



NMWSC

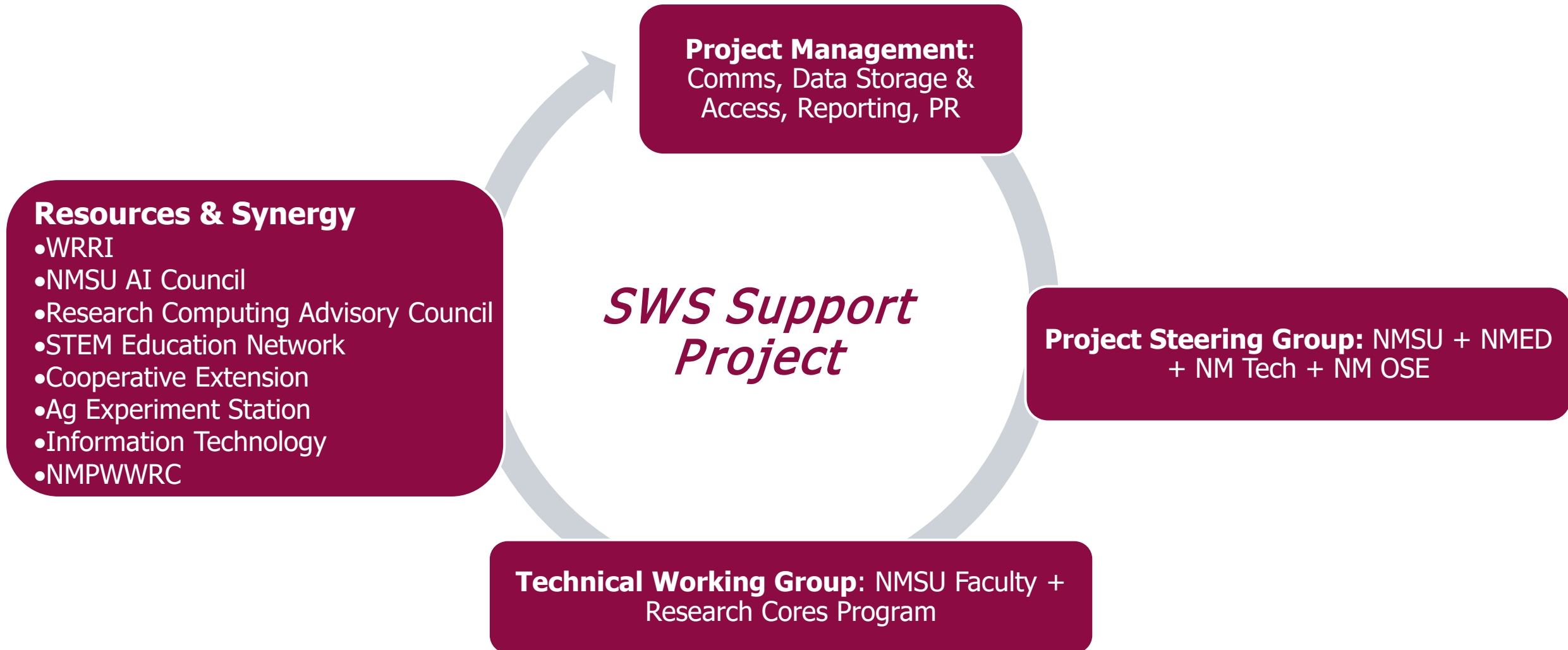
NEW MEXICO WATER SOLUTIONS
COLLABORATIVE

NMSU Research & Innovation Support for
The New Mexico Strategic Water Supply Program

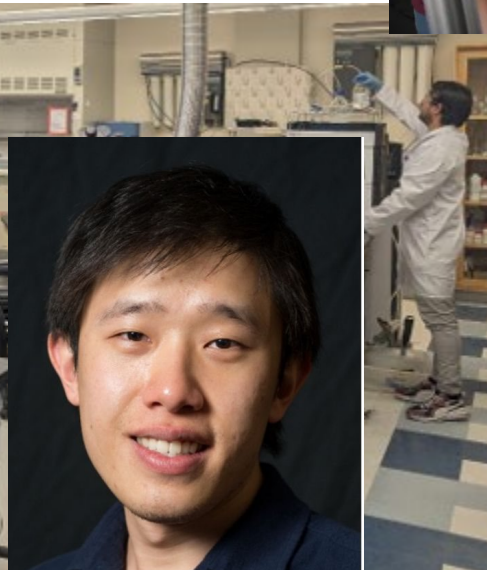
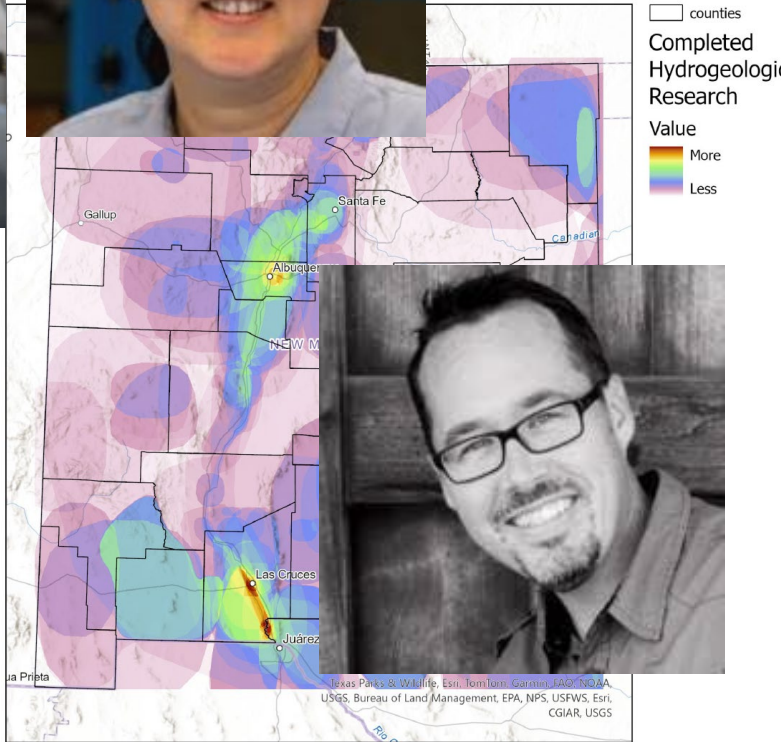
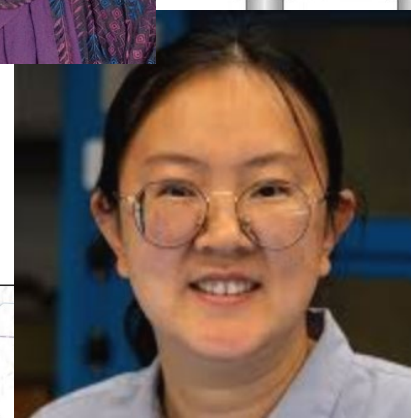
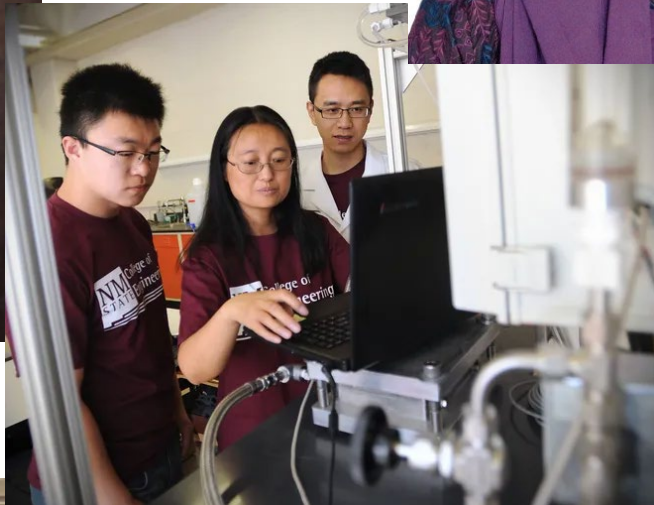
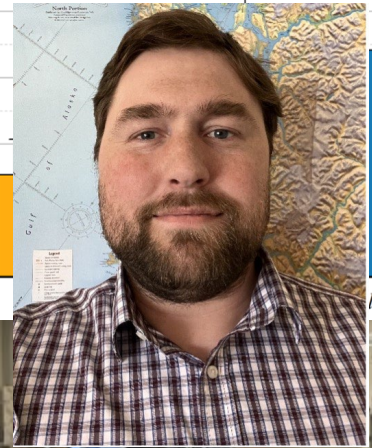
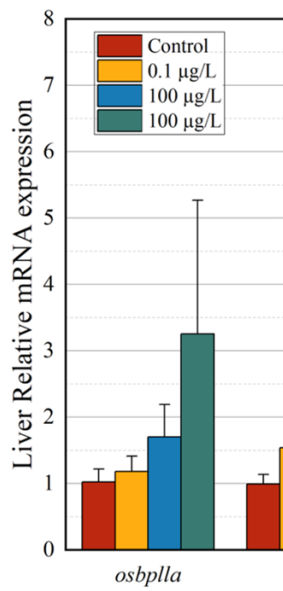
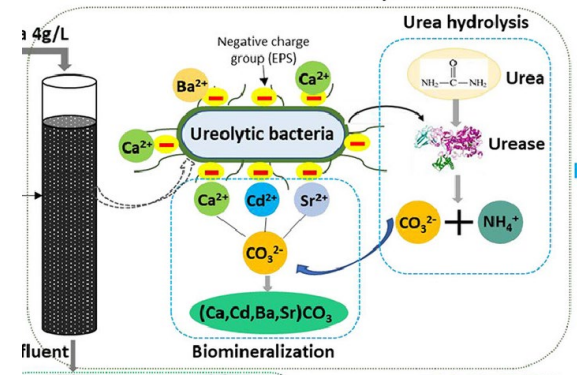




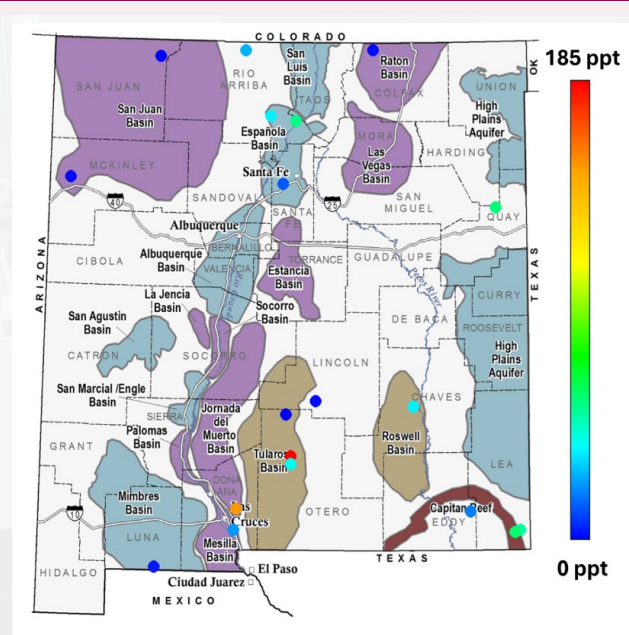
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People & Labs

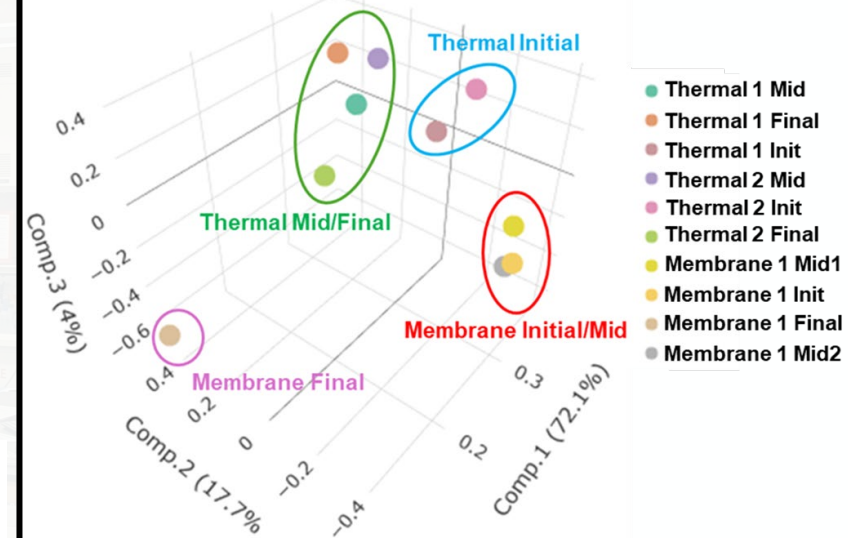


Chemical Analysis and Instrumentation Laboratory (CAIL) Water and Environmental Analysis



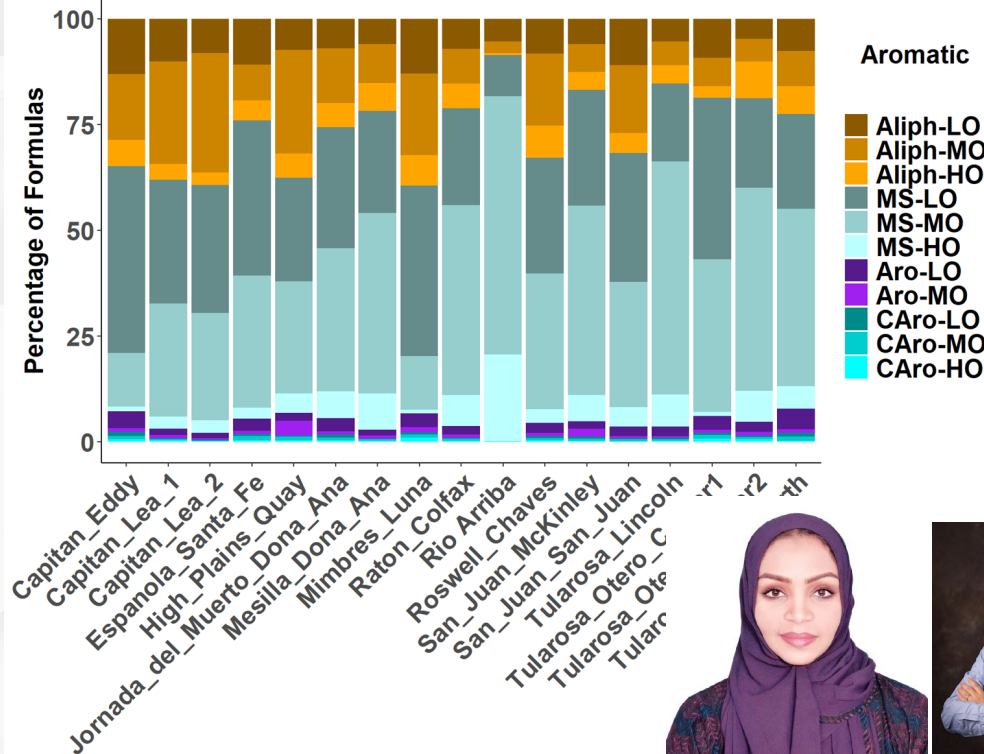
Non-Targeted Qualitative Analysis:

- Identify 1000s of previously unknown molecules
- Evaluate overall molecular composition (oxidation, aromaticity, etc.) of natural samples
- Find new chemical targets of interest or risk



Targeted Quantitative Analysis:

- PFAS
- Elements (Be, Fe, Pb, etc.)
- Ions (Na^+ , NH_4^+ , Cl^- , SO_4^{2-} , etc.)
- Organic pollutants (BTEX, PAHs, more)



Instrumental and Analytical Method Development:

- EPA 1633 for PFAS
- Techniques with minimal or no sample preparation
- Advanced non-targeted data analytical techniques



Simeon Schum

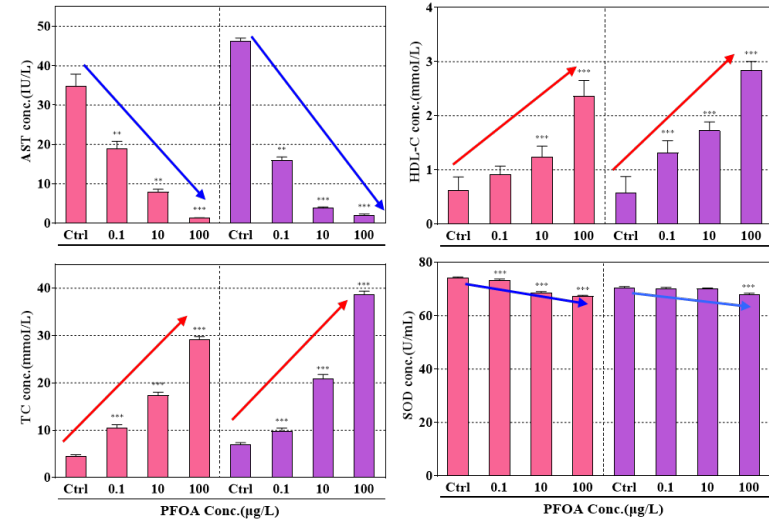
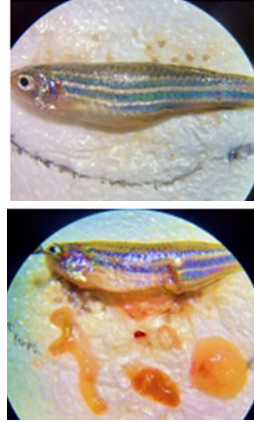
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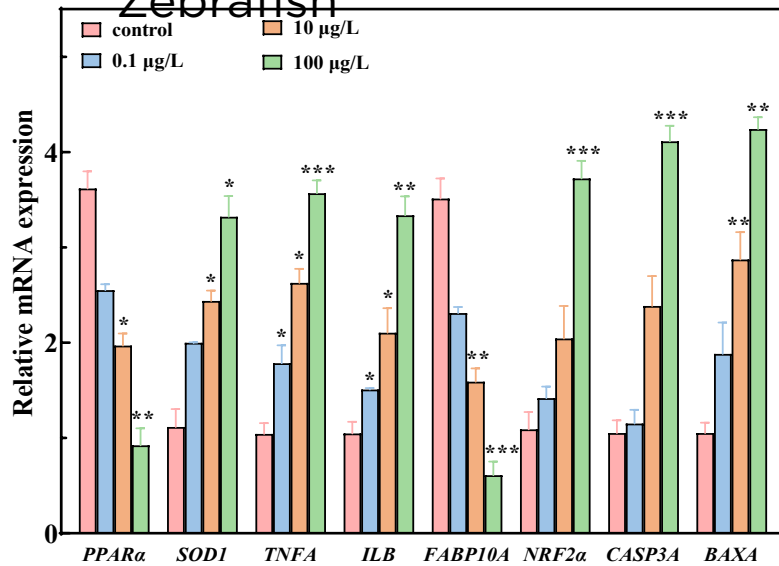
Emerging Contaminants - Toxicity



Case Study: PFOA Hepatotoxic Effects

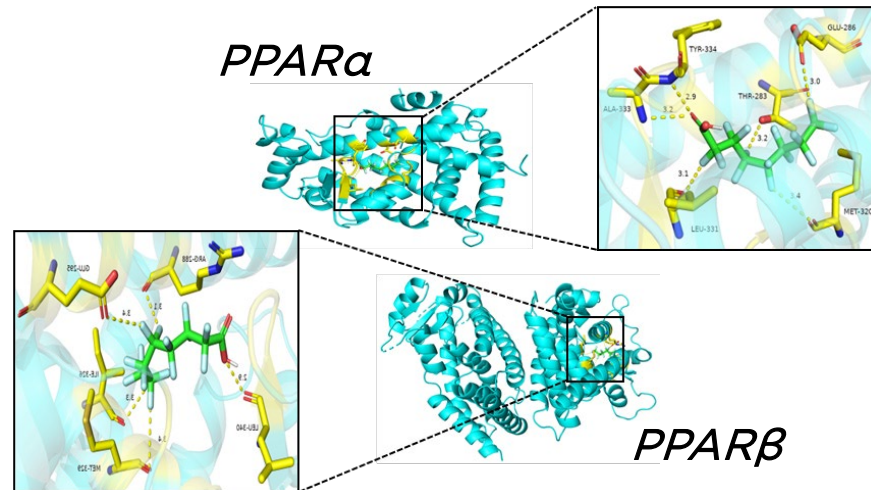


- In vivo* exposure: Zebrafish

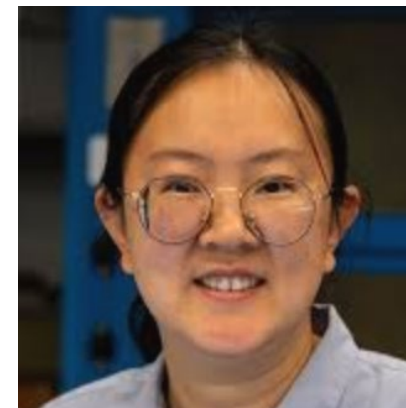


- qPCR: Gene expression difference

- Significant changes in liver enzymes



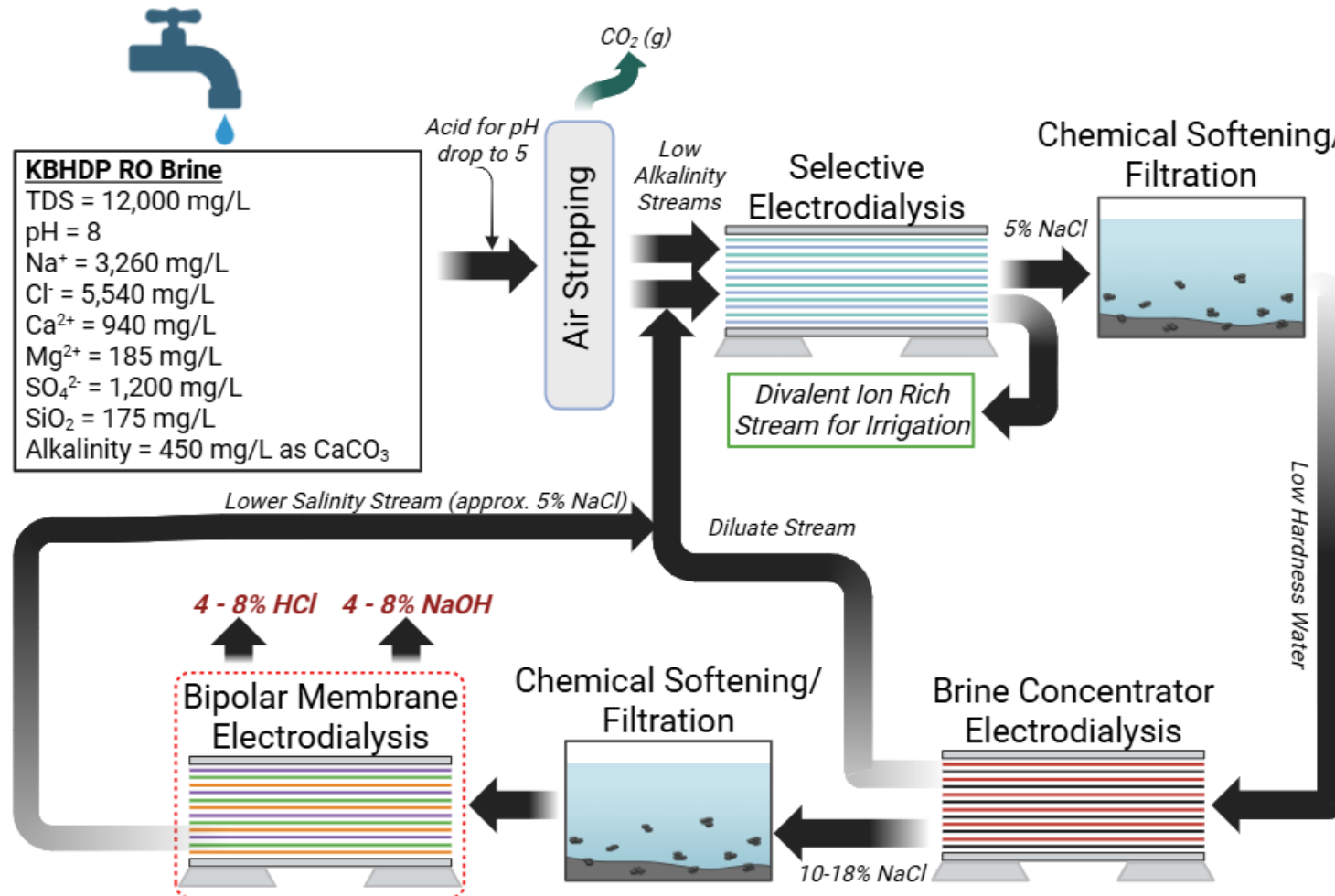
Yanyan Zhang
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- In silico* simulation: PFAS binding with key proteins in zebrafish

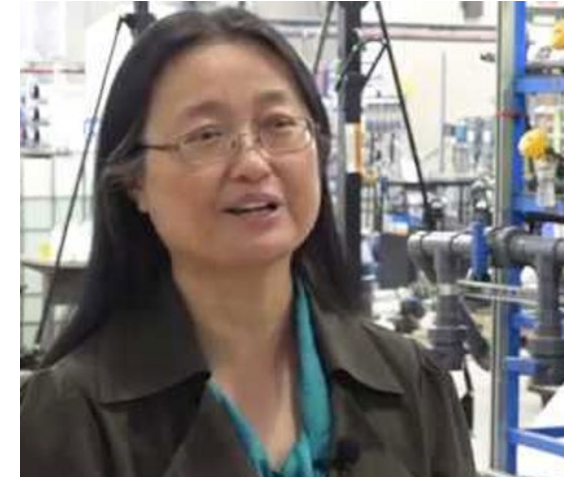
High Water Recovery Desalination and Brine Valorization

- Increase efficiency to improve water recovery.
- Reduce brine volumes, and thus costs
- Produce valuable minerals for reuse or sale



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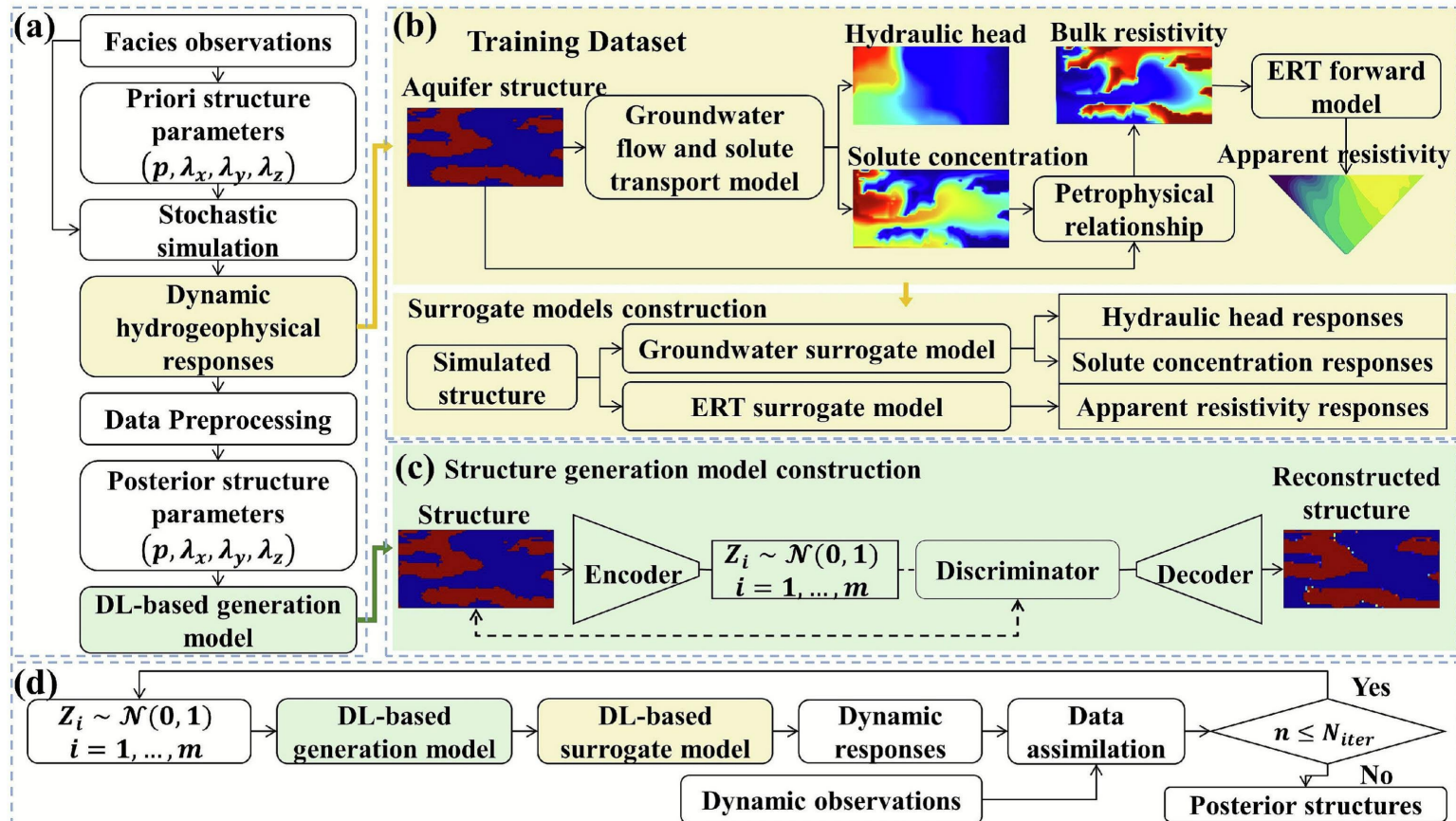
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Research papers

Combining hydrologic, chemical, and geophysical deep learning-based inversion for heterogeneous aquifer structure identification

Yuzhou Xia^{a, *}, Chuanjun Zhan^{b, c, *}, Zhenxue Dai^{a, b, *}, Jichun Wu^d, Xiaoying Zhang^a,
Huichao Yin^e, Lin Zhu^f, Jiahe Yan^g, Zihao Wang^a, Mohamad Reza Soltanian^h,
Kenneth C. Carroll^e



Kenneth "KC" Carroll
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Core Programs

- Agricultural Water Resilience
- Strategic Community Water Management (SCWMP)
- Community Hydrology & Groundwater Conservation
- Clean Drinking Water Technology

Tools & Modeling

- Statewide Water Assessment & Dynamic Water Budget
- Hydro-Agro-Economic (HAE) Model
- System dynamics modeling for water policy (e.g., following)

Research Funding

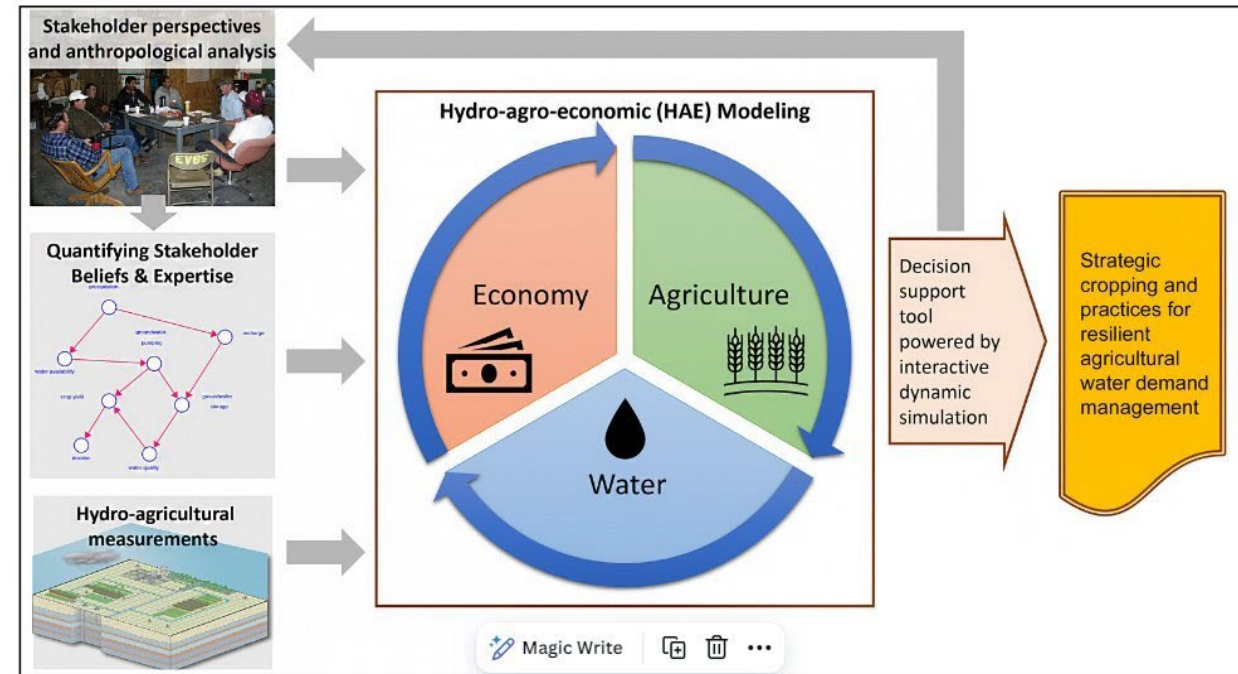
- Faculty & Student Water Research Grant Programs
- Statewide university research support

Community Engagement

- Direct support to communities, water users, and managers
- Watershed restoration, monitoring, and planning tools

Outreach

- NM Annual Water Conference + workshops
- Technical reports and monthly “NM Water eNews”



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