

GHOSH LAB OVERVIEW

<https://ghoshlab.umbc.edu>



Dr. Upal Ghosh,
Professor



UMBC



Chemical
Biochemical and
Environmental
Engineering





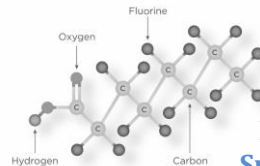
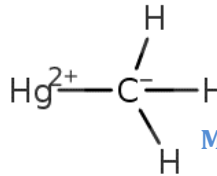
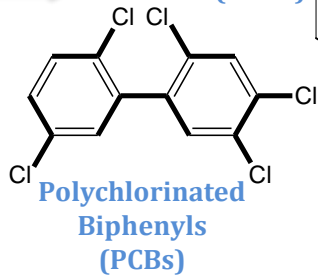
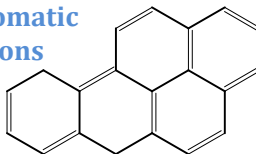
Environmental
Engineering
&
Science

FATE AND TRANSPORT

EFFECT

REMEDIATION

Polycyclic Aromatic
Hydrocarbons
(PAHs)



H
O
C

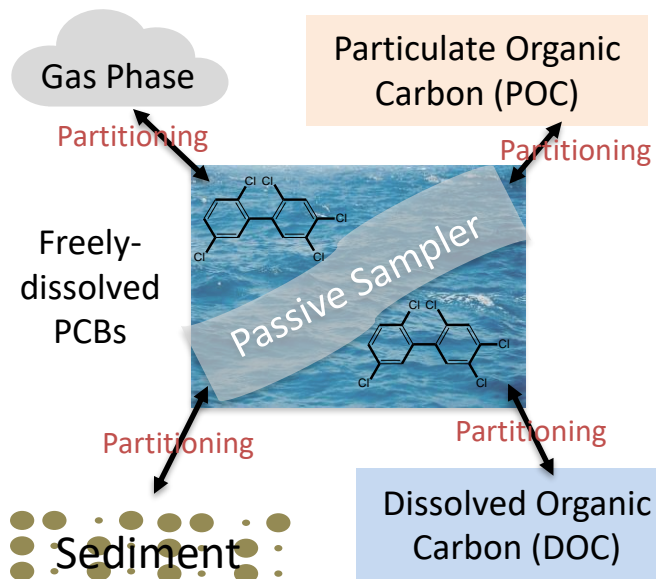
Areas
of
Work:

Quantification of HOCs in the environment using **Passive Sampling**.
Enhancement/Optimization of Passive Sampling Methods.

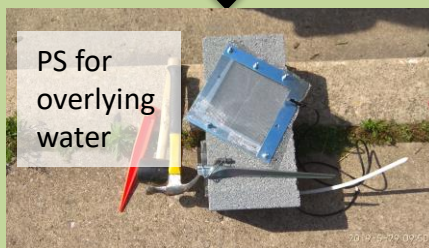
Assessment of **pollutant fate** and **bioavailability**

Development, Demonstration, and Transition of novel **remediation technologies** for polluted sediment





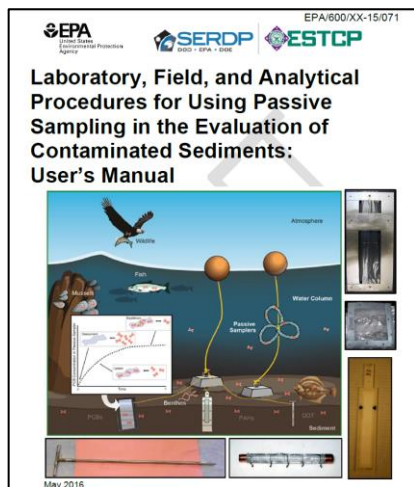
Data Collection/Field Work



Sample Processing

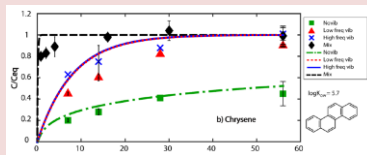


NEW GUIDANCES & STANDARD METHODS

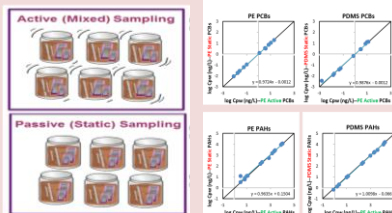


Ghosh et al., 2014

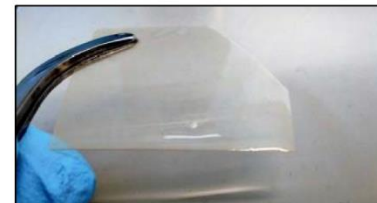
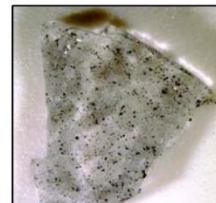
Actively shaken in situ passive sampler platform for methylmercury and organics.

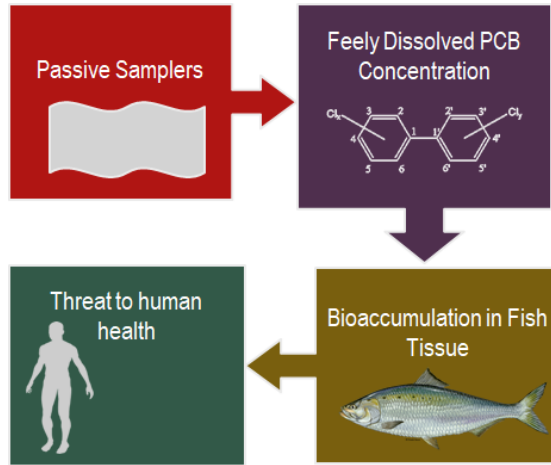


Standardization of Polymeric Sampling for Measuring Freely Dissolved Organic Contaminant Concentrations in Sediment Porewater.

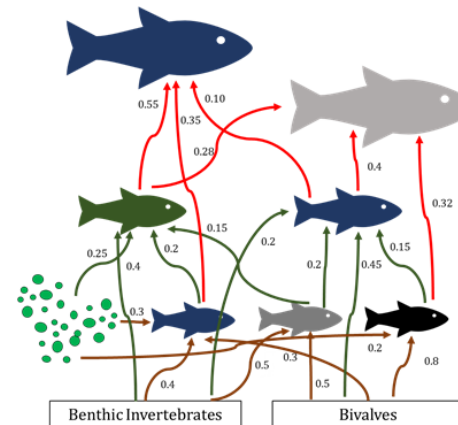
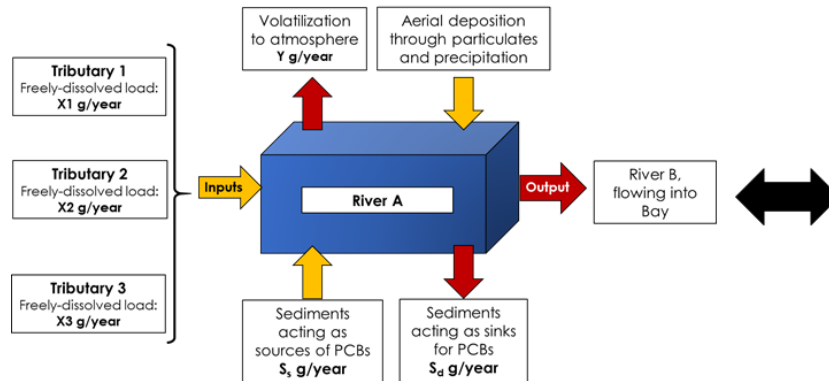


Development of novel functionalized polymeric thin films for equilibrium passive sampling of PCBs, PAHs, MeHg, PFAS compounds in surface and groundwater.





- Human exposure from water through food chain
- **Dissolved concentrations control exposure**
- Contributions to water from:
 - 1) Bed sediments
 - 2) Inputs from tributaries and outfalls
 - 3) Air-water exchange



Roanoke River, VA



This map represents tidal waters that are impaired for some part or all of the indicated Bay segment by toxic chemicals based on each state's implementation of the Clean Water Act.

Baltimore

Washington

Upper Potomac River, DC

Potomac River, MD

Upper Potomac River, VA

Lower Potomac River, MD

Middle Branch Potomac River

Upper Rappahannock River

Upper Mattaponi River

Upper Pamunkey River

Lower Pamunkey River

Upper James River

Appomattox River

Richmond

Norfolk

Southern Branch Elizabeth River

Western Branch Elizabeth River

Eastern Branch Elizabeth River

Littletown River

Impairments by Segment (full or partial)

- PCBs
- PCBs and Metals
- PCBs and Unknown Toxics
- PCBs and Priority Organics
- PCBs, Priority Organics and Metals
- None Listed

Data Source: Bay jurisdictions' 2014 impairment listings.
For more information, visit www.chesapeakebay.net.
Disclaimer: www.chesapeakebay.net/homepage.htm

Of the 92 segments displayed on this map, 80.4% contain some level of impairment due to toxics.

Four decades since the bay remains a dominant source

Trevor P. Needham, Upal Ghosh

Department of Chemical, Biochemical, and Environmental

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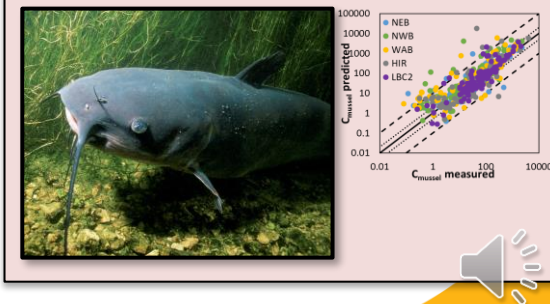
ELSEVIER

journ

0 5 10 20 Kilometers
0 4.75 9.5 18.75 miles

UTM Zone 18N, NAD

Monitoring PCB levels in fish in
MD.



PUBLICATIONS IN LEADING JOURNALS

Environmental
Science & Technology

FEATURE
pubs.acs.org/est

In-situ Sorbent Amendments: A New Direction in Contaminated Sediment Management[†]

Upal Ghosh*

University of Maryland Baltimore County, Baltimore, Maryland 21250, United States

Richard G. Luthy

Stanford University, Stanford, California, United States

Gerard Cornelissen

Norwegian Geotechnical Institute, Oslo, Norway; University of Life Sciences, Ås, Norway; Stockholm University, Stockholm, Sweden

David Werner

Newcastle University, Newcastle upon Tyne, United Kingdom

Charles A. Menzie

Exponent, Alexandria, Virginia, United States



COLLABORATING WITH STATE AND FEDERAL AGENCIES

- ☐ Maryland Department of Environment (MDE)
- ☐ Delaware Department of Natural Resources and Environmental Control (DNREC)
- ☐ DC Department of Energy and Environment (DOEE)
- ☐ US Geological Survey (USGS)
- ☐ US Fish and Wildlife Service (USFWS)
- ☐ Baltimore Port Administration

TECHNOLOGY TRANSITION (Scale up through EPA-SBIR, NIEHS, DoD)

Microbial amendments for
in-situ treatment of
Christina River, Delaware.

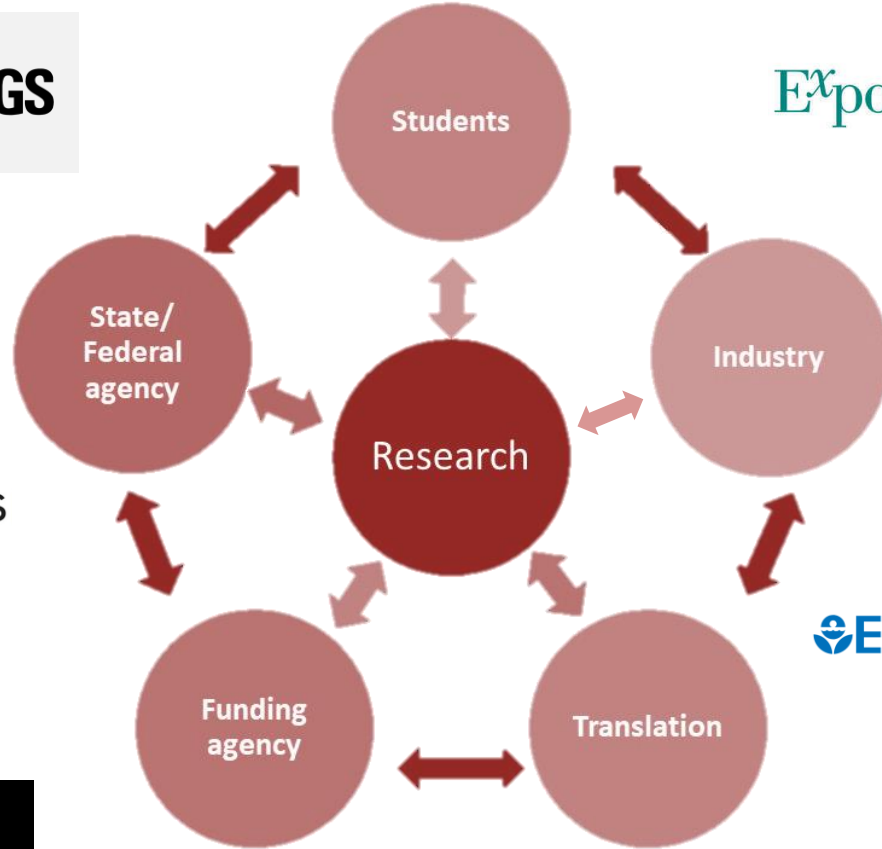
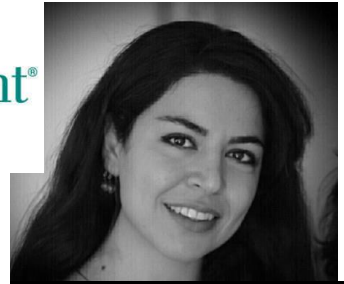




Trevor Needham
Hydrologist

USGS

Hilda Fadaei
Environmental Engineer

ARCADISExponent®

Mehregan Jalalizadeh
Senior Associate

EPA United States Environmental Protection Agency

James Sanders





THANK YOU

