SOUTHERN CALIFORNIA

Superfund Research and Training Program

FOR PFAS ASSESSMENT, REMEDIATION, AND PREVENTION

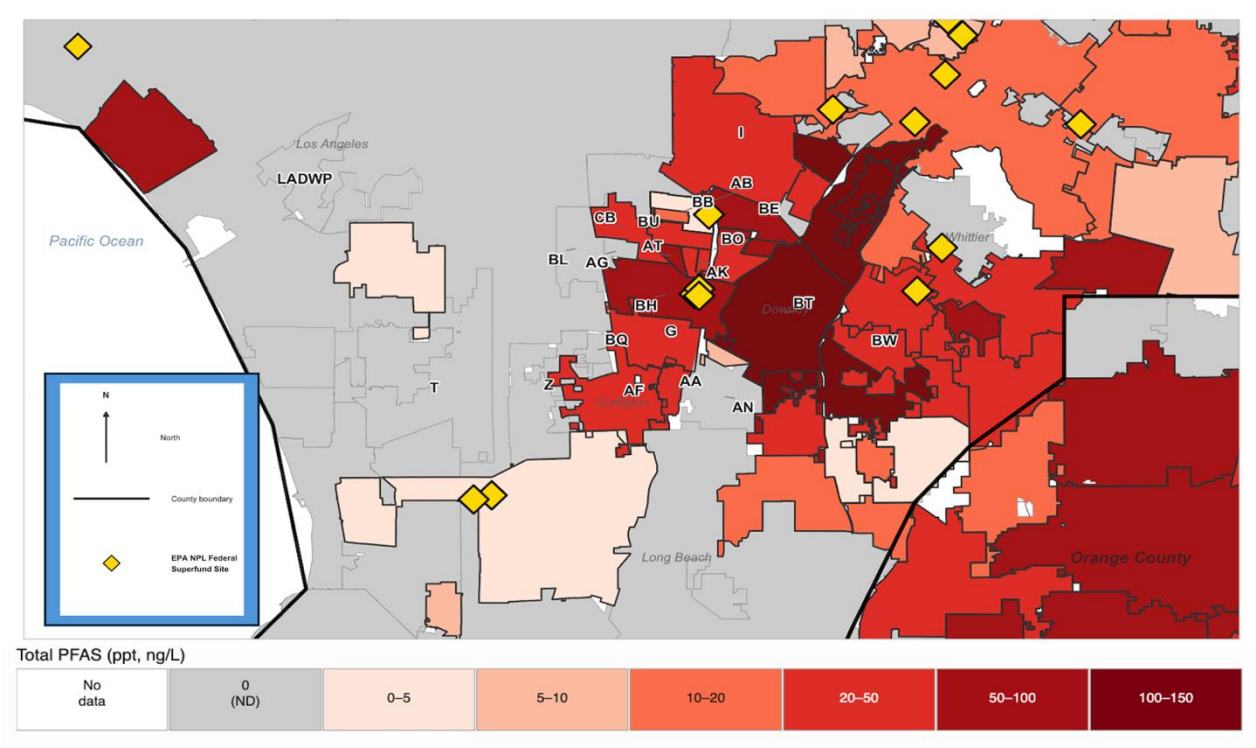
Lida Chatzi, MD, PhD
Director, ShARP Center
USC Keck School of Medicine
Keck School of Medicine of USC

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.

ShARP
SUPERFUND PFAS ASSESSMENT, REMEDIATION & PREVENTION

What is the problem in SoCal ?



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

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

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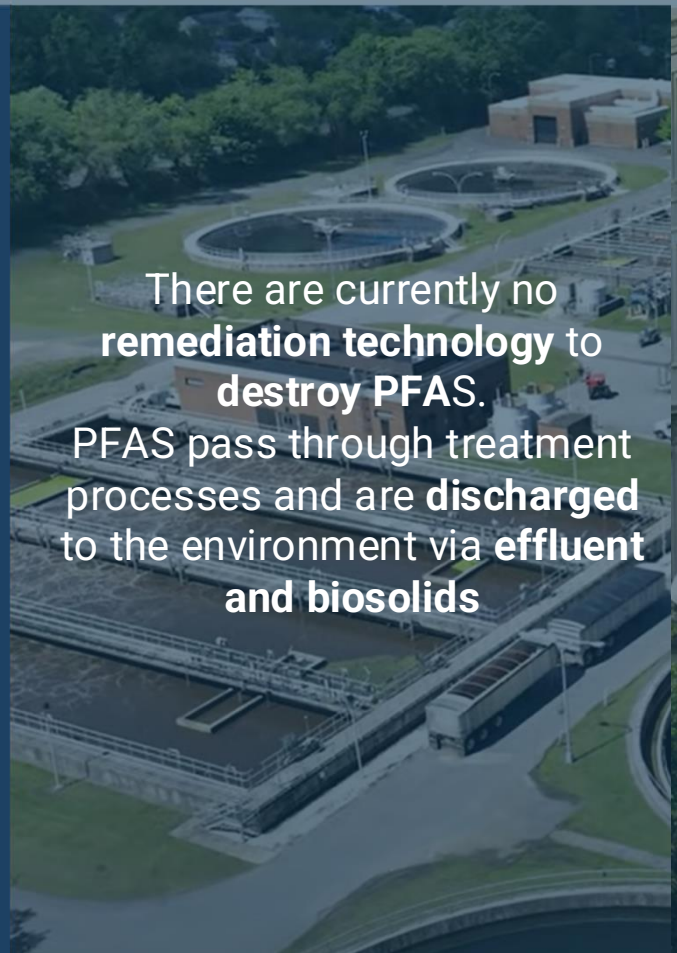
HUMAN HEALTH RISKS

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

REMEDIATION TECHNOLOGY

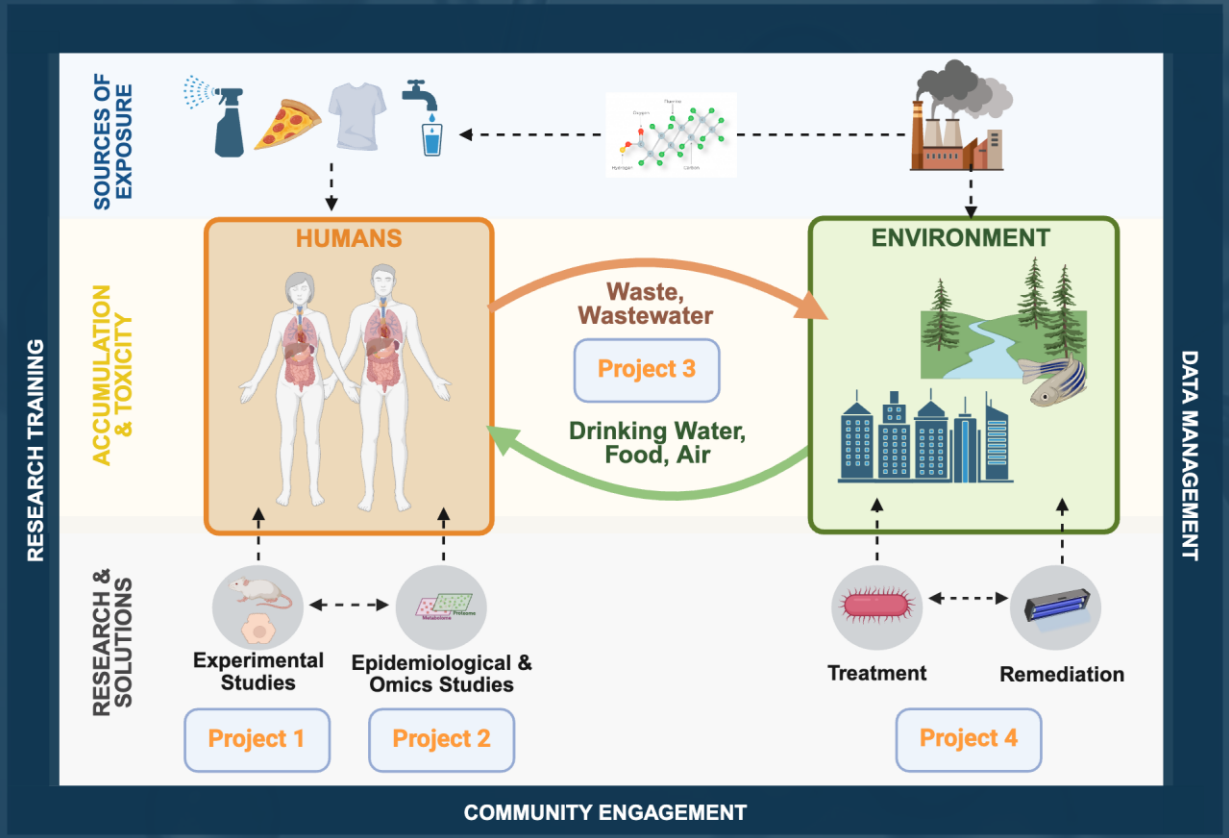


There are currently no **remediation technology** to **destroy PFA**S.
PFAS pass through treatment processes and are **discharged** to the environment via **effluent and biosolids**

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



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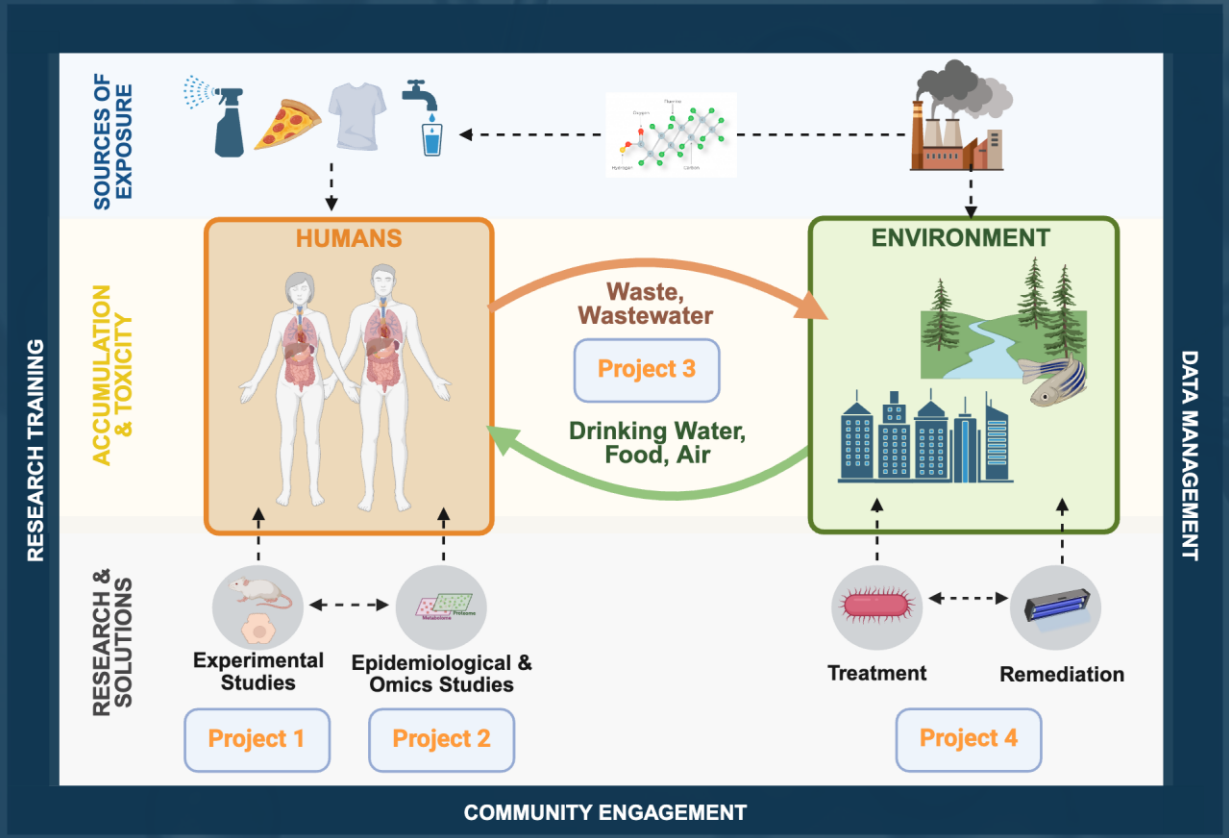
Our Research Approach

Solutions and Innovation



- **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
SUPERFUND PFAS ASSESSMENT, REMEDIATION & PREVENTION

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

Max Aung, PhD
Project 2
Co-Investigator

Frank Gilliland, PhD
Project 2
Co-Investigator

Veronica Vieira, DSc
Project 2
Co-Investigator

Sherlock Li, PhD
Project 2
Post-Doctoral Trainee

Scott Bartell, MS, PhD
Project 2
Co-Investigator

Engineering Projects

Project 3

Adam Smith, PhD
Project 3
Primary Investigator

Adam Simpson, PhD
Project 3
Co-Investigator

Felipe De Barros, PhD
Project 3
Co-Investigator

Jiachen Zhang, PhD
Project 3
Co-Investigator

Project 4

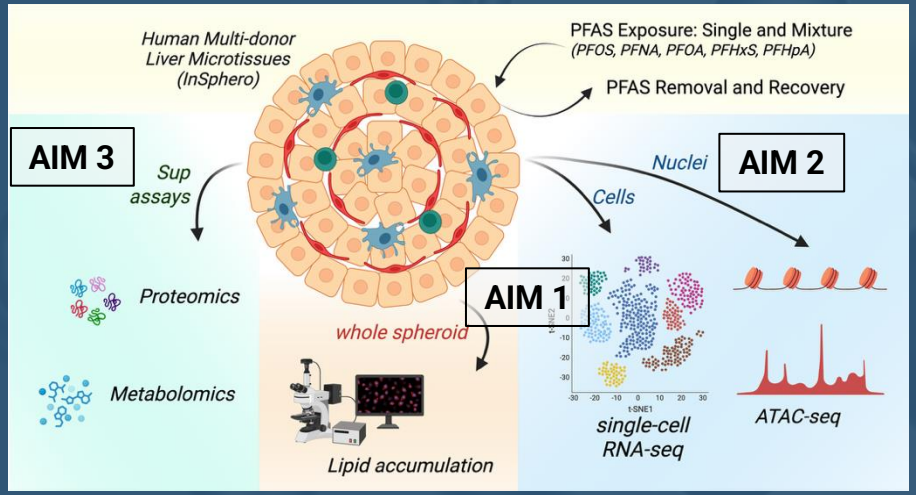
Daniel McCurry, PhD
Project 4
Primary Investigator

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



Lucy Golden, PhD
Project 1
PI

Ana Maretti-Mira, PhD
Project 1
Co-I

Matthew Salomon, PhD
Project 1 and DMAC
Co-I

PUBLISHED RESULTS & PRESS

Environment International 203 (2025) 109763

Contents lists available at ScienceDirect

Environment International

journal homepage: 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 [a,1], Matthew P. Salomon [b,1], Chikako Matsuba [a], Yufen Wang [a], Veronica Wendy Setiawan [c], Lida Chatzi [c], Ana C. Maretti-Mira [a,*]

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

September 10, 2025 | EurekAlert! ↗

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

February 9, 2026 | CHEM Trust ↗

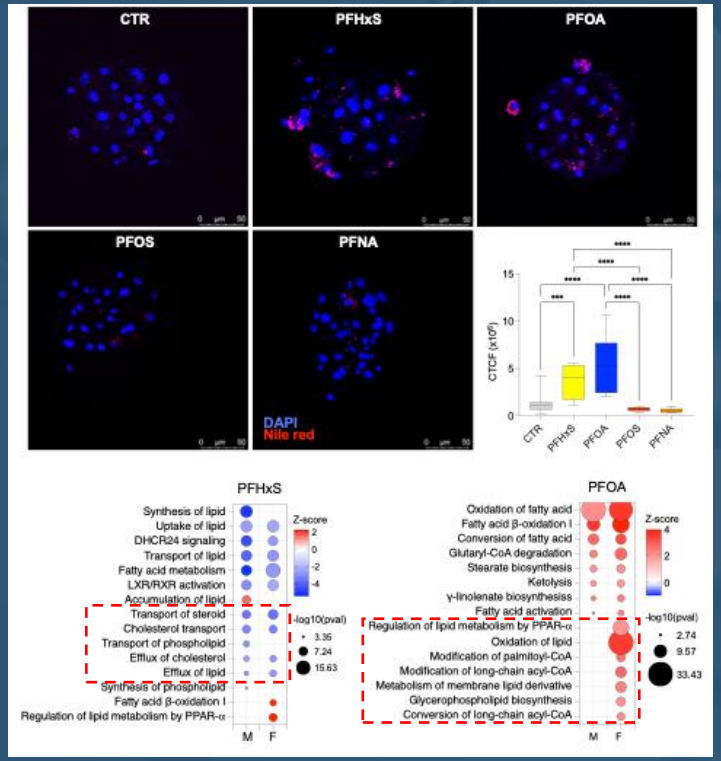
Study details how 'forever chemicals' disrupt liver function

September 11, 2025 | TheHill.com ↗

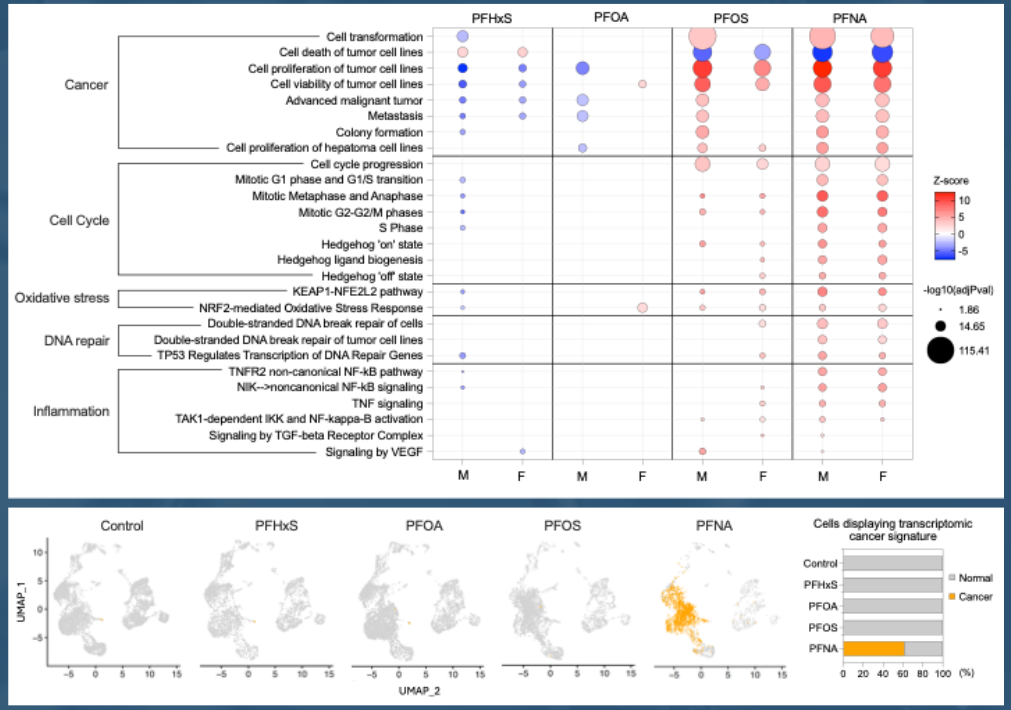
EXPERIMENTAL STUDY Effects of single PFAS exposure

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

PFOA and PFHxS: Steatogenic Effect



PFOS and PFNA: Pro-oncogenic Effect



Golden-Mason & Salomon et al. Environment International 2025

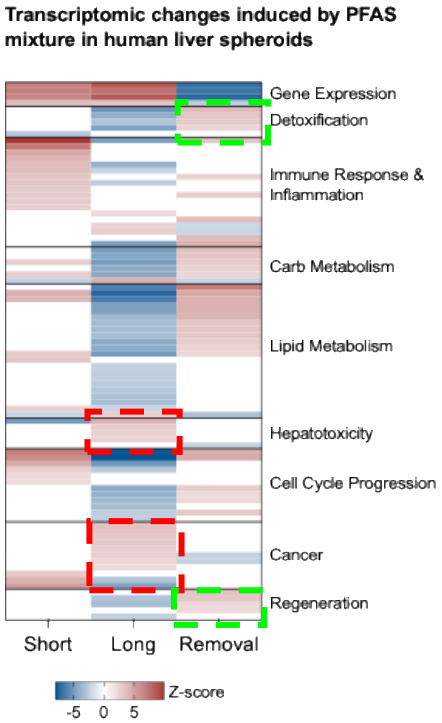
PRELIMINARY RESULTS Effects of PFAS Mixtures and PFAS Removal

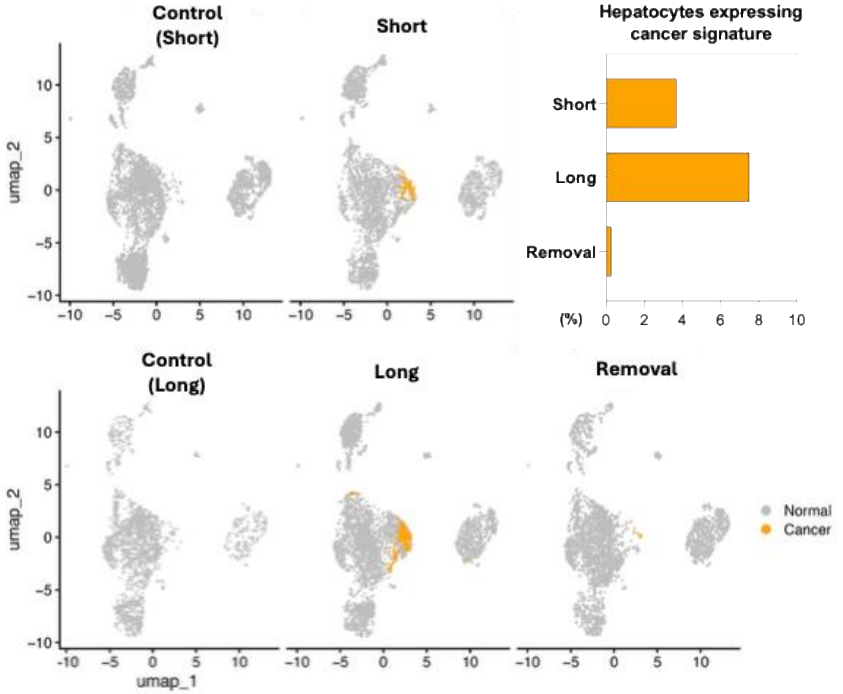
PFAS Mixture
PFOA, PFOS, PFNA
PFHxS, PFHpA
4μM each

Exposure Time
Short
1 week

Long
2 weeks

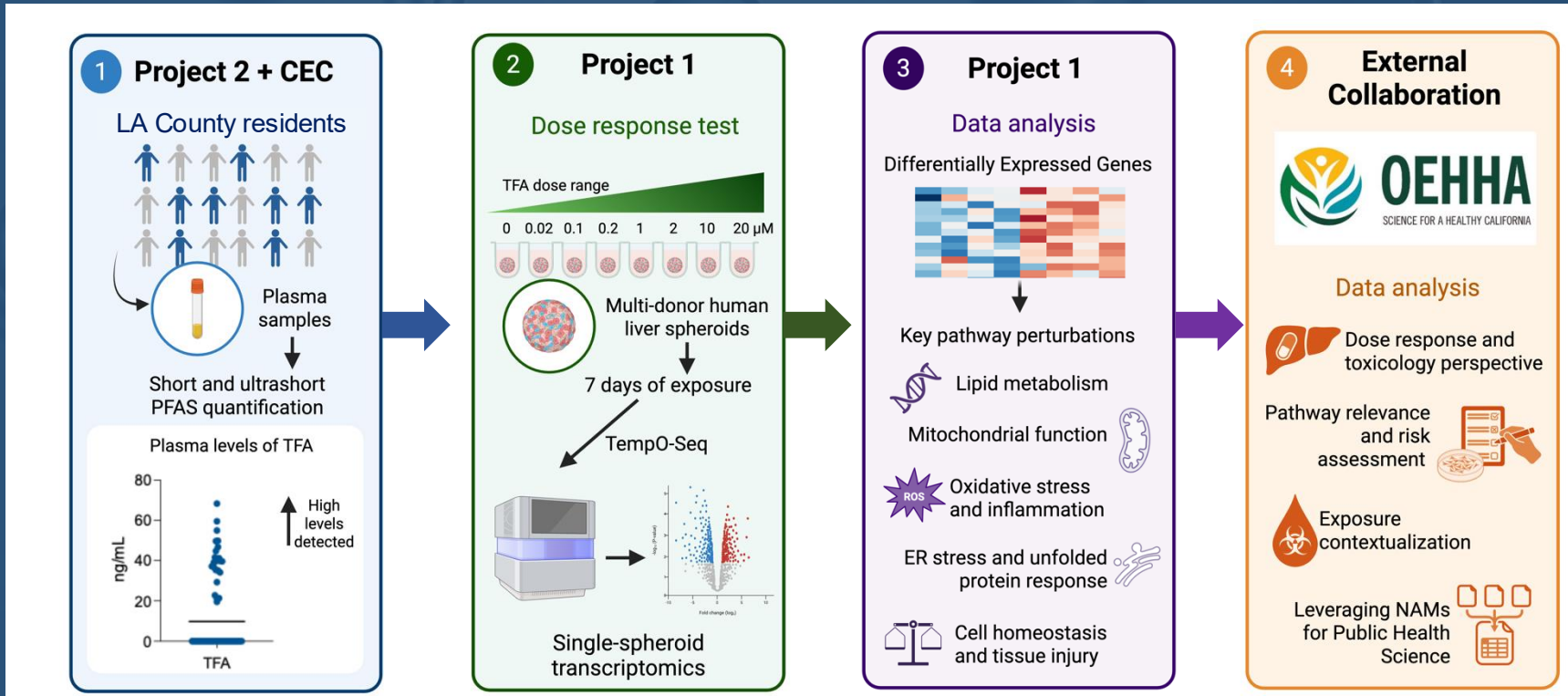
Removal
PFAS mix: 1 week
Recovery: 1 week





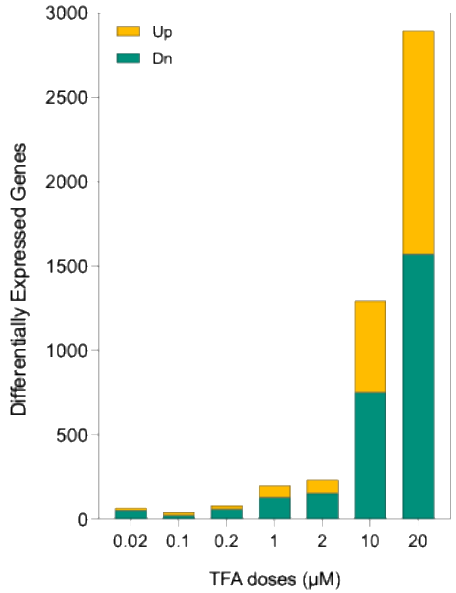
Manuscript in preparation

COLLABORATIONS From observation to public health impact

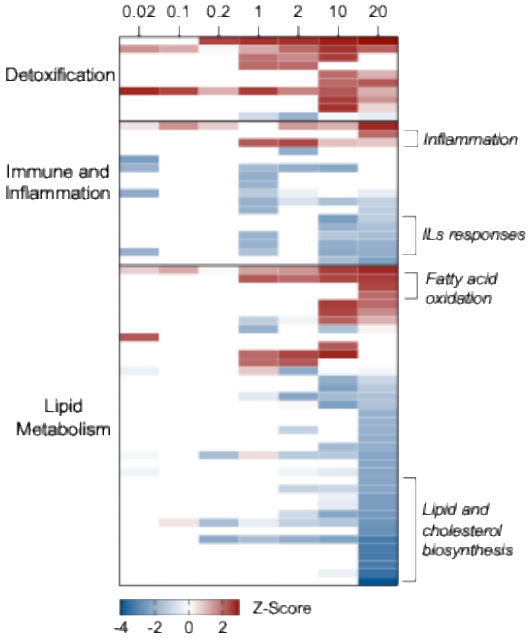


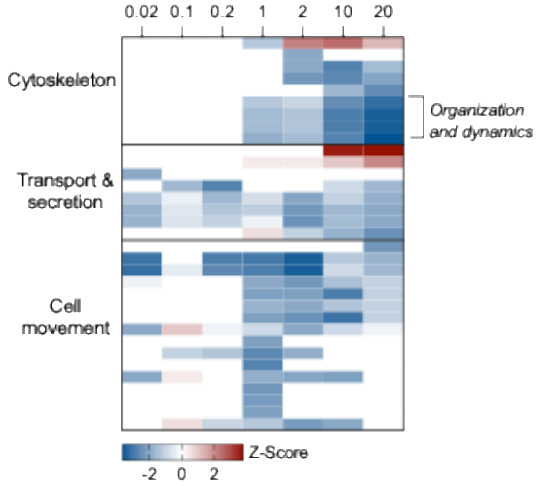
PRELIMINARY RESULTS Effects of TFA on liver metabolism

Differentially expressed genes



Most Important Pathways

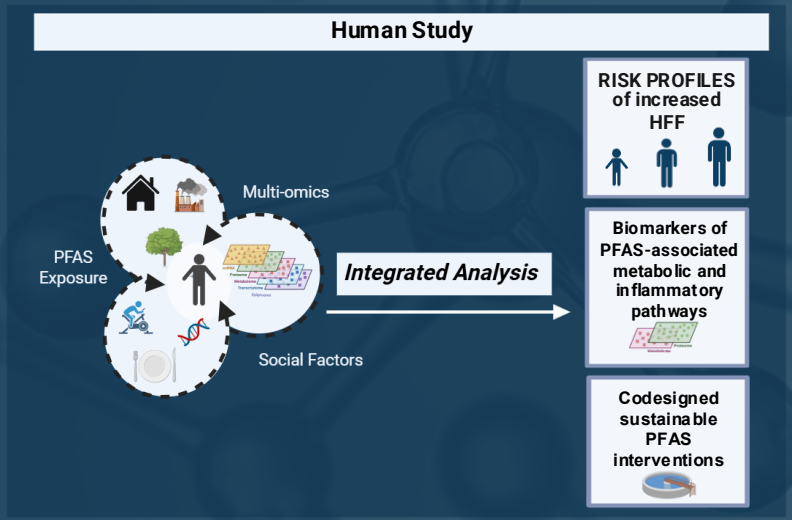




Manuscript in preparation in collaboration with OEHHA

HUMAN STUDY Estimating PFAS health risks in impacted communities

STUDY DESIGN



Lida Chatzi, MD, PhD
Project 2
Primary Investigator

Max Aung, PhD
Project 2
Co-Investigator

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. Baumert, Ana C. Maretti-Mira, Douglas I. Walker, Zhenjiang Li, Nikos Stratakis, Hongxu Wang, Yinqi Zhao, Fabian Christoph Fischer, Qiran Jia, Damaskini Valvi, Scott M. Bartell, Jiawen Carmen Chen, Thomas Inge, Justin R. Ryder, Todd Jenkins, Stephanie Sisley, Stavra Xanthakos, David E. 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, 123320

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 Dara, Lucy Golden-Mason, Ana C. Maretti-Mira, Scott M. Bartell, Veronica M. Vieira, Tanya L. Alderete, Michael I. Goran, Zhanghua Chen, Frank D. Gilliland, Brittney O. Baumert, 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

Environmental Science & Technology
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

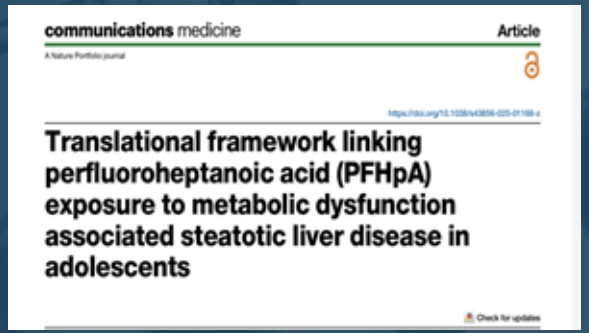
Article | Open access | Published: 09 January 2025

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 Oliva, 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



communications medicine — Article

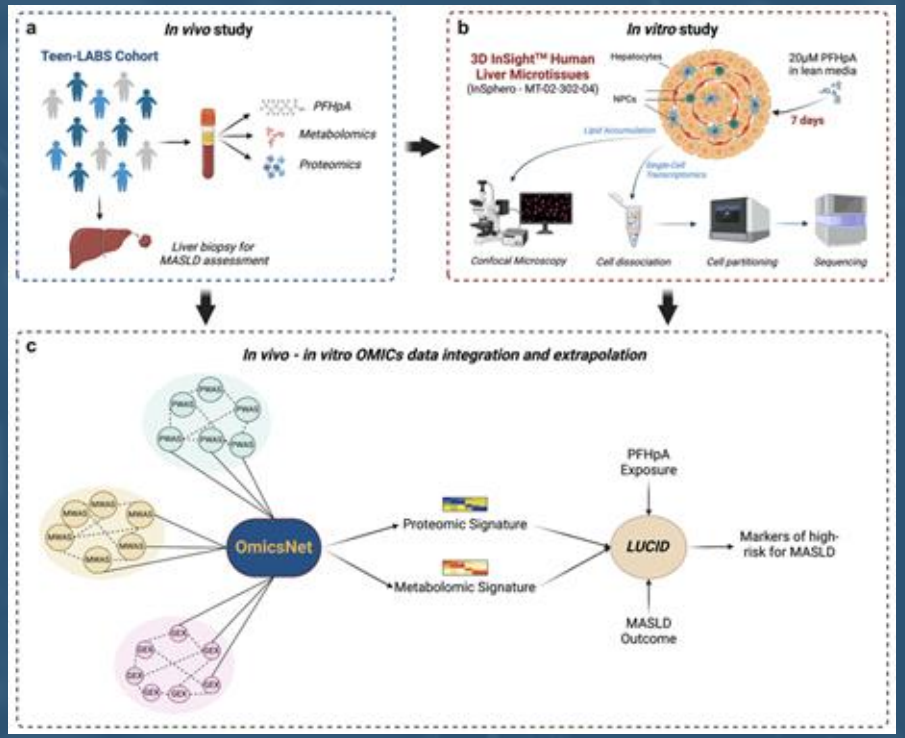
A Nature Portfolio journal

https://doi.org/10.1038/s43856-025-01168-z

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

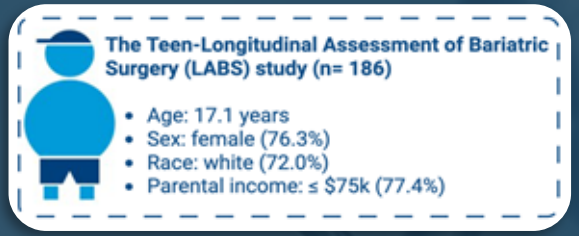
Check for updates

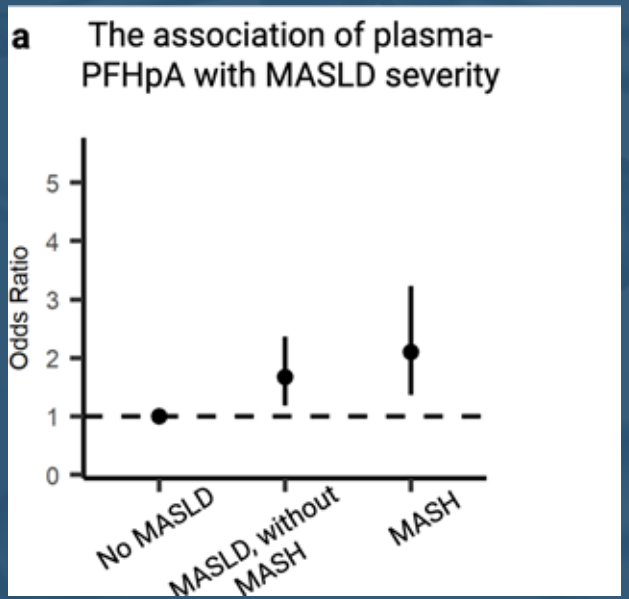
STUDY DESIGN

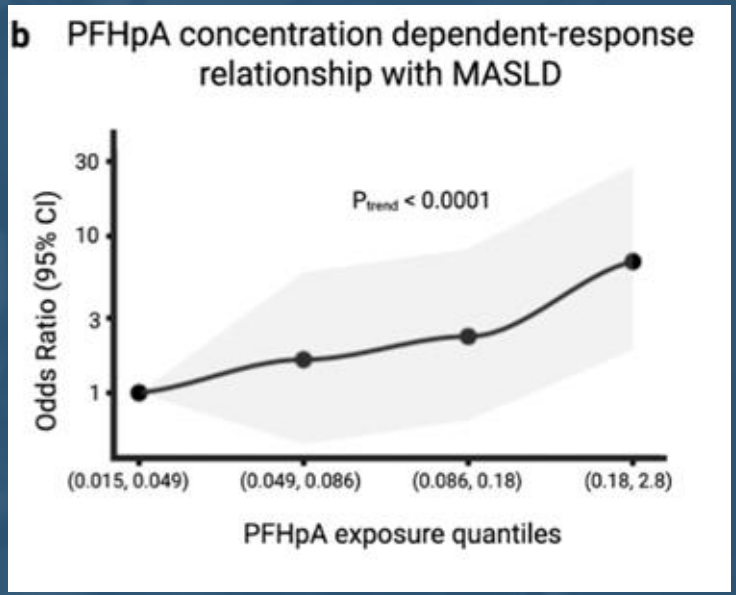


Baumert B et al., 2025, Commun Med

EXAMPLE OF TRANSLATIONAL FRAMEWORK Human Study

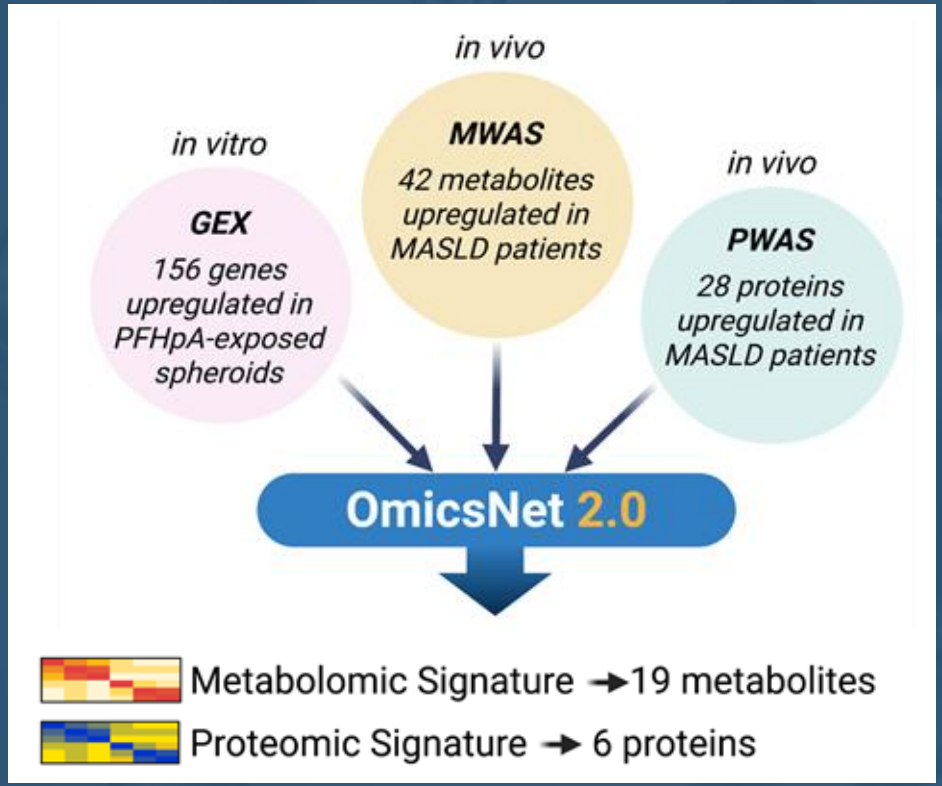






Baumert & Maretti-Mira et al. Communications Medicine 2025

EXAMPLE OF TRANSLATIONAL FRAMEWORK Statistical Methods

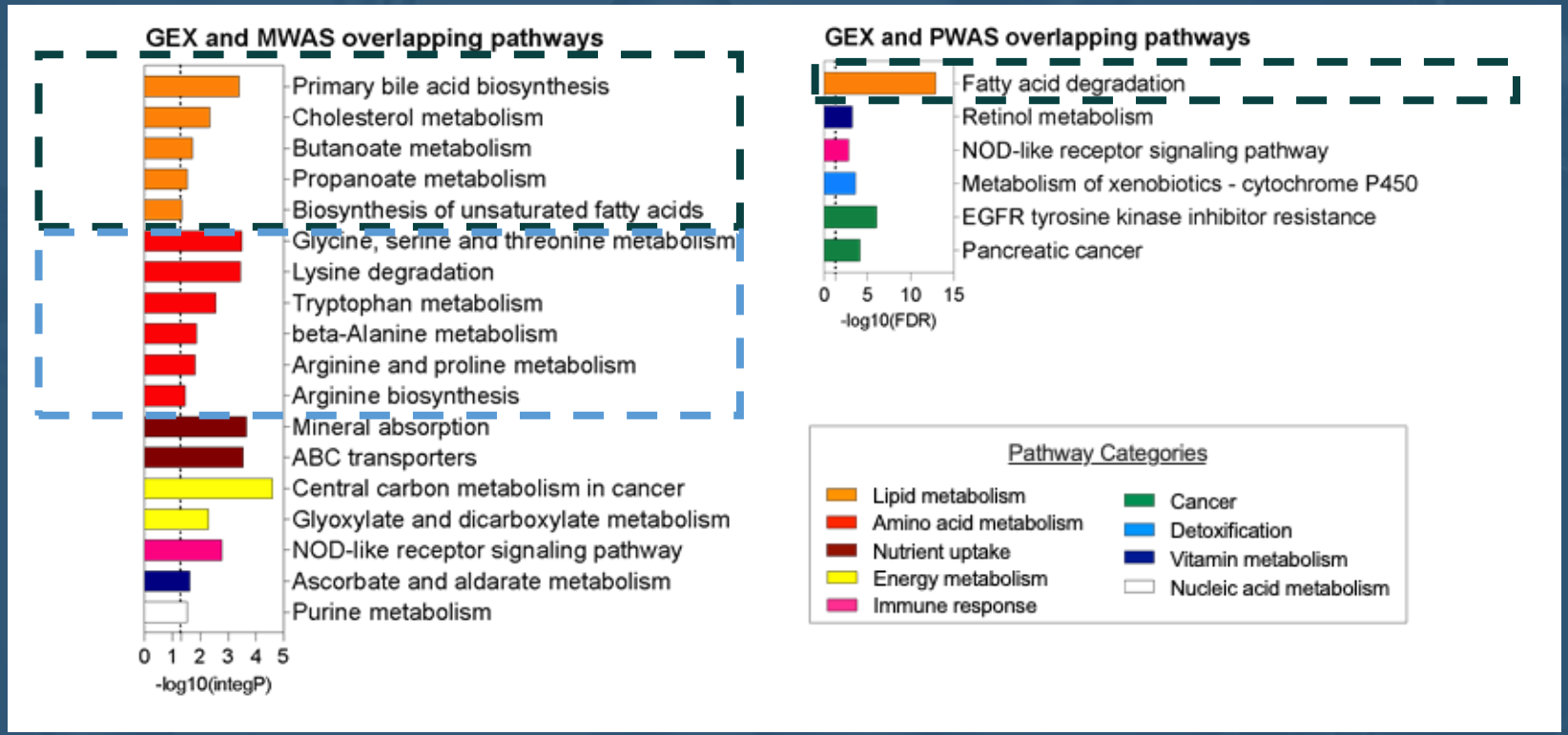


Integrative multi-omics across in vitro (organoids) and human studies to identify molecular signatures of PFAS exposures

Baumert & Maretti-Mira et al. Communications Medicine 2025

EXAMPLE OF TRANSLATIONAL FRAMEWORK Results

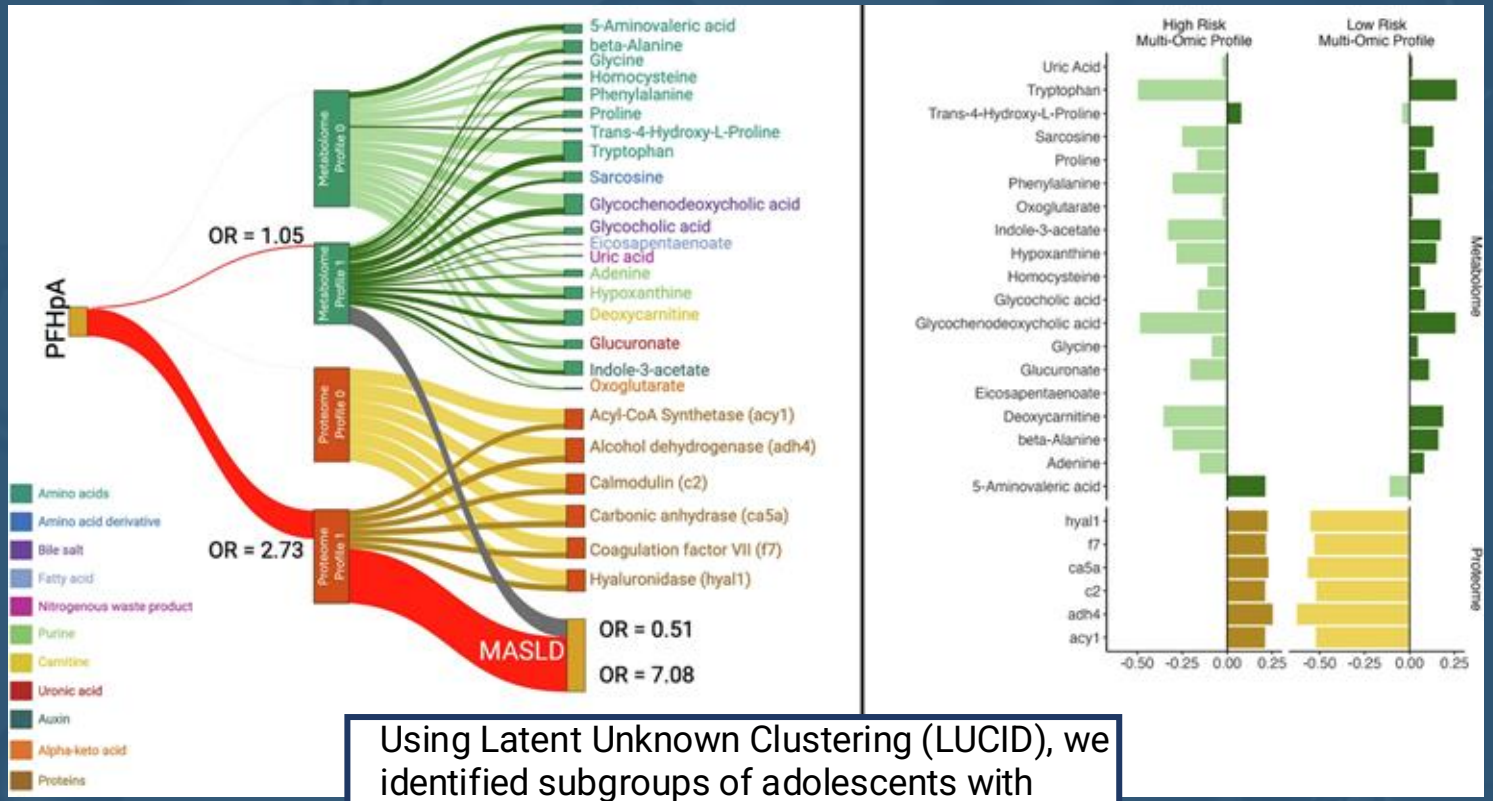
Overlapping Pathways from PFHpA Exposed Organoids and the Human Study



Baumert & Maretti-Mira et al. Communications Medicine 2025

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

Baumert B et al., 2025, Commun Med

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

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

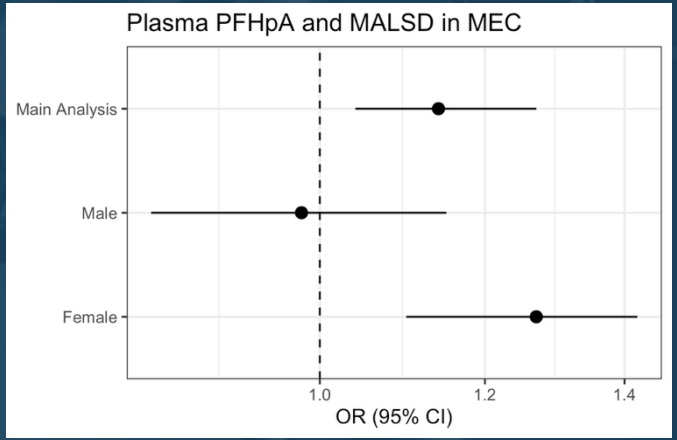
STUDY DESIGN

The Multethnic 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

Yerin Jung, PhD
Postdoctoral Scholar
USC Keck School of Medicine

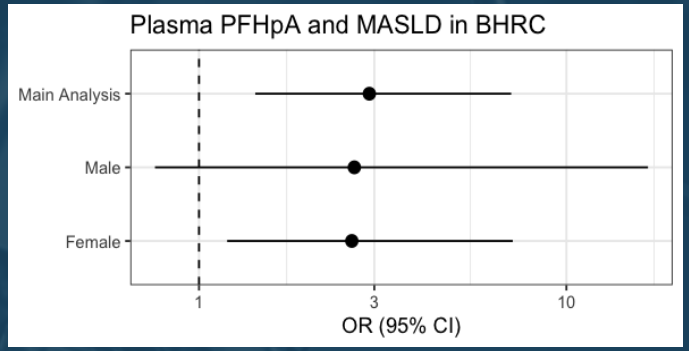
STUDY DESIGN

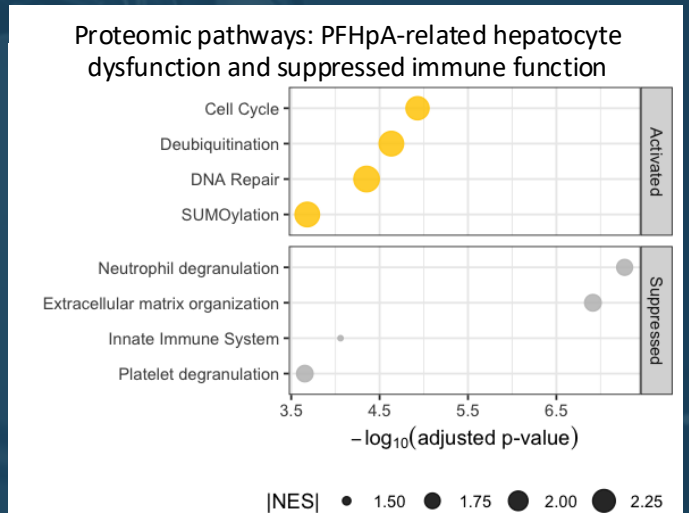
Border Health Research Cohort (BHRC);
formerly Cameron County Hispanic Cohort (CCHC)

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

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

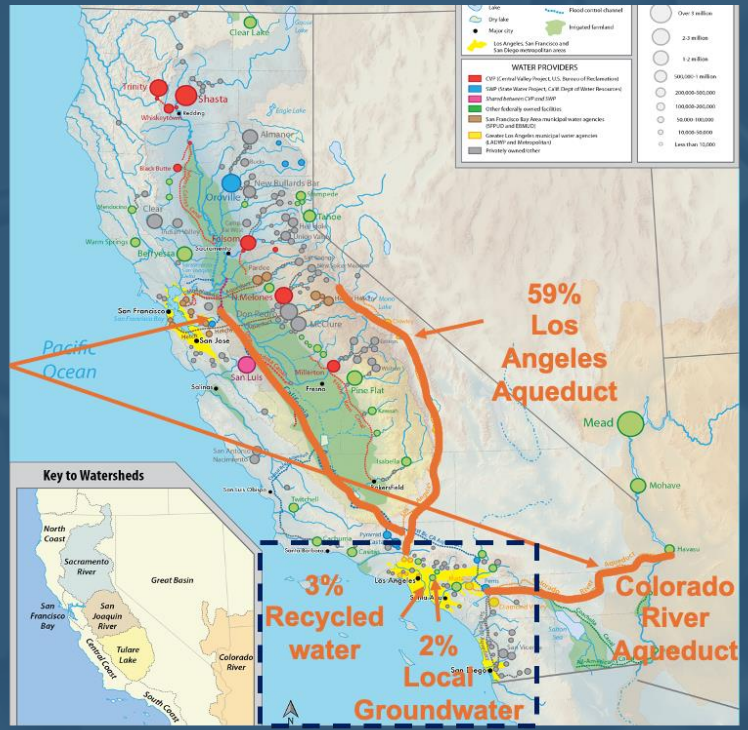
PRELIMINARY RESULTS

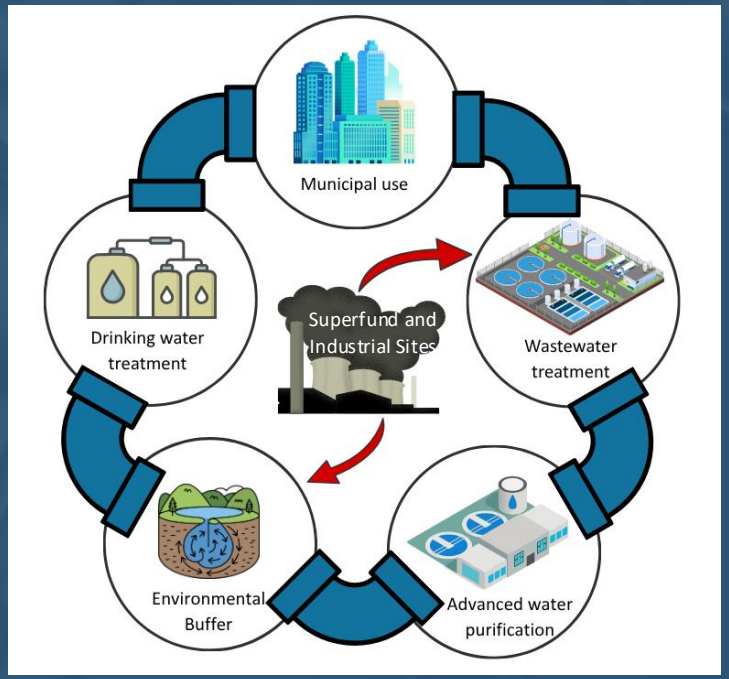




PROJECTS 3 & 4 Water reuse is a key solution amid worsening long-term drought

36% State Water Project & Colorado River Aqueduct





PROJECT 3 PFAS in water reclamation facilities and the environment

AIM 2: Characterization of PFAS in groundwater including contributions from soil and air

Adam Smith
PI

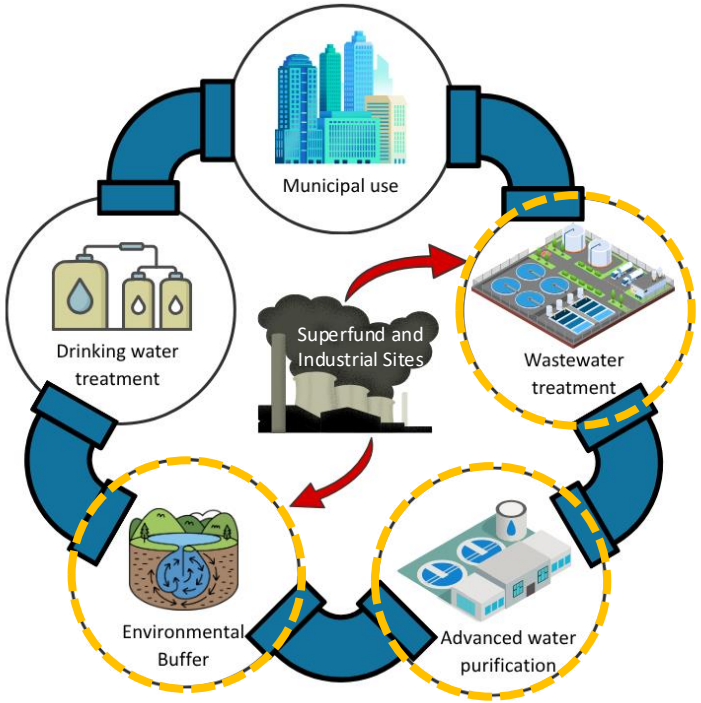
Jiachen Zhang
Co-PI

Adam Simpson
Co-PI

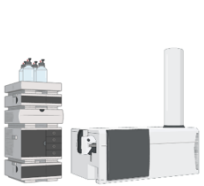
AIM 3: Prediction of PFAS contamination using a fate and transport application-oriented model

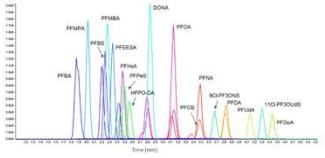
Felipe de Barros
Co-PI

Russ Detwiler
Co-PI, UCI



AIM 1: Multi-factor quantification of PFAS across water reclamation facilities



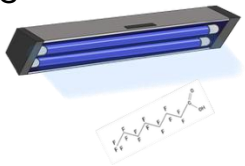


Adam Smith
PI

Dan McCurry
Co-PI

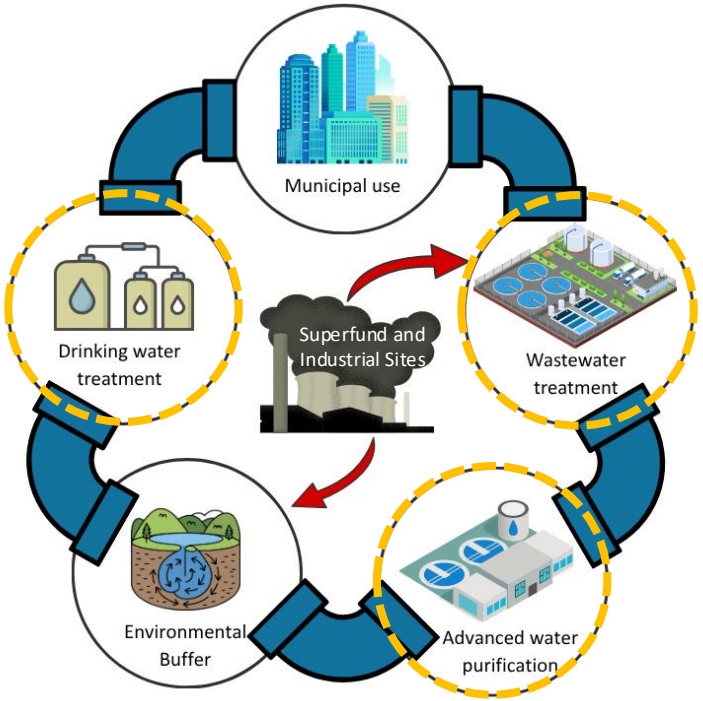
PROJECT 4 PFAS remediation via biological and UV/chemical methods

AIM 2: UV/Chemical destruction of PFAS

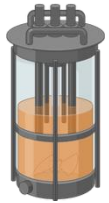


Dan McCurry
PI

Amy Childress
Co-PI



AIM 1: Bioremediation of PFAS

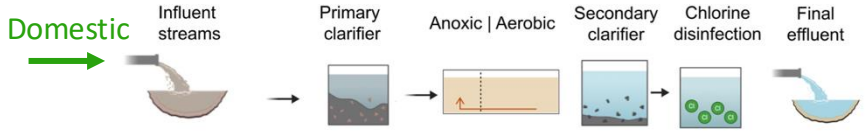


Adam Smith
Co-PI

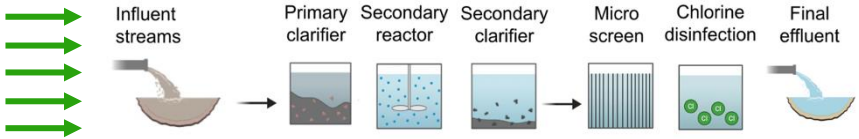
Amy Childress
Co-PI

PROJECT 3 Robust assessment of PFAS behavior in water reclamation facilities (WRFs) is needed

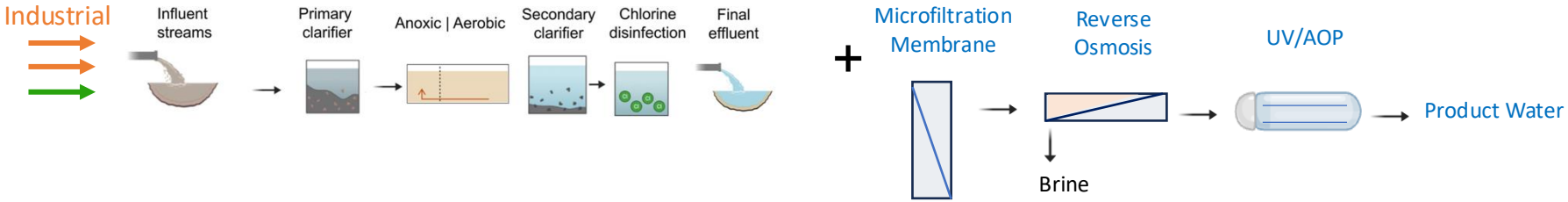
① Modified Ludzack-Ettinger + Tertiary



② High Purity Oxygen Activated Sludge + Tertiary



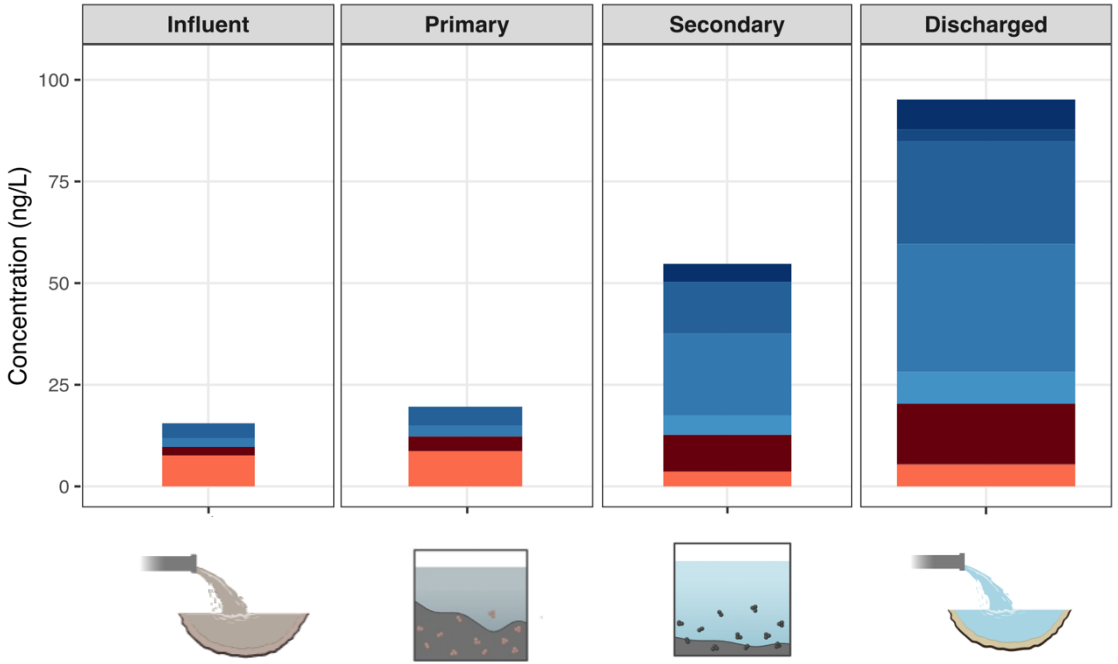
③ Modified Ludzack-Ettinger + Advanced Water Purification



Three Sampling Events

Samples

Predominantly observed **PFCAs** and significant increase across treatment at **WRF 1**



PFAS Compound

- PFPeA
- PFHpA
- PFHxA
- PFOA
- PFDA

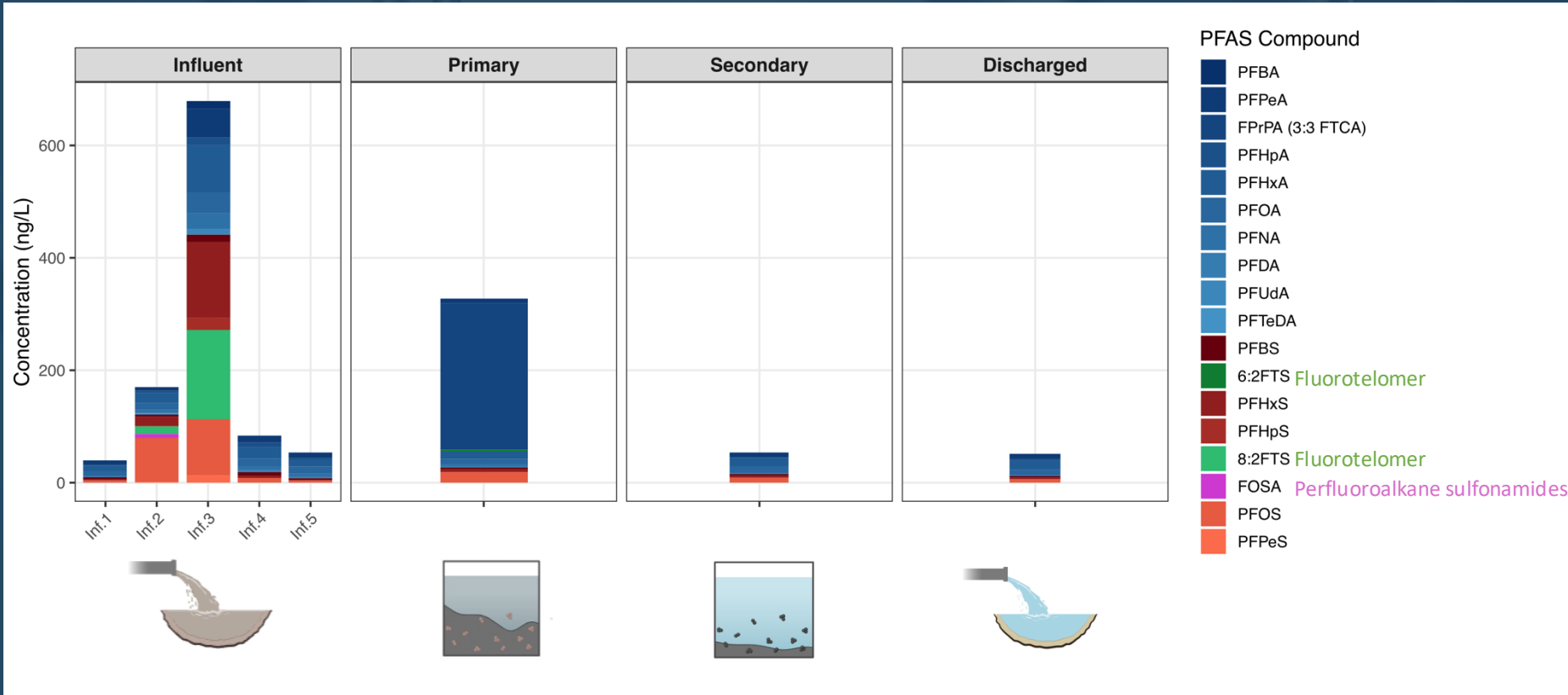
Carboxylic acids

- PFBS
- PFHpS
- PFOS

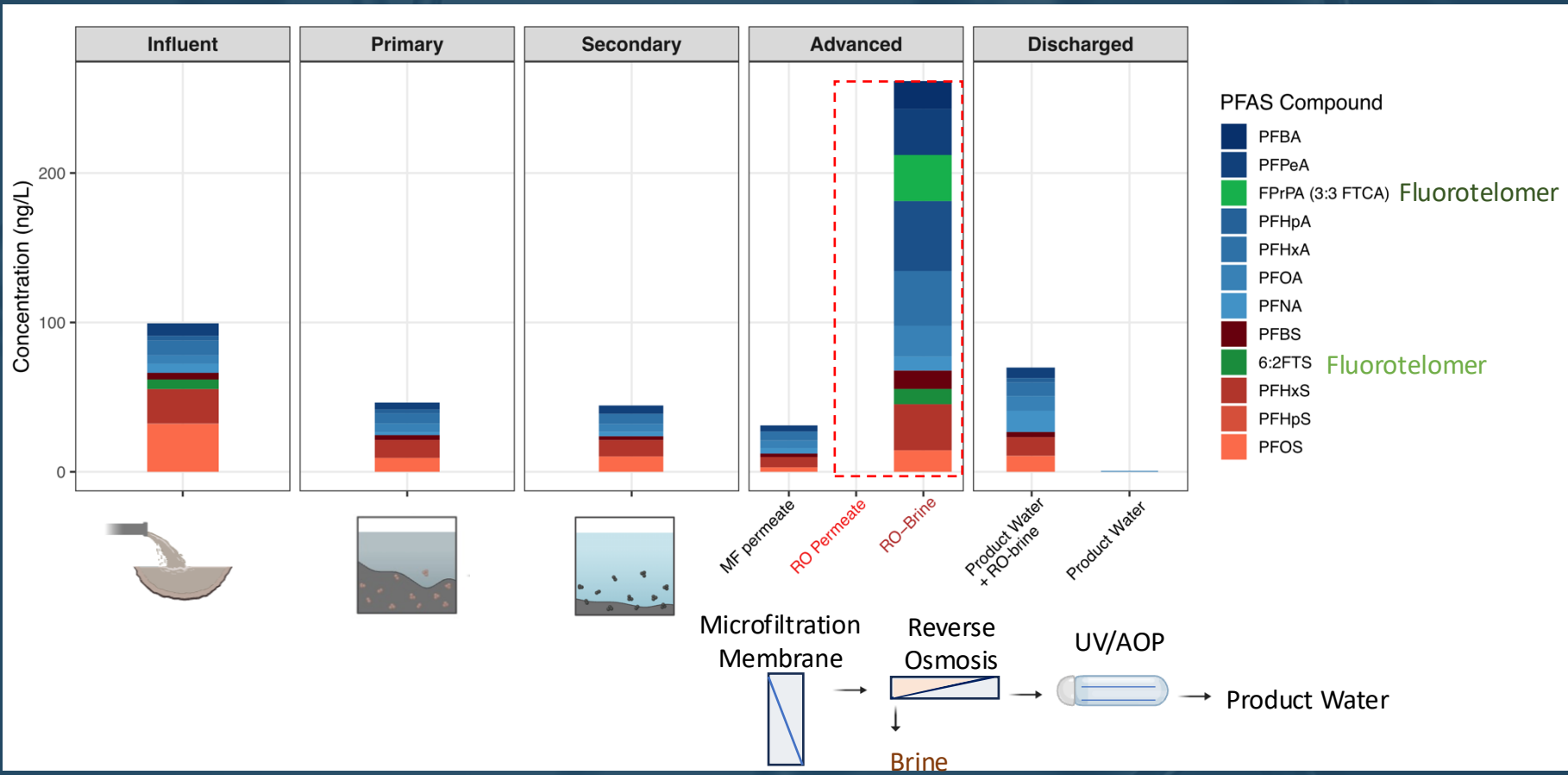
Sulfonic acids

Increased Chain Length

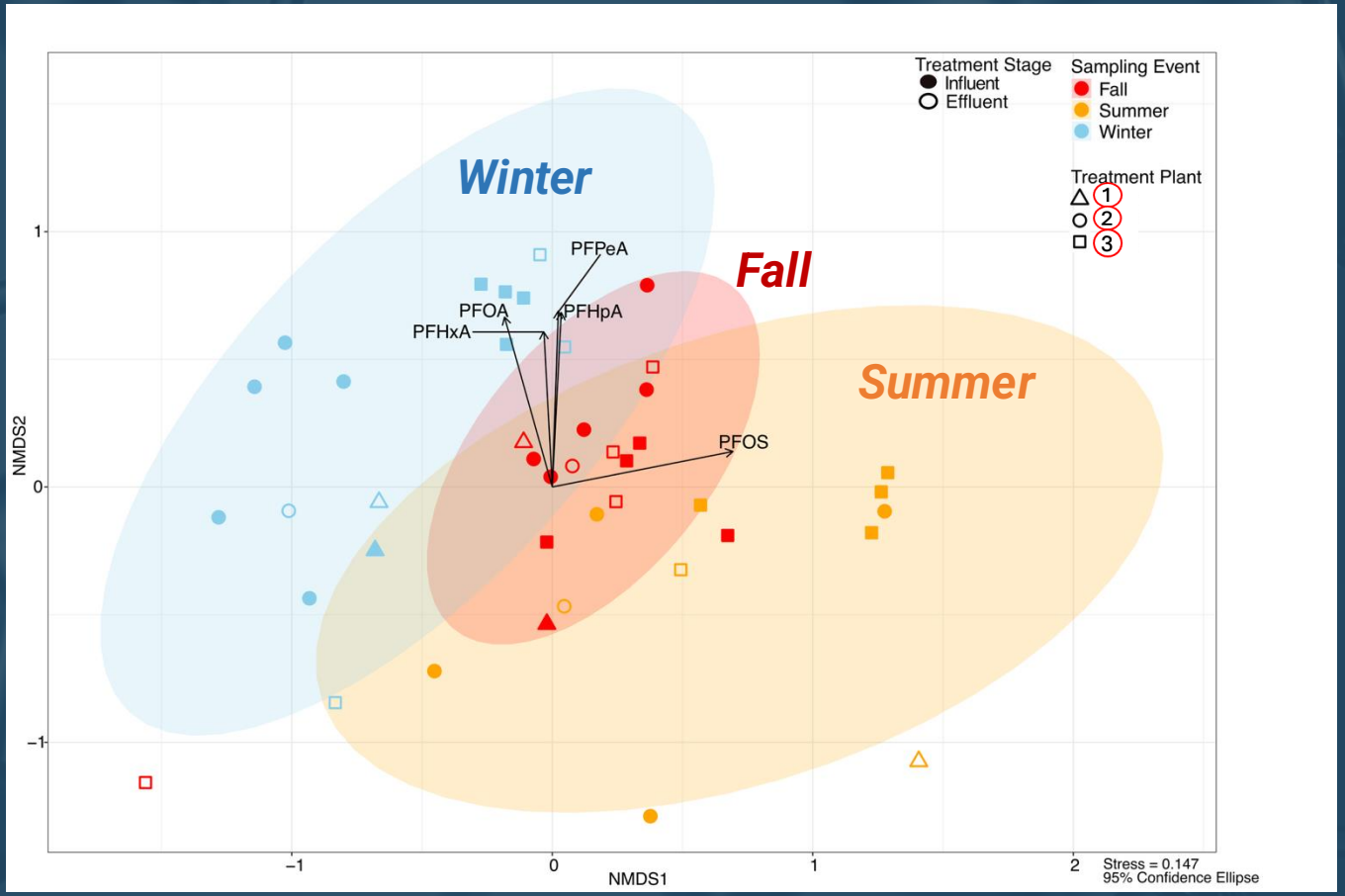
Sub-sewershed variability reflects importance of source tracking PFAS at **WRF 2**



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



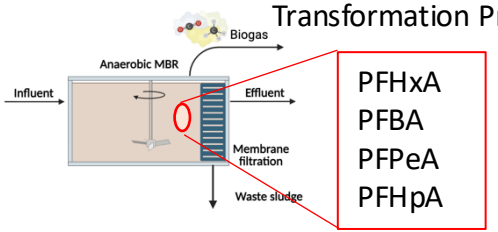
Temporal clustering observed across the different treatment trains



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*



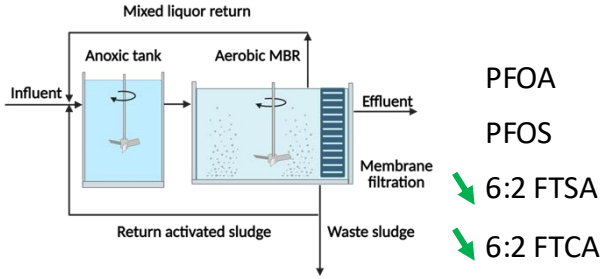
Anaerobic Membrane Bioreactor

PFOA : ***1*** *ug/L*

PFOS : ***1*** *ug/L*

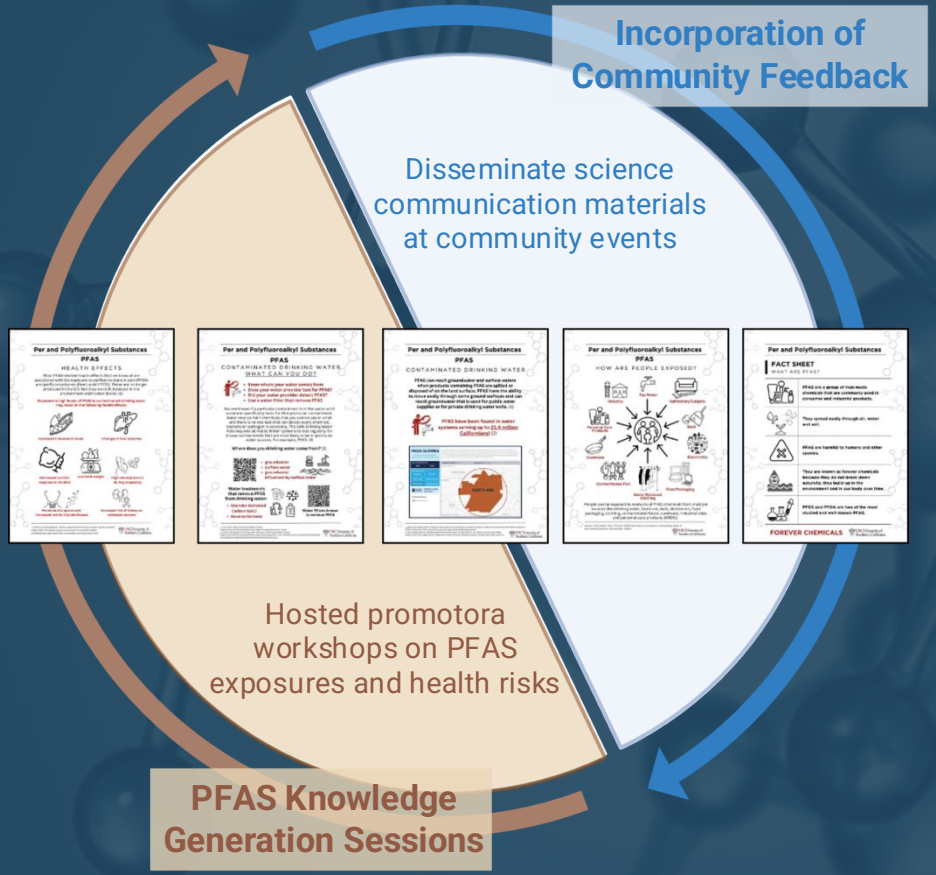
6:2 FTSA : ***1*** *ug/L*

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



Anoxic/Aerobic Membrane Bioreactor

Science Translation and Engagement



Community Outreach

West LA College
WICC Water Insecurity Correction Coalition
Nawakalmekak
Orange County Environmental Justice
SCCTSI
NW2C Native Ways 2 College

Community Engagement Core

Max Aung, PhD, MPH
CEC Director

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

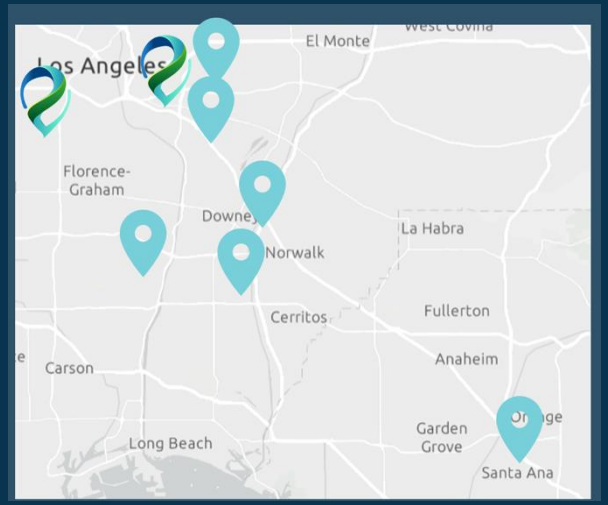
Yaneth Rodriguez, MPH
Strategic Initiatives Coordinator

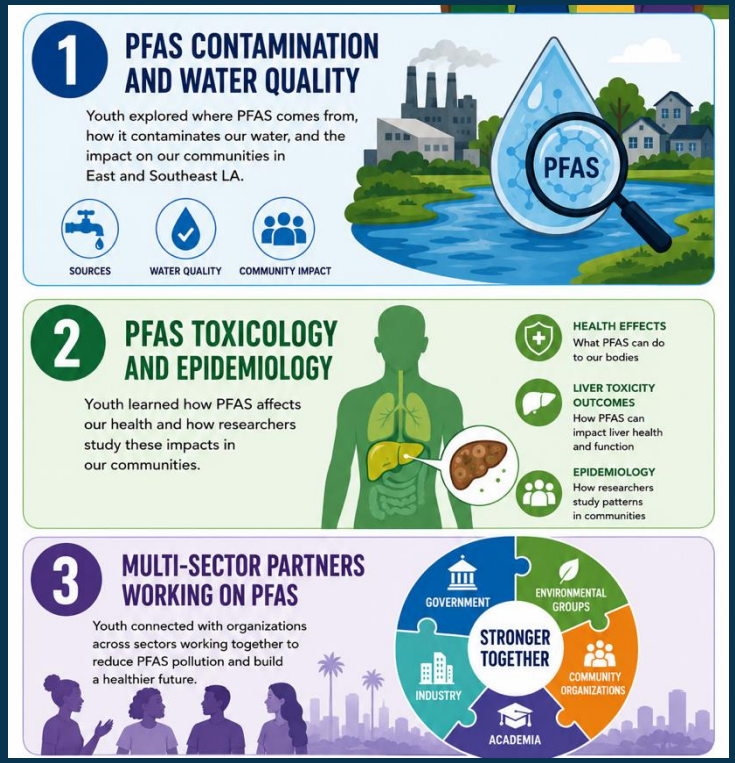
Science Translation and Engagement

PFAS Youth Engagement Workshops

Tamar Galindo

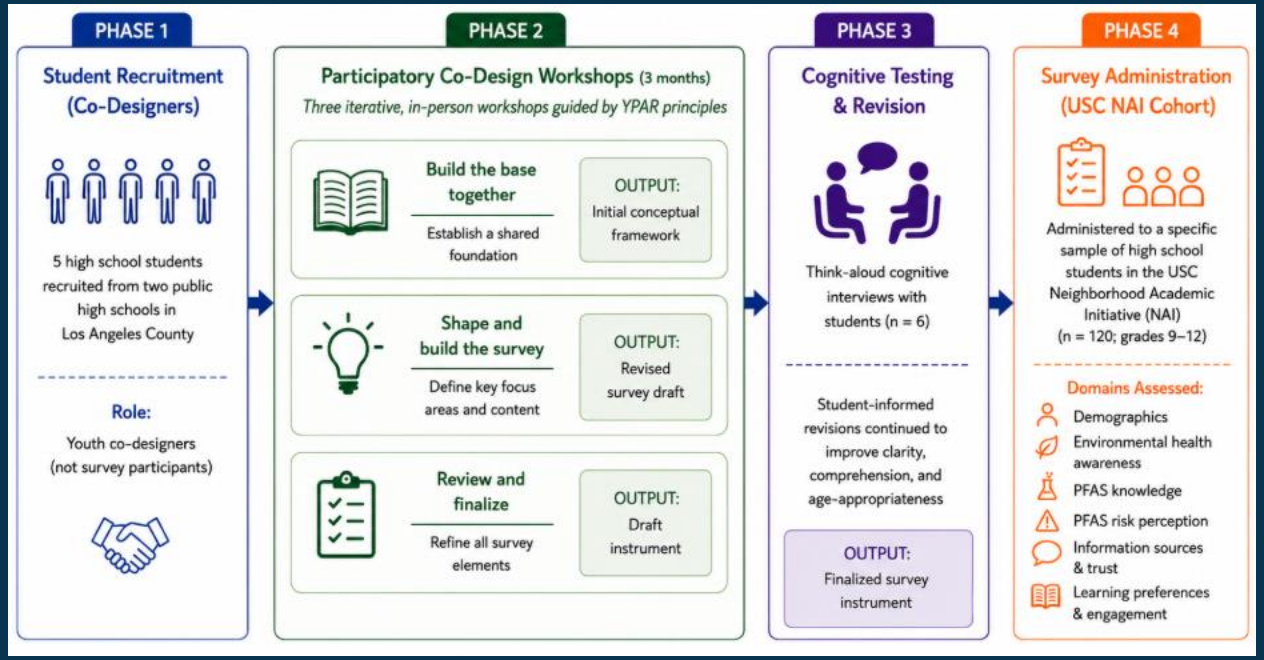
Venezia Ramirez





Science Translation and Engagement

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

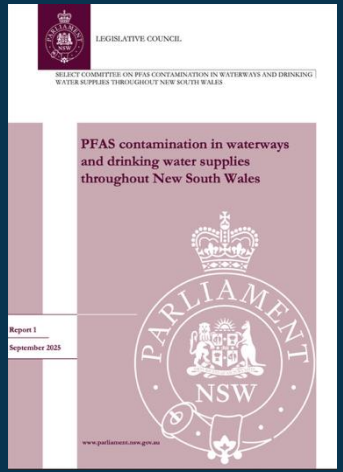
October 17, 2023

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

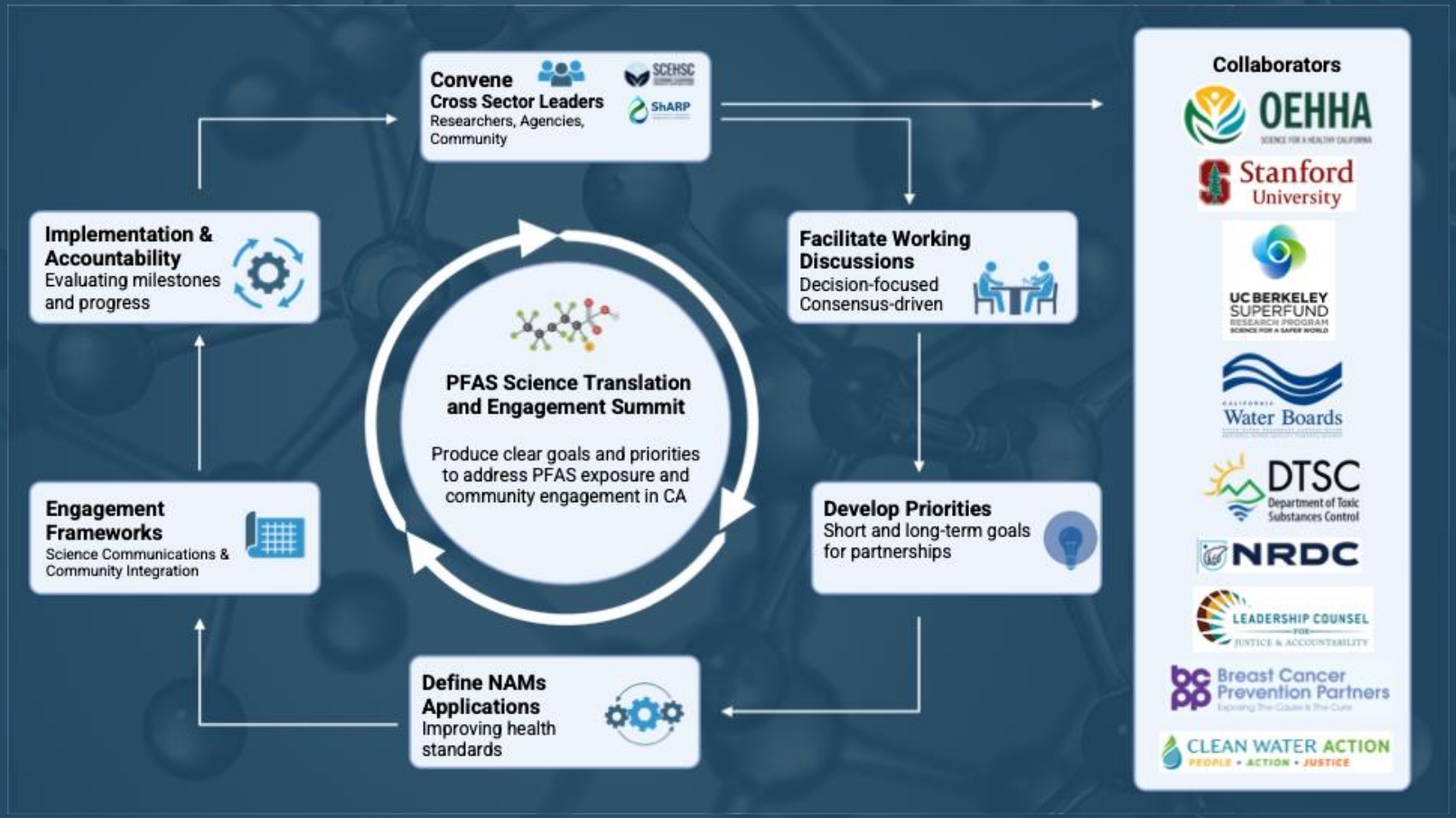
RE: Assembly Bill 1200 – Hazardous Chemicals in Food Packaging and Cookware

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.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB1200.



Science Translation and Engagement



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- Russell Detwiler, PhD

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NIH National Institute of Environmental Health Sciences
Your Environment. Your Health.

ShARP
SUPERFUND PFAS ASSESSMENT, REMEDIATION & PREVENTION

ReWater CENTER

CTER