



SOUTHERN CALIFORNIA

# Superfund Research and Training Program

FOR PFAS ASSESSMENT, REMEDIATION, AND PREVENTION

**Lida Chatzi, MD, PhD**

Director, ShARP Center

USC Keck School of Medicine

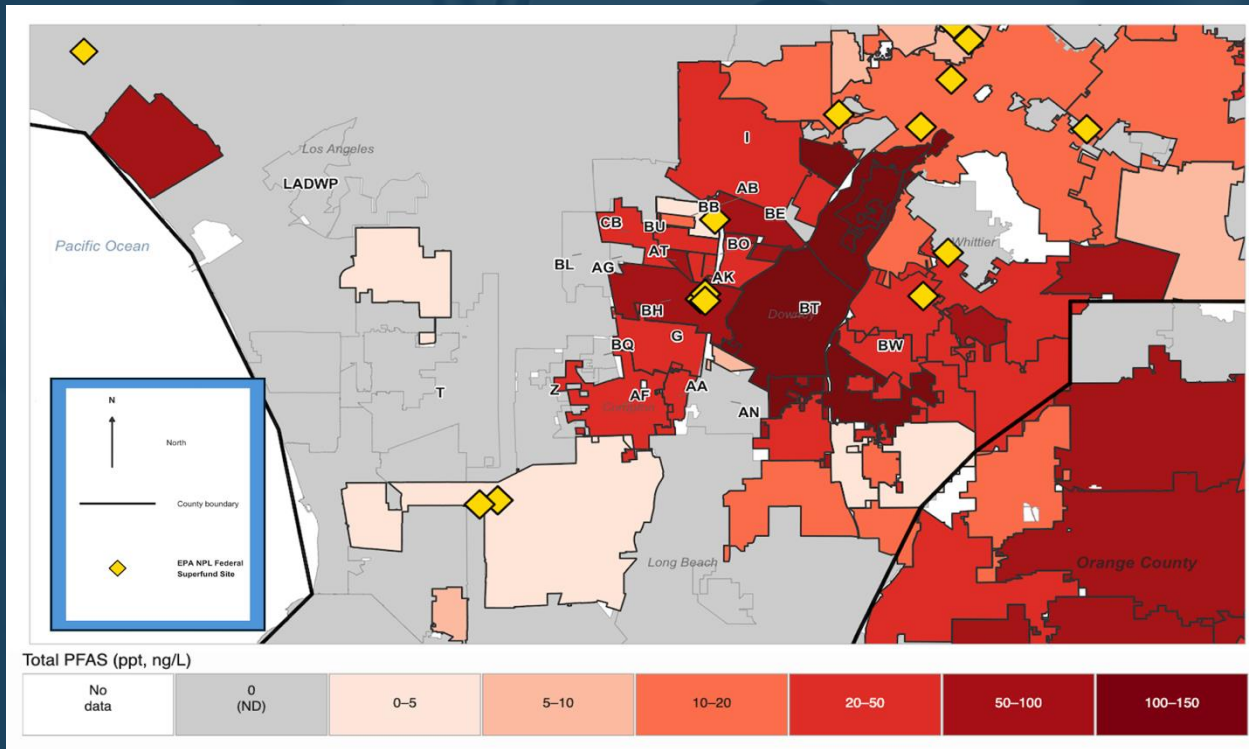
Keck School of Medicine of **USC**

# What Is The Problem?

PFAS contamination has been identified at more than 10,000 sites across the United States, including numerous Superfund sites. What does this mean? 160–180 million Americans may be exposed through contaminated drinking water.



# What is the problem in SoCal ?



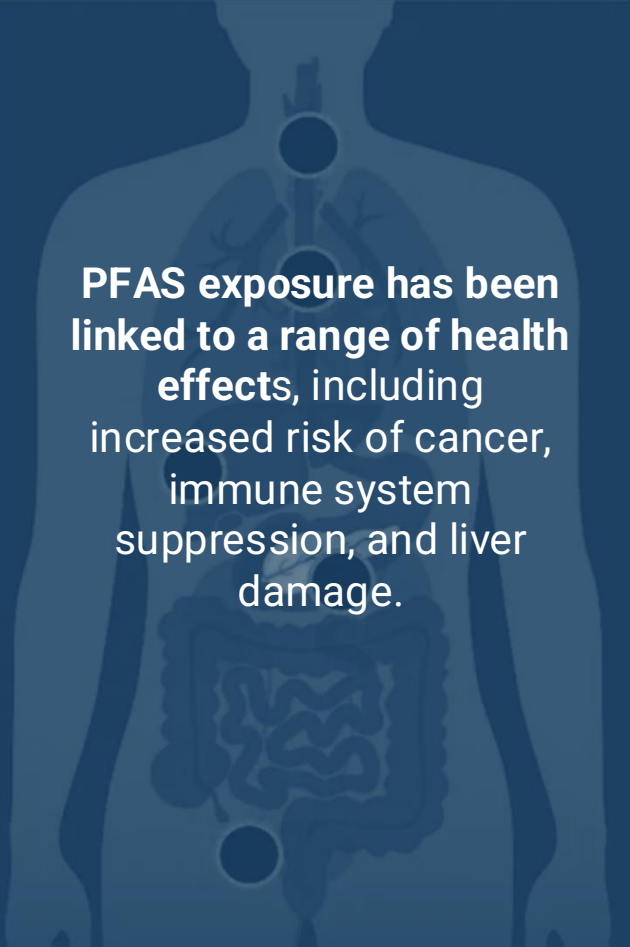
Small water systems which rely on ground water show high PFAS contamination **>150ppt** with **19 EPA Superfund sites** located within this region

The large municipal supplier LADWP showed **no detectable** in federal monitoring

*PFAS in public water systems across Los Angeles and Orange Counties; PFAS data from EPA UCMR5, 2023–2025*

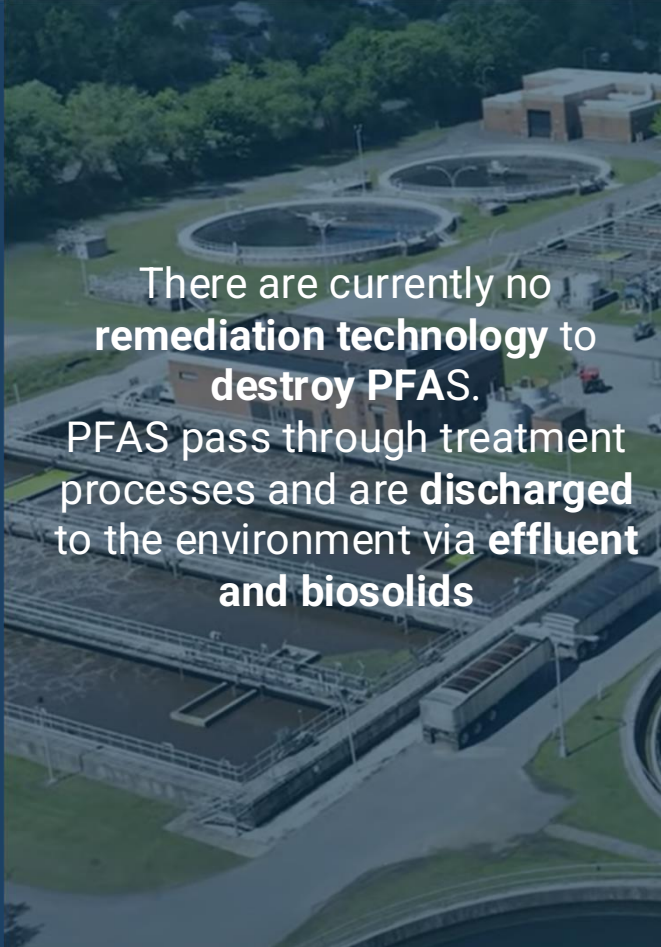


## HUMAN HEALTH RISKS




**PFAS exposure has been linked to a range of health effects**, including increased risk of cancer, immune system suppression, and liver damage.

## REMEDIATION TECHNOLOGY



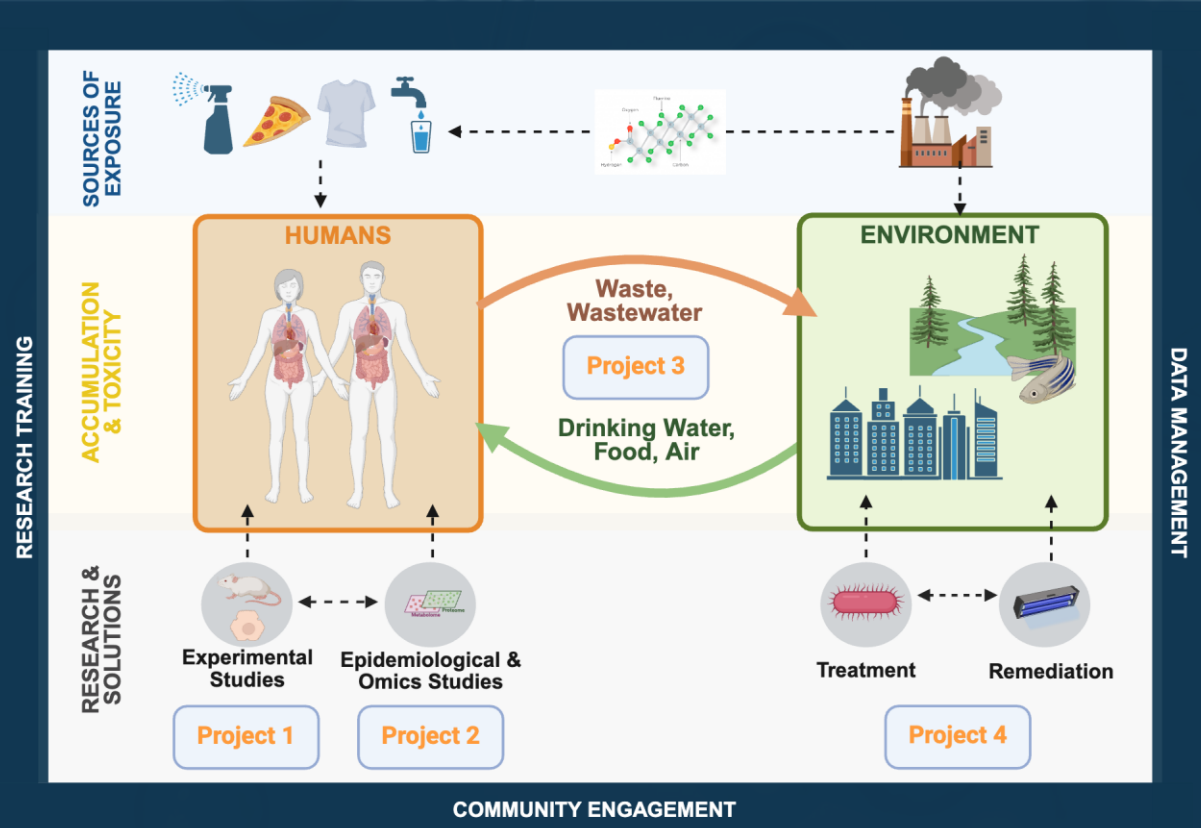
There are currently no **remediation technology to destroy PFAS**. PFAS pass through treatment processes and are **discharged to the environment via effluent and biosolids**

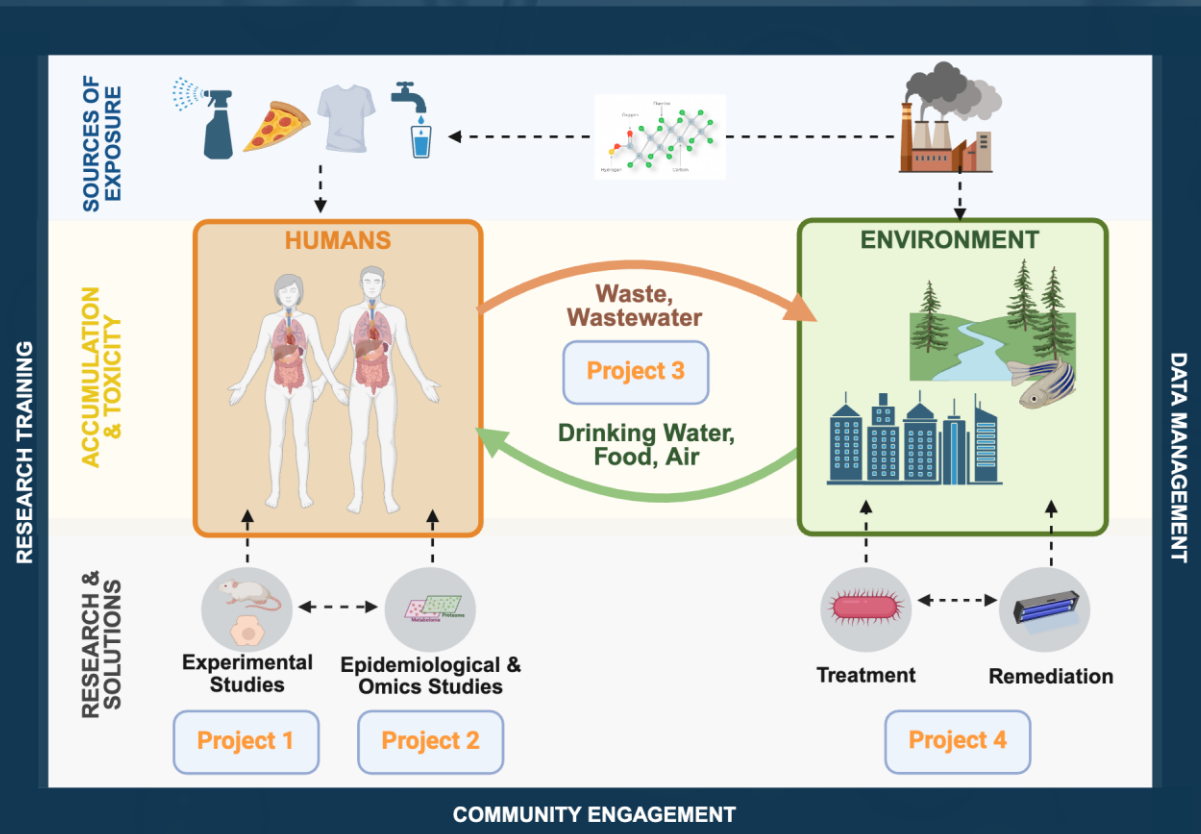
## TRANSLATIONAL OPPORTUNITIES



**Collaborating** with state agencies and community-based organizations to **improve public health outcomes and reduce PFAS exposure risks** in affected communities.

# Our Research Approach





- Innovative, problem-based, translational study
- Cutting-edge technologies including NAMs, multi-omics profiling, AI-assisted data integration, and PFAS remediation technologies.
- Multi-directional stakeholder engagement to translate research into disease prevention and evidence-based intervention.
- Cross-disciplinary training to SRP trainees to tackle complex EH challenges

# ShARP Team Science

## Administrative Core



Lida Chatzi, MD, PhD  
ShARP Director



Rob McConnell, MD  
ShARP Deputy Director  
Research Translation  
Coordinator



Amy Childress, PhD  
ShARP Deputy  
Director

## Data Management & Analysis Core



David Conti, PhD  
DMAC Lead



Matthew Salomon, PhD  
DMAC  
Co-Investigator



Felipe De Barros, PhD  
DMAC  
Co-Investigator



Jesse Goodrich, PhD  
DMAC  
Co-Investigator

## Community Engagement Core



Max Aung, PhD  
CEC Lead



Lourdes Baezconde,  
PhD  
Co-Investigator

## Research Experience & Training Coordination Core



Jane Steinberg, PhD  
RETCC Co-Lead



Adam Smith, PhD  
RETCC Co-Lead



Max Aung, PhD  
RETCC  
Co-Investigator

## Biomedical Projects

### Project 1



Lucy Golden, PhD  
Project 1  
Primary Investigator



Ana Maretti Garcia, PhD  
Project 1  
Co-Investigator



Matthew Salomon, PhD  
Project 1  
Co-Investigator

### Project 2



Lida Chatzi, MD, PhD  
Project 2  
Primary Investigator



Frank Gilliland, PhD  
Project 2  
Co-Investigator



Sherlock Li, PhD  
Project 2  
Post-Doctoral Trainee



Max Aung, PhD  
Project 2  
Co-Investigator



Veronica Vieira, DSc  
Project 2  
Co-Investigator



Scott Bartell, MS, PhD  
Project 2  
Co-Investigator

### Project 3



Adam Smith, PhD  
Project 3  
Primary Investigator



Felipe De Barros, PhD  
Project 3  
Co-Investigator



Adam Simpson, PhD  
Project 3  
Co-Investigator



Jiachen Zhang, PhD  
Project 3  
Co-Investigator

### Project 4



Daniel McCurry, PhD  
Project 4  
Primary Investigator



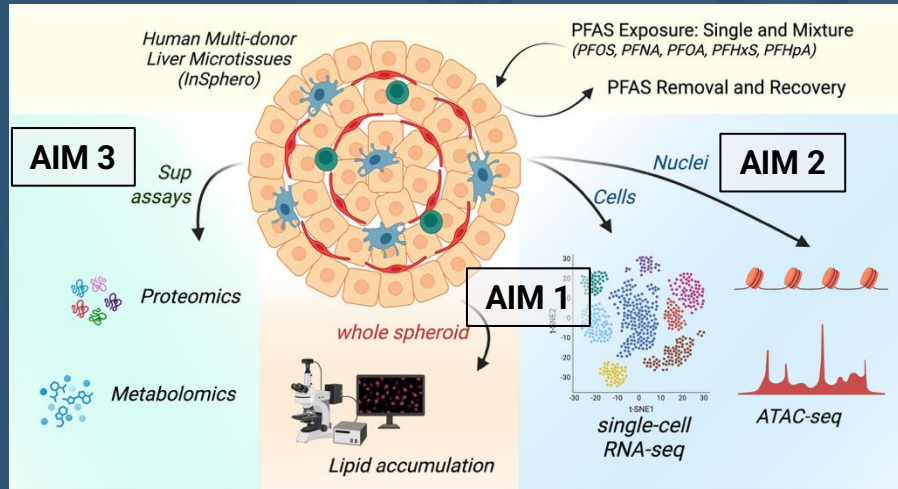
Amy Childress, PhD  
Project 4  
Co-Investigator



Adam Smith, PhD  
Project 4  
Co-Investigator

# PROJECT 1 Uncovering precise mechanisms of PFAS liver toxicity

## STUDY DESIGN



## PUBLISHED RESULTS & PRESS

Environment International 203 (2025) 109763

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Environment International

journal homepage: [www.elsevier.com/locate/envint](https://www.elsevier.com/locate/envint)



Full length article

Assessing the impact of perfluoroalkyl substances on liver health: a comprehensive study using multi-donor human liver spheroids

Lucy Golden-Mason<sup>a,1</sup>, Matthew P. Salomon<sup>b,1</sup>, Chikako Matsuba<sup>a,b</sup>, Yufen Wang<sup>a</sup>, Veronica Wendy Setiawan<sup>c</sup>, Lida Chatzi<sup>c</sup>, Ana C. Maretta-Mira<sup>a,\*</sup>

USC study shows how PFAS disrupt healthy function in human liver cells

September 10, 2025 | [EurekAlert!](https://www.eurekalert.com)

EU Medical Experts Call for Action on PFAS and Point to Safer Innovation in the Healthcare Sector

February 9, 2026 | [CHEM Trust](https://www.chemtrust.org)

Study details how 'forever chemicals' disrupt liver function

September 11, 2025 | [TheHill.com](https://www.thehill.com)



Lucy Golden, PhD  
Project 1  
PI



Ana Maretta-Mira, PhD  
Project 1  
Co-I

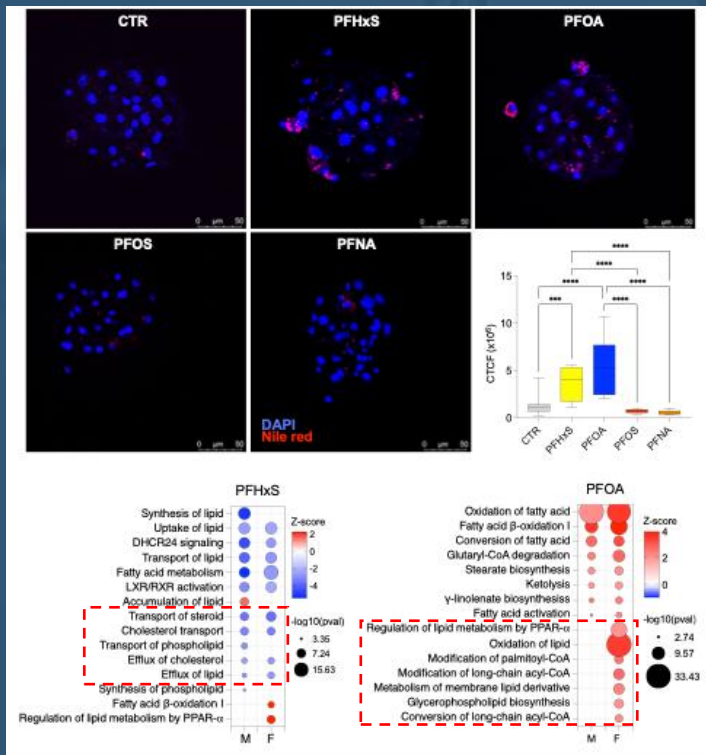


Matthew Salomon, PhD  
Project 1 and DMAC  
Co-I

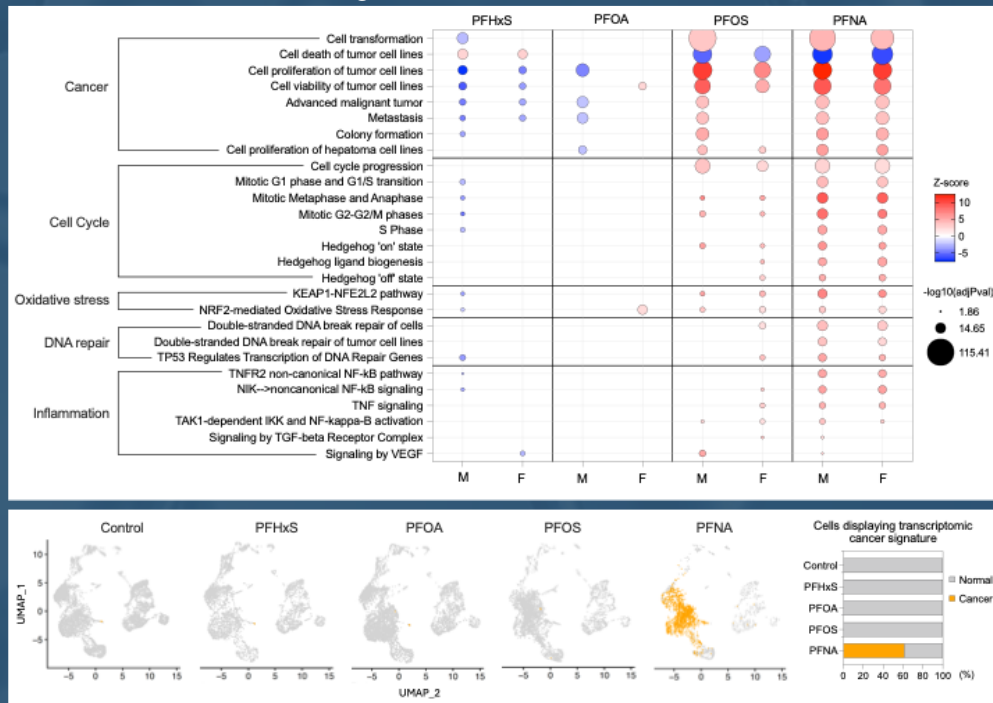
# EXPERIMENTAL STUDY Effects of single PFAS exposure

RESULTS: PFAS impacted liver spheroids in a compound- and sex-specific manner.

## PFOA and PFHxS: Steatogenic Effect



## PFOS and PFNA: Pro-oncogenic Effect



# PRELIMINARY RESULTS Effects of PFAS Mixtures and PFAS Removal

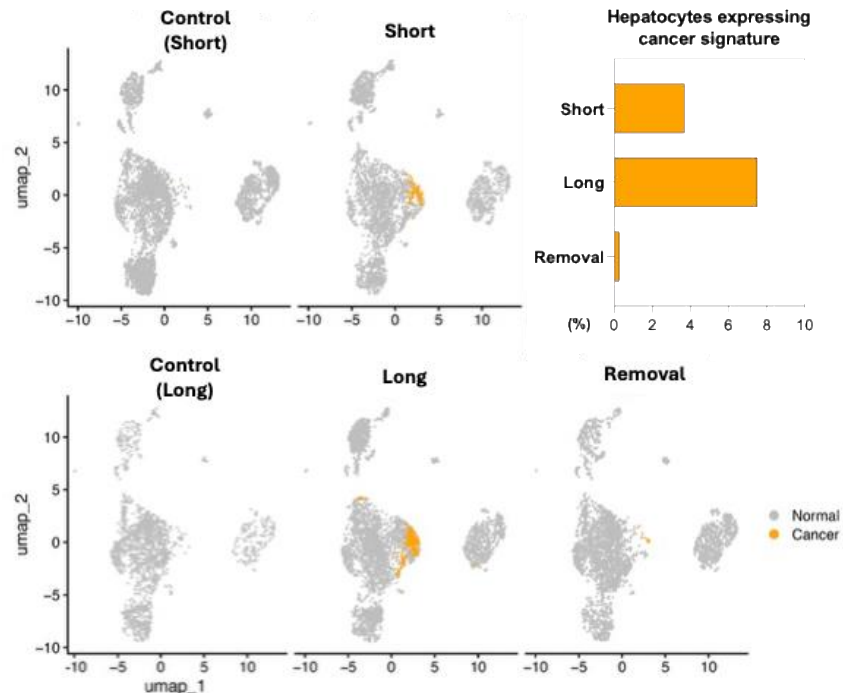
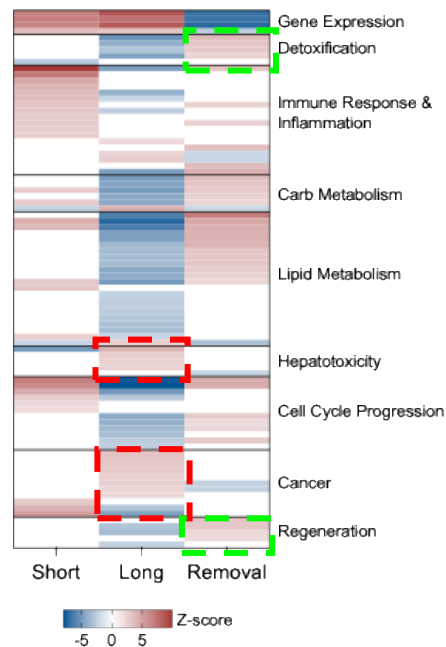
PFAS Mixture  
PFOA, PFOS, PFNA  
PFHxS, PFHpA  
4 $\mu$ M each

Exposure Time  
**Short**  
1 week

**Long**  
2 weeks

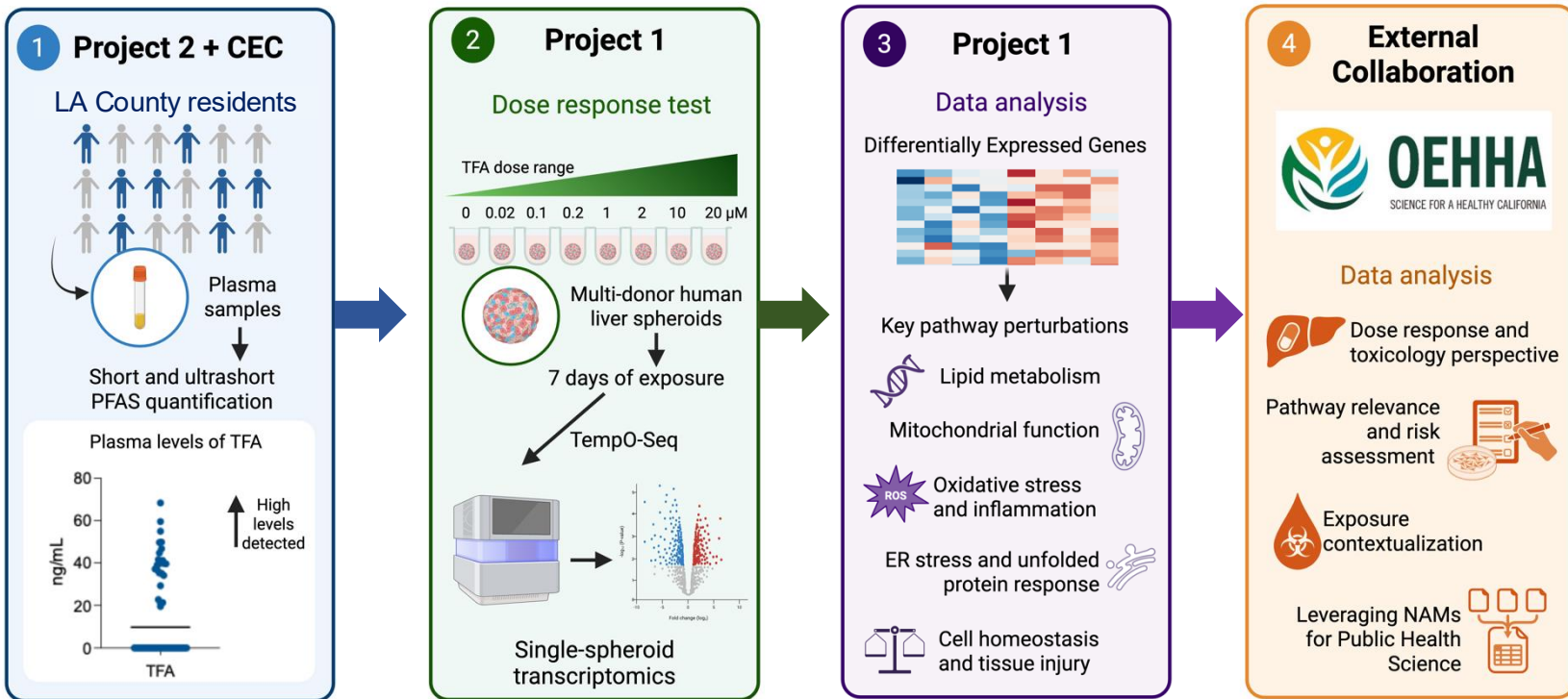
**Removal**  
PFAS mix: 1 week  
Recovery: 1 week

Transcriptomic changes induced by PFAS mixture in human liver spheroids



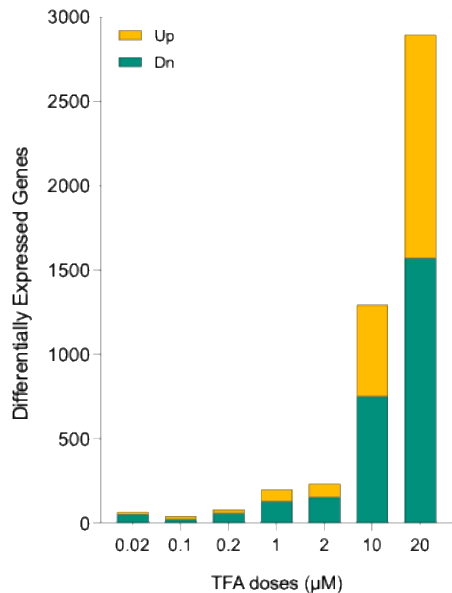
Manuscript in preparation

# COLLABORATIONS From observation to public health impact

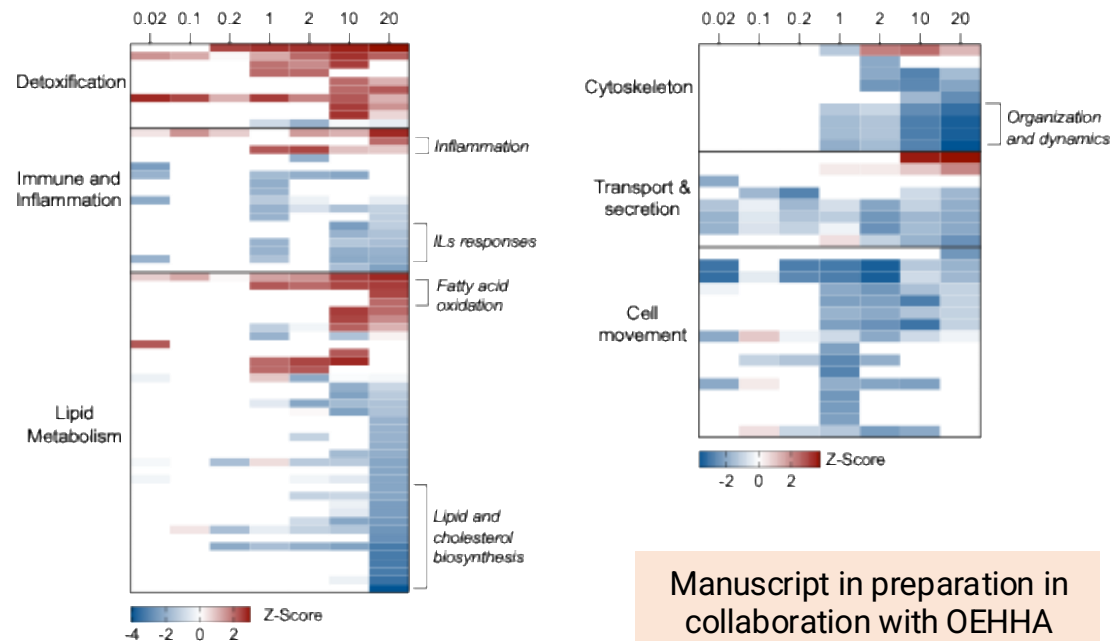


# PRELIMINARY RESULTS Effects of TFA on liver metabolism

## Differentially expressed genes



## Most Important Pathways

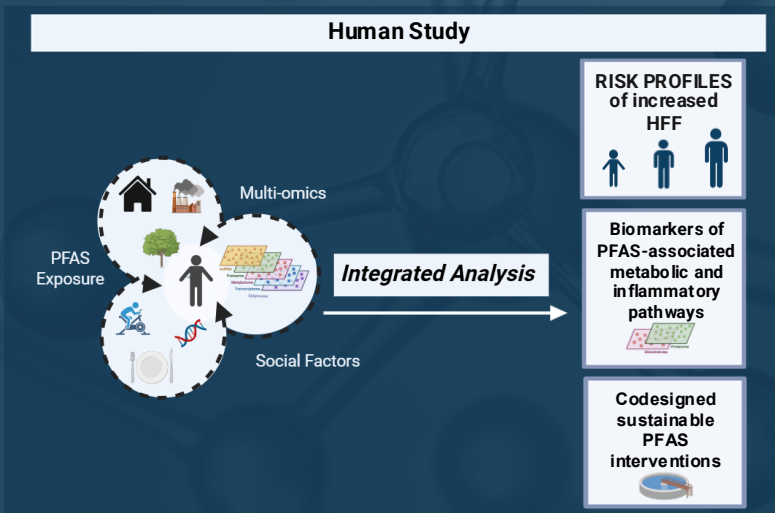


Manuscript in preparation in collaboration with OEHA

# HUMAN STUDY Estimating PFAS health risks in impacted communities

## STUDY DESIGN

## PUBLISHED RESULTS & PRESS



### communications medicine

Article | [Open access](#) | Published: 29 October 2025

#### Translational framework linking perfluoroheptanoic acid (PFHpA) exposure to metabolic dysfunction associated steatotic liver disease in adolescents

[Brittney O. Baumer](#), [Ana C. Maretti-Mira](#), [Douglas I. Walker](#), [Zhenjiang Li](#), [Nikos Stratakis](#), [Hongxu Wang](#), [Yinqi Zhao](#), [Fabian Christoph Fischer](#), [Qiran Jia](#), [Damasikini Valvi](#), [Scott M. Bartell](#), [Jiawen Carmen Chen](#), [Thomas Inge](#), [Justin R. Ryder](#), [Todd Jenkins](#), [Stephanie Sisley](#), [Stavra Xanthakos](#), [David F. Kleiner](#), [Rohit Kohli](#), [Sarah Rock](#), [Sandrah P. Eckel](#), [Michele A. La Merrill](#), [Max M. Aung](#), [Matthew P. Salomon](#), [Rob McConnell](#), [Jesse Goodrich](#), [David V. Conti](#), [Lucy Golden-Mason](#) & [Lida Chatzi](#)

[Show fewer authors](#)

[Communications Medicine](#) 5, Article number: 430 (2025) | [Cite this article](#)

Environmental Research  
Volume 288, Part 2, 1 January 2026, 123220

Associations between per- and polyfluoroalkyl substances and metabolic dysfunction-associated steatotic liver disease in adolescents and young adults: modifying roles of age, lifestyle factors, and PNPLA3 genotype

[Shiwen Li](#), [Jiawen Carmen Chen](#), [Elizabeth Costello](#), [Douglas I. Walker](#), [Jesse A. Goodrich](#), [Lily Dana](#), [Lucy Golden-Mason](#), [Ana C. Maretti-Mira](#), [Scott M. Bartell](#), [Veronica M. Vieira](#), [Tanya L. Alderete](#), [Michael I. Goran](#), [Zhanghuo Chen](#), [Frank D. Gilliland](#), [Brittney O. Baumer](#), [Sarah Rock](#), [Alan Ducatman](#), [Sandrah P. Eckel](#), [David V. Conti](#), [Rob McConnell](#), [Max Aung](#), [Lida Chatzi](#)

### PRESS RELEASE

#### USC Superfund Researchers Identify “Forever Chemical” PFHpA as Risk Factor for Severe Liver Disease in Adolescents

October 29, 2025

### PRESS RELEASE

#### ‘Forever chemicals’ may increase liver disease risk in adolescents by as much as 3-fold

January 06, 2026



**Lida Chatzi, MD, PhD**  
Project 2  
Primary Investigator



**Max Aung, PhD**  
Project 2  
Co-Investigator



pubs.acs.org/est

Critical Review

#### Exposure to Per- and Polyfluoroalkyl Substances and Liver Cancer: A Systematic Review of Animal and Epidemiological Studies

[Roselyn B. Tanghal](#), [Emily Beglarian](#), [Arthur Stem](#), [Max Aung](#), [Tanya L. Alderete](#), [Alan Ducatman](#), [Vasilis Vasiliou](#), [Rob McConnell](#), [David Conti](#), and [Lida Chatzi](#)

### Journal of Exposure Science & Environmental Epidemiology

Article | [Open access](#) | Published: 09 January 2025

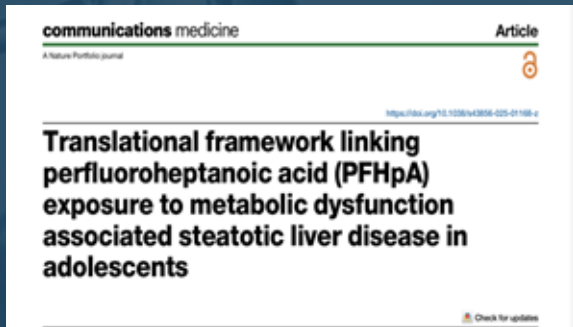
#### Associations between per- and polyfluoroalkyl substances (PFAS) and county-level cancer incidence between 2016 and 2021 and incident cancer burden attributable to PFAS in drinking water in the United States

[Shiwen Li](#), [Paulina Olyga](#), [Lu Zhang](#), [Jesse A. Goodrich](#), [Rob McConnell](#), [David V. Conti](#), [Lida Chatzi](#) & [Max Aung](#)

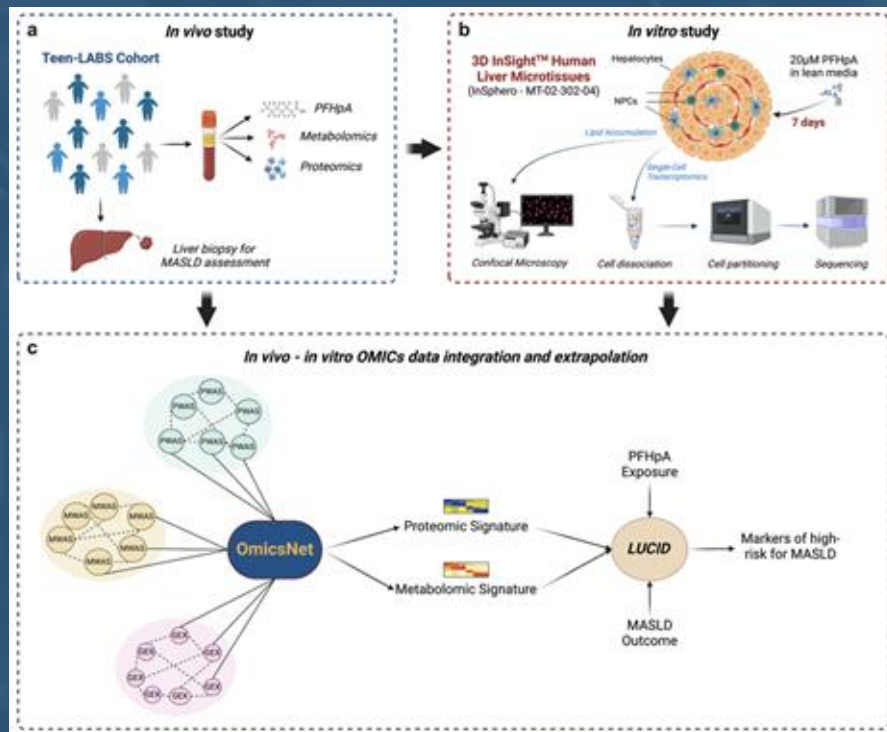
# EXAMPLE OF TRANSLATIONAL FRAMEWORK: Integrating Multi-Omics with PFAS Data for Precision Liver Medicine




Brittney Baumert, PhD  
Postdoctoral Scholar  
USC Keck School of Medicine



## STUDY DESIGN

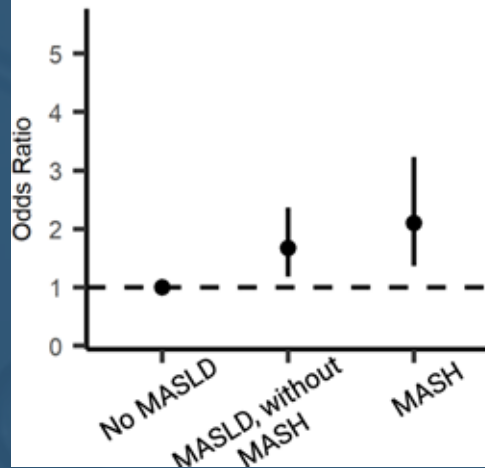


# EXAMPLE OF TRANSLATIONAL FRAMEWORK Human Study

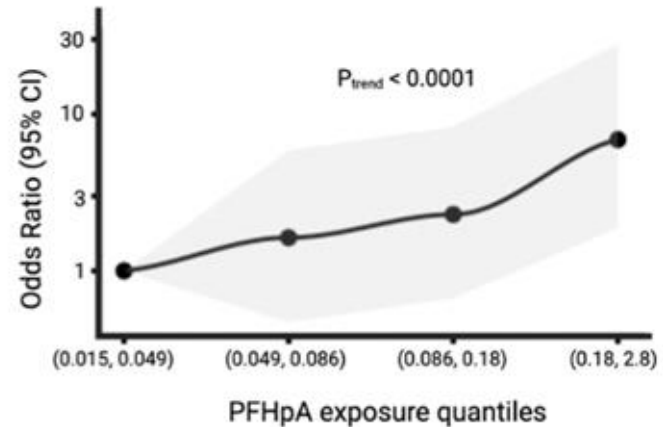
 The Teen-Longitudinal Assessment of Bariatric Surgery (LABS) study (n= 186)

- Age: 17.1 years
- Sex: female (76.3%)
- Race: white (72.0%)
- Parental income: ≤ \$75k (77.4%)

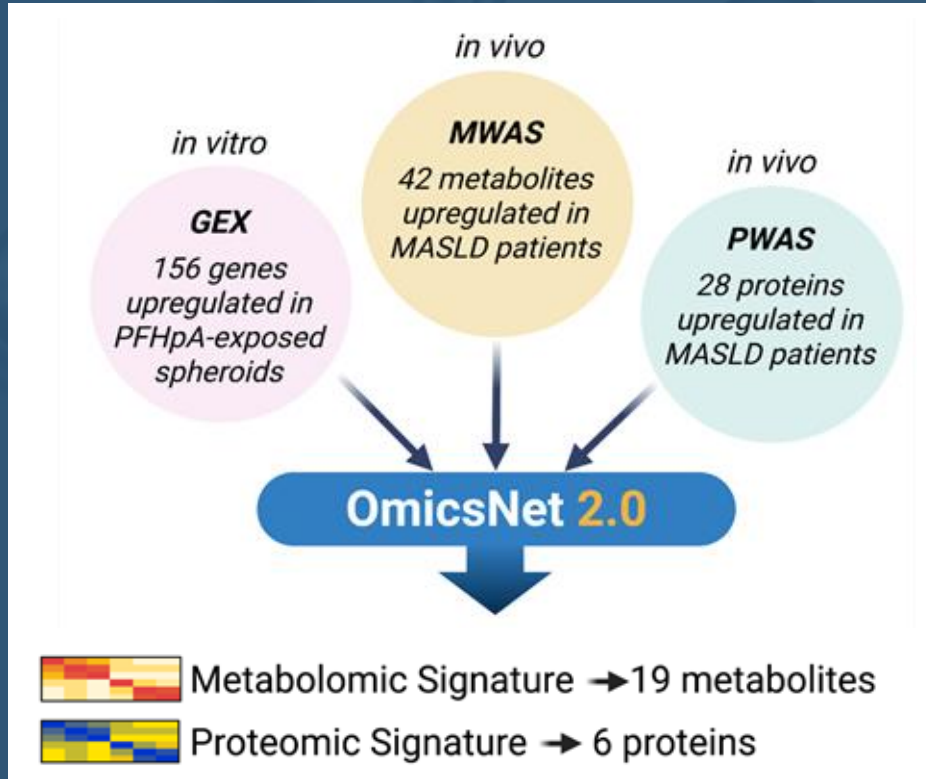
**a** The association of plasma-PFHpA with MASLD severity



**b** PFHpA concentration dependent-response relationship with MASLD



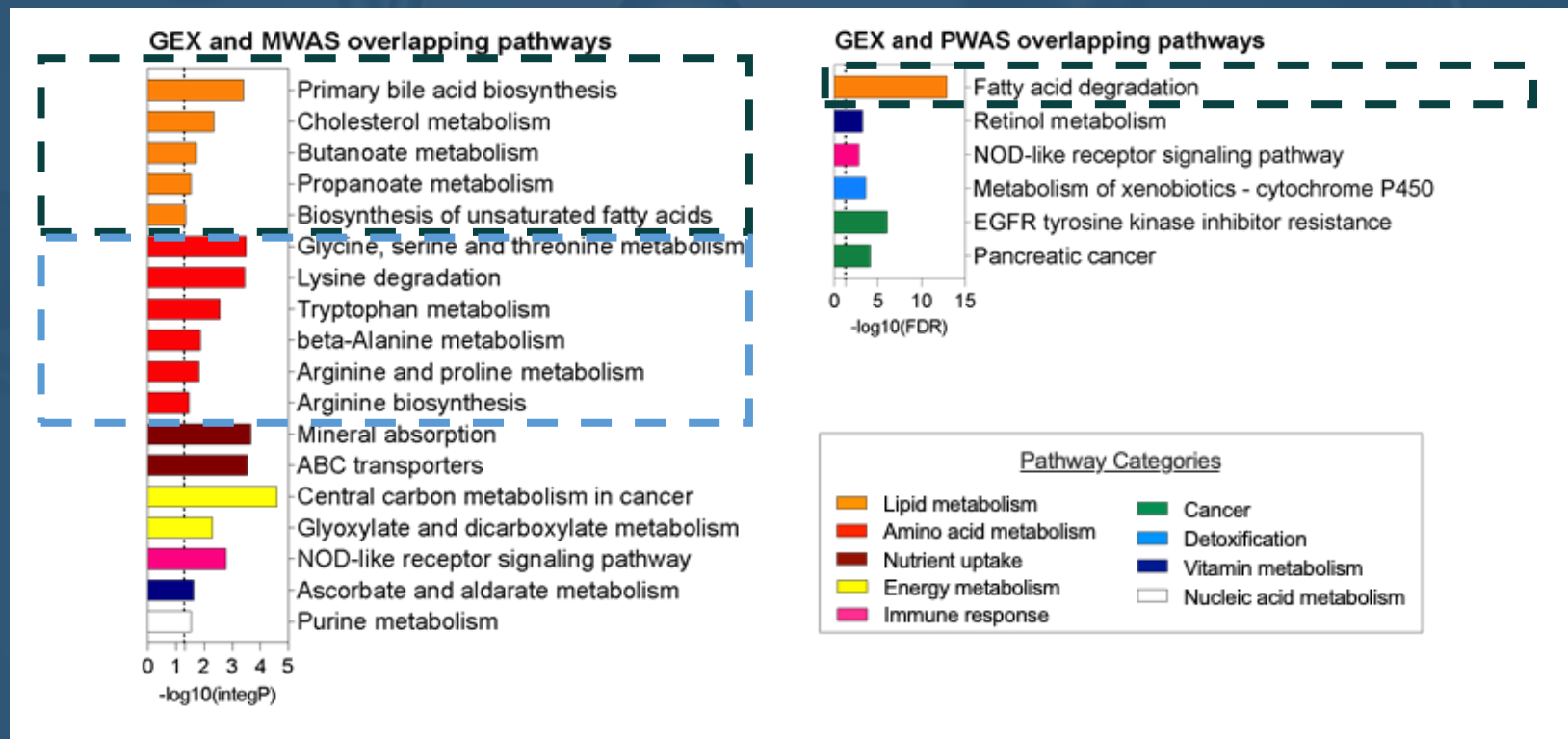
# EXAMPLE OF TRANSLATIONAL FRAMEWORK Statistical Methods



**Integrative multi-omics across in vitro (organoids) and human studies to identify molecular signatures of PFAS exposures**

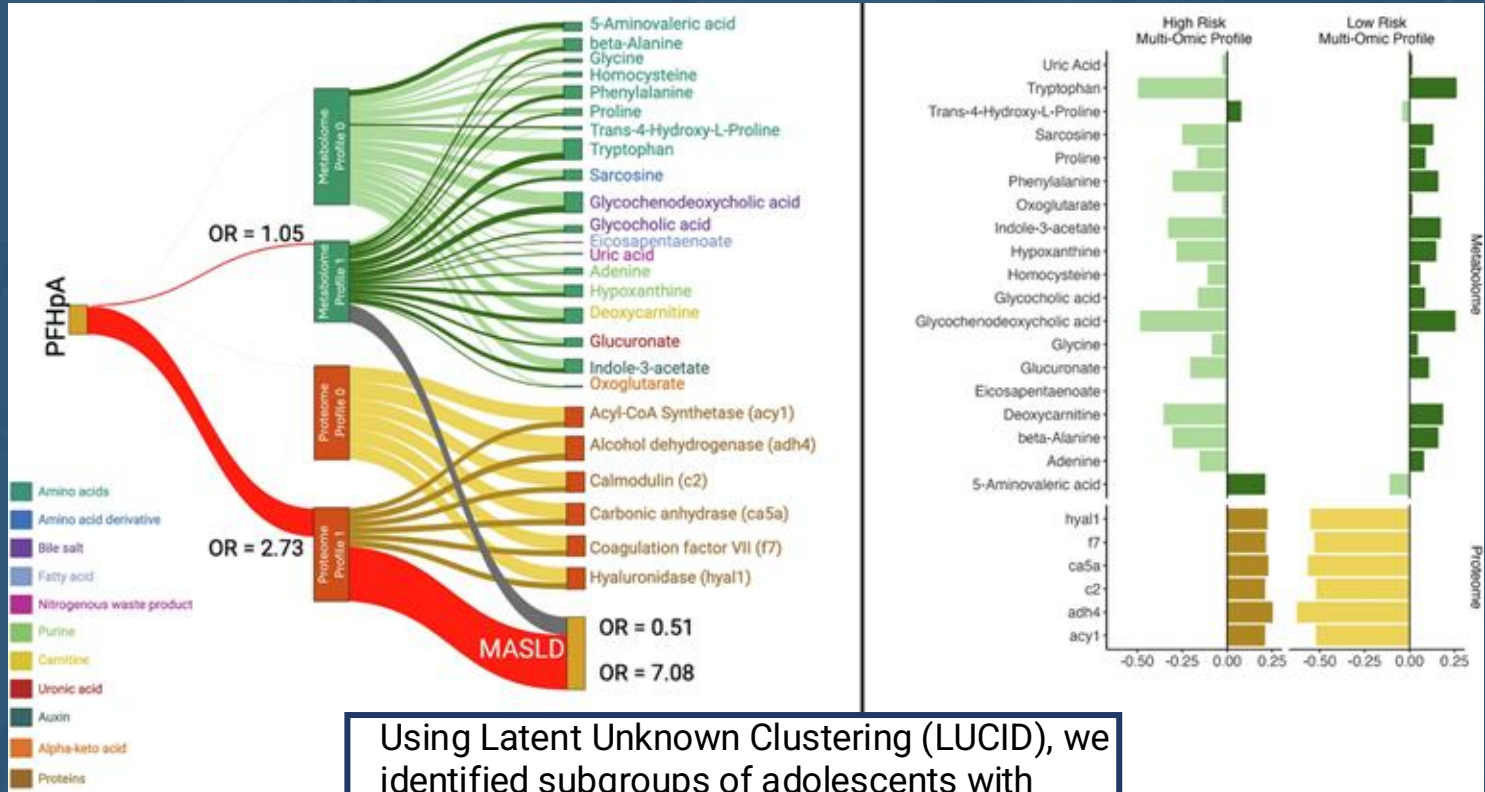
# EXAMPLE OF TRANSLATIONAL FRAMEWORK Results

## Overlapping Pathways from PFHpA Exposed Organoids and the Human Study



# EXAMPLE OF TRANSLATIONAL FRAMEWORK: Precision Liver Medicine

Multi-omics integration of PFAS and multi-omics identified a subgroup of adolescents at high risk for MASLD



Using Latent Unknown Clustering (LUCID), we identified subgroups of adolescents with increased risk of MASLD

# HUMAN STUDY PFHpA Exposure and MASLD Risk in a Large-Scale Historic Cohort

## STUDY DESIGN



Roselyn B. Tanghal, MPH  
PhD Candidate  
USC Keck School of Medicine



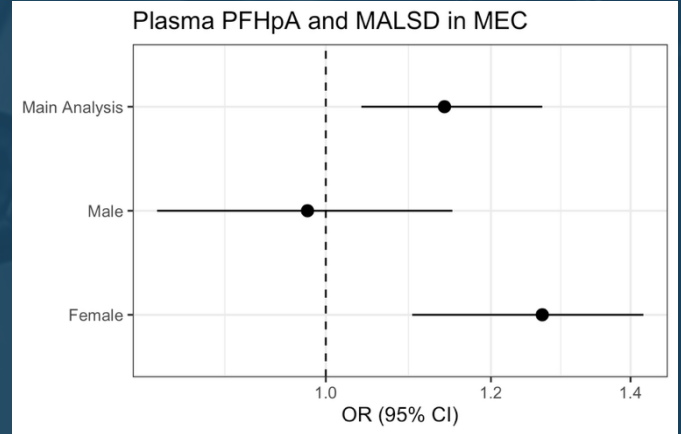
### The Multitethnic Cohort (MEC) (n=2,012)

- Age = 55.5 years
- Sex = female (61.2%) and male (38.3%)
- Race = Japanese American (63.7%), Latino (14.3%), Native Hawaiian (7.2%), African American (3.9%), White (10.9%)



- PFAS measured in pre-diagnostic blood samples
- MASLD cases identified through healthcare claims
- Cases: 1,006
- Controls: 1,006

## PRELIMINARY RESULTS



# HUMAN STUDY PFHpA Exposure and MASLD Risk in an Elderly Population

## STUDY DESIGN



**Border Health Research Cohort (BHRC);**  
formerly Cameron County Hispanic Cohort (CCHC)

- n = 108
- Age = 61 years (range: 50-74)
- Sex = female (74%) and male (26%)
- Race = All Hispanic/Latino



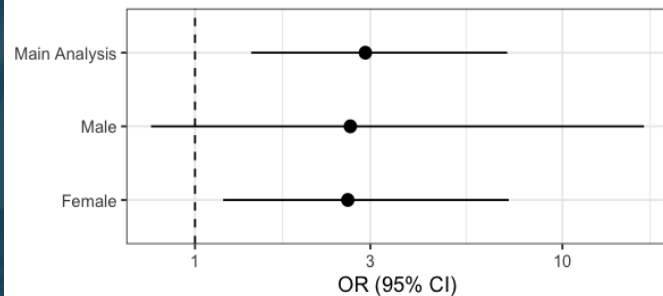
**Yerin Jung, PhD**  
Postdoctoral Scholar  
USC Keck School of Medicine



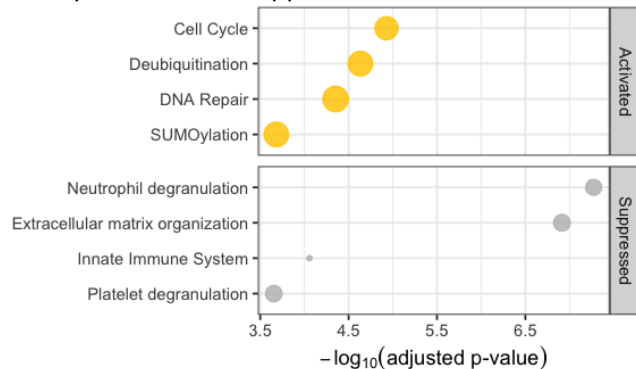
- Plasma PFAS collected at the same clinical visit for MASLD
- MASLD cases confirmed through FibroScan measurements
- MASLD prevalence: 72%

## PRELIMINARY RESULTS

### Plasma PFHpA and MASLD in BHRC



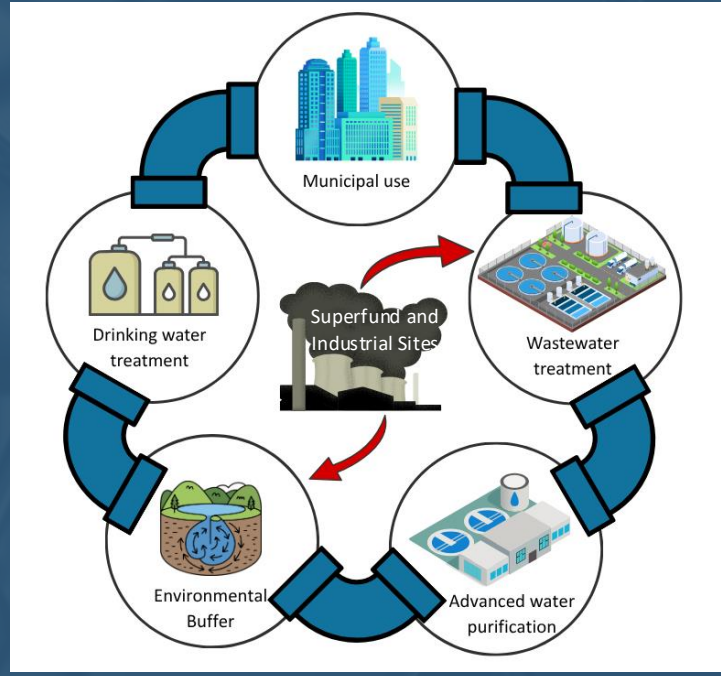
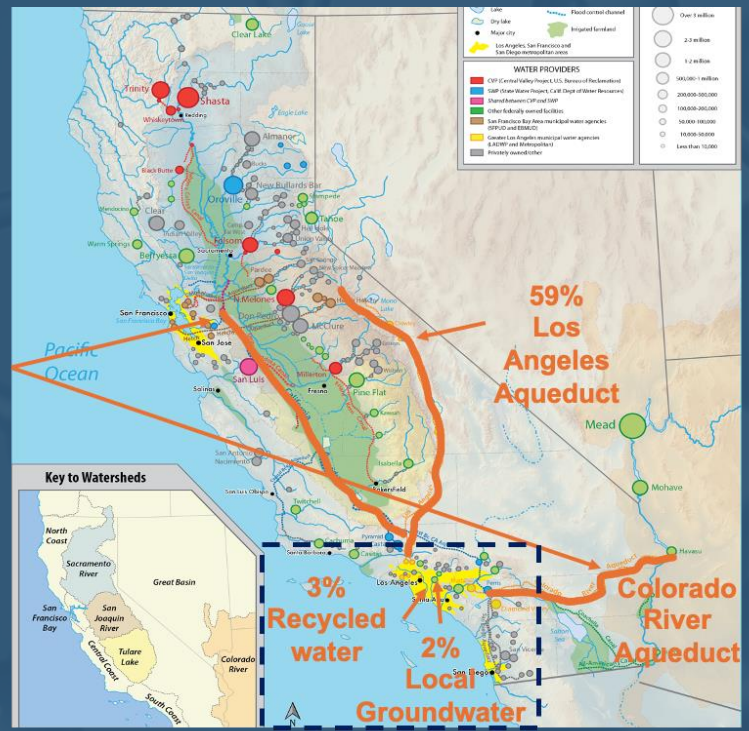
### Proteomic pathways: PFHpA-related hepatocyte dysfunction and suppressed immune function



|NES| • 1.50 • 1.75 • 2.00 • 2.25

# PROJECTS 3 & 4 Water reuse is a key solution amid worsening long-term drought

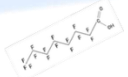
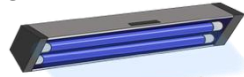
36%  
State Water  
Project &  
Colorado  
River  
Aqueduct





# PROJECT 4 PFAS remediation via biological and UV/chemical methods

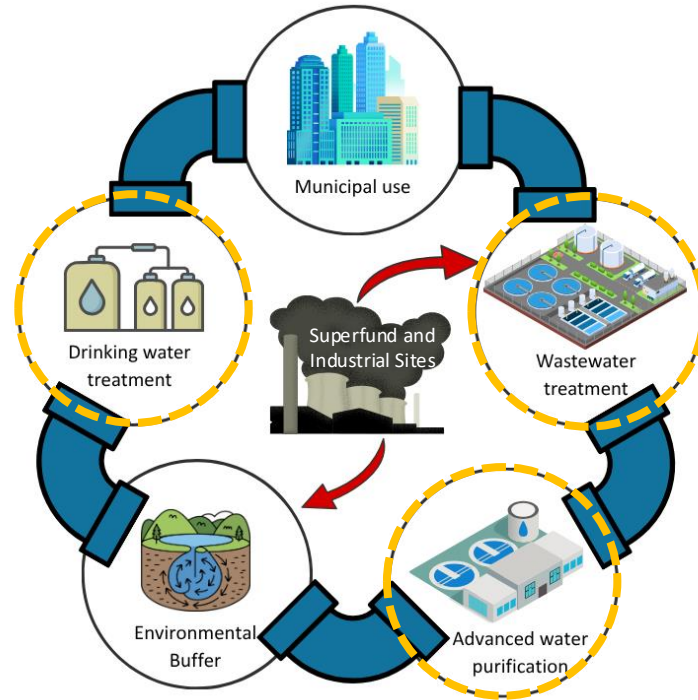
## AIM 2: UV/Chemical destruction of PFAS



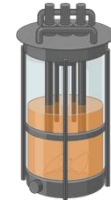
Dan McCurry  
PI



Amy Childress  
Co-PI



## AIM 1: Bioremediation of PFAS



Adam Smith  
Co-PI

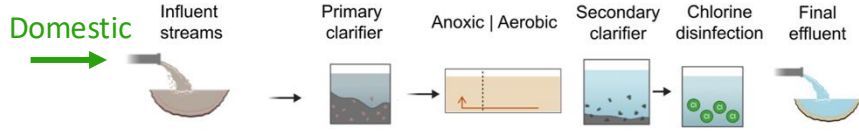


Amy Childress  
Co-PI

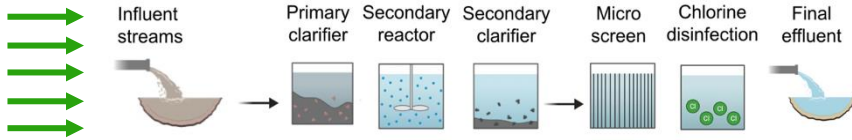
# PROJECT 3

Robust assessment of PFAS behavior in water reclamation facilities (WRFs) is needed

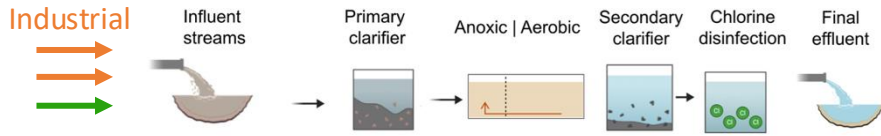
## 1 Modified Ludzack-Ettinger + Tertiary



## 2 High Purity Oxygen Activated Sludge + Tertiary



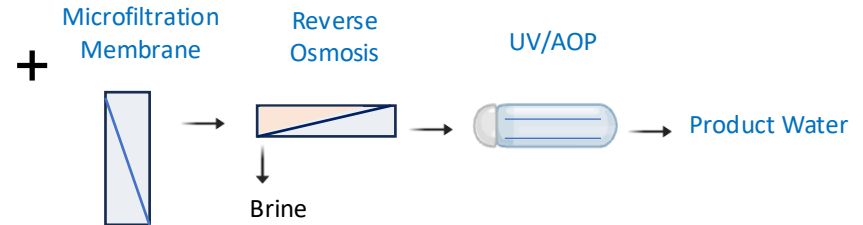
## 3 Modified Ludzack-Ettinger + Advanced Water Purification



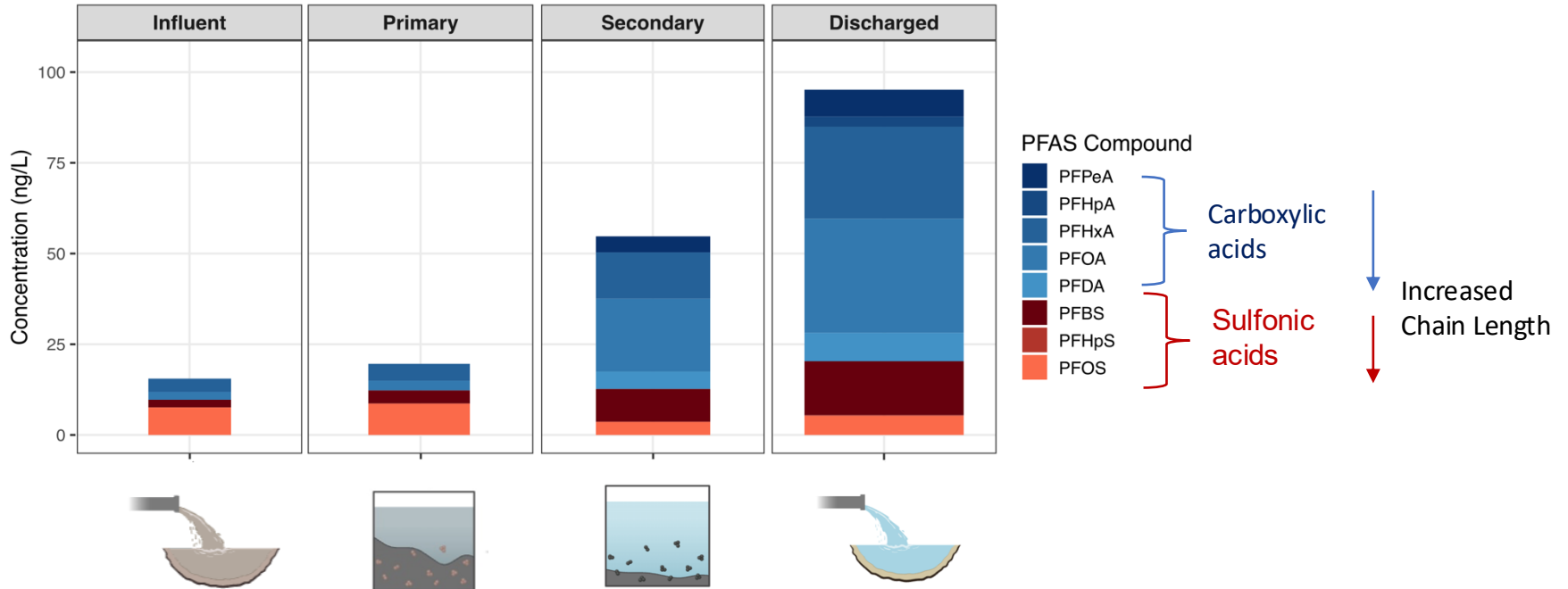
## Three Sampling Events



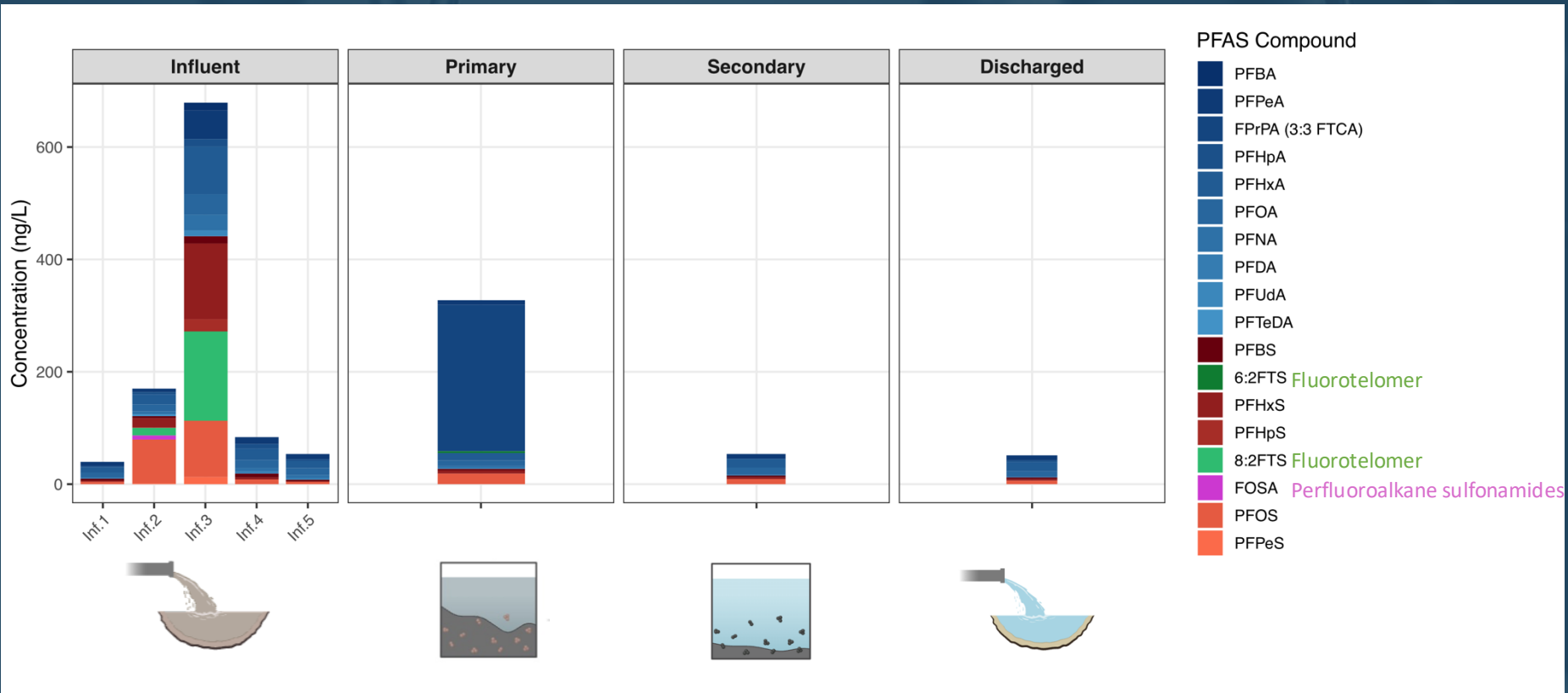
## Samples



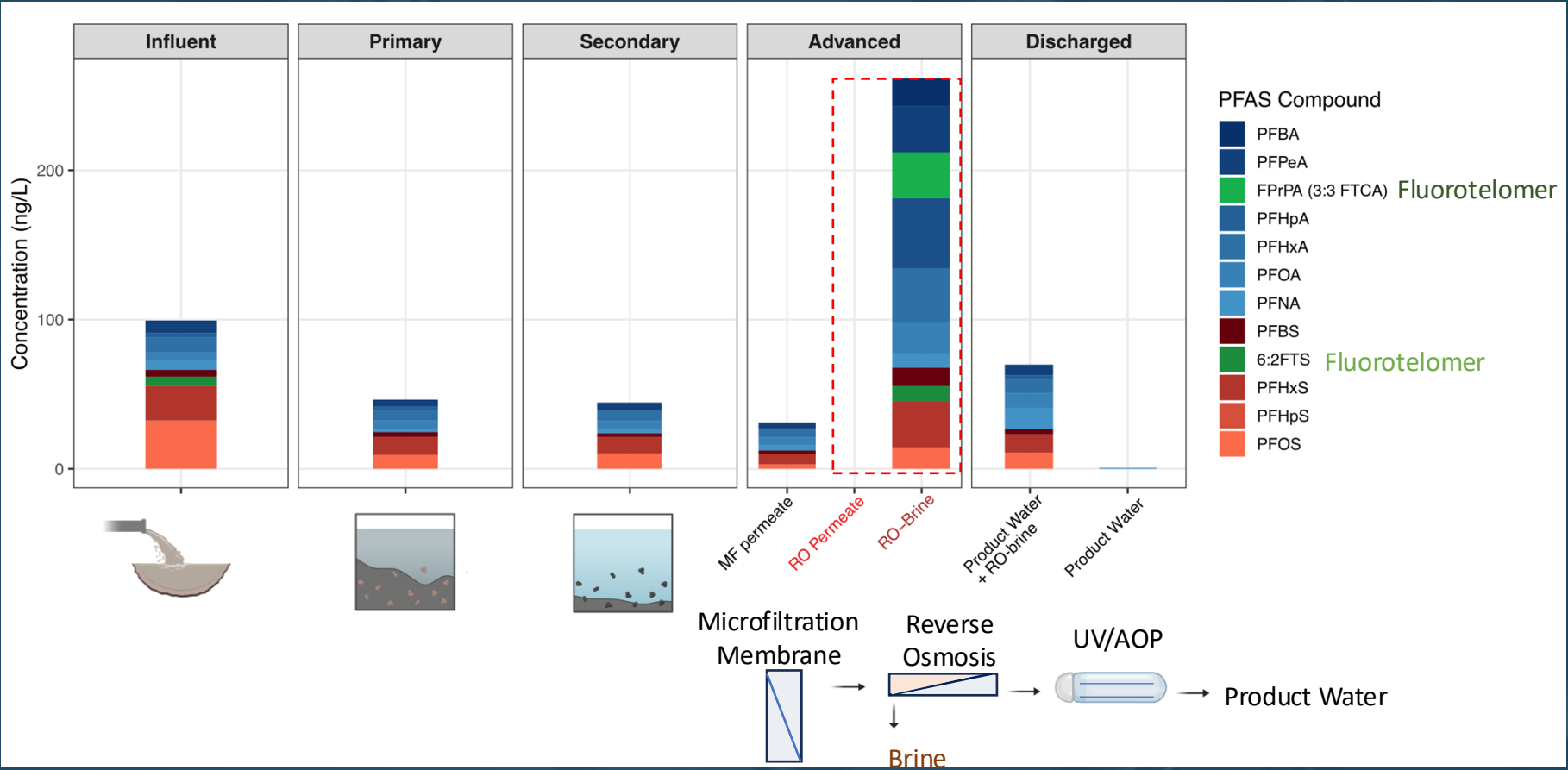
# Predominantly observed PFCA and significant increase across treatment at WRF 1



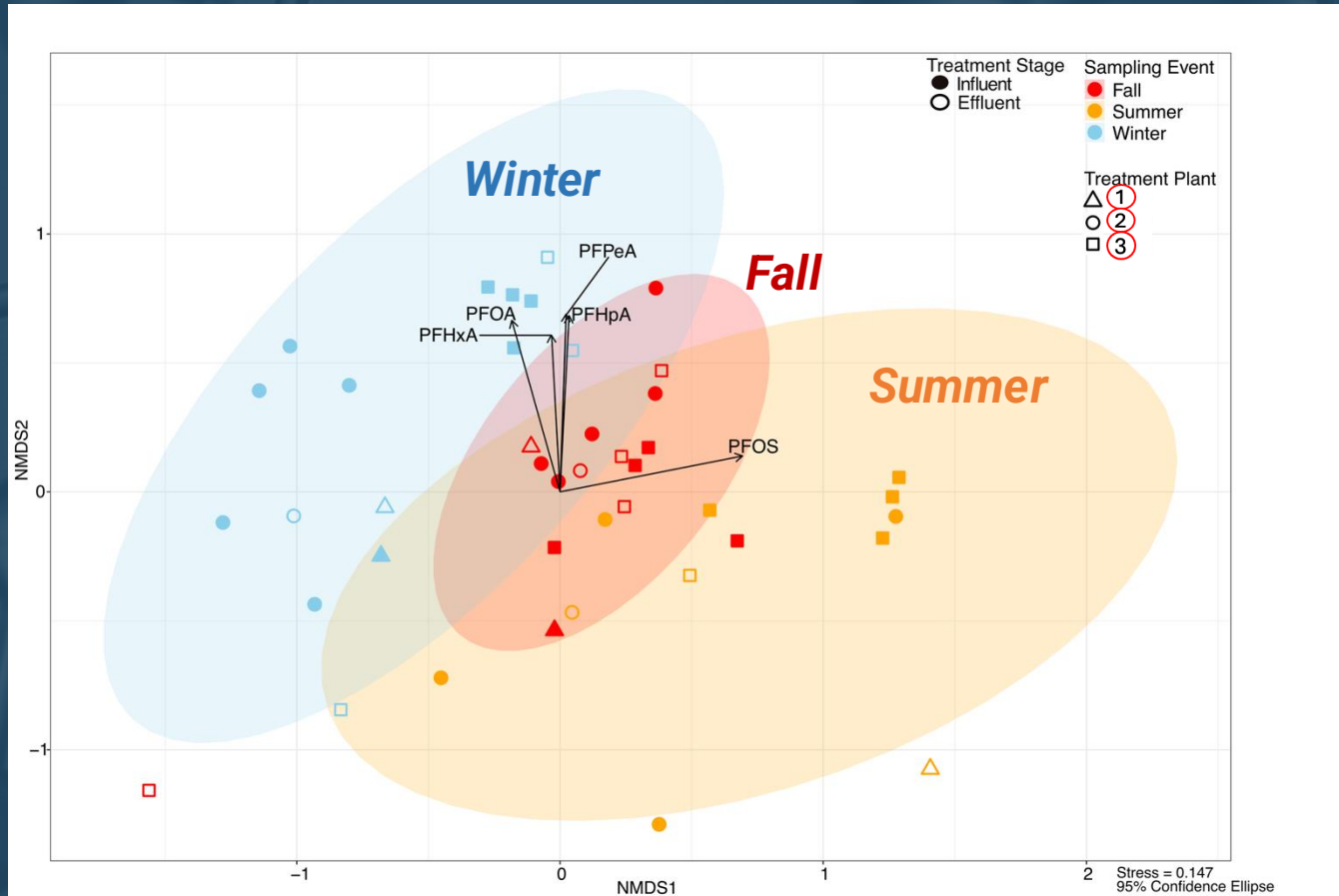
# Sub-sewershed variability reflects importance of source tracking PFAS at **WRF 2**



# High variability in influent streams and higher proportion of PFSA's; Substantial PFAS removal by reverse osmosis at **WRF 3**



# Temporal clustering observed across the different treatment trains

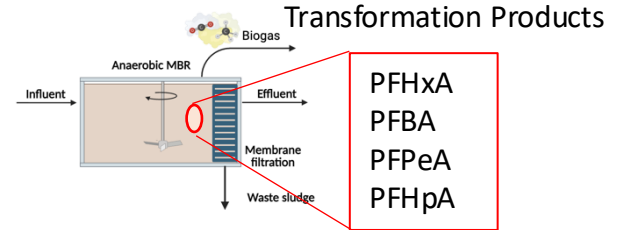


**Project 4** Ongoing work is investigating PFAS bioremediation in next-generation bioprocesses for water reclamation



PFOA : **100** ug/L

6:2 FTOH : **100** ug/L



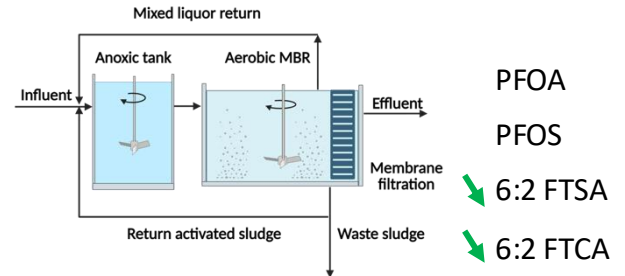
*Anaerobic Membrane Bioreactor*

PFOA : **1** ug/L

PFOS : **1** ug/L

6:2 FTSA : **1** ug/L

6:2 FTCA : **1** ug/L



*Anoxic/Aerobic Membrane Bioreactor*

# Science Translation and Engagement

Incorporation of  
Community Feedback

Disseminate science  
communication materials  
at community events



Hosted promotora  
workshops on PFAS  
exposures and health risks

PFAS Knowledge  
Generation Sessions

Community Outreach



NW2C  
Native Ways 2 College

Community Engagement Core



Max Aung, PhD,  
MPH  
CEC Director



Lourdes Baezconde-  
Garbanati, PhD, MPH  
(co-I)



Yaneth Rodriguez, MPH  
Strategic Initiatives  
Coordinator

# Science Translation and Engagement



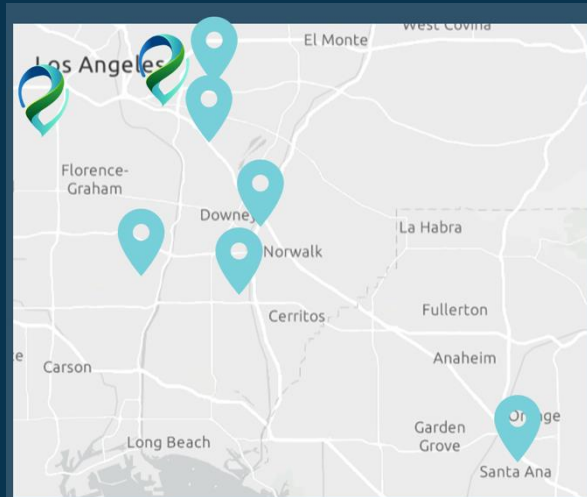
## PFAS Youth Engagement Workshops



Tamar Galindo



Venezia Ramirez



### 1 PFAS CONTAMINATION AND WATER QUALITY

Youth explored where PFAS comes from, how it contaminates our water, and the impact on our communities in East and Southeast LA.



SOURCES



WATER QUALITY

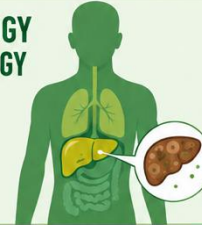


COMMUNITY IMPACT



### 2 PFAS TOXICOLOGY AND EPIDEMIOLOGY

Youth learned how PFAS affects our health and how researchers study these impacts in our communities.



HEALTH EFFECTS  
What PFAS can do to our bodies



LIVER TOXICITY OUTCOMES  
How PFAS can impact liver health and function



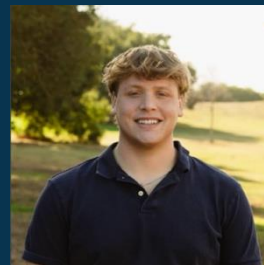
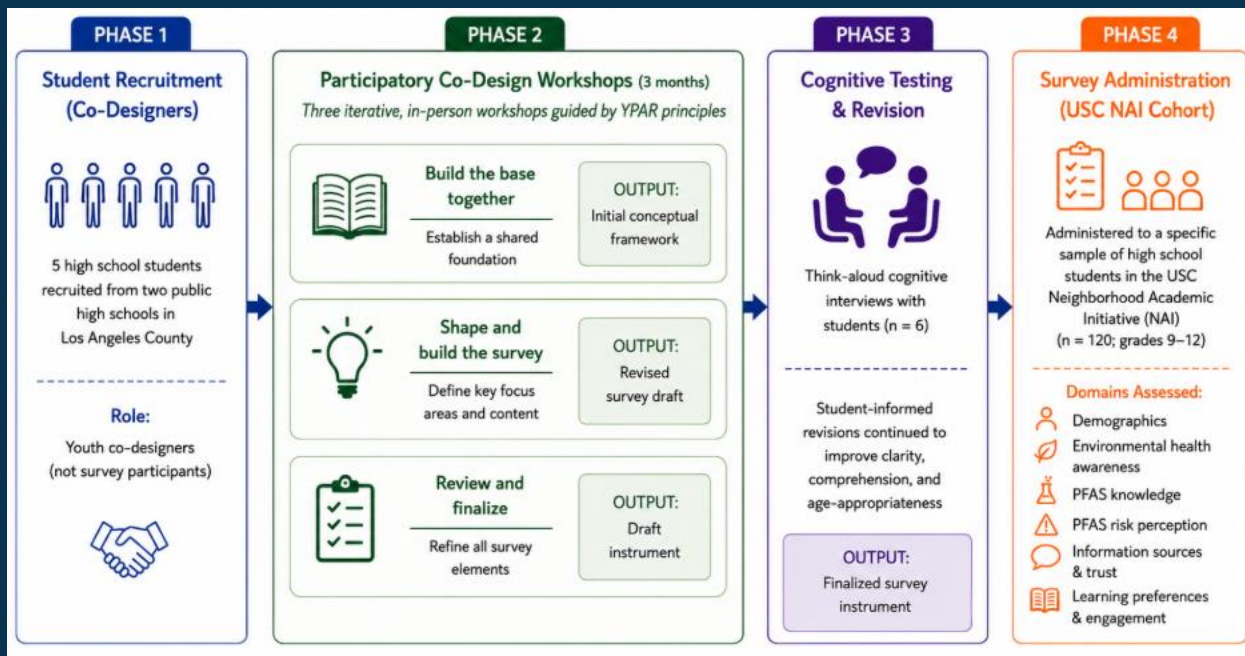
EPIDEMIOLOGY  
How researchers study patterns in communities

### 3 MULTI-SECTOR PARTNERS WORKING ON PFAS

Youth connected with organizations across sectors working together to reduce PFAS pollution and build a healthier future.



## Student Health and Awareness for PFAS and the Environment (SHAPE)



Nico Gentile

# Science Translation and Engagement



State of California  
Office of the Attorney General

**ROB BONTA**  
ATTORNEY GENERAL

October 17, 2023

To: Manufacturers, Distributors, and Sellers of Food Packaging and Cookware

RE: **Assembly Bill 1200 – Hazardous Chemicals in Food Packaging and Cookware**

I am issuing this enforcement advisory letter to inform manufacturers, distributors, and sellers of food packaging and cookware of new requirements established under California Assembly Bill 1200 (2021) ("A.B. 1200"), codified in Health and Safety Code sections 109000 through 109014. As the chief law enforcement officer of the State of California, I have broad authority to enforce California's statutes, including A.B. 1200.

A.B. 1200 restricts the distribution or sale of food packaging that contains "regulated perfluoroalkyl and polyfluoroalkyl substances or PFAS" ("regulated PFAS") and sets forth disclosure and labelling requirements for manufacturers of cookware. Failure to comply with A.B. 1200's requirements may constitute a violation of California's Unfair Competition Law, Business and Professions Code section 17200 ("UCL"), Business and Professions Code section 17500, and other applicable laws. Accordingly, the California Attorney General's Office may bring an enforcement action for a failure to comply with A.B. 1200, seeking civil penalties, restitution, and injunctive relief, and can pursue criminal liability. (See e.g., Bus. & Prof. Code, §§ 17203, 17206, 17500.) The text of A.B. 1200 can be found at: [https://leginfo.ca.gov/fares/billNavClient.shtml?bill\\_id=202120220AB1200](https://leginfo.ca.gov/fares/billNavClient.shtml?bill_id=202120220AB1200).



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**JOEL TORREZ, JR., MS**

Public Health and Environmental Health Specialist  
Chair & Head of the Harbor Area Protocol

Joel Torrez is a public health and environmental health leader with 18 years of professional experience working in the California State Senate, AltaMed Health Services Corporation, Coalition of Orange County Community Health Centers, L.A. Care Health Plan, and Organized Health Solutions. Torrez served as the Executive Director of Plenum Health, where he integrated artificial intelligence data into health information systems. Most recently, Joel served with the County of Los Angeles Board of Supervisors, providing executive-level leadership on multi-jurisdictional environmental and public health initiatives, managing complex programs, and supporting legislation rooted in environment health and community health. Torrez holds a Master of Science in Healthcare Management from California State University and a Bachelor of Science in Human Services from California State University, Fullerton.



**PAULA TORRADO PLAZAS, MPH**

Program Director at Office of Environmental Health Impact Assessment

Paula Torrado Plazas serves in the State of California's Office of Environmental Health Hazard Assessment (OEHHA) as the Program Director for Environmental Health Education, Community Engagement, and Cumulative Impacts. Paula has over 8 years of experience in public health and community science. Before being a part of OEHHA, Paula worked at Physicians for Social Responsibility - Los Angeles Health and Environment, where she operated as a project manager with extensive expertise in health science education translation, advocacy, policy advancement, and air monitoring. Paula received her Master of Public Health at Johns Hopkins University Bloomberg School of Public Health, where she was awarded the Bloomberg American Health Initiative Fellowship.



**DAHSHISH SHAMS, MPH**

Dr. Environmental Scientist at California Department of Toxic Substances Control

Dahhish Shams is a Senior Environmental Scientist (Supervisor) in the Safer Consumer Products Program at the California Department of Toxic Substances Control (DTSC). In this role, he leads efforts to connect science, policy, and public engagement. Dahhish works closely with researchers, community organizations, industry, government partners, and the public to advance and expand awareness of California's Safer Consumer Products Program. Through this work, he supports the Program's mission to promote the design, development, and use of products that are chemically safer for people and the environment. Prior to joining DTSC, Dahhish worked in the U.S. Environmental Protection Agency's Office of Research and Development, supporting the evaluation of chemicals found in the environment. He holds undergraduate degrees from the University of California, Irvine, and a Master in Public Health from George Washington University.

**TUESDAY, MARCH 31, 2026**  
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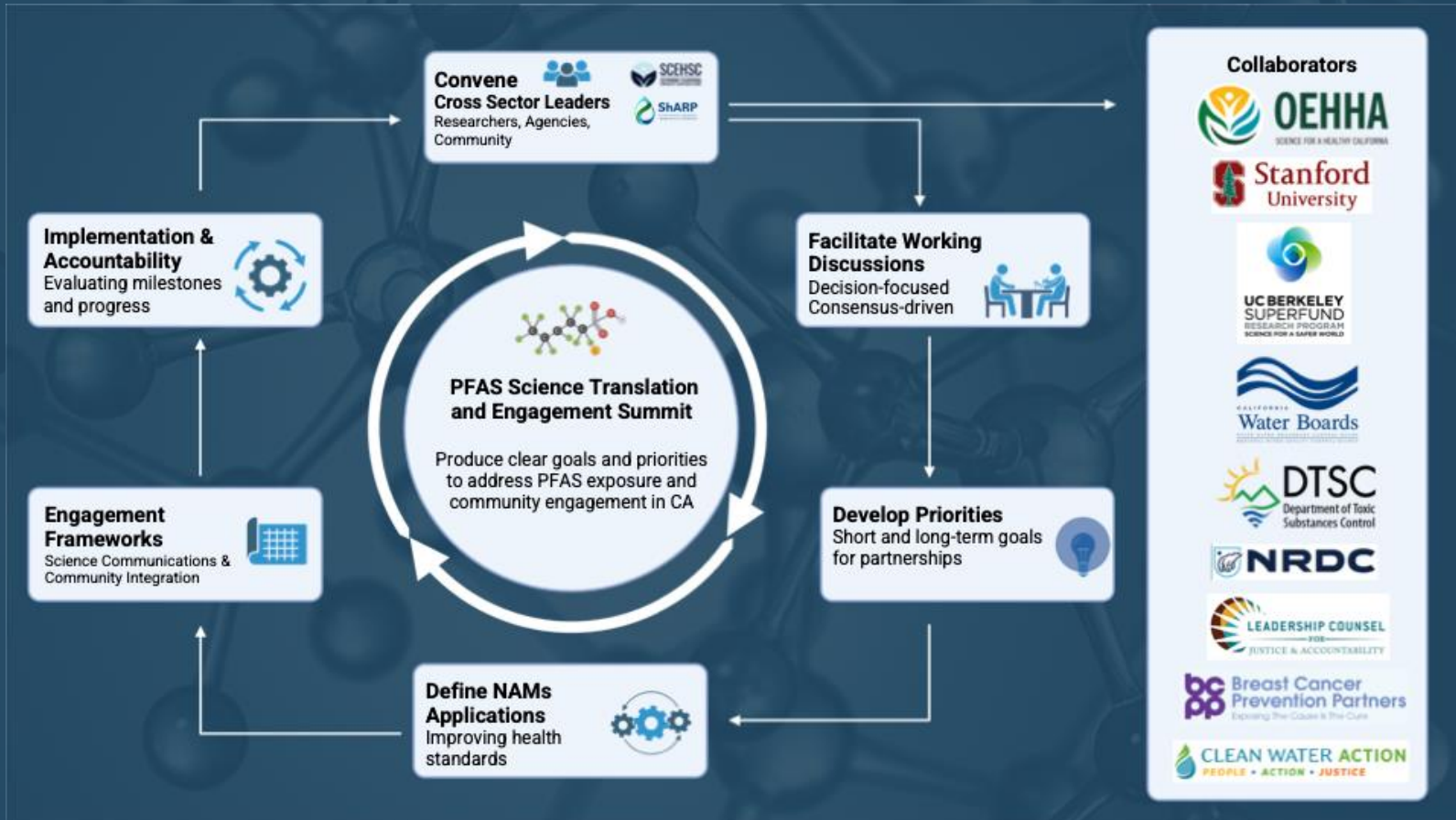


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# Science Translation and Engagement



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