Welcome

THE UNIVERSITY OF TEXAS AT ARLINGTON
Forum on ‘Natural Disasters & Community Resilience’
The University of the Future?

• Is higher education, writ large, doing all it should, and could do, for today’s & tomorrow’s students?
The University of the Future

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• No!
The University of the Future

• Is higher education, writ large, doing all it should, and could do, for today’s & tomorrow’s students?

  • No!

• What is the problem, and is there a solution?
The Earth-Human System

1. The Earth-Human System (EHS) is operating well beyond carrying capacity (expert opinion).

2. The EHS is strongly coupled, very complex, and incompletely understood—what, then, can be done?

3. Climate change is only one aspect of a very much larger “systems problem”.
The Earth-Human System

4. Transitions are likely to occur more rapidly than society can adapt → social stress and disruption…

5. As a whole, human behavior, globally, is largely “business as usual” — with some noteworthy but limited exceptions

6. Higher education—universities and colleges—are the ideal engines to “face and embrace” the future
The Earth-Human System

4. Transitions are likely to occur more rapidly than society can adapt → social stress and disruption…

5. As a whole, human behavior, globally, is largely “business as usual” — with some noteworthy but limited exceptions (but that enables magical thinking!)

6. Higher education—universities and colleges—are the ideal engines to “face and embrace” the future
The University of the Present

• **Tradition**: specialized training—business, engineering, health, sciences, humanities…
  – But that model—life-long careers—is very much less valid today.

• **Inertia**: Universities change very slowly!
  – A major virtue, but now this inertia has become a vice.

• **Anxiety**: “We all know there is a problem, but we don’t know what a genuine solution looks like.”
  – The *University of the Future* confronts this issue directly!
The University of the Future

• Embraces the Earth-Human System as the central element in higher education.
  – **Step one**: Organize a year-long *Series* of high-quality, coherent presentations according to a syllabus that spans all relevant aspects:
    • Module 1: Fundamentals and Global Aspects
    • Module 2: Physical Elements in the EHS
    • Module 3: Irreversible Processes
    • Module 4: Human Elements in the EHS
    • Module 5: Scenario Construction
The University of the Future

- Embraces the Earth-Human System as the central element in higher education.

  - **Step two:** Establish a Department of the Earth-Human System (DEHS)

  → DEHS exerts an increasing impact in curricular organization and development.
The University of the Future

• Embraces the Earth-Human System as the central element in higher education.

TAG Step three: The curriculum has evolved, to one that best serves the students of tomorrow.

TAG The DEHS is accepted as having enabled a transition to the University of the Future
The University of the Future

• I have composed a “prospectus” about this in which important details, syllabus, and implementation scenario are elaborated. (This is really a manifesto!)

• Contact: nygren@uta.edu

• Please feel welcome to join me in the quest to envisage / realize the University of the Future!
THE UNIVERSITY OF TEXAS AT ARLINGTON

Forum on ‘Natural Disasters & Community Resilience'
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Florence Haseltine, PhD, MD

Department of Health and Human Services (HHS) Resources in Emergencies
Section 319 of the Public Health Service Act

a) A disease or disorder presents a public health emergency or

b) A public health emergency, infectious disease or bioterrorist attacks

- HHS – Office of Disaster Preparedness
- Public Health Services
- CDC
General Information Related to Health

- **At-Risk Populations**
  - e.g. Elder population with extreme heat
- **Alerts, Warnings, and Communications**
- **Education and Training**

Specific Information on each type of disaster

- **Plans, Tools, and Templates**
HHS- HealthCare Emergency Information Gateway

- Technical Resources
- Assistance Center
- Information Exchange

**Hurricanes**

**Extreme Heat**

**Tornadoes**
Water Issues

Lack of Water

Keeping people hydrated

Keeping people out of the water

- Debris
- Sewage
- Nuclear Waste from Hospitals
- Snakes and other problematic animals

Onion Water Tank

Fire Ants
• Federal Policy for the Protection of Human Subjects ('Common Rule')

• Exception from informed consent requirements for emergency research designed to help with epidemiologic studies to be added to lessons learned
Two Institutes Have Strong Focus on Global Environmental Impact

The mission of the National Institute of Environmental Health Sciences (NIEHS) is to discover how the environment affects people in order to promote healthier lives.

- Global environmental health & stewardship
- Disaster health effects
  - Manmade: Chemical and oil spills
  - Natural: Hurricanes and tsunami
- Disaster research response
- Nanomaterials and the environment
- Endocrine disruptors
- Environmental influences on Child Health Outcomes
- Exposure biology

Fogarty International Center and its NIH partners invest in research on a variety of topics vital to global health. Topics relevant to environmental impact include:

- Climate change
- Household air pollution
- Implementation science
- Infectious diseases
- Preparedness
Multiple Institutes Have Strong Focus on Global Environmental Impact

Pat Hunt at Washington State University

- Funded not just by NIEHS
- But also by GM and NICHD
  - Endocrine disruptors
  - Environmental influences on Child Health Outcomes
  - Exposure biology

- Her genetic studies in mice lead her to the dangers of Bisphenol A, a plasticizer in the animals cages
Forum on ‘Natural Disasters and Community Resilience’

Nick Z. Fang PhD, PE

Understanding of Natural Disasters to Build Our Communities More Resilient
THE POTENTIAL ESTIMATED DAMAGE BY HARVEY $125 BILLION
Texas Medical Center

- 54 institutions including the largest children hospital and cancer hospital in the world with 106,000 employees
- 10 million patients visit per year
- 1 surgery every 3 minutes
- 8th largest business district in the U.S.
Flood Alert System (FAS4)

- High-resolution NEXRAD Radar-rainfall calibrated by rain-gauges
- Rapid prediction of stream-flow conditions using hydrologic models
- Rapid prediction of inundation levels using the Floodplain Map Library (FPML)
- Visual confirmation of inundation levels provided by in-situ bayou cameras
- Automatic dissemination of emergency warnings delivered via website and text message.
Rice/TMC Flood Alert System (FAS4)

Data Retrieval Module
- NEXRAD
- QPE & Rain Gages

Flood Prediction Module
- Real-Time Rainfall
- Real-Time Hydrographs
- Flood Plain Map Library
- Visual Monitoring & Verification
- Real-Time Forecast Flood Map

Warnings & Communication Module
- Rice/TMC
  - Website
  - Social Media
  - E-mail
  - Phone
- Alert Levels
  - Flood Protection & Action Levels
  - Flood Protection & Emergency Actions
    - Evacuations
    - Flood door closure
    - Recall of Personnel
    - Backup Power

FANG RESEARCH GROUP
The University of Texas at Arlington
FAS-GP and FAS-WOB

Flood Alert System for Grand Prairie

Flood Alert System for White Oak Bayou
InFRM Watershed Hydrology Assessment

Sponsored by FEMA Region 6

Basins Underway:
- Neches, Trinity, and Guadalupe

Frequency Flows for Design & NFIP
- 2-, 5-, 10-, 25-, 50-, 100-, 250-, 500- yrs

Interagency Flood Risk Management (InFRM) Academic Council

Academic Council
- RICE
- University of Texas at Arlington
- University of Texas at Austin
- LSU
- UTSA
- TAMU
Many severe hurricane-induced urban floods occurred in coastal communities:


Meanwhile, coastal cities also experience significant land subsidence (LS) and sea level rise (SLR):

- which exacerbate the urban floods.
- SLR and LS have rarely been considered in the existing urban flooding

Thus, we are motivated to establish the first and innovative methodology to understand and identify urban flood exacerbated by the contributing impacts from LS and SLR.
Many severe hurricane-induced urban floods occurred in coastal communities:

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UAV Advanced Sensors, Capabilities & Research: The MavAir Experience

- High-Resolution Imagery
- LiDAR
- InSAR
- Hyperspectral Sensors
- Waypoint Navigation

Flood Damage/Hazard Assessment, Reconnaissance, Disaster Relief
Vegetation Studies, Environmental Assessment
Erosion Deposition, Scour, River Morphology

3-D Mapping, GIS, Topographic
Construction, Site Monitoring
Agriculture, Soil Moisture

—Water Resources
The University of Texas at Arlington
Texas Consortium for Infrastructure Modeling and Management

Data
- Rain Gage
- Radar
- PRISM
- Satellite

Rainfall & Storm
- Storm Catalog
- Stochastic Storm Transposition
- Stochastic Storm Generator

Storm Surge
- ADCIRC Simulation
- Fully-physics-based

Flooding
- WRF-Hydro Simulation
- Large Riverine Scale

Runoff & Inundation
- High resolution
- Urban Environment
Thanks for listening!

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Registrant Speakers

- DJ Seo
- Hershel Thomas
- Courtney Cronley
- Paul Componation
- Diane Allen
- Ard Anjomani
- Kelly Bergstrand
- Michelle Hummel
- Troy Johnson
- Daniel Sledge
- Nur Yazdani
- Yu Zhang
Upcoming Strategic Plan Events

Symposium on Health and the Human Condition  
*Thursday, April 18, 8:30-10:30 a.m.*  
[Register Today!](#)

Forum on Faculty and Staff Excellence  
*Wednesday, April 24, 1:00-3:00 p.m.*  
[Register Today!](#)

Forum on Corporate Partnerships  
*Friday, May 3, 8:30-10:30 a.m.*  
[Register Today!](#)

Symposium on Data-Driven Discovery  
*Wednesday, May 8, 9:00-11:00 a.m.*  
[Register Today!](#)