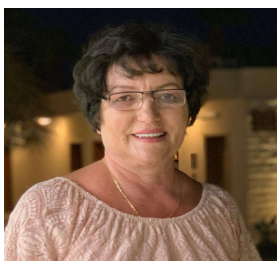


Building collaborative research capacity and preliminary data related to pesticide and per-and poly-fluoroalkyl substances (PFAS) contamination of ground and surface waters in Albania



Albanian Scholar

Magdalena Cara, Research Professor, Department of Plant Protection, Agricultural University of Tirana, Albania

<https://sites.google.com/a/ubt.edu.al/magdalena-cara/>



Diaspora Fellow

Anila Bello ScD MSc, Research Professor, Department of Public Health, UMASS Lowell, USA

<https://www.uml.edu/health-sciences/public-health/faculty/bello-anila.aspx>

Presentation outline

- READ application
 - 1) Collaborative research
 - 2) Co-teaching
 - Research
 - Why is research important?
 - Per-polyfluroalkyl substances (PFAS) environmental contamination
 - Research plan
 - Teaching
-



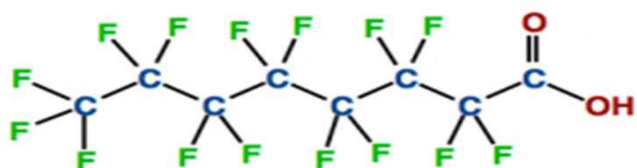
Rationale for the research project

- ❖ Agriculture is a major sector of the Albanian economy
- ❖ Pesticides are essential in modern agriculture production
- ❖ Pesticides are toxic, persistent and bioaccumulate in the environment
- ❖ In Albania pesticides are used without any criteria and some of them enter the country illegally
 - ❖ Farmers health
 - ❖ Food contamination
 - ❖ Water sources contamination
- ❖ Compliance with European Standards is very important for protecting human health and environment
- ❖ We don't know the degree of environmental contamination and human health impacts in Albania

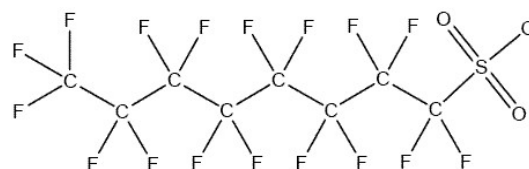


Per-polyfluoroalkyl substances (PFAS)

PFAS or “Forever chemicals”, man-made
>5,000 compounds in the PFAS group (most studied PFOA and PFOS)



Perfluorooctanoic acid (PFOA)



Perfluorooctane sulfonic acid (PFOS)

- ❖ The **C- F bond** is the strongest bond in organic chemistry
- ❖ PFAS are hydrophobic and lipophobic
- ❖ Excellent technical performance as surfactants and polymers
- ❖ Widely used



Aerospace



Apparel



Building and Construction



Chemicals and Pharmaceuticals



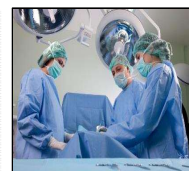
Electronics



Oil & Gas



Energy



Healthcare and Hospitals



Aqueous Film Forming Foam



Semiconductors

PFAS environmental contamination

❖ PFAS are “Persistent, Bioaccumulating, Toxic”

- ❖ Adverse human health effects
 - ❖ Cancer (e.g. kidney, prostate, etc.)
 - ❖ Thyroid disease
 - ❖ Reproductive system
 - ❖ Immune system

❖ 98% of Americans have PFAS in their blood

- ❖ In Albania?

- ❖ Contamination of ground, surface and drinking water
 - ❖ Irrigation waters
 - ❖ Food contamination

The status of PFAS water contamination in Albania is not known



The focus of proposed research

❖ **Short-term goal:** To identify PFAS and pesticide contamination hot spots with focus on surface waters used for irrigation across Albania

❖ Dr Cara will lead the field work and sample collection

❖ Collect samples of surface waters (e.g. rivers, streams and reservoirs) and ground water systems (e.g. wells) utilized by large farms and greenhouses with high water consuming plants (e.g. strawberries).

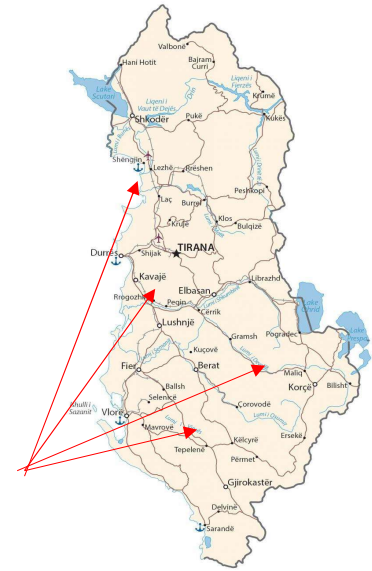
❖ 100 samples representative of all regions in the country



❖ Samples will be shipped to UMass Lowell for PFAS and pesticide analysis with liquid chromatography tandem-mass spectrometry (LC-MS/MS). Statistical analysis will be led by Dr. A. Bello.

❖ Results will be published in a peer-revised publication led by the Albanian team

❖ **Develop a research agenda for a sustainable collaboration (e.g larger grant application, institutional collaborations, NANO Alb, etc.)**



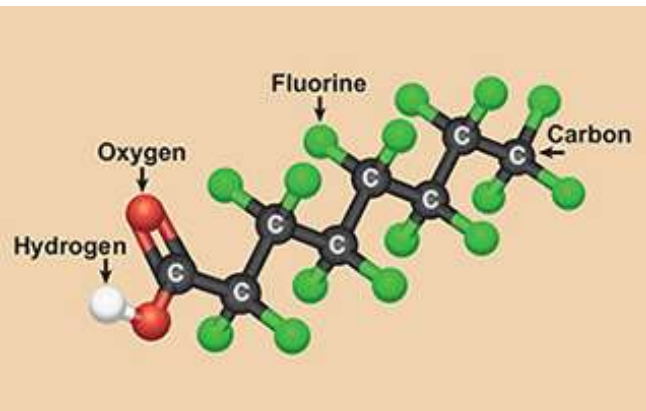
Teaching

- ❖ During her visit to Albania Dr. Bello will teach a module on occupational and environmental health in the Department of Plant Protection at the Agricultural University of Tirana.
- ❖ She will lecture on PFAS chemistry, toxicology, and human health effects
- ❖ Dr Bello is currently leading several research projects.
 - ❖ *Incentives and barriers to adopting PFAS-free firefighter foams in fire training facilities. (PI- FEMA –funded)*
 - ❖ Reactive Chemical Systems in Construction: Part B – Developing data-driven interventions. (co-PI- NIOSH/CPWR)
 - ❖ Impact of Open Burn Pit Exposure on Respiratory and Cardiovascular Health Among Military Veterans. (co-I DoD)
 - ❖ *Improving Health and Indoor Air Quality for Older Adults with Asthma* (co-I HUD)
- ❖ She will teach research methods and manuscript writing to prepare the students conduct independent research
 - ❖ 20-25 students will attend her classes

One year Timeline: June 2023 - June 2024

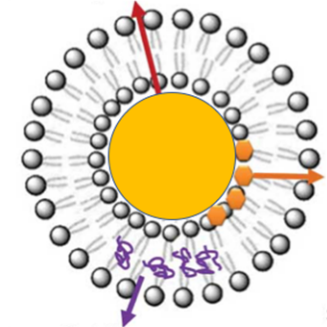
Main tasks	2023							2024					
	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Mau	Jun
<u>Albanian team</u>													
Establish the research team comprised													
Identify locations for sample collection													
Develop a check list of other information needed													
Conduct Sampling													
Ship samples to US , Umass Lowell													
Conduct Literature reiew													
Write the introduction and methods													
Develop Tables and Figure for the paper													
Complete the results and discussion sections													
<u>US team</u>													
Meet regulary with the team in Albania													
Analyze water samples													
Conduct qulaity control for chemical analysis													
Complete statistical analysis													
Conceptualize the research paper													
Guide manuscript writing and revisions													

Dr. Bello will visit Albania in October 2023.



Thank you

Core Magnetic Iron Oxide (Fe_3O_4) Nanoparticles



Fat soluble PFOAs

