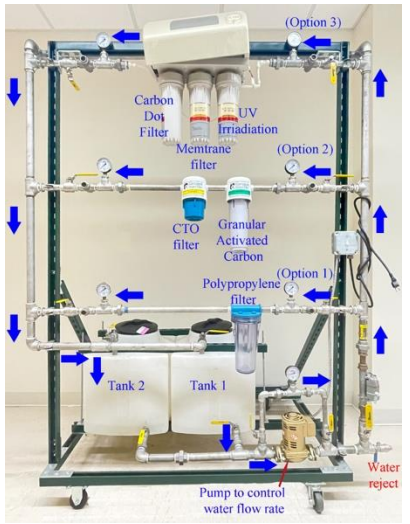
Project 4: Biodegradation of PFAS.

Identify bacteria capable of converting PFOA to its corresponding fluorotelomer and generating acetate and/or carbon dioxide when provided with a fluorotelomer.

Project 5: Electrochemical oxidization of PFAS in drinking water.

Anode and cathode are connected by outlet or one 1.5V alkaline battery. Water passes through the gap between the anode and cathode. The anode is coated with active material to generate super-active radicals to degrade PFAS molecules in water. After PFAS removal, the water passes through our regular adsorbent filter to remove fluorine ions and other contaminations.

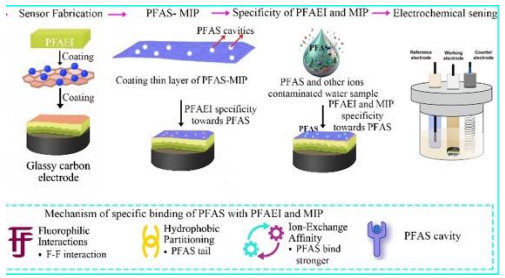




C. Portable PFAS detection and monitoring in water:

Project 6: A fast and portable electrochemical sensor to detect PFAS.

Design a portable electrochemical sensor for rapid onsite PFAS detection. The targeted analysis time <10 minutes. The sensor is designed for 1–1000 ppt PFAS detection in water.



Development of Stable Carbon-Based Adsorbents with Metal Nanoparticles for PFAS Adsorption and Decomposition: Research, Education, and Community Engagement

From lab-scale methods to practical PFAS treatment options

UWSP | Amirfakhri Group

Methods

- Carbon-based adsorbents and metal/oxide-modified activated carbon
- Microwave-assisted persulfate / Fenton-like PFAS decomposition
- Short chain and long chain PFAS
- SEM, BET, ^{19}F NMR, LC–MS/MS, and fluoride ISE for method development and tracking

UW–Madison | Pan Group

Methods

- Development of biomass-derived dual-function porous carbon materials with single-atom metal catalysts for integrated PFAS removal and destruction
- The engineered carbon integrates two critical functions: PFAS adsorption and subsequent electrochemical and catalytic defluorination

Project goals

- Build scalable, Wisconsin-relevant PFAS treatment strategies using material design, process intensification, and clear performance metrics.
- Achieve PFAS destruction with measurable defluorination.

Seyed Javad Amirfakhri, PhD | UW–Stevens Point • Xuejun Pan, PhD | UW–Madison

FresH2O Partner Event • PFAS Collaboration Group • Oct. 9, 2026

PFAS Policy and Outreach

From Fields to Food: Regulating PFAS in Land-Applied Wastes

Stanford Environmental Law Journal (forthcoming 2027)

Anna Watson, Tressie Kamp, Melissa Scanlan – Co-collaborators
Thomas Dunbar (Water Policy Specialist, 2026-27)

Question:

What legal frameworks regulate PFAS along the contamination pathway from wastewater treatment to land application to food?

Research Method:

- Assess contamination pathway
- Survey federal, state, and EU regulatory structure for sewage and industrial sludge – food safety
- Compare regulations and identify gaps
- Propose policy options

Lyn van Swol
Bret Shaw
UW-Madison

PFAS Risk Communication: Efficacy Wins!

Research Deep Dive

Dr. Brian Pompeii, UW-La Crosse

Brian Pompeii is an environmental geographer who specializes in water resource management, environmental justice, sustainability and hazards. Based out of La crosse, Brian has been working with local communities to better understand the impact of per- and polyfluoroalkyl substances and environmental contamination on people's daily lives.