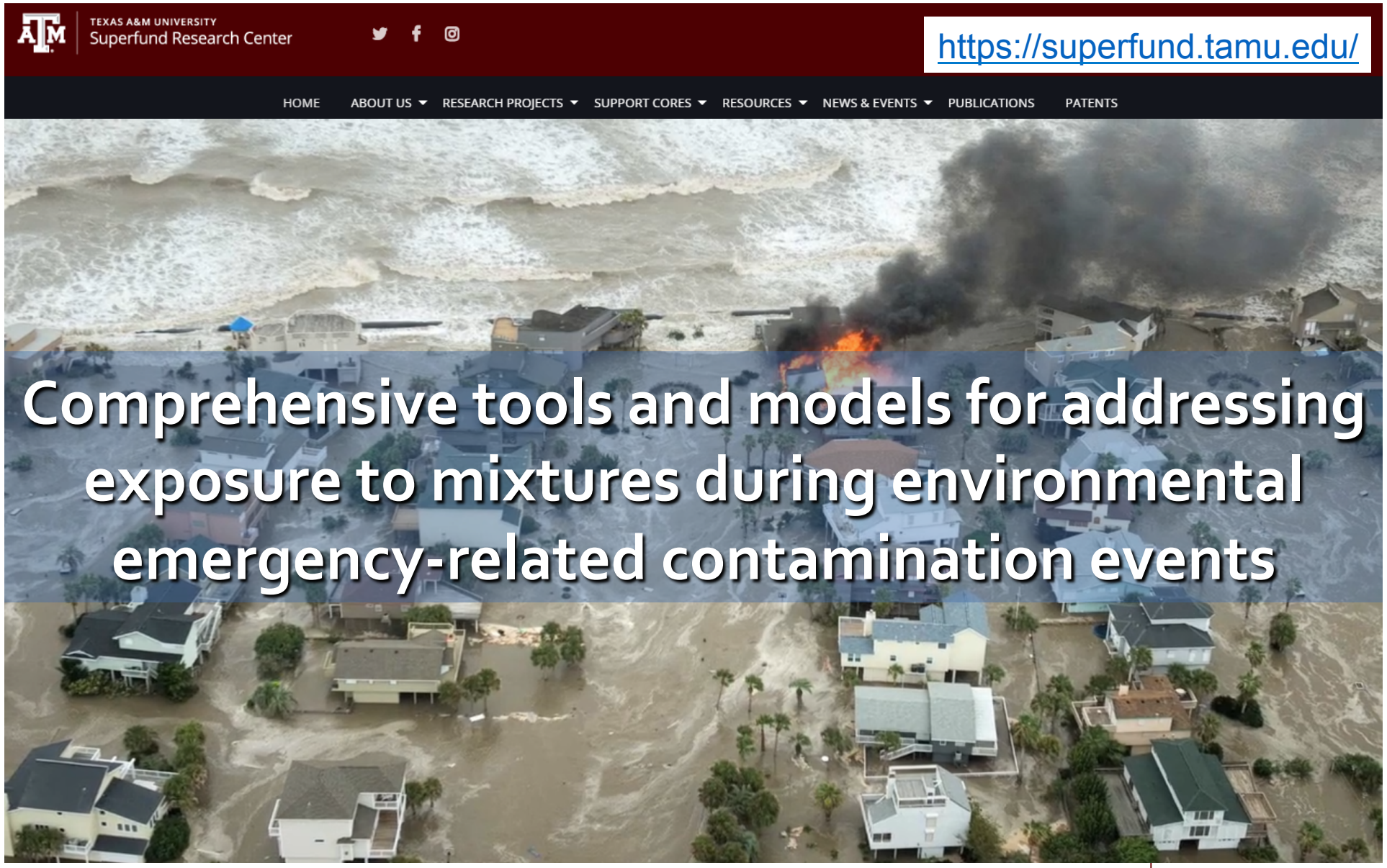
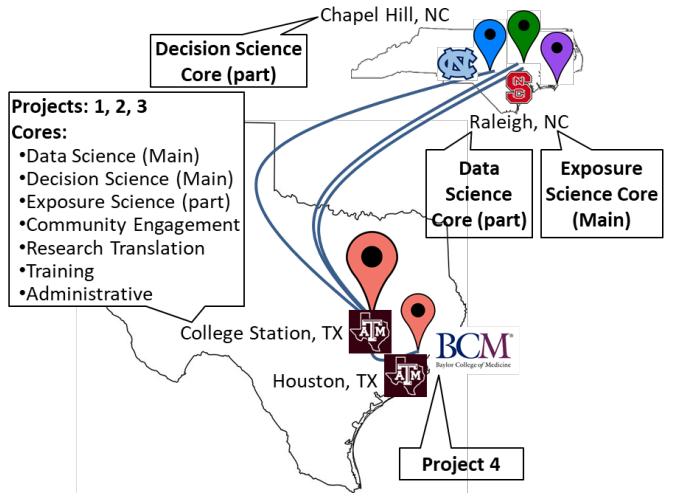


TEXAS A&M UNIVERSITY
SUPERFUND
RESEARCH CENTER

Texas A&M University Superfund Research Center (2017-2022):

Comprehensive tools and models for addressing exposure to mixtures during environmental emergency-related contamination events

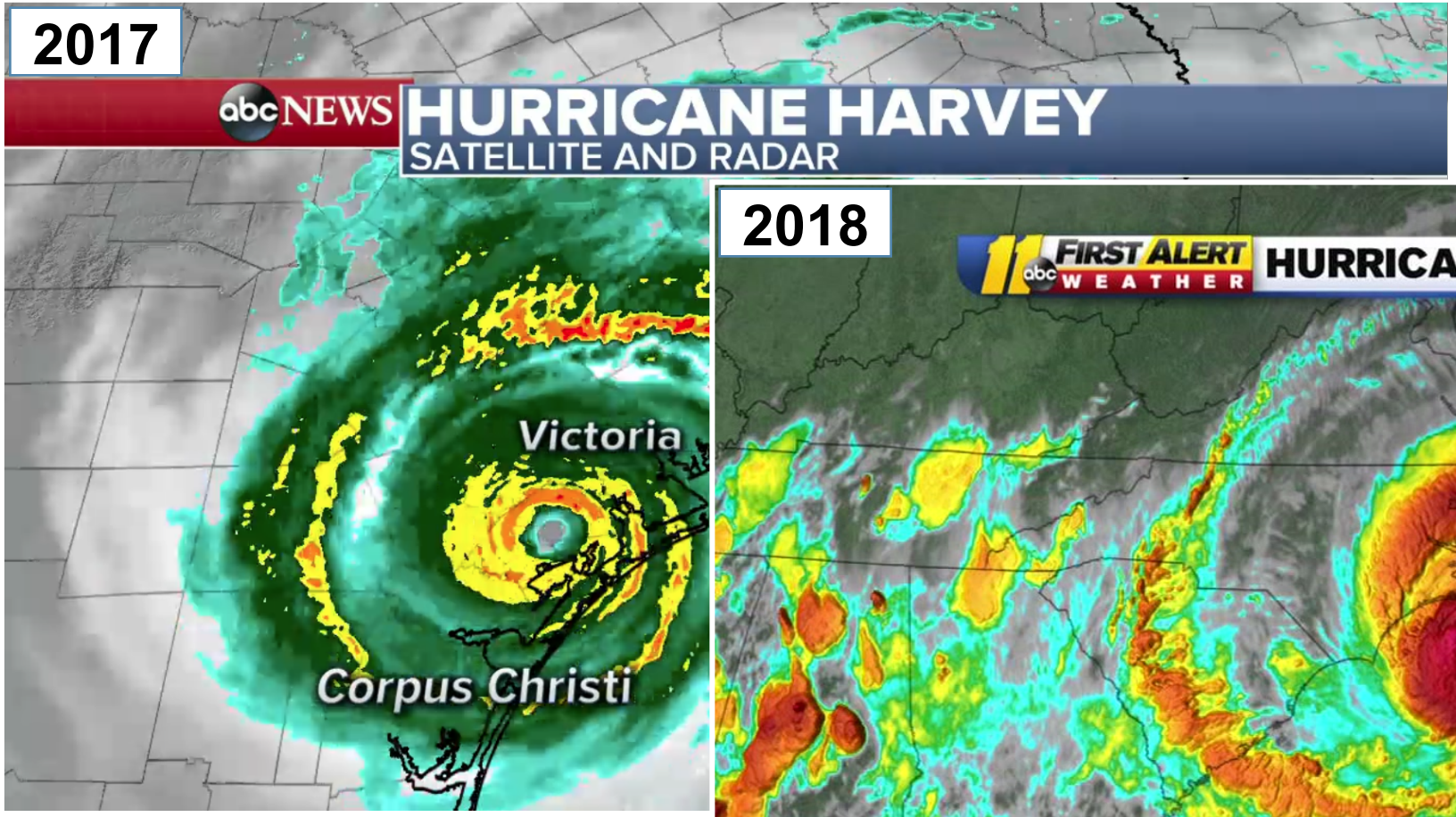
Case scenario: Hurricane Ike (2008) hit on Galveston Bay-Houston Ship Channel

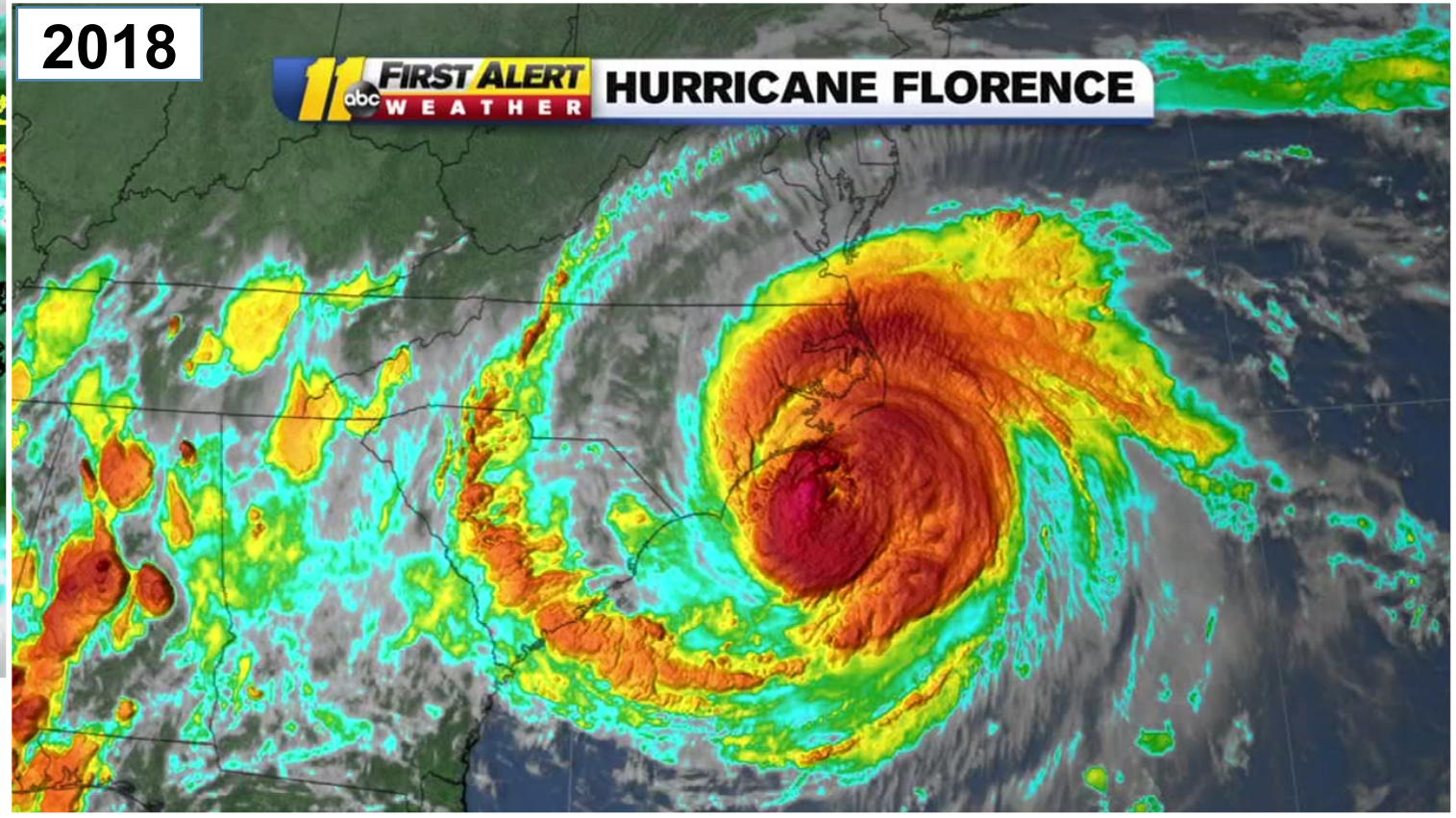


TEXAS A&M UNIVERSITY
SUPERFUND
RESEARCH CENTER

Texas A&M University Superfund Research Center (2017-2022):

To characterize and manage both existing and environmental emergency-created hazardous waste sites through the development of the tools that can be used by first responders, the impacted communities, and the government bodies involved in site management and cleanup





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A common goal: to develop, apply, and translate a comprehensive set of tools and models that will aid in mitigating the human health consequences of exposure to hazardous mixtures during environmental emergency-related contamination events

A "Thematic" Approach to Disaster Research

- Theme 1 – Disaster Research (Hurricane Harvey response)
- Theme 2 – Disaster Response Exposomics
- Theme 3 – Disaster Response Hazard Identification
- Theme 4 – Disaster Response Modeling
- Theme 5 – Disaster Mitigation Strategies

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Texas A&M University Superfund Research Center (2017-2022):

To characterize and manage both existing and environmental emergency-created hazardous waste sites through the development of the tools that can be used by first responders, the impacted communities, and the government bodies involved in site management and cleanup

RESEARCH PROJECTS

Project 1: Dynamic exposure pathways under the conditions of environmental emergencies.

Goal: Study the mobilization of contaminants through laboratory and computational models.

Project 2: Novel broad-acting sorption materials for reducing bioavailability of contaminants.

Goal: Development of novel enterosorbent materials for communities at risk of exposure to hazardous substances during disasters.

Project 3: *In vitro* and *in vivo* studies of hazard, kinetics and inter-individual variability of responses to mixtures.

Goal: Develop a tiered translational experimental testing strategy for evaluating inter-tissue and inter-individual variability in responses to mixtures.

Project 4: *In vitro* multiplex single-cell assays to detect endocrine disruption potential of mixtures.

Goal: Develop and commercialize *in vitro* assays that facilitate evaluation of endocrine disruption hazards through novel high throughput imaging approaches.

SUPPORT CORES

Administrative Core

The central hub for all Superfund Center activities. Provides leadership and guidance, assuring the excellence of research, support, outreach, community engagement, translation, and training activities

Community Engagement Core

Builds relationships with community partners to ensure community involvement in every stage of the research process to the communication of findings

Research Translation Core

Expands the reach and impact of research by communicating key findings with stakeholders and communities with the dissemination of key data and predictions on the impacts of contamination

Training Core

The central hub for science and practice learning by creating opportunities for the professional development of graduate students and postdoctoral fellows

Data Science Core

Translates data produced by the research projects into useful knowledge for the community via data collection, quality control, analysis, and modeling

Decision Science Core

Helps investigators to convert environmental and biological data into predictions of health effects and economic costs useful for risk management

Exposure Science Core

Uses state of the art instruments to identify known chemicals of interest, as well as unknown chemicals in environmental samples to understand exposures

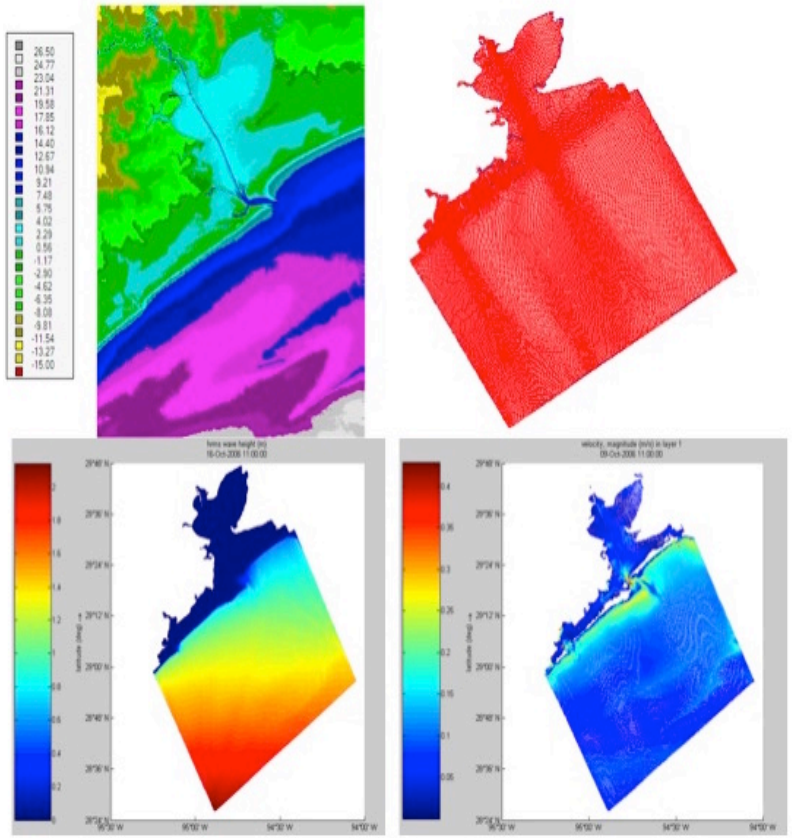
Project 1:

Dynamic exposure pathways under the conditions of environmental emergencies

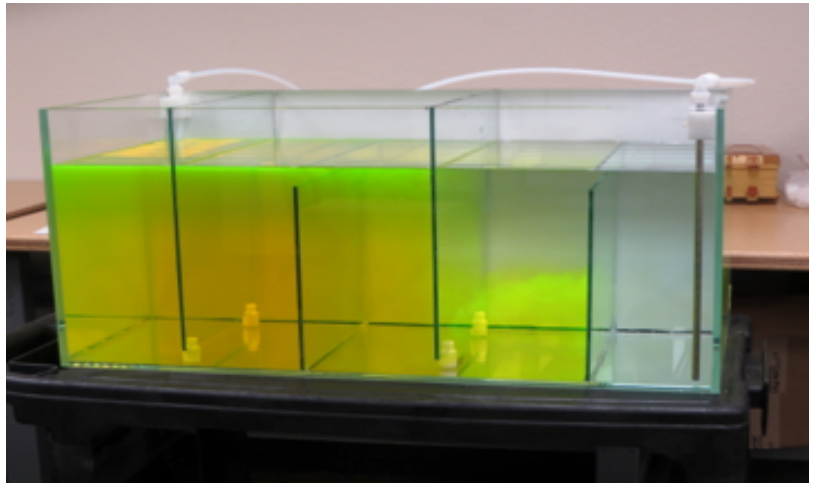
Principal Investigators:
ANTHONY KNAP (GERG)
TERRY WADE (GERG)

Co – investigators:
MIKYOUNG JUN (STAT)
JAMES M. KAIHATU (CVEN)

https://superfund.tamu.edu/project-1/



Goal: to develop a comprehensive strategy for characterizing exposure pathways to contaminated sediments and soils mobilized by environmental emergency conditions



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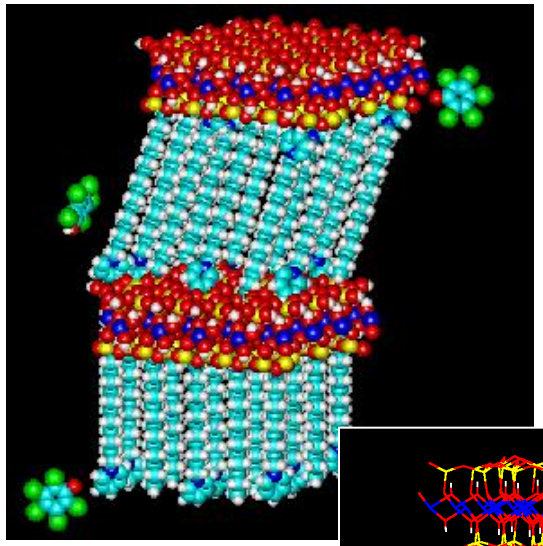
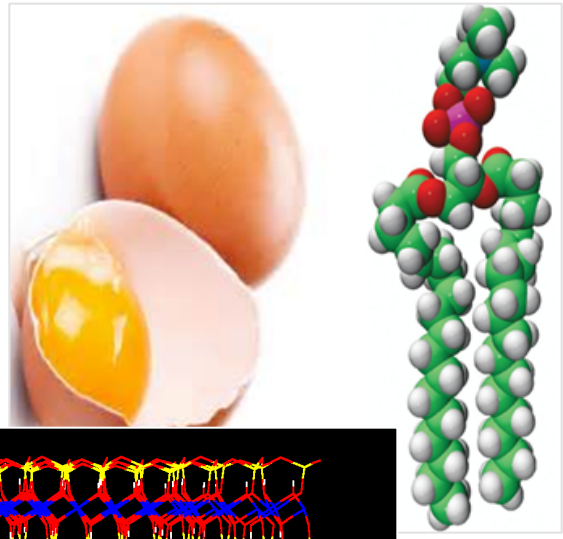
Project 2:

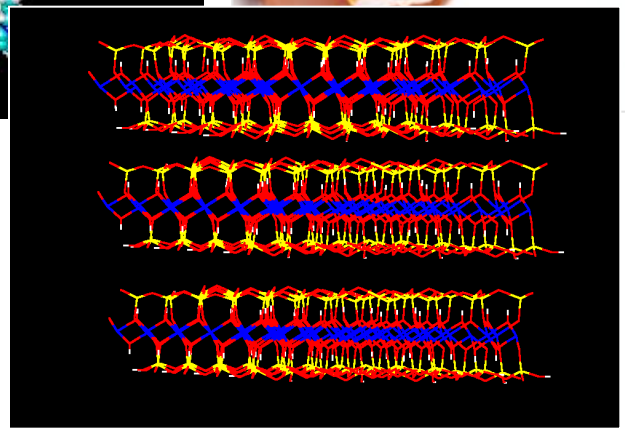
Novel broad-acting sorption materials for reducing bioavailability of contaminants

Principal Investigator:
TIMOTHY PHILLIPS (VIBS)

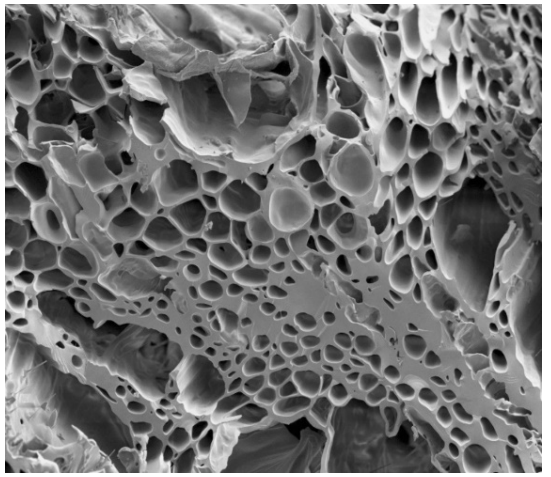
Co – investigator:
STEVEN WHEELER (UGA)







Goal: Development of novel enterosorbent materials for communities at risk of exposures to hazardous substances during disasters



https://superfund.tamu.edu/project-2/

Patent #9,597,313 [issued 3/21/2017]
"Composition and methods for the entero-sorption and management of toxins"

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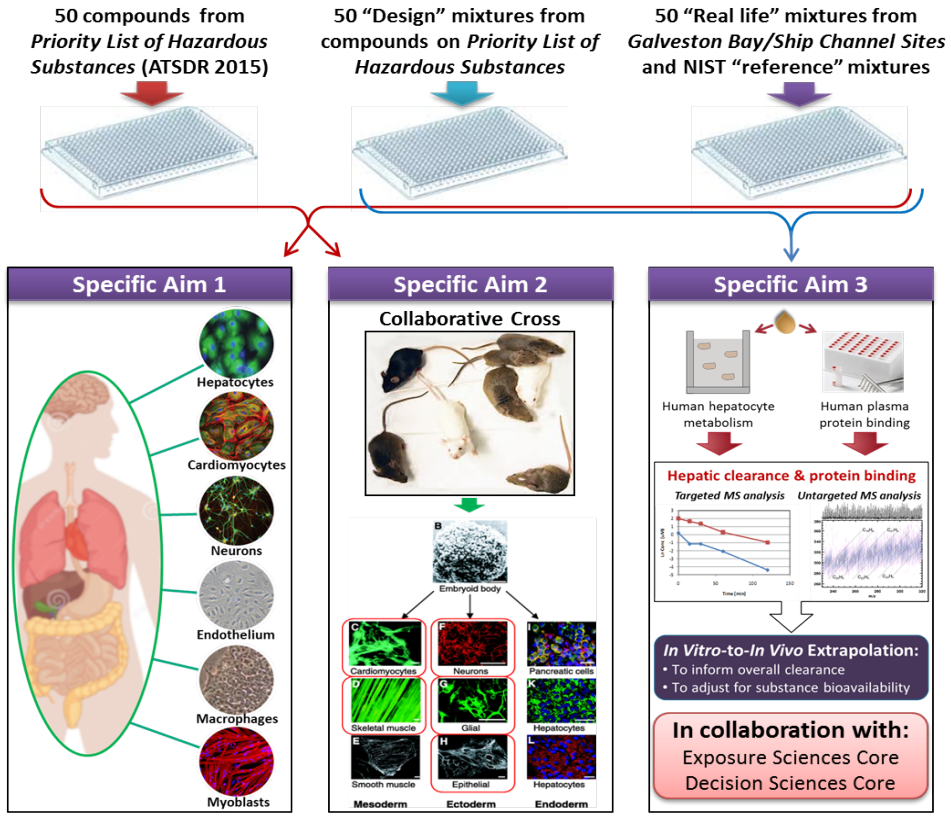
Project 3:

In vitro and *in vivo* studies of hazard, kinetics and inter-individual variability of responses to mixtures

Principal Investigator:
IVAN RUSYN (VIBS)

Co – investigator:
DAVID THREADGILL (VTPB)

https://superfund.tamu.edu/project-3/



Goal:
to develop a tiered translational in vitro-to-in vivo experimental testing strategy for evaluating inter-tissue and inter-individual variability in responses to mixtures

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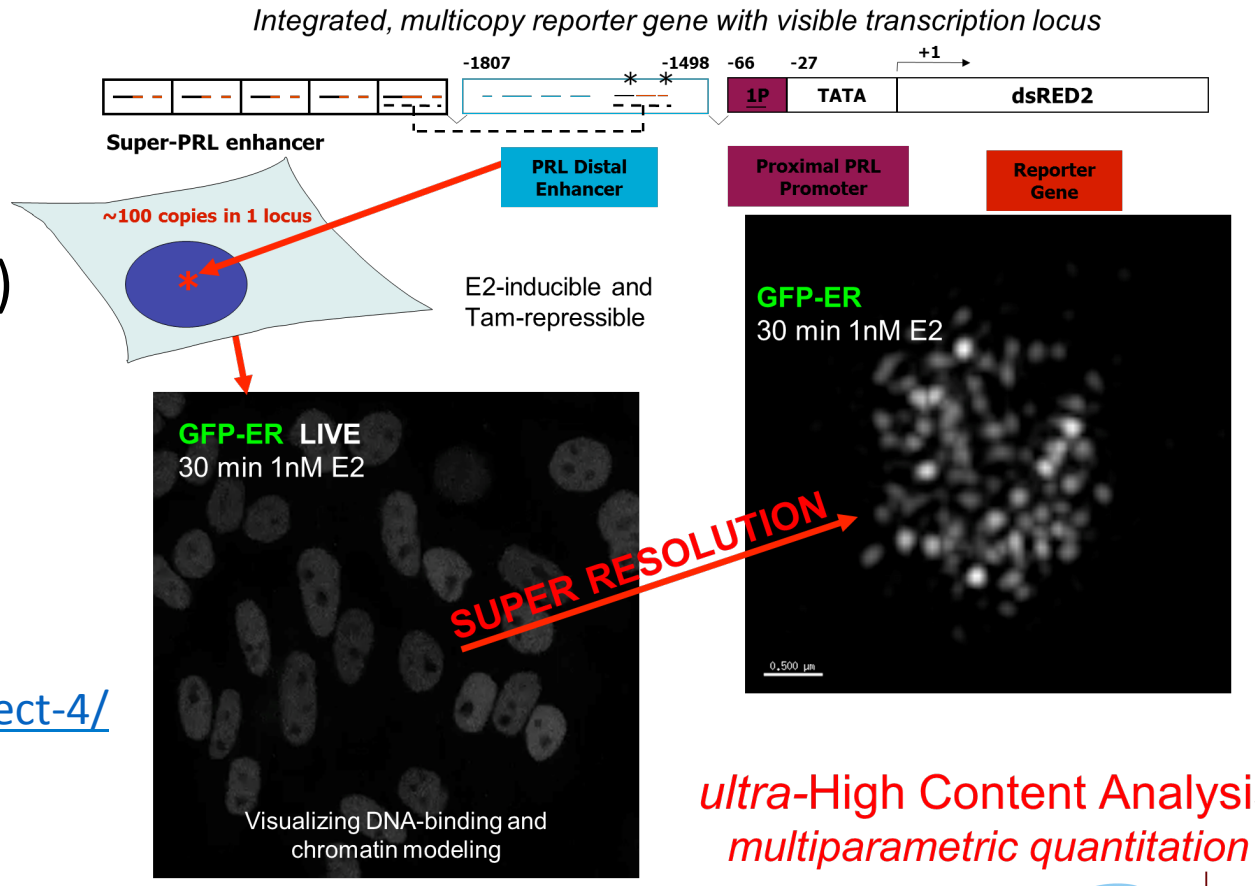
Project 4:

In vitro multiplex single-cell assays to detect endocrine disruption potential of mixtures

Principal Investigator:
MICHAEL MANCINI (BCM)

Co – investigator:
FABIO STOSSI (BCM)

https://superfund.tamu.edu/project-4/



ultra-High Content Analysis
multiparametric quantitation

Goal:
to develop and commercialize *in vitro* assays that facilitate evaluation of endocrine disruption hazards through novel high throughput imaging approaches

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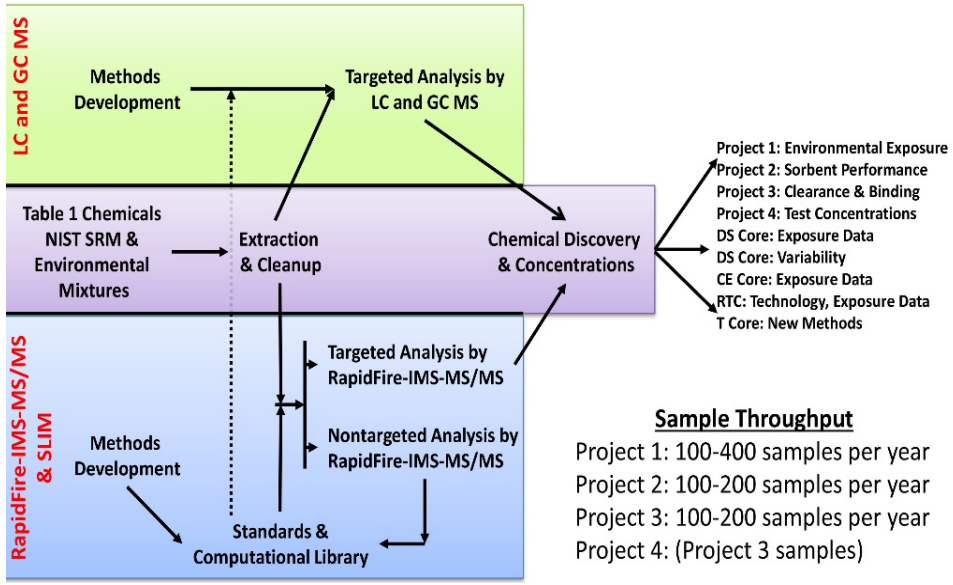
RESEARCH CORES

Exposure Science Core:

To address the needs for novel analytical methods for Exposure ID during an environmental emergency:

- Targeted analyses
- Non-targeted analyses



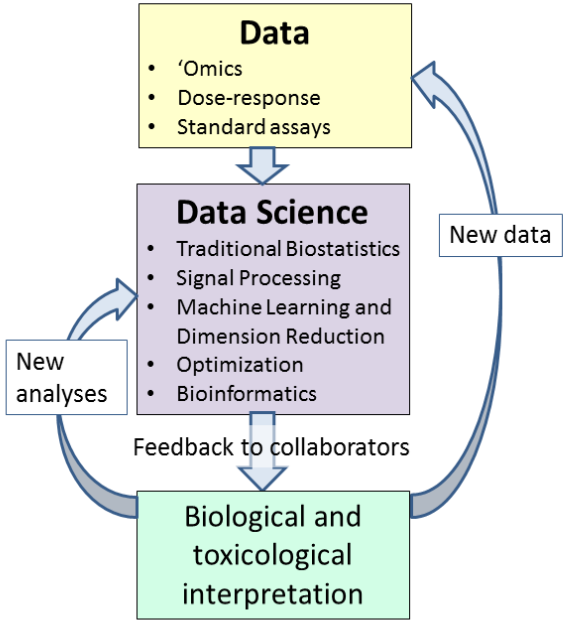
Sample Throughput

Project 1: 100-400 samples per year
Project 2: 100-200 samples per year
Project 3: 100-200 samples per year
Project 4: (Project 3 samples)

Data Science Core:

Using big data to address challenges in decision-making on mixtures:

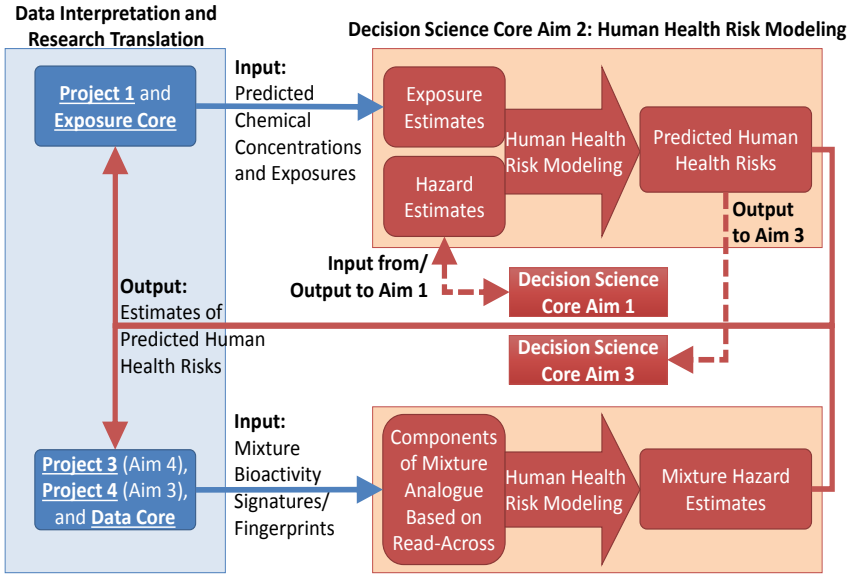
- Multiclass classification
- Optimal clustering
- Simultaneous dimensionality reduction



Decision Science Core:

Bridging the gap between decision-making and Center data:

- Toxicokinetic modeling
- Human health risk modeling
- Economic modeling



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SUPPORT CORES

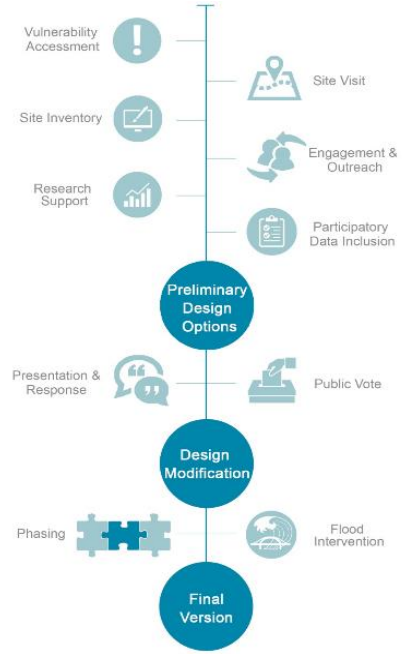
Community Engagement:

To develop, apply, and translate a comprehensive set of tools and models that will aid in mitigating the human health consequences of exposure to hazardous mixtures during environmental emergency-related contamination events

t.e.j.a.s
Texas Environmental Justice Advocacy Services

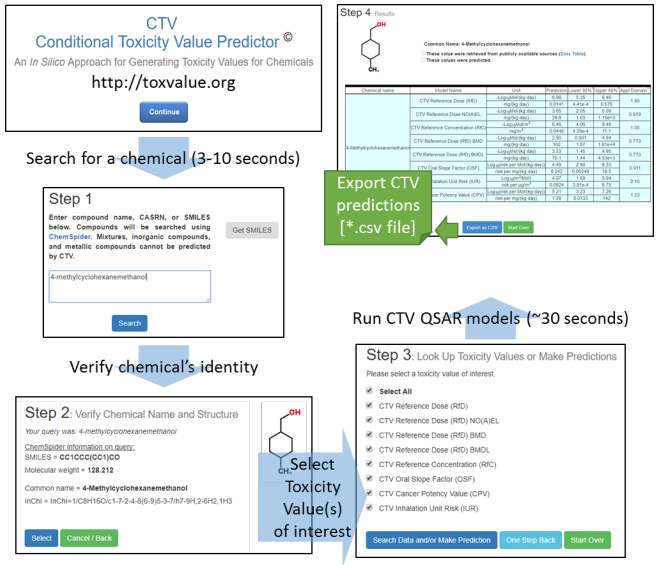
CHARITY PRODUCTIONS
SINCE 1984

THE GREEN INSTITUTE
FURR HIGH SCHOOL



Research Translation:

To advance the practical application of Center's research through interactions with stakeholders and deployment of innovative decision support tools and environmental assessment technologies for responding to emergency events



Example decision-support tool: http://toxvalue.org/

Training:

To educate trainees and faculty in disaster response and regulatory science through innovative special programs and boot-camps

Poster presentation boot camp (2018)

Topic	Date	Instructor(s)
University Writing Center workshop	Se	
Rough sketch main poster components: rationale/abstract (incl. hypothesis), methods, results	Se	
Develop electronic version of poster for peer review	Se	
Peer review updated posters; "field trip" to have updated posters printed	Se	
How to engage passers-by and field questions	Se	
3-minute speed presentation of electronic poster to peers	Se	

Platform presentation boot camp (2018)

Topic	Date	Instructor(s)
UWC platform presentation workshop	Session 1 April 6	University Writing Center
	Session 2 April 6	Langford UWC instructors
	Session 3 April 11	Langford Horney
	Session 4 April 13	Langford Horney Porter
	Session 5 April 20	Langford Other faculty
	Session 6 April 27	Langford Other faculty
	Session 7 April 30	Langford Other faculty

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Pilot Projects Funded in 2018 (from TAMU VPR funds)

Perceptions of Apologies among Houston Residents Living with Environmental Risk

PI: Phia Salter; **Co-I:** Michael Perez

Department of Psychological & Brain Sciences and the Africana Studies Program at Texas A&M University

Translation of multi-stream data into interactive visual profiles

PIs: David Reif, North Carolina State University and Weihsueh Chiu, Texas A&M University

Development of receptor-binding based biosorbent through microbial nano-templating for endocrine-disrupting compound (EDC) removal

PI: Arum Han, Dept. Electrical and Computer Engineering & Dept. Biomedical Engineering, Texas A&M University

Co-Is: Hongmin Qin, Department of Biology; Kung-Hui Chu, Department of Civil Engineering; Texas A&M University

Hurricane Harvey [August 25-29, 2017]

Texas A&M University Superfund Center award date: August 31, 2017

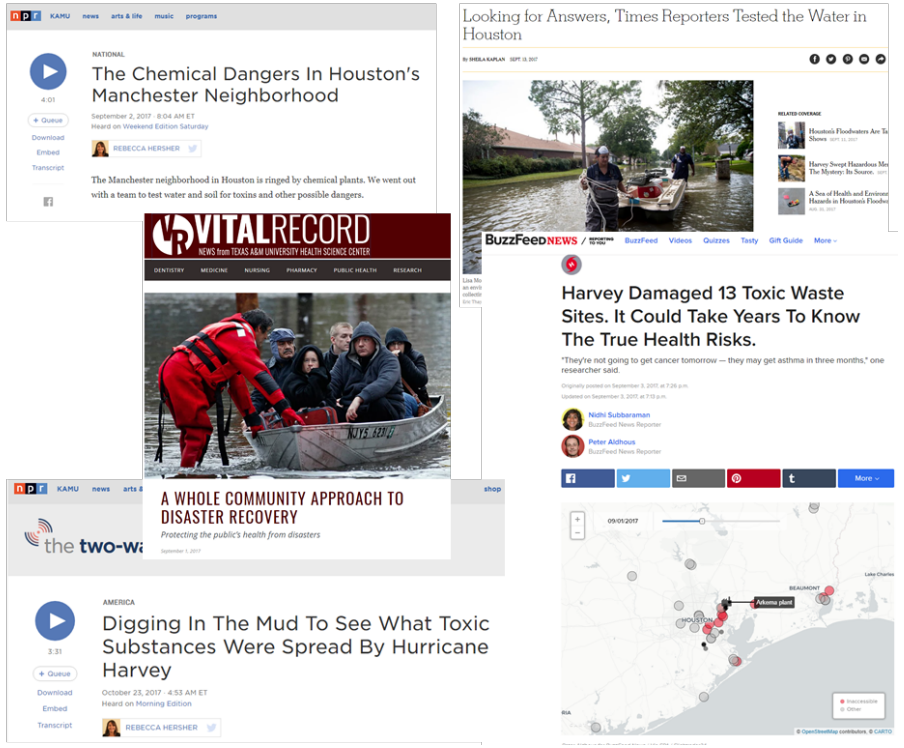
Post-Harvey sampling:

In the homes

In the communities

In Galveston Bay and other watersheds

Post-Harvey translation:



Post-Harvey analyses:

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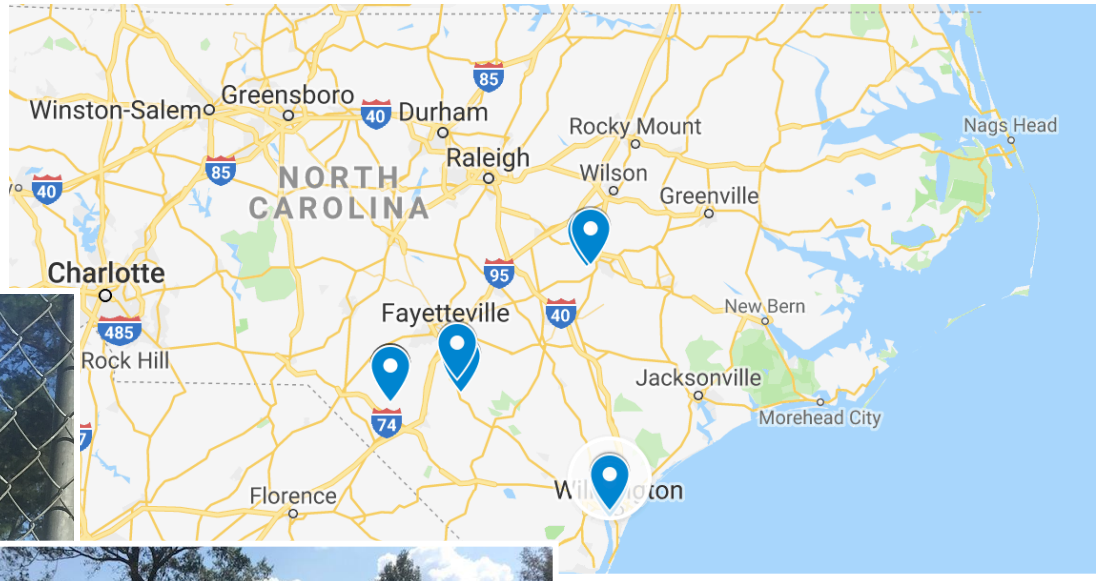
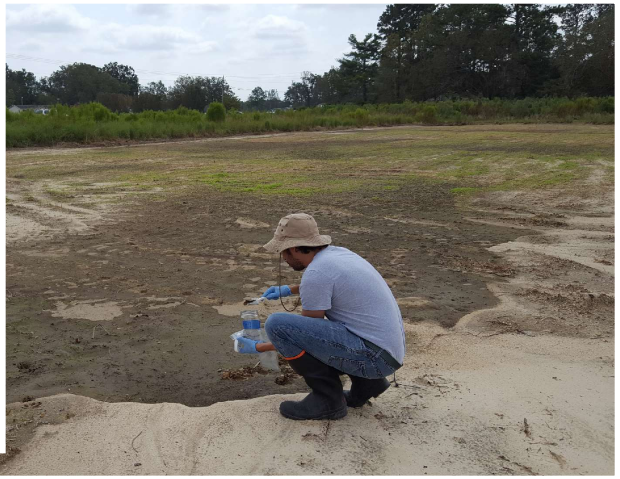
Hurricane Florence [August 31 - September 20, 2018]





Photographs by Gaston Casillas (TAMU-Superfund)

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Texas A&M Superfund Center Disaster Research Training Workshop

Key topics:

- Incident command system and emergency operation centers
- Risk communication
- Hazardous occupational environments
- Human health impacts of disasters and environmental emergencies
- Protocols and best practices for environmental sampling in the field
- Hands-on practical training exercises

SAVE THE DATE

TEXAS A&M SUPERFUND RESEARCH CENTER
DISASTER RESEARCH TRAINING WORKSHOP
DECEMBER 17-18, 2018

LOCATION
Texas A&M Engineering Extension Service (TEEX), Disaster City
College Station, TX

COST
$500/person
Includes coffee, snacks, lunches, transportation to and from TEEX (does not include hotel & other travel cost)

REGISTRATION
Register here

INFORMATION
Judlyn Telesford-Checkley
Tel: (979) 862-4063
Email: JTelesford-Checkley@cvm.tamu.edu