



Community of Research Scholars, Labs & Resources

Lightning Talks

December 2019

FedEx Institute of Technology

THE UNIVERSITY OF
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Welcome

Teresa Franklin

Executive Director, iIMPACT
Division of Research and Innovation

THE UNIVERSITY OF
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Troy Parkes

UMRF Research Park

THE UNIVERSITY OF
MEMPHIS



Naomi Eichorn

Team-based Healthcare

Faculty and Community Collaborators



Naomi Eichorn
CSD/SLP



Marian Levy
Public Health



Joy Hoffman
Nursing



Deborah Moncrieff
CSD/Audiology



Melissa Zarn
Optometry

SOUTHERN
COLLEGE OF
OPTOMETRY



Jason Caplan
Founder, ULR



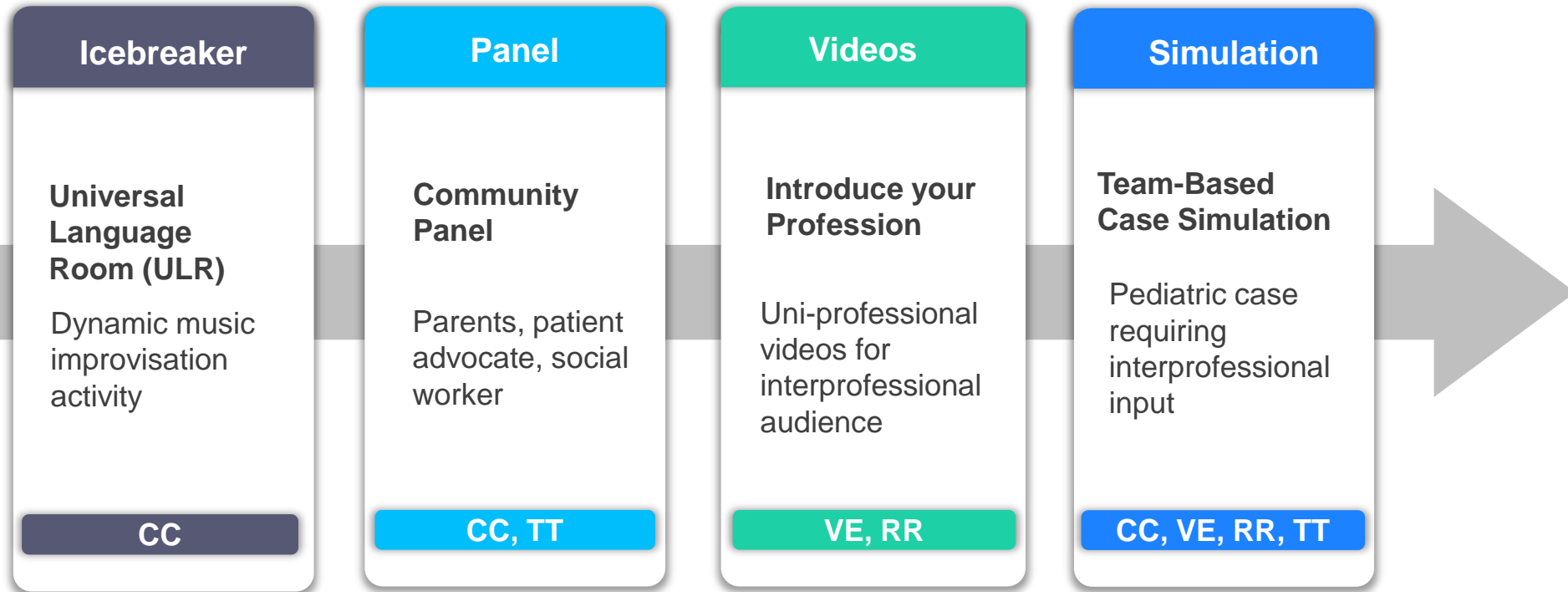
Caroline Sposto
Actor/educator



Goal

Develop, implement and assess a framework for team-based healthcare and interprofessional education

Pilot Course: Components

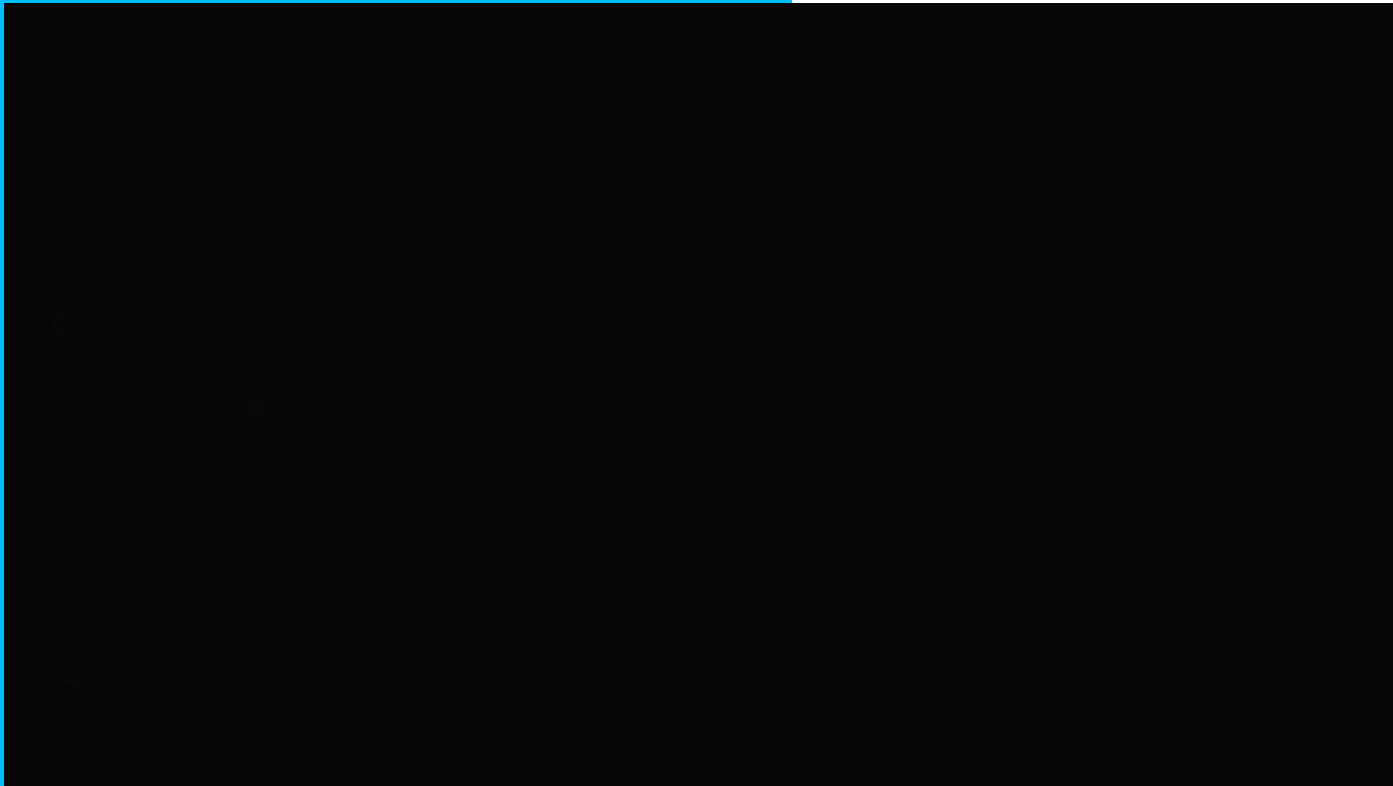


Students organized into interprofessional teams (5 students per team)



Conclusion

Student Perceptions



Outcomes

- Successful framework for cross-program and cross-institution interprofessional education (IPE)
- Pilot data demonstrating improved IPE competencies
- Submission of Dept of Ed. grant related to personnel preparation in IPE
- Manuscript under review, 3 in preparation
- Formation of student-led IPE organization



Omar Skalli

Integrated Microscopy Center

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THE INTEGRATED MICROSCOPY CENTER

WHO WE ARE:

- University shared-core facility reporting to the Executive VP for R&D.
- Funded through Office of Executive VP for R&D, user fees and NSF MRI grant.
- Open to UM and non-UM investigators from academia and private sector.
- Staff includes Director, Material Science Manager, Technical Coordinator .

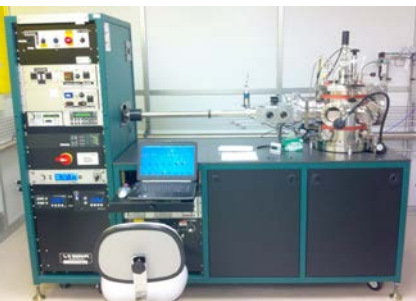
WHAT WE OFFER:

High-end instrumentation and services for STE(M) R&D including:

- High resolution SEM capable also STEM, EDS mapping and EBL.
- Confocal scanning laser fluorescence microscope.
- Histology and tissue immunolabelling services.
- X-ray photoelectron spectroscopy (XPS), unique in Memphis and surrounding area
- Metal deposition unit

WHERE WE ARE LOCATED:

- In the ground floor of the Life Sciences building on Walker Avenue.
- Contact: imc@memphis.edu or oskali@memphis.edu





Firouzeh Sabri

Materials Science Laboratory

- **Associate Professor of Physics and Materials Science**
 - ❖ Porous materials-Sol-Gel-aerogels
 - ❖ Elastomers and composites, “smart” materials with sensing capabilities
 - ❖ Scaffolds for neuro-regeneration, neural prosthetics-Biophysics
 - ❖ High performance thermal insulation
- **Co-Director, Biologistics Research Cluster-FIT**
 - ❖ **(Co-Director Mike Golias)**
 - ❖ Transportation and storage optimization and advances in biostorage
 - ❖ Packaging and Tracking/Tracing
 - ❖ Cyber and physical network security
 - ❖ Organizational practices
- **2019 CoRS: Renewable, Sustainable, and Clean Energy Research & Education**
 - ❖ Motivation: To consolidate efforts and create one connected community from across disciplines that normally would not have reasons to interact. “One Stop Shop” virtual core facility
 - ❖ Dr Mohd Hasan Ali-EECE, Dr George Deitz-Marketing & Supply Chain Management, Dr Kevin Berriso-Computer Engineering—more members to be invited!



PK JAIN

Financial Infrastructure Stability &
Cyber-security Center (FISC)

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Cook Lab Innovations in FinTech



Pankaj Jain, Vivek Sharma, Rasheek Irtisam

The University of Memphis

Machine Learning

- Machine learning is a field of computer science that uses statistical techniques to give computers the ability to "learn" with data and progressively improve performance on a specific task.

MACHINE LEARNING USE CASES IN FINANCE



Process
Automation



Security



Underwriting and
credit scoring



Algorithmic
trading



Robo-advisory

- Security:** Security threats in finance are increasing along with the growing number of transaction, users, and third-party integrations. And machine learning algorithms are excellent at **detecting frauds**. For instance, banks can use this technology to monitor thousands of transaction parameters for every account in real time.

Research Projects at FISC

- *Insights from Bitcoin Trading.* [Pankaj K. Jain](#), [Thomas H. McNish](#), and Jonathan Miller. Fintech Special Issue, Financial Management, forthcoming, 2019.
- *Trade signing in fast markets.* [Allen Carrion](#) and Madhuparna Kolay. Financial Review, forthcoming, 2019.
- *Unfiltered Market Access and Liquidity: Evidence from the SEC Rule 15c3,* B. Chakrabarty, [Pankaj K. Jain](#), Andriy Shkilko, [Konstantin Sokolov](#), Management Science 2019.
- *The Impact of Default and Foreclosure on Housing Values: Rings vs. Neighborhoods Approach.* Ying Huang, [Ronald Spahr](#) and [Mark Sunderman](#). Journal of Real Estate Finance and Economics, forthcoming, 2019.
- *You're Fired: Gender Disparities in CEO Dismissal.* [Sabatino Silveri](#), Vishal Gupta, Sandra Mortal, Minxing Sun and Daniel Turban, Journal of Management, 2018.
- *Exploring the manipulation toolkit: The failure of Doral Financial Corporation.* Elnahas, Ahmed, [Pankaj K. Jain](#), and [Thomas McNish](#), Applied Economics 50, 157-171, 2018,
- *How a Credit Enhancement Affects Bond Liquidity and Default Risk of the Firm.* [Black, Jeffrey R.](#), S.A. Hoelscher and D. Stock. Journal of Fixed Income, 28(03), 2018.

Student Success Stories

In inter-university hedge fund competition, Memphis students ranked number 1 in the world <https://www.hfcomp.net/winners> with \$10000 cash award beating out 40+ brand name schools like Duke, Vanderbilt, Georgia, Alabama, Auburn, Delaware, Kentucky, UMass, Notre Dame, etc.

<https://www.hfcomp.net/faculty-coordinators> Because of the time faculty spend with students, the training here is actually very solid and better than most places.

Prof. Vivek Sharma

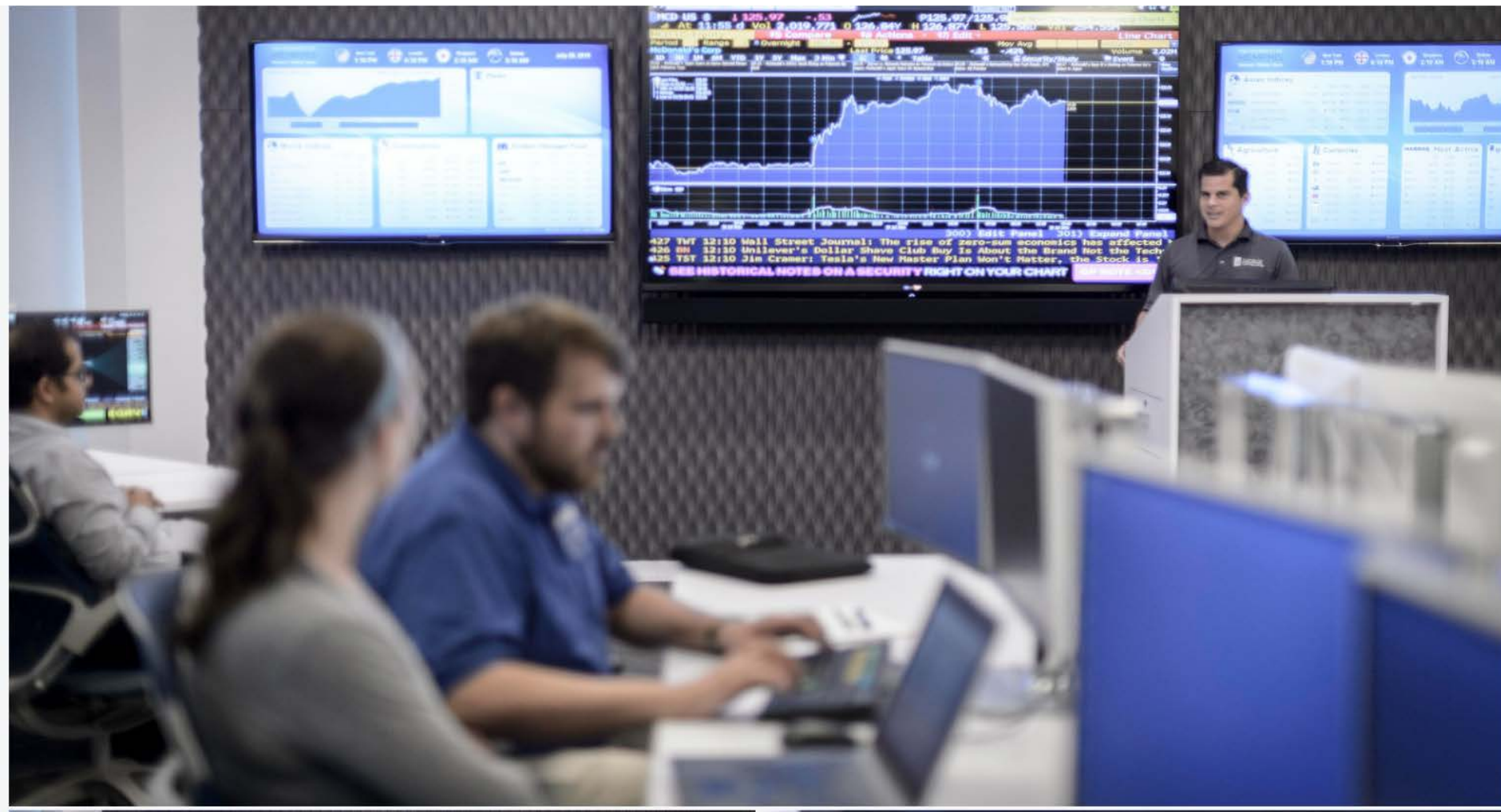


Student Success Stories

- CFA Institute Global Investment Research Challenge Competition 2500 students from 600+ universities
 - Prepare Wall Street equity research reports and manage real \$\$\$ money
 - First place in the 2017 Mid-South preliminary round of the CFA Global IRC
 - Market Price versus Fair Value



FISC Big Data Workshops (rirtisam@memphis.edu)



Datasets access and Training

- We provide you access to the most widely used platform in academic research: WRDS (Wharton Research Data Services)
 - CRSP: historical daily stock prices for all public firms from 1926
 - Compustat and Datastream: provides annual/quarterly accounting information for 99,000 global securities, covering 99% of the world's total market capitalization dating back from 1950
 - Bitcoin Blockchain transactions and Settlement
 - Big Data: Nanosec Timestamp TAQ & ITCH: trades, quotes, orders

Servers

- Two high speed servers to process big data:
- Server 72: Intel Xeon Processor, 128 GB RAM, Windows Server 2012, 100TB+ Fast access storage

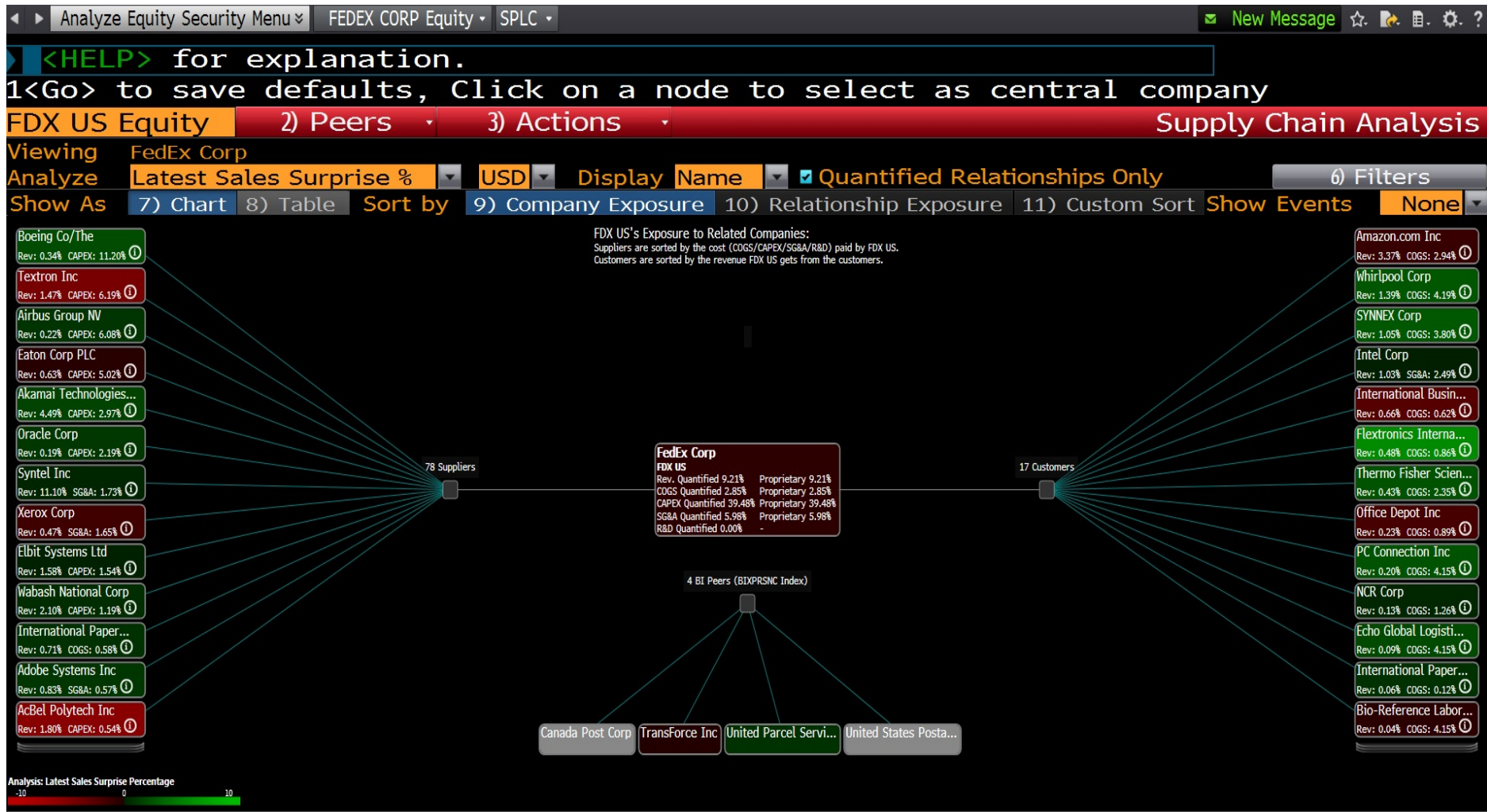


Bloomberg Certification (vsharma@memphis.edu)

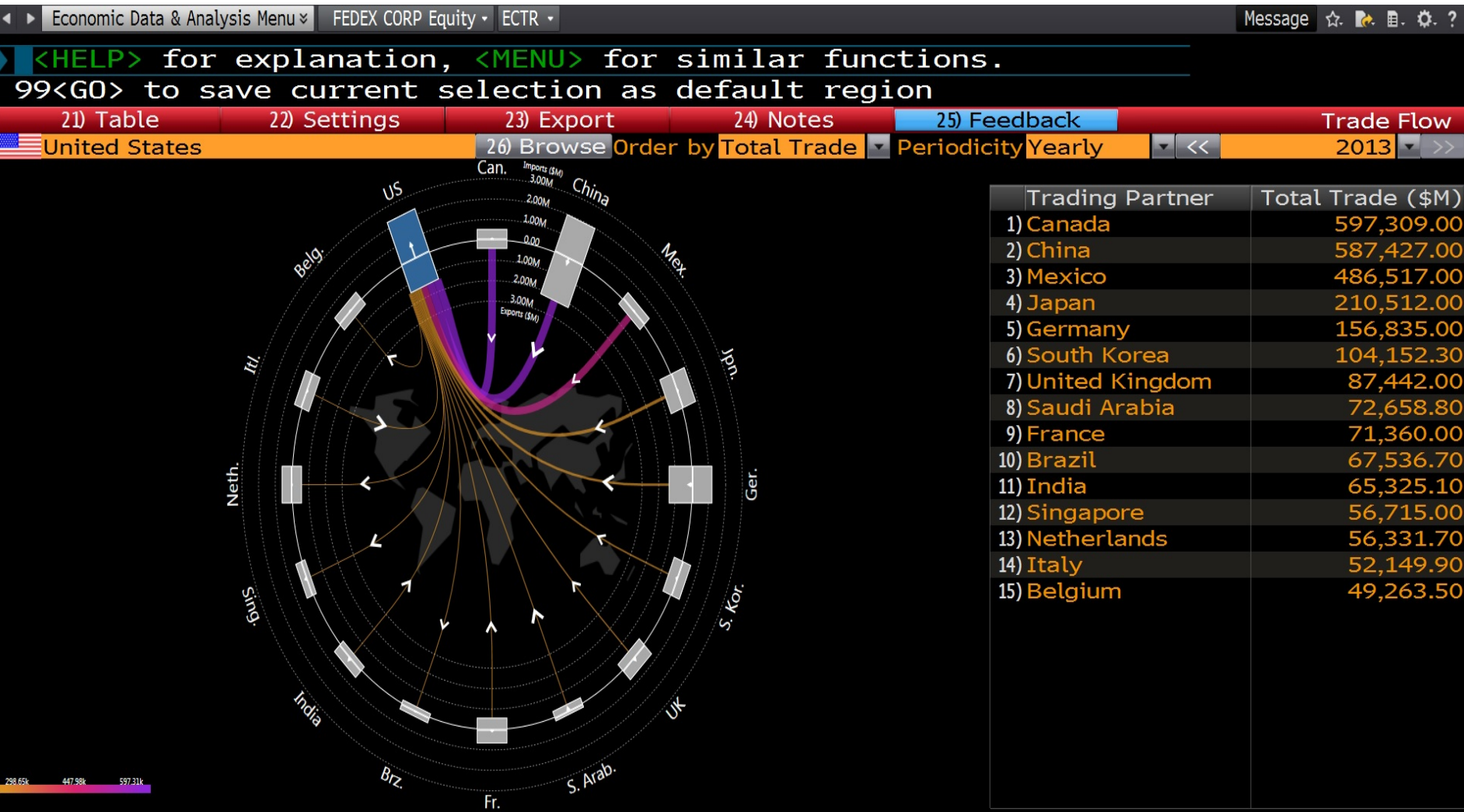
- The Cook Analytics & Trading Lab at FCBE has 12 Bloomberg terminals with real-time and historic information on a variety of markets including equities, fixed income, government securities, commodities and foreign currency markets.



Supply Chain Analysis



Global Trade Network



Contact Information

- Department Website: <http://www.memphis.edu/finance>
- FISC website:
<http://www.memphis.edu/finance/research/fisc.php>
- Email us at FIR@memphis.edu or call us at (901) 678-5980.
- For more information about trading lab, meet us in person at College of Business(FCBE) 4th Floor, Room #402 or Room #123



Brian Waldron

Center for Applied Earth Science
and Engineering Research (CAESER)

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Center for Applied Earth Science
and Engineering Research

Strengthen communities by improving the
environmental and social conditions through
research and collaboration

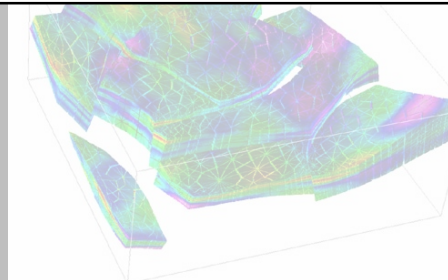
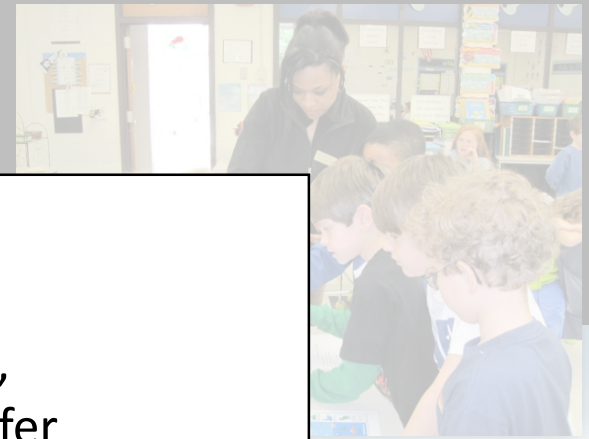
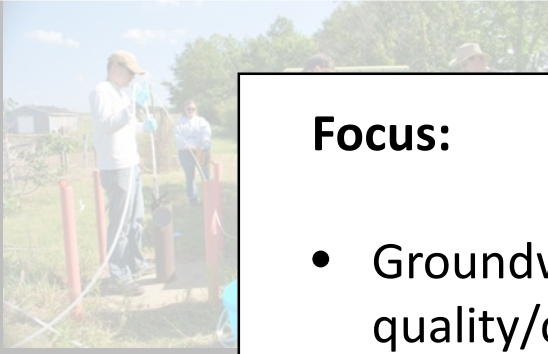
Brian Waldron, Ph.D. PE
Director, CAESER

<http://water-gis.memphis.edu/>

WATER

Focus:

- Groundwater resources, sustainability, quality/contamination, recharge, aquifer characterization
- Surface water modeling, flooding, aquifer exchange, streambed properties, green infrastructure design
- Atmospheric inputs (as drivers)
- Education outreach to multi-generational audiences



GIS

Focus:

- Foremost experts in GIS using ESRI® and third-party solutions
- Provide UoM IT and faculty support with ESRI products
- Legacy data migration, infrastructure mapping, spatial analyses, custom scripting, Python for ETL and data processing, field mapping incl survey-grade GPS

Urban Analytics

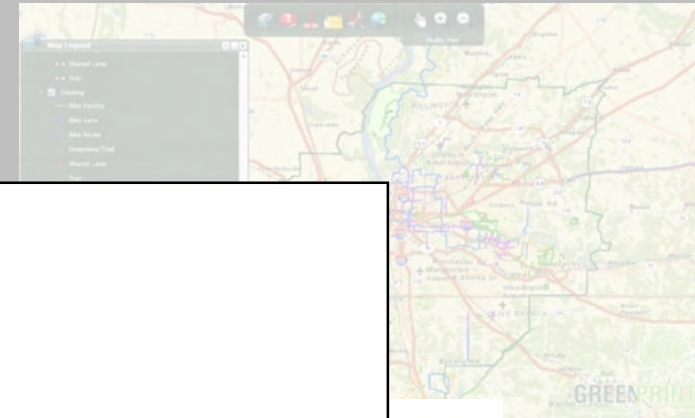
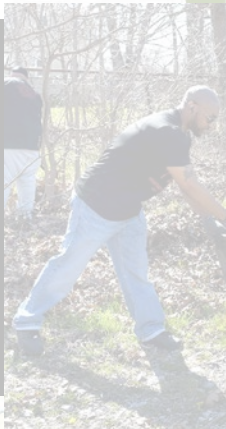
Focus:

- Active connection with nearly 60 community organizations addressing local issues
- Conduct urban analyses and provide analytics/metrics for decision making
- Offer Geoportal for free data sharing; serves as a collaboration platform

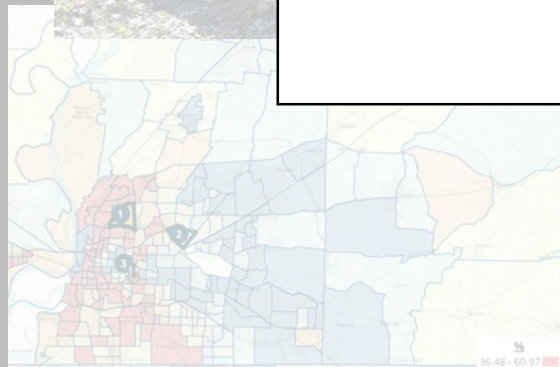
Please don't take our
sunshine away ☹️

WHERE
midso

Discover the info
for the impa



N A L
IT





Chunrong Jia

Environmental Health CoRS

Environmental Exposure Laboratories in School of Public Health

Environmental Health Program
Division of Epidemiology, Biostatistics,
and Environmental Health

Dr. Pratik Banerjee, Associate Professor

Dr. Debra Bartelli, Research Associate Professor

Dr. Chunrong Jia, Associate Professor



Environmental Chemistry Lab

- Thermal desorption–gas chromatography/mass spectrometry (TD-GC/MS)
 - Analysis of volatile organic compounds (VOCs)
- Accelerated solvent extractor (ASE)-GC/MS
 - Analysis of semi-VOCs
- High-performance liquid chromatography (HPLC) with diode-array detector (DAD)
 - Analysis of low- and high-molecular organics

The lab is optimized to analyze a wide range of organic chemicals in air, water, dust, and soil.

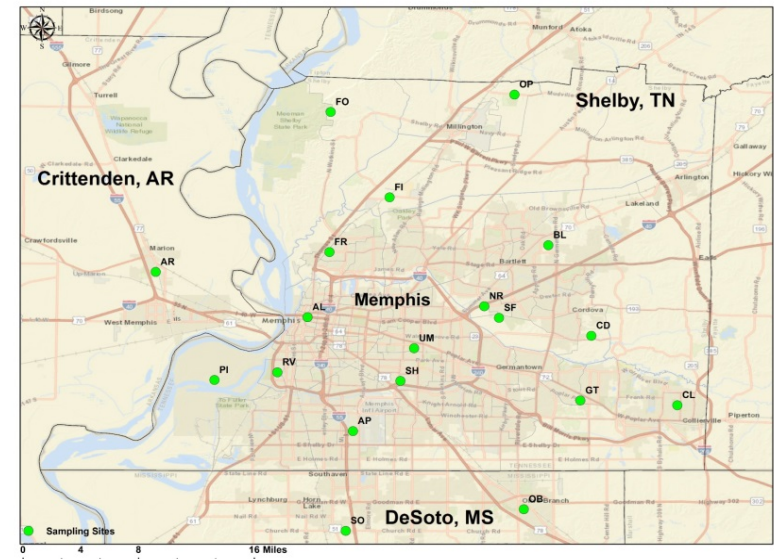
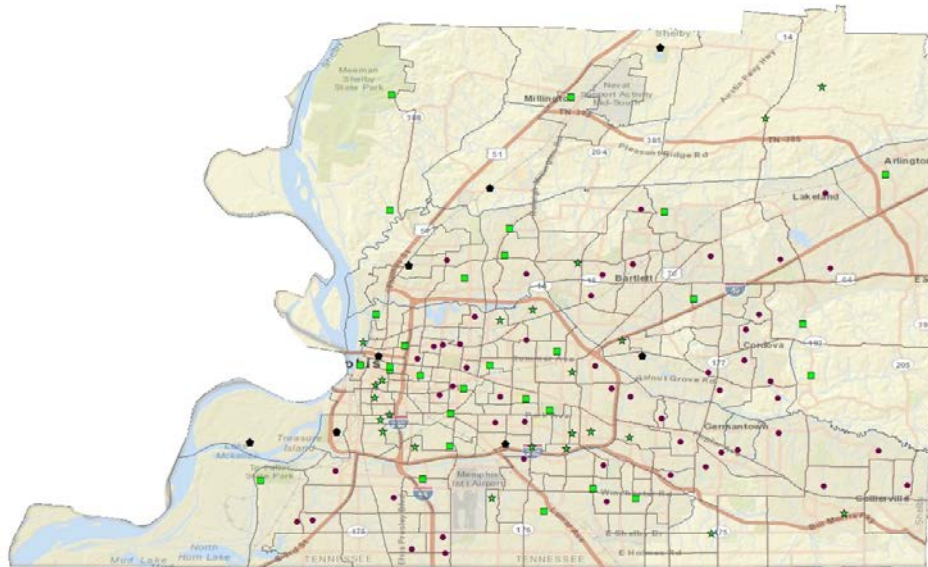


Environmental Microbiology Lab

- Major instruments:
 - qPCR
 - Electrical microscope
 - Photo-spectrometer
- The lab is able to analyze biological agents in air, water, dust, soil, and human specimens
 - Bacteria and other microbes
 - Human and animal tissue culture
 - Microbiome and metagenomics
 - Antibiotic resistance genes (ARGs)
 - Allergens, and other agents



Environmental Monitoring Network





Robin Lennon-Dearing

HIV Disparities CoRS

HIV Disparities Group

Dr. Lennon-Dearing (Social Work)
Dr. Hirschi (Social Work)
Dr. Harrell (Nursing)
Dr. Ward (Public Health)
Dr. Pichon (Public Health)
Dr. Bartelli (Public Health)
Dr. Windsor (Institute for Intelligent Systems)
Jacqueline “Jay” Reid, Graduate Assistant



HIV Criminal Statues in Tennessee

Criminal Exposure to HIV

TCA: 39-13-109

Aggravated Prostitution

TCA: 39-13-516



- Transmission of HIV is not required for prosecution. Both of these charges are Class C felonies that are punished by 3- 15 years in prison.
- Must register as violent sex offenders for the rest of their lives and follow the same sex offender restrictions as pedophiles, rapists and child molesters.






Tennessee HIV Modernization Coalition

- The **Tennessee HIV Modernization Coalition** is a grassroots group of community members comprised of people with HIV who have been criminalized, HIV service providers and public health and legal policy leaders working to modernize Tennessee's HIV-related criminal statutes.

The Tennessee HIV Modernization Coalition is promoting a model bill to be introduced in the upcoming 2020 Tennessee General Assembly.

Criminal Exposure to HIV Will be changed to *Intentional Criminal transmission of an infectious or communicable disease.*

Aggravated prostitution will be repealed.



Modernize HIV Criminal Laws in Tennessee

TOWN HALL

HIV Modernization Town Hall Meeting

Monday, December 9, 2019
At the Benjamin L. Hooks Central Library
3030 Poplar Ave. Memphis, TN 38111
5:30PM – 7:00PM
Meeting Room B/C

- Tennessee's HIV exposure laws are an unrecognized social justice issue that reinforces HIV stigma and discrimination.
- In Tennessee, a charge for criminal exposure to HIV or aggravated prostitution requires the person with HIV to permanently register as a violent sex offender, which restricts access to housing, employment, and education.
- Learn about the proposed model law, that conforms to the Center for Disease Control and the Department of Justice' Best Practices Guide, that will be presented to the 2020 Tennessee General Assembly.

Panel Presentation and Discussion
Open to the Public

Sponsored by: **Tennessee HIV Modernization Coalition**
For more information contact Robin Lennon-Dearing at rlennodr@memphis.edu or 901.828.7312

Activities

Stories of HIV Criminalization

HIV Criminalization in Shelby County

- The impact and consequences of an HIV-related arrest in Tennessee.
- Focus group study ($n = 14$)
- To uncover disparities in arrests and prosecutions of persons living with HIV in Shelby County, TN.
- Public records for 78 cases from the Shelby County District Attorney's office of offenders charged with an HIV-related offense.

Know Your Rights cards

ARE YOU AT RISK OF HIV CRIMINALIZATION IN TENNESSEE? WHAT IS AGAINST THE LAW FOR PEOPLE LIVING WITH HIV?

LIST OF CRIMINALIZED BEHAVIORS

- Anal intercourse without disclosure
- Vaginal intercourse without disclosure
- Blood donation
- Plasma donation
- Needle sharing
- Oral sex (only applies to sex work)
- Sex work (see "Special Considerations")

PLAIN LANGUAGE LAW

- **Tenn. Code Ann. § 39-13-109 Criminal Exposure:** If you know you are HIV positive or have viral hepatitis and (1) engage in "intimate contact" without first disclosing your status, (2) donate blood, tissue, organs, or semen, or (3) share needles, it is a Class C felony (3 to 15 years).
- **Tenn. Code Ann. § 39-13-516 Aggravated Prostitution:** If you know you are HIV positive and you engage in sex work it is a Class C felony (3 to 15 years).
- **Tenn. Code Ann. § 40-39-202 Sex Offender Registry:** A person who is convicted of criminal HIV exposure or aggravated prostitution is required to register as a violent sex offender.
- **Tenn. Code Ann. § 40-35-**

SPECIAL CONSIDERATIONS FOR SEX WORKERS

HIV status alone can be used to increase the punishment if convicted of any sex work-related crime. Many activities can be included in the definitions of sex work, solicitation, and luring to engage in solicitation.

- Aggravated prostitution is considered a violent sexual offense and requires the individual to register as a sex offender for life.
- No physical contact has to occur for a person to be charged with aggravated prostitution.
- Transmission does not have to occur for the penalty to be elevated.
- ANY sexual activity for hire can be considered sex work, regardless of the risk of transmission it poses.
- It does not matter if a condom or other protection was used.

SEX OFFENDER REGISTRATION

PROTECT YOURSELF!

PROVING DISCLOSURE

Proof that you disclosed your HIV status prior to sexual contact can be hard to get but may be helpful in court (though there is no guarantee).

- Save emails, text exchanges, social media, and dating website or app interactions showing both your disclosure and the date these messages were sent.
- Take partners to your doctor or caseworker's office and ask them to note your partner's knowledge of your status in your case records.
- Discuss your status in the presence of your partner and third parties who can attest to the disclosure.
- Use your cell phone to take a video of your disclosure to your partner.
- Ask your partner to sign a statement prior to any sexual activity acknowledging that you disclosed your status.

WHAT TO DO IF YOU ARE ARRESTED OR AT RISK OF AN ARREST ON AN HIV CRIMINALIZATION CHARGE:

- **DO NOT** disclose your status to law enforcement officers without a lawyer present.
- **DO NOT** talk to police or investigators without a lawyer present unless to give identification.
- **DO NOT** consent to any medical tests (including blood draws or saliva swabs).
- **DO NOT** sign anything without first consulting a lawyer.
- **DO NOT** discuss your situation with anyone on the phone, social media, email, in person etc. before consulting your lawyer.
- **DO NOT** contact the person who is or may be pressing charges against you.
- **DO** request a lawyer as soon as you have been charged with any crime.
- **DO** contact a local HIV legal services organization or CHLP for connections to possible attorneys and/or resources related to the routes and risks of HIV transmission.
- **DO** provide treatment records, medication history, documents proving disclosure to your attorney as soon as possible.
- **DO** protect yourself from further criminal charges by not resisting arrest.

"Phone Home" Hotline
For TGNC people who have been recently incarcerated
901.517.4152

FOR MORE INFORMATION VISIT
<http://www.hivlawandpolicy.org/>
SEE THE "KNOW YOUR RIGHTS GUIDE" AT
<https://www.pwn-usa.org/issues/know-your-rights-guide/>



Craig Stewart

Midsouth LGBTQ+
History & Archive CoRS

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MID-SOUTH
LGBTQ+
ARCHIVE

Accomplishments

- Mid-South LGBTQ+ Archive established in McWherter Library Special Collections
 - Finding aid prepared
 - Materials prepared for preservation
 - 15 new oral histories collected
 - Unveiling of 1969 Miss Memphis historical marker at Evergreen Theatre and painting of rainbow crosswalk in Cooper-Young documented for archive
 - Social media presence on Twitter, Facebook, and Instagram
- De-Centering Stonewall/The Category is... 1969 to Now
 - De-Centering Stonewall panel and keynote speaker attended by ~60 people
 - The Category is ... 1969 to Now (co-hosted with Stonewall Tigers) attended by ~130 people

Partnerships

- Invisible Histories Project (Queer archives in Alabama, Mississippi, and Georgia)
 - Partnering on a digitization grant
- Tennessee LGBTQ+ Collaborative
 - Partnering with Queer archives in Middle and East Tennessee
- Pink Palace Museum
 - Contributing to 3000 sq. ft. LGBTQ+ history exhibit (2021)
 - Partnering to preserve and display 3-D artifacts for the archive

Challenges

- Did not receive continuing CoRS grant to support ongoing work on the project
 - Preserving and digitizing film footage
 - Growing the archive
 - Partnerships with other organizations in Memphis and Mid-South
 - Community outreach
- Proposed solutions
 - Partnerships with Invisible Histories Project, TN LGBTQ+ Collaborative, and Pink Palace
 - Developing grant proposal to Mellon Foundation



Hongmei Zhang

Epidemiology, Biostatistics, & Environmental Health

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Biostatisticians and Their Expertise

in the

Division of Epidemiology, Biostatistics, and Environment Health School of Public Health

Statistical Consulting/Research Exchange

October 24, 2019

- 
- 
- The Division of Epidemiology, Biostatistics, and Environmental Health has strong expertise in biostatistics collaborative research/consulting
 - Here I introduce six faculty members and their strength in the applied fields

Dr. Yu (Joyce) Jiang, Assistant Professor

yjiang4@memphis.edu

- Research Interest
 - Statistical methods development in biomarker detection in cancer studies and inflammatory disease.
 - Statistical methods and tool development for prediction of patient accrual in multicenter clinical trials.
- Consulting experience
 - Experimental design in clinical trials
 - Grant preparation (statistical methods and power calculations)
 - Survival analyses
 - Data cleaning and analysis with standard methods (e.g., regressions)



Dr. Xichen Mou, Assistant Professor

xmou@memphis.edu

- ▶ Research Interest
 - ▶ Statistical methods development in group testing of pooled data
- ▶ Consulting experience
 - ▶ Data analyses with standard statistical methods
 - ▶ Nonparametric regression
 - ▶ Data with repeated measures
 - ▶ Machine learning algorithms such as xgboost



Dr. Meredith Ray, Assistant Professor

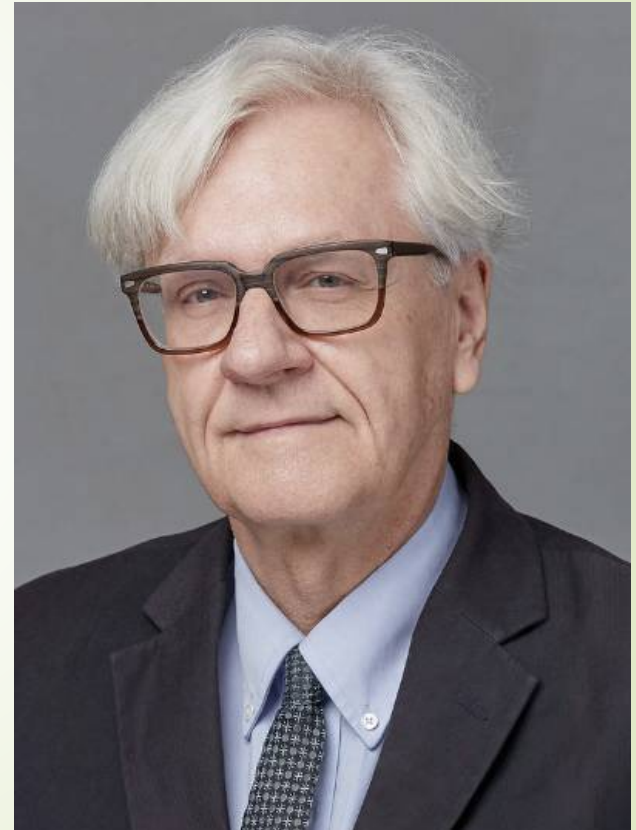
maray@memphis.edu

- Research Interest
 - Statistical methods development for clustering high dimensional data
- Consulting experience
 - Sample size calculations and power analysis
 - Data analyses with standard methods (linear and generalized linear regressions, and linear mixed models)
 - Model building and variable selection
 - Non-parametric approaches
 - Clustering or pattern recognition
 - Analyses with high dimensional data



Prof. George Relyea, Associate Research Professor grelyea@memphis.edu

- More than 40 years' experience in statistical consulting for faculty and graduate students across *all* academic disciplines
- 25 years' experience as head of Statistical Services for consulting in *applied* statistical methods and computing for research and grant support, thesis and dissertations, software support (e.g. SAS, SPSS, Minitab, BMDP, etc), and data Management.
- Management experience in research team projects including large scale data management projects/grants
- 40 years' experience in IBM SPSS, SAS/(IML, STAT, Macro Language) programming



Dr. Matt Smeltzer, Assistant Professor

msmeltzer@memphis.edu

- Research Interest
 - Epidemiological studies in cancer research
- Consulting experience
 - Database construction
 - Data analyses with standard methods (linear and generalized linear regressions, and linear mixed models)



Dr. Xinhua Yu, Associate Professor

xyu2@memphis.edu

- Research Interest
 - Epidemiological study in health disparities, aging, and quality of care
- Consulting experience
 - Epidemiological study design and clinical trials
 - Analysis of biomedical experimental data (small data or non-linear)
 - Analysis of massive complex data
 - Machine learning including deep learning



Dr. Hongmei Zhang, Professor

hzhang6@memphis.edu

- Research Interest
 - Statistical methods development in variable selection, clustering, and graphical modeling/networks
- Consulting experience
 - More than 15 years of collaborative experience
 - Grant preparation
 - Sample size calculations
 - Statistical methods (basic and advanced approaches, e.g., regressions, cluster analyses, multi-level modeling, and structural equation modeling/path analyses)
 - Data analyses with standard methods (basic and advanced)





Elena Delavega

Poverty CoRS

POVERTY CORS

UMPRC Juvenile Justice & Social Equity Research Proposal

- First meeting:
 - November 1, 2019 at the UofM Law School
 - We also now have the juvenile court's data analyst person on board, and are paying her a stipend for her participation.
- We also now have the juvenile court's data analyst person on board, and are paying her a stipend for her participation.

UMPRC Juvenile Justice & Social Equity Research Proposal

- The University of Memphis Poverty Research Collaborative (UMPRC) will develop a Juvenile Justice & Social Equity Initial Report that will:
 - 1) Examine available data from a number of public and private sources to create a rich dataset mapping these socioeconomic deficits;
 - 2) Determine what gaps in data exist; and
 - 3) Connect these findings to quantitative data generated through a number of public and private social service organizations, where possible.

UMPRC Blame Research

- Proposal to investigate attitudes towards poverty
 - Among UofM students in diverse disciplines
 - Internationally, in collaboration with the University of Puerto Rico
- IRB in process



Eric Spangler

High Performance Computing

THE UNIVERSITY OF
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How HPC Facilitates Research at the University of Memphis

Fall Semester 2019

Research Computing



University of Memphis HPC Hardware



2 Login and 2 Head nodes

6 GPU nodes with
2 GPUs each

4 Big memory nodes with
768 GB and 1536 GB memory
per pair

78 thin nodes

- 192 GB memory
- 2x20 core CPUs
- 100 Gbit Infiniband network

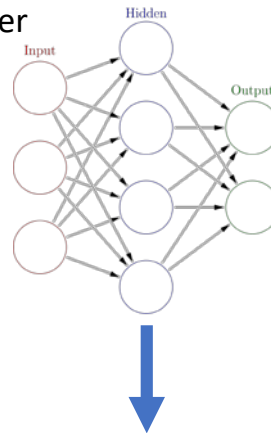


480 TB storage



300 Users!

Computer
Science

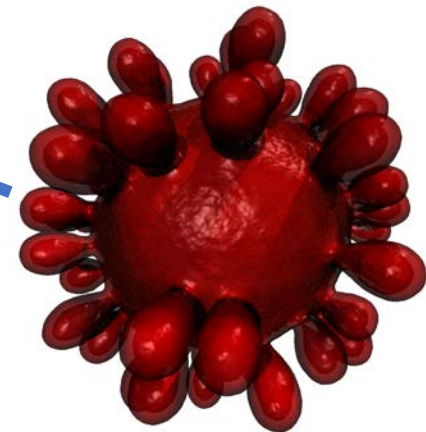


Biology



Political Science

Physics



Psychology

Geology

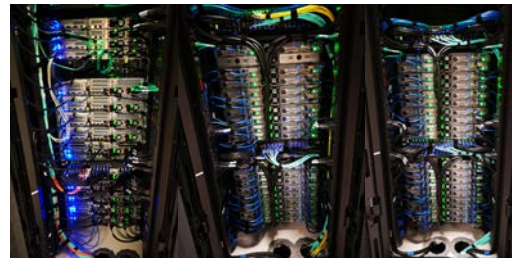
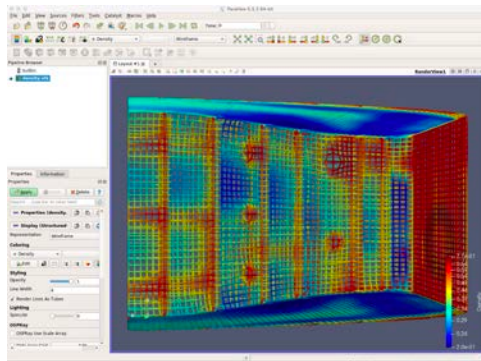
Finance

Public Health

Chemistry

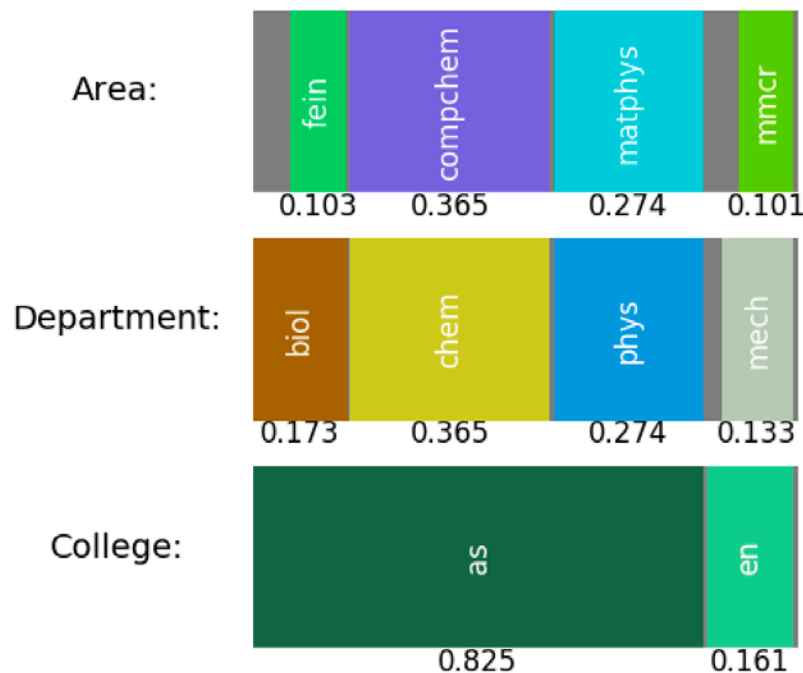


Engineering





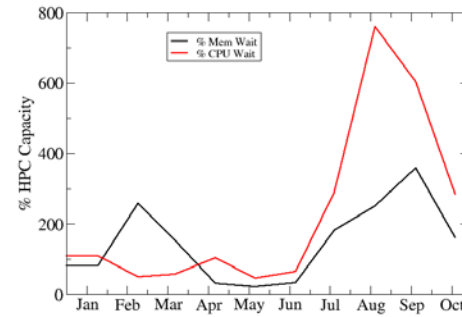
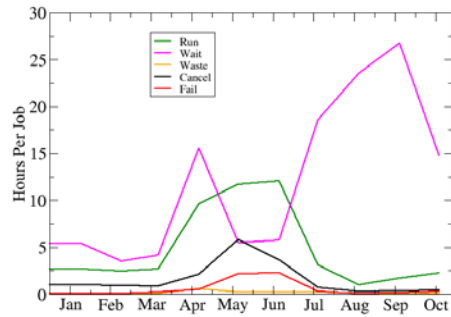
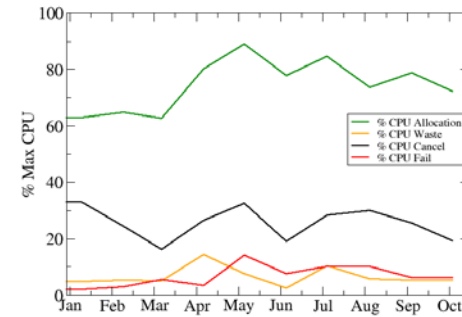
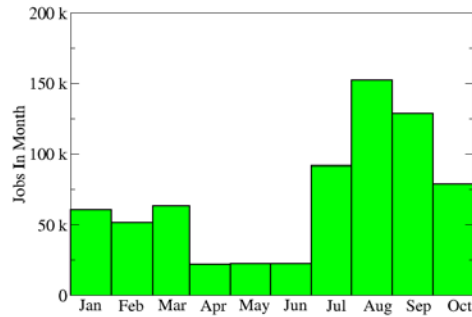
Departments/Colleges/Content areas



- Fein = Feinstone Center
- CompChem = Computational Chemistry
- Matphys = Materials Physics
- Mmcr = Materials and Manufacturing Computational Research
- As = Arts and Science
- En = Engineering



Utilization



Who runs all of this?

- Research Computing (Primarily Software and Users)
 - Eric Spangler (Me!)
 - Ed Koshland (Former, now interim director of IT security and ID Management)
- Enterprise Infrastructure Systems (Primarily Hardware)
 - Kristian Skjervold



Nate DeYonker

Synthesis of Research & Teaching Practices with the UofM High Performance Computer

Development of Online Course for High Performance Computing Best Practices

Prof. Nathan J. DeYonker

Department of Chemistry

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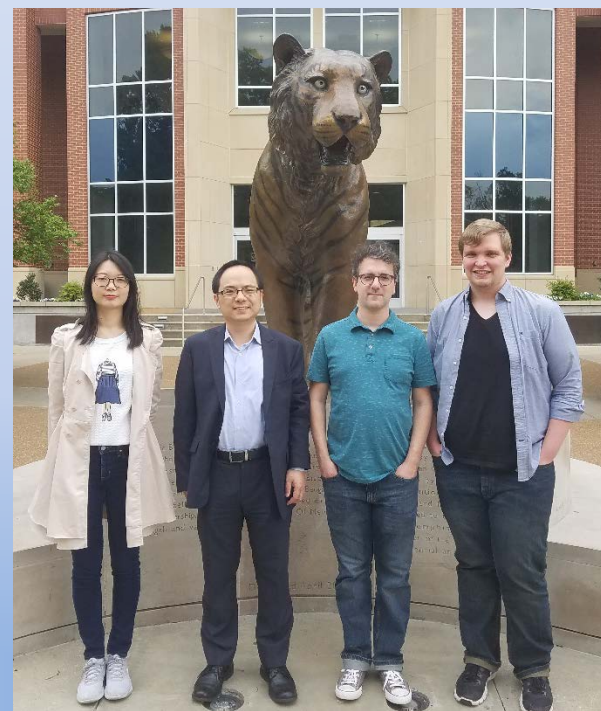
12/5/19

CoRS funding

- 1-credit online course at 4000/6000 level
 - Ease the burden of training new students/faculty/staff to use HPC
 - Standardize practices of using resources on the HPC
 - More efficiently use HPC to collaborate and answer research questions
- 10 members of Community
 - Staff & Faculty in CAS/Engineering/Public Health/ITS

Outcomes

- Juan Chen and Joseph Burns
 - Grad students coordinated with faculty and staff via in-person interviews
 - Compiled ideas and concerns
 - Assignment of learning objectives
- Juan initiated development of first sample exercise
 - Calculate hydrogen molecule binding energies using VASP software





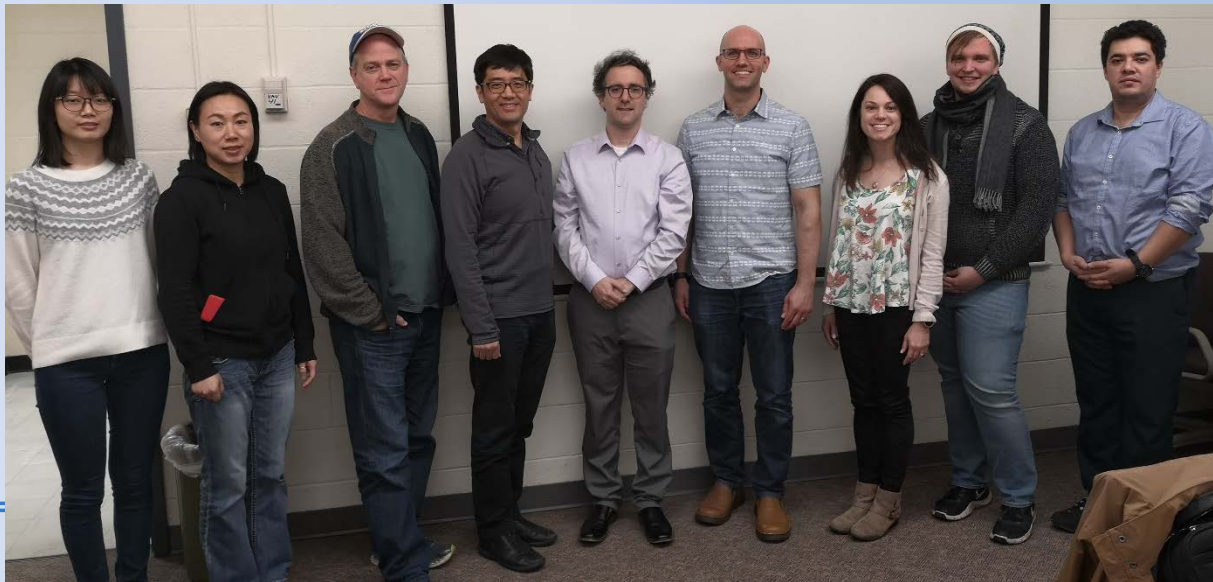
Command to get energy :
`grep "gy wi" OUTCAR`

Solve for binding energy
$$= \text{energy of H}_2 - 2 * \text{energy of H}$$



Outcomes

- Course design with Dr. Katie Sharpe (UM3D)
 - “Most ambitious course design they’ve worked on”
 - eCourseware tools
 - Developing capstone project
 - Partitioning of public-facing “training” versus proprietary coursework



Outcomes

- End-of-year banquet for participating faculty/staff and their research groups
- Continuation of the project
- Networking with new faculty who are active HPC users:
 - Daniel Foti (Mechanical Engineering); Christos Kyriakopoulos (CERI); Jeff Black (FIR); Emily Puckett (Biology);





Michael Harris & Joel Roberts

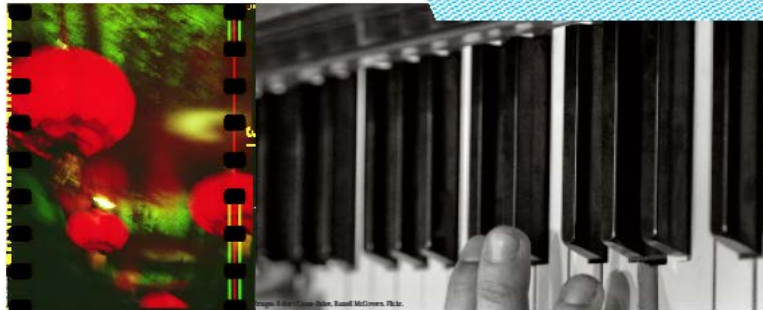
The Memphis Film
and Music Collective

Memphis Film & Music Collective

Dr. Michael Harris & Joel Roberts
University Libraries

Initial Steps

- Purchased domain for memfilmusic.org
- Commissioned a composer to score our promo video
- Promo video was made by the Corporate/Promotional Video Production class (COMM 4222)



CALLING STUDENT FILM MAKERS AND MUSICIANS: THE MEMPHIS FILM AND MUSIC COLLECTIVE

College students are invited to submit proposals to create a short film (5-15 minutes), ideally focused on Memphis, though all submissions are welcome. The MFMC will pair film makers up with UofM student musicians to create music for the short film. Finished or in-production short films will not be considered. The selected proposals will receive a grant to assist in making the film

and music, and screen their films. Proposals are due September 27. See memfilmmusic.org for more information and to apply!



Funded by CoRS.

The University of Memphis is an Equal Opportunity/
Affirmative Action University. It is committed to
education of a non-racially identifiable student body.



THE UNIVERSITY OF
MEMPHIS.

Driven by doing.

Culminating Event

- Film Festival to highlight the best submissions on February 20th
- We accepted 6 proposals to the festival
 - Good variety of proposals
- Based on filmmaker's vision, we paired student composers with appropriate films

Funds

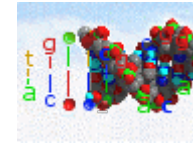
- Trying to use funds to offset production costs for filmmakers and composers
- Purchasing plaques for festival awards
- Food and drink



Max Garzon

Knowledge for Data Science, Computer Science,
and Mathematical Sciences (K4DS)

THE UNIVERSITY OF
MEMPHIS



K4DS: Knowledge for Data Science Working Group

Dale Bowman, Max Garzon

Lih-Yuan Deng, Nirman Kumar, Deepak Venugopal

{ddbowman, mgarzon}@memphis.edu

<http://bmc.memphis.edu>



Foundations of Data Science

- Main goal is to develop integrative approaches to data analytics
- Interdisciplinary research across Statistics, Computer Science, Mathematics and Biology
- Targeting three NSF programs:
 - ◆ HDR: Harnessing the Data Revolution (TRIPODS)
 - ◆ Understanding the Rules of Life (URoL): Predicting Phenotype (CFP NSF-20513)
 - ◆ REU: Math Sciences



Participants

- Faculty

Math/Statistics: Lih-Yuan Deng, Dale

Bowman, Ching-Chi Yang, Paul Ballister

Dennis Lin (Penn State U)

Computer Science: Max Garzon, Nirman

Kumar, Deepak Venugopal

- PhD students

Sambriddhi Mainali (CS), Stats students

- Work previously supported by

NSF QuBIC program, award number EIA-0130385



Outcomes

- Fall Semester

- Weekly meetings to

- ◆ Develop synergy (hard in interdisciplinary research)
 - ◆ identify topics of common research interest
Dimensionality Reduction, Sampling, GenIS
 - ◆ Identify potential CFPs for potential submissions

- Invited speakers

Dennis Lin from Penn State-Statistics visited campus and delivered talks at K4DS and the nascent Learning Data Science Institute (V. Rus: PI)

[1] Mainali S, Colorado, F. A., Garzon, M. H. (2019a). Foretelling the Phenotype of a Genomic Sequence. IEEE Transactions On Computational Biology and Bioinformatics, revision under review.

[2] Mainali S, Garzon, M. H., Colorado, F. A. (2019b). Species Definition and Delimitation: a Geometric and Structural Approach. *Systematic biology*, under review.



.. Outcomes

- Proposals

NSF-REU-Math Sciences (submitted 8/2019)
(1/1/2020-8/31/2022) [\$315,057]

James Campbell (PI), Dale Bowman (coPI),
Max Garzon, Deepak Venugopal (Senior P)

- Publications

Two papers have been submitted ^[1]_[2] and
two more are in preparation

[1] Mainali S, Colorado, F. A., Garzon, M. H. (2019a). Foretelling the Phenotype of a Genomic Sequence. IEEE Transactions On Computational Biology and Bioinformatics, revision under review.

[2] Mainali S, Garzon, M. H., Colorado, F. A. (2019b). Species Definition and Delimitation: a Geometric and Structural Approach. *Systematic biology*, under review.



.. Outcomes: Speakers

- Dec 6 Research Problems in Exchangeability (Lead: Segun George)**
- Nov 22 Proposal Programs and Problems: Discussion (Proposal reqd)**
- Nov 15 Proposal Programs and Problems: Discussion (All hands on deck!)**
- Nov 8 Research Problems in Shape in Biology (Lead: M. Garzon)**
- Nov 1 Research Problems in Order of Addition Experiments (Lead: D. Lin, Penn State)**
- Oct 25 Research Problems in Shape Graphical Models (Lead: D. Venugopal)**
- Oct 18 Research Problems in Data Dependent Metrics (Lead: N. Kumar)**
- Oct 11 Research Problems in Dimensional Analysis (Lead: C. Yang)**
- Oct 4 Research Problems in Exchangeability (Lead: Dale Bowman)**
- Sep 27 Research Problems in Sampling (Lead: L.Y. Deng)**
- Sep 20 No mtg (CS retreat)**
- Sep 13 No mtg (Combinatorics Conference)**
- Sep 5 Encoding Shape and Size in Genomic Data (Lead: S. Mainali)**
- Aug 30 Research problems: What's the "shape" of a data set?**



Outcomes: Structure of DNA spaces

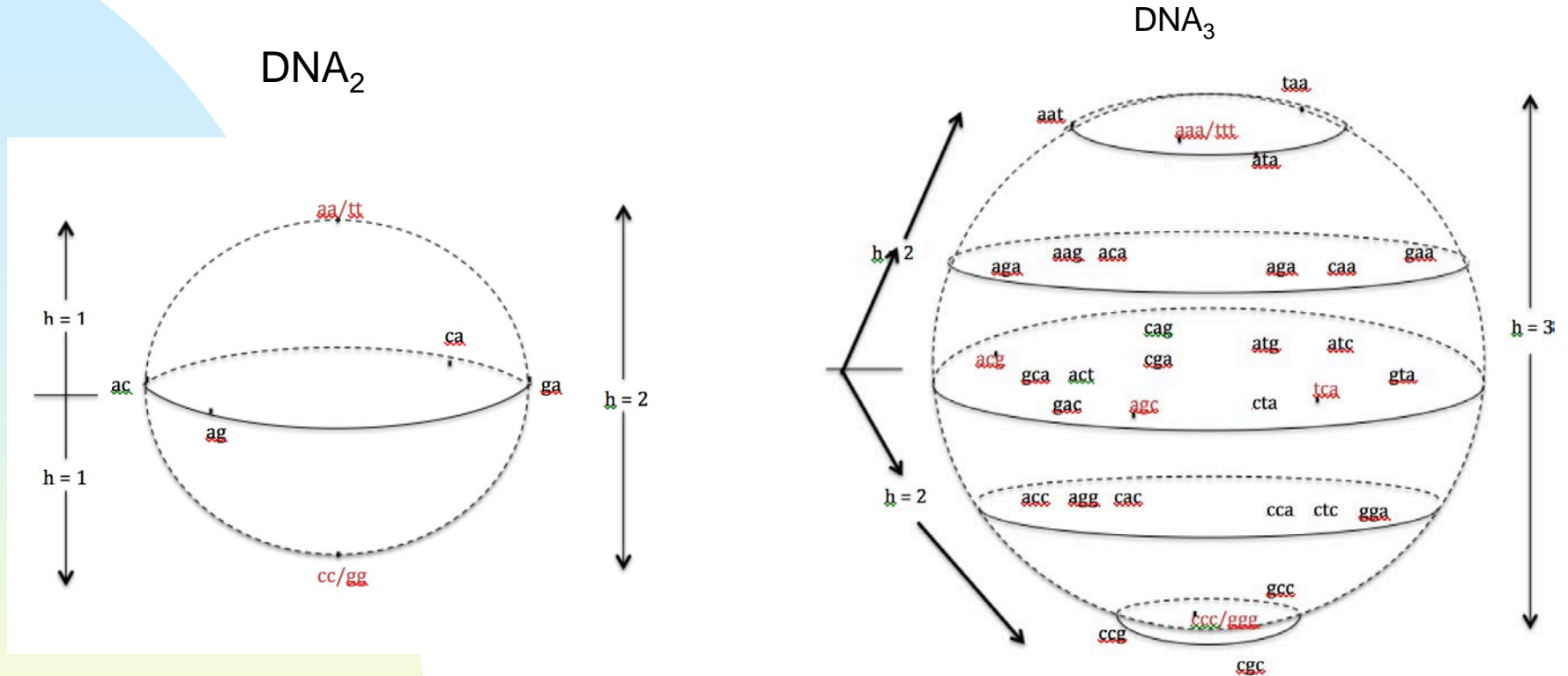


Fig 1: DNA-space for 2-mers (left) and 3-mers (right)

.. Structure of DNA spaces

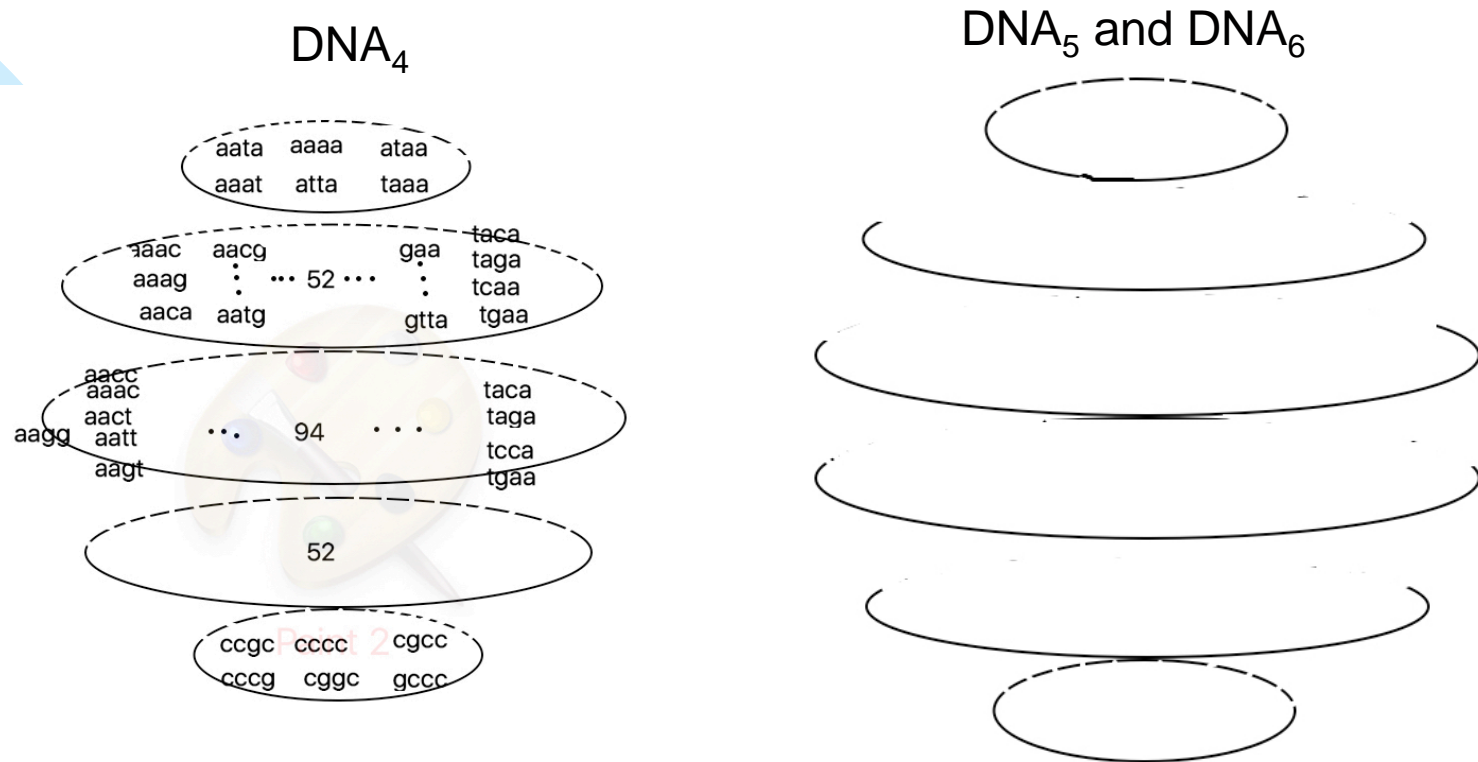
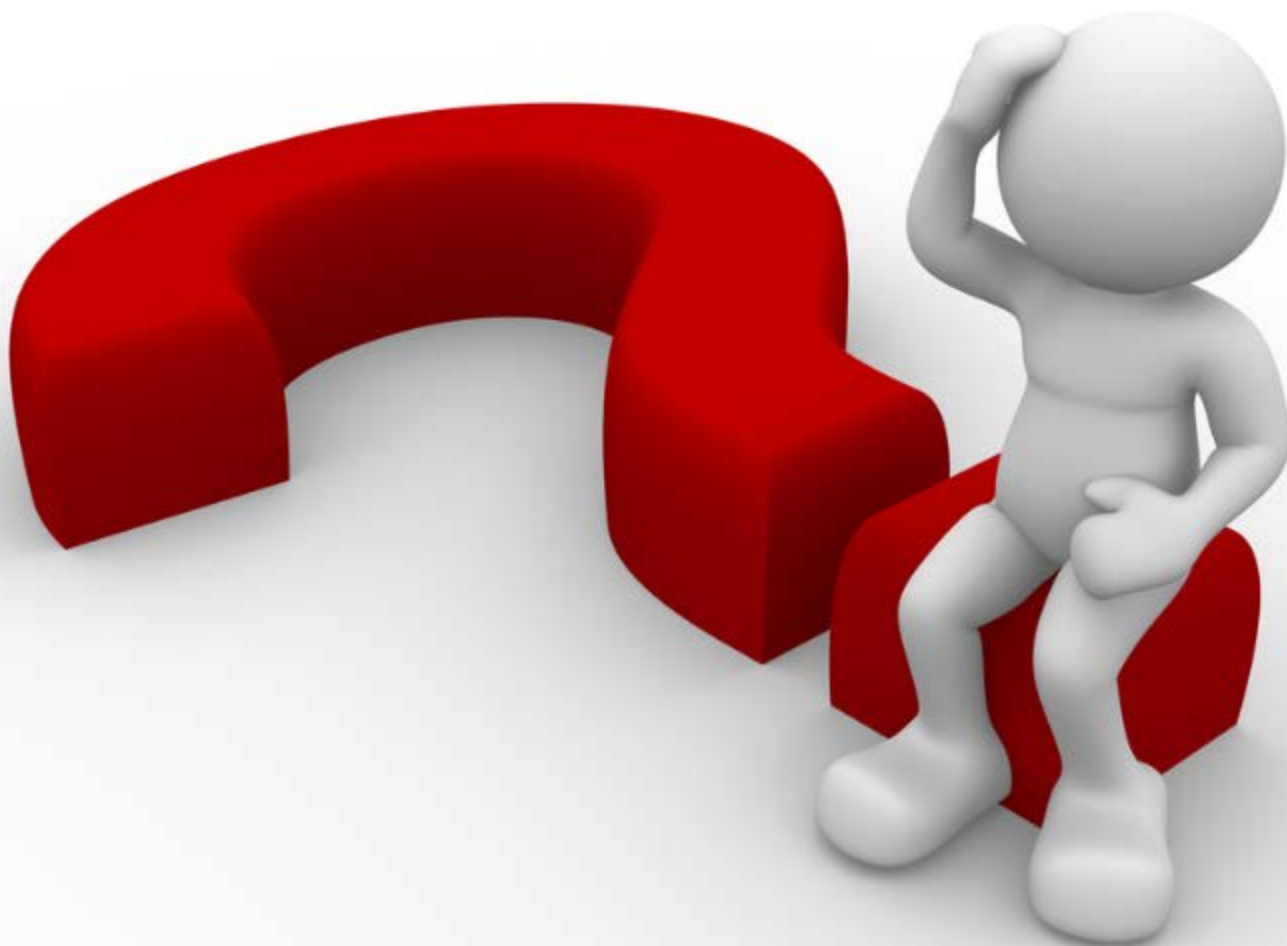


Fig 2a-b: DNA space for 4-mers (left) and for 5 and 6 mers (right)

Questions?





Charles Langston

Center for Earthquake
Research and Information (CERI)



CENTER FOR EARTHQUAKE RESEARCH AND INFORMATION

Chuck Langston

Director



CERI

- First Research Center at the University – 1977 Tennessee Earthquake Information Center
- Research in
 - Natural Sciences
 - Earthquake Hazards
 - Theoretical and Applied Geophysics
- Seismic Networks and Seismic Instrumentation
- Important Partners
 - US Geological Survey (Advanced National Seismic System)
 - Southern California Earthquake Center (since July 2019)

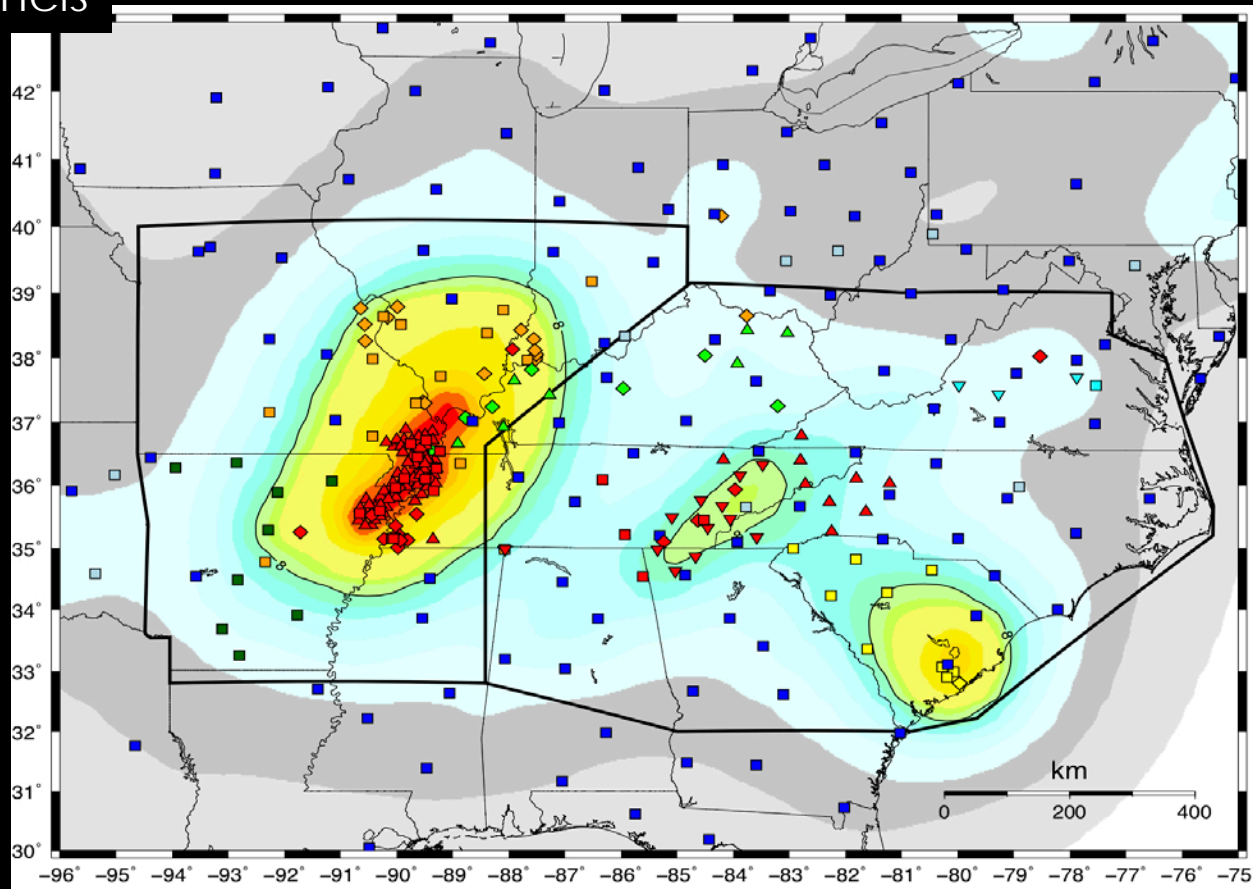


REGIONAL/NATIONAL/INTERNATIONAL PROJECTS



328 Stations
136 CERI/AG
~1.2k Channels

SEISMIC AND GNSS NETWORKS



NEW DIRECTIONS

- Large Scale Systems Simulation and Visualization

Christos Kyriakopoulos

[HOME](#)

[RESEARCH](#)

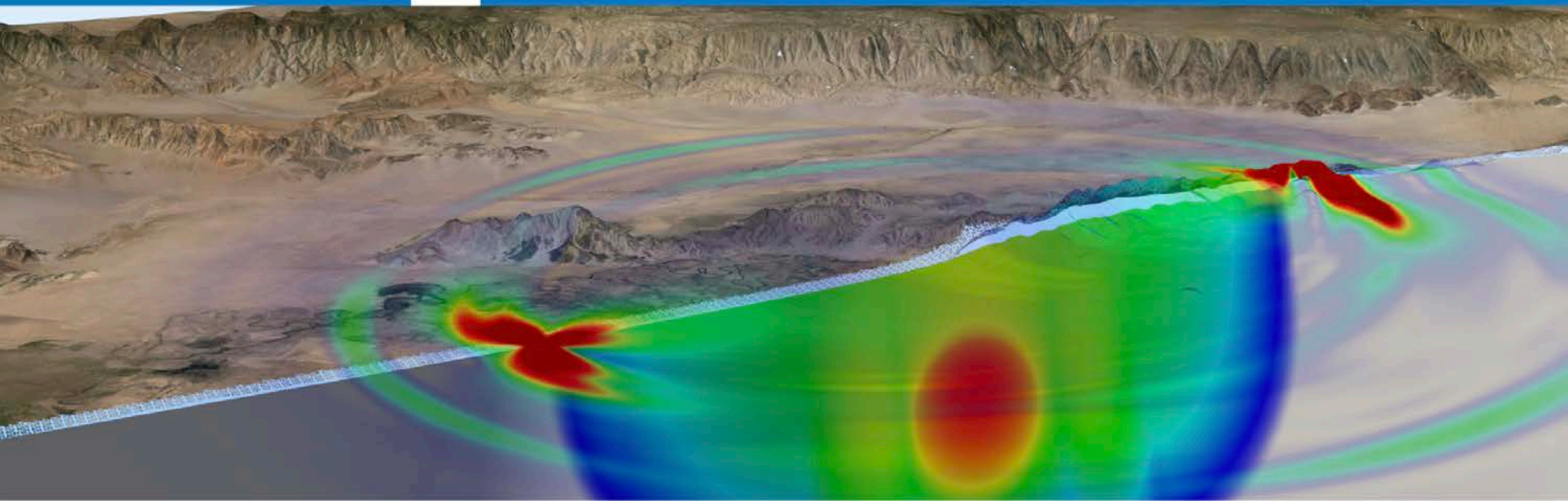
[SIMULATIONS](#)

[PUBLICATIONS](#)

[3D PRINTING](#)

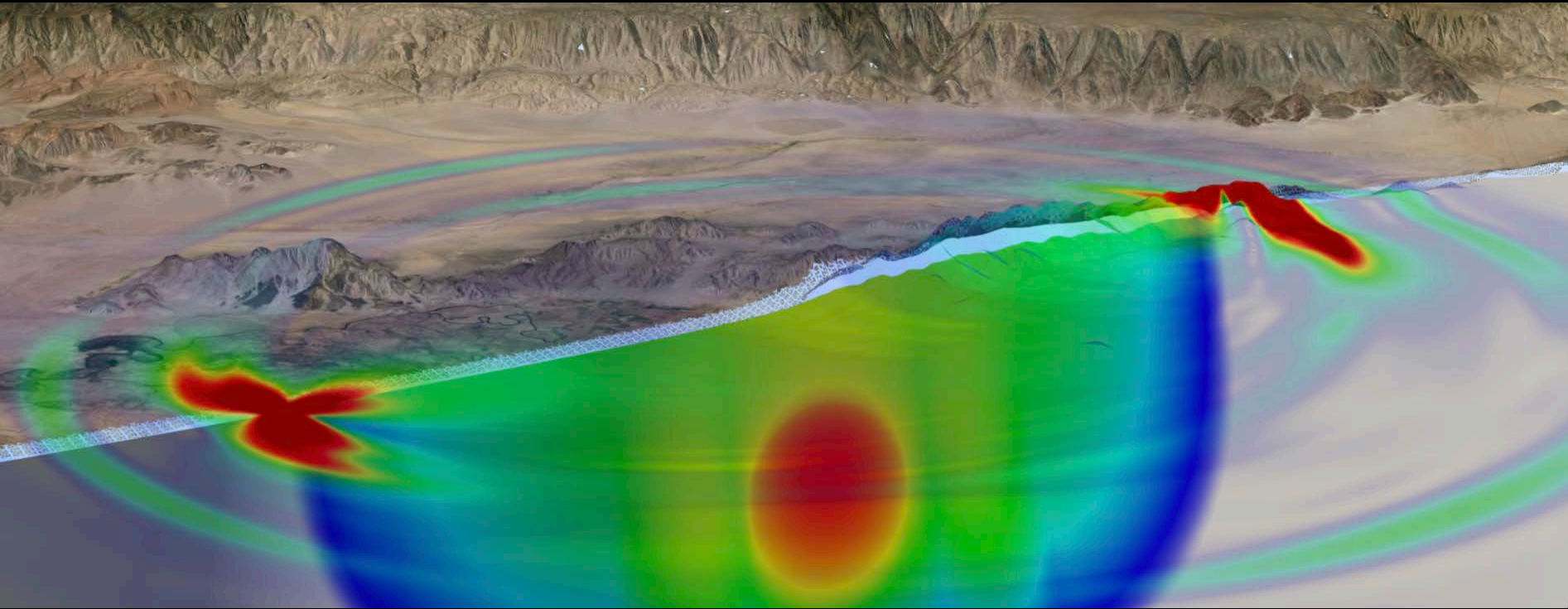
[VIRTUAL REALITY](#)

[More ▾](#)

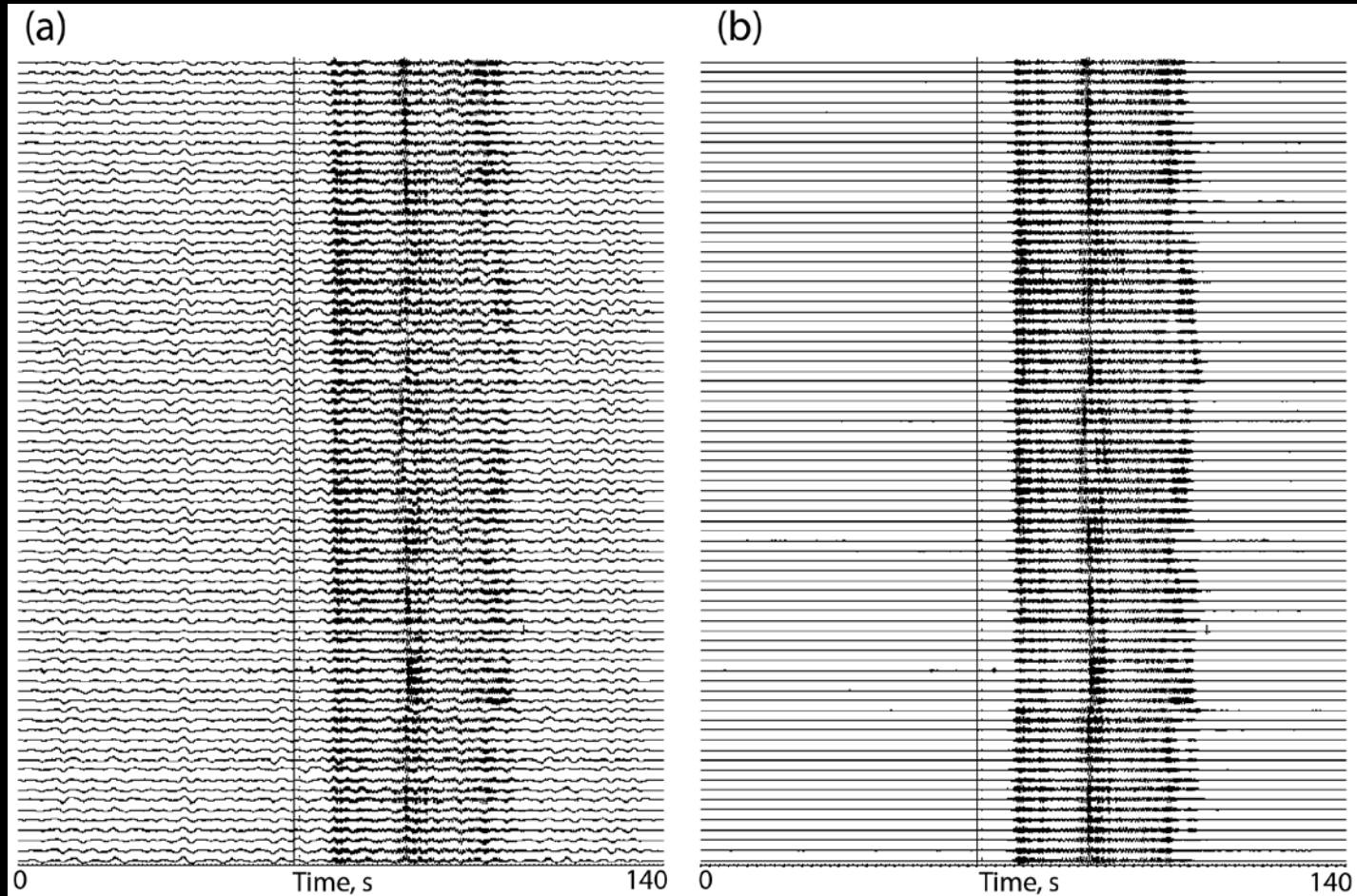


NEW DIRECTIONS

- Laboratory Measurements of Rock Friction (Earthquake Physics – Thomas Goebel)



DATA DENOISING

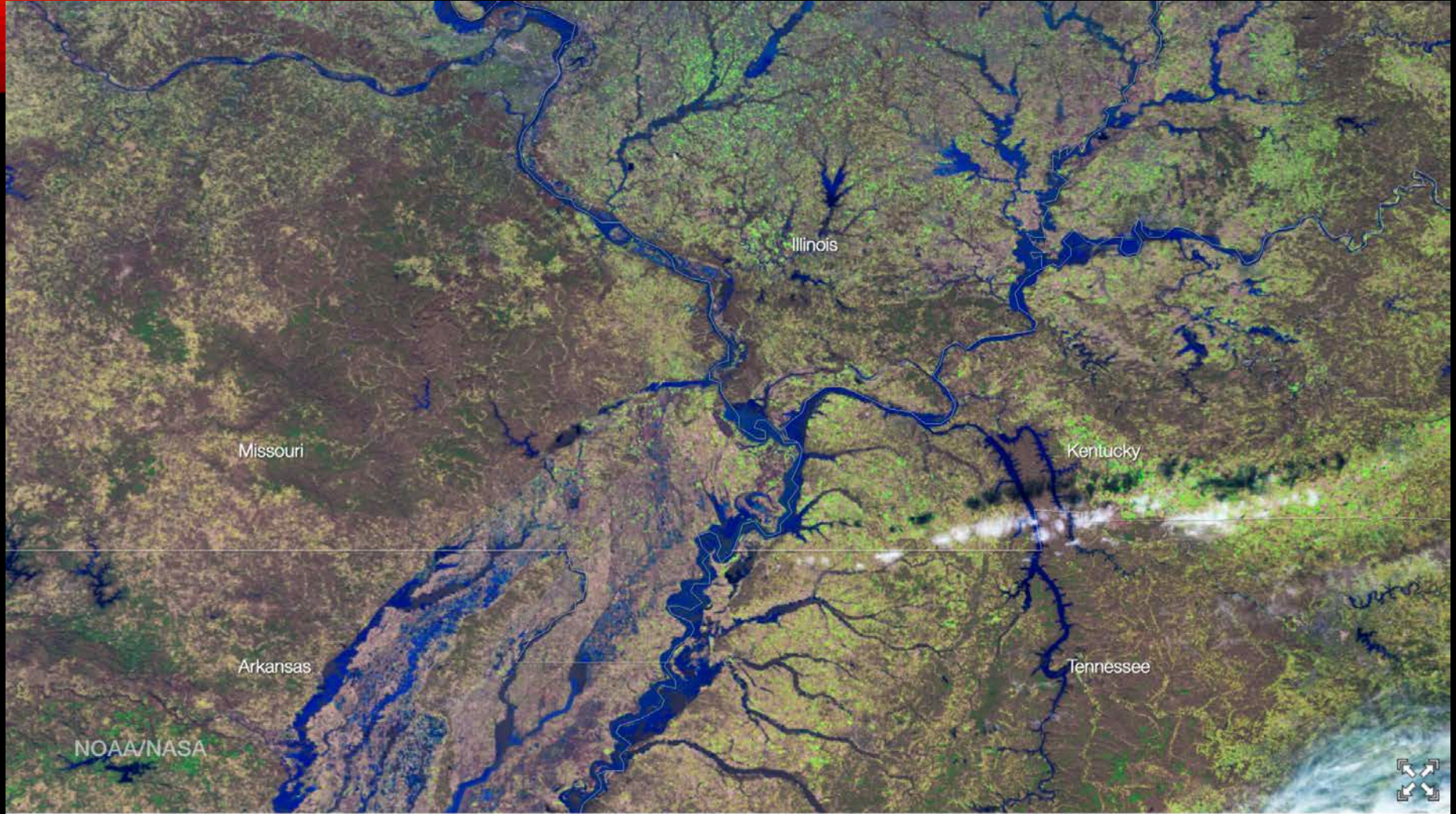




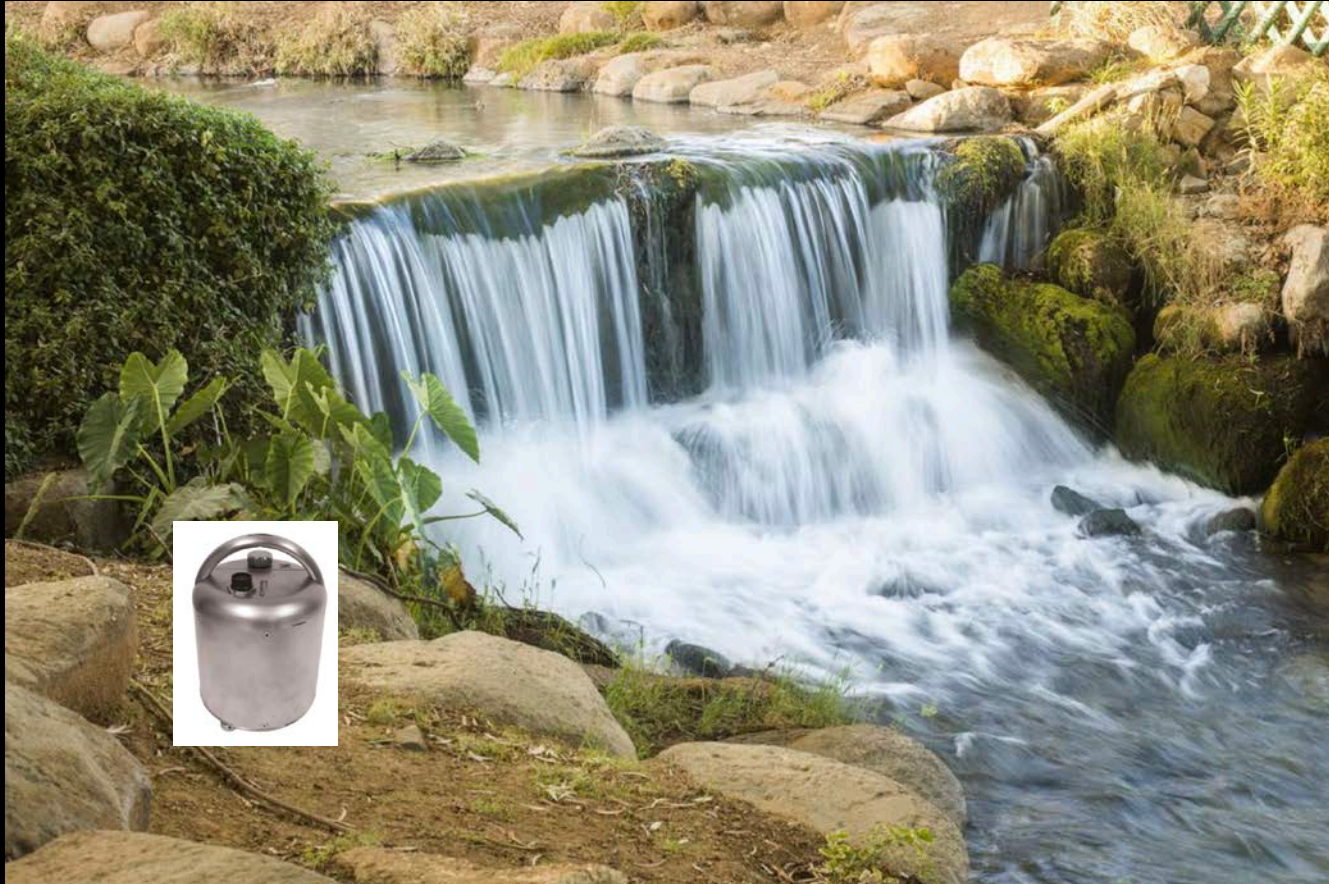
INTERDISCIPLINARY RESEARCH IDEAS

Sensor Deployments in the Natural
Environment

Seismic Hydrology



A false-color NOAA Suomi NPP VIIRS satellite image documents flooding in the Mississippi River Valley on Jan. 3, 2016. (Credit: NOAA/NASA)



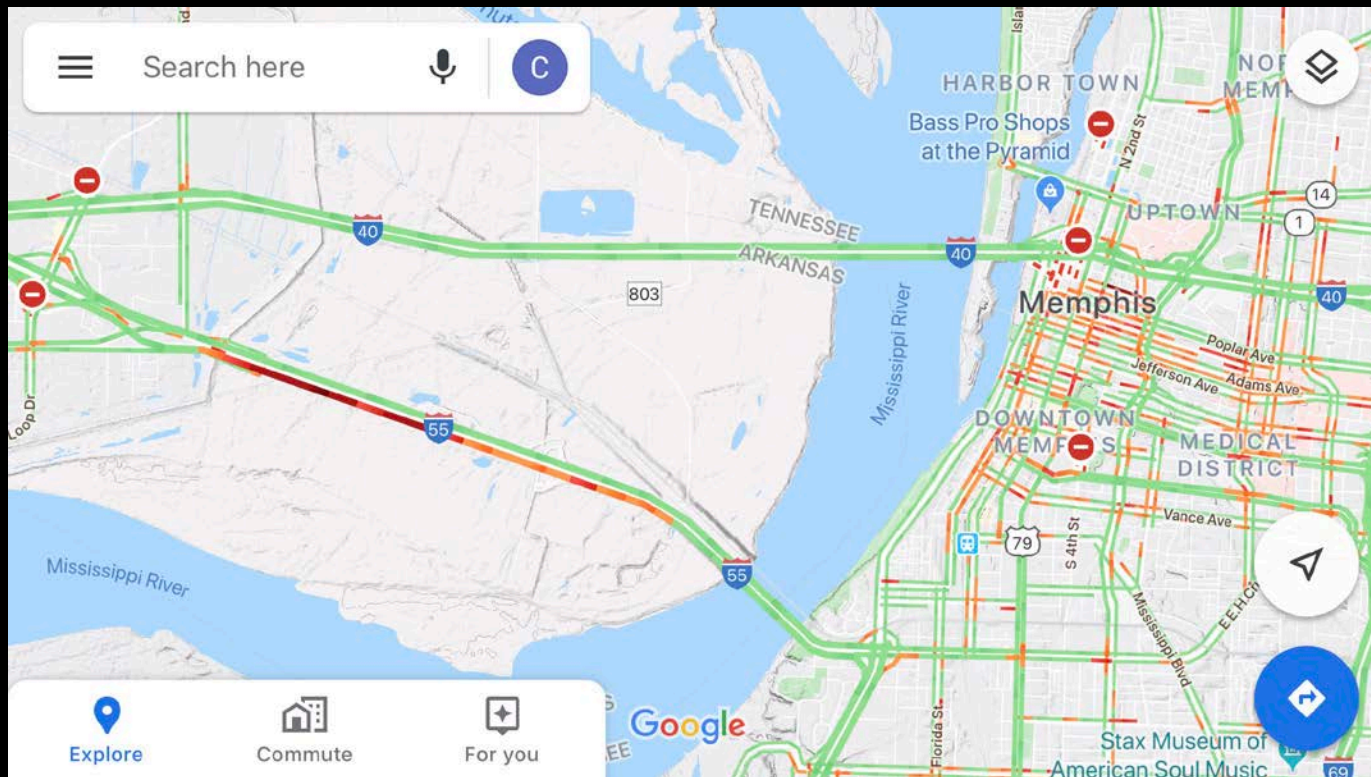


INTERDISCIPLINARY RESEARCH IDEAS

Sensor Deployments in the Built
Environment

Dynamic Responses

TRAFFIC FLOW (ROAD AND RAIL)



INTERDISCIPLINARY RESEARCH AND OUTREACH IDEAS



VR



Questions?

Thank you for joining us today at the FedEx Institute of Technology.