



Community of Research Scholars

Division of Research & Innovation
April 25, 2019

THE UNIVERSITY OF
MEMPHIS

Health and Technology

- https://prezi.com/3nzbo9-cj2js/uofm-cors-lightening-talks-lee/?utm_campaign=share&token=4878eb320eec84536956c1e84defad096dcf716daa9eed6b7de67a977d8c5a5e&utm_medium=copy

Data Science Cluster

*Collaborative Cluster for Data Science
Research and Education*

Directors: David Kemme and Vasile Rus
{dmkemme,vrus}@memphis.edu

April 25, 2019



MISSION

- Provide advanced research opportunities and facilities for Data Science research scientists, University of Memphis faculty, advanced graduate students and community based researchers, in a collaborative environment



https://www.memphis.edu/fedex/research/data_science/index.php

MISSION

- The Data Science Cluster provides leadership for the Data Science Research Initiative at the University of Memphis and the local community by creating a vibrant research environment and training future data scientists to build a Data Science community of practice that includes academia, government and industry in West Tennessee, the Mid-South and beyond.

https://www.memphis.edu/fedex/research/data_science/index.php

Focal Points

- **Research:** funded research, tight University-Corporate collaboration (see the Amazon – University of Washington model, *inter alia*)
- **Teaching and Instruction:** certificates, concentration, degrees, internships and fellowships, short-term intense workshops
- **Outreach Activities:** Seminar, 2-3 invited external speakers, Annual summit


Recent and Ongoing Activities

- Memphis DATA conference
 - well-attended (150+ attendees)
 - Two keynote speaker: Dr. Henry Kautz (NSF), and Dr. Bala Vaidyanathan (Fedex)
 - www.memphis-data.org

Memphis DATA Conference

www.memphis-data.org


CALL FOR PARTICIPATION
Memphis DATA - A Data Science Conference
[CLICK HERE TO REGISTER](#)
March 29, 2019
FedEx Institute of Technology
www.memphis-data.org



Important Dates
Paper Submission Deadline: March 15, 2019
Poster Submission Deadline: March 15, 2019
Regular Registration Deadline: March 15, 2019
Late Registration Deadline: March 29, 2019

Organizing Committee
General Chairs: David M. Kiemme (Economics) & Ebenezer Olusegun George (Mathematical Sciences, Statistics)
Program Chairs: Hongmei Zhang (Public Health) & Vasilie Rus (Computer Science)
Local Arrangements Chairs: Deepak Venugopal (Computer Science) & Mark Gillenson (BIT)
Speaker's Chairs: Dale Bowman (Mathematical Sciences, Statistics) & Bernie J. Dalgle, Jr. (Biological Sciences and Computer Science)
Tutorials Chairs: Vasilie Rus & Deepak Venugopal (Computer Science)

Memphis Data is Sponsored by The University of Memphis



Goal
"The coming century is surely the century of data" (Donoho, 2000). Data Science is emerging as a new, transformative paradigm in science and technology. With large volumes of data being generated every day from multiple sources (including business data, biomedical data, educational data, science data, engineering data, and personal data), the importance of systematic and rigorous approaches to understanding and putting these large volumes of data to good use is now well recognized.

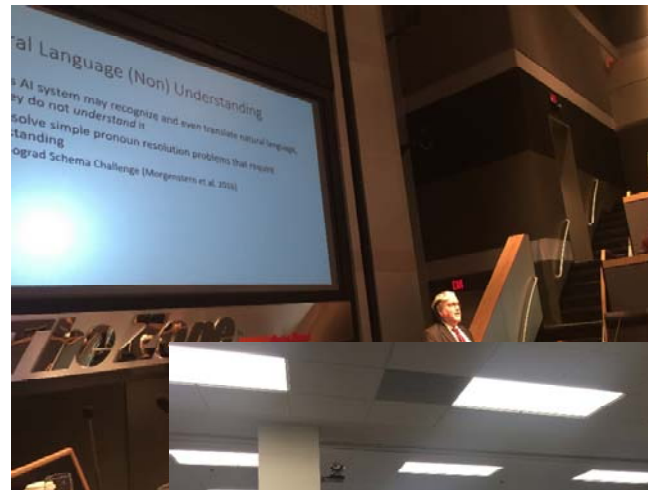
At the initiative of the Office of the Vice President for Research and Innovation the Office of Sponsored Research, the University of Memphis has launched an ambitious multi-year effort to provide Data Science leadership for the local community, train future data scientists, create an environment to foster research in this area, and build an inclusive Data Science community of practice.

The Memphis DATA conference is meant to support the Data Science initiative and bring together the local community, train future data scientists, create an environment to foster research in this area, and to build a Data Science community of practice that would include members from academia, government, and industry in West Tennessee and the Mid-South and beyond.

We invite submissions that address topics relevant to Data Science, broadly construed:

- data analysis methods
- data storage solutions
- data warehousing
- data engineering
- databases
- data privacy
- data security
- data visualization
- data provenance
- data quality
- big data
- machine learning
- data mining
- economics and business analytics
- data science in education
- machine learning in Economics and Finance
- forecasting
- simulation
- healthcare
- bioinformatics
- data science in government
- ethical aspects of data science
- and other relevant topics.

Submission Guidelines: Paper submissions should be in the form of an extended abstract (1 page, including references). Papers will be presented as talks. Poster submissions should be in the form of an abstract (1 page, including references). All submissions should be sent as PDF files via email to the Program Co-Chairs: Dr. Vasilie Rus (vrus@memphis.edu) and Hongmei Zhang (hizhang@memphis.edu).



Recent and Ongoing Activities

- Training workshops
- Funded research
 - 11 projects funded for a total of \$92k
- Data Science Speaker Series
 - Coming up

Data Science Cluster

*Collaborative Cluster for Data Science
Research and Education*

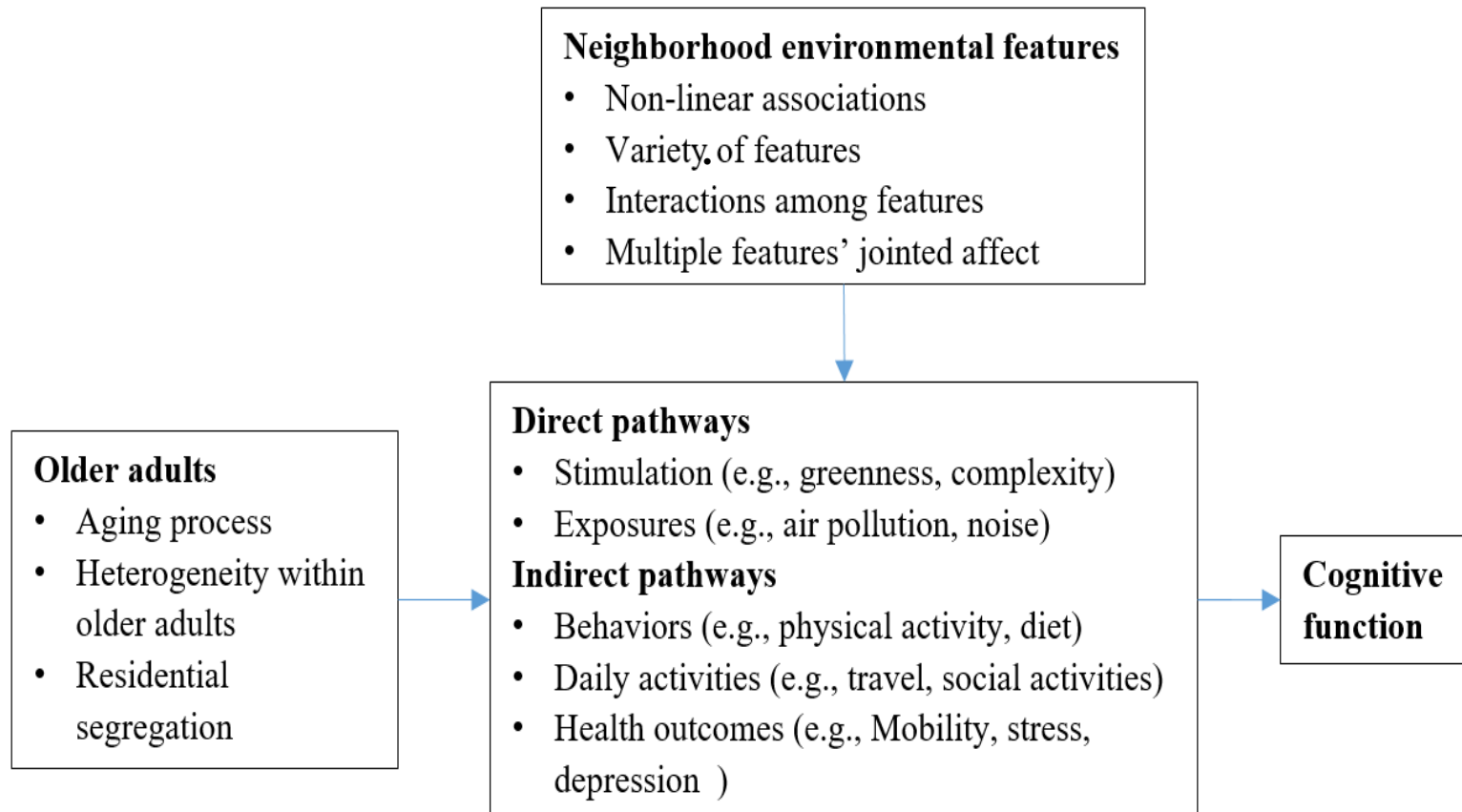
Directors: David Kemme and Vasile Rus
{dmkemme,vrus}@memphis.edu

April 25, 2019

The influence of neighborhood environment on health over aging process

- Neighborhood environment is associated with multiple health behaviors and outcomes
- Neighborhood environment may be more important for older adults
- Health ABC data, a longitudinal dataset
 - 1500+ older adults in Memphis
 - Cover a number of major health outcomes over 20 years
 - Household address / Neighborhood
- Goal: the impact of neighborhood environment on multiple diseases and health behaviors among older adults in Memphis
 - Major outcomes to be considered
 - Physical activity and diet
 - Obesity, hypertension
 - Depression, cognition
 - Research methods
 - Regression analysis, spatial analysis, structural equation analysis, and agent-based modelling

Yong Yang, School of Public Health, yyang15@Memphis.edu



Yong Yang, School of Public Health, yyang15@Memphis.edu

Digital Humanities Methods CoRS

April 2019 Update

Convener: Dr. Melanie Conroy, World Langs +
Lits (mrconroy@memphis.edu)

Presenter: Dr. Elizabeth T. Lane, English
(etlane@memphis.edu)

DIGITAL HUMANITIES COMMUNITY OF RESEARCH SCHOLARS

DIGITAL HUMANITIES METHODS WORKSHOPS



TUESDAYS | 3–4:30 PM

UC FOUNTAIN VIEW BOARDROOM, 352 UNIVERSITY CENTER

JANUARY 29 Creating a Digital Archive for Teaching Dr. Christine Eisel History Dr. Will Thompson World Languages and Literatures	APRIL 9 Project Breakout Sessions New Projects and Project Ideas Welcome
FEBRUARY 26 Tools for Corpus Linguistics Dr. Romy Ghanem English Dr. Liz Lane English	APRIL 23 Working Collaboratively and Project-Based Funding Dr. Keri Brondo Anthropology Dr. Melanie Conroy World Languages and Literatures Dr. Donal Harris English
MARCH 26 Maps and Mapping in the Humanities Dr. Catherine Phipps History	For more information, contact Dr. Melanie Conroy at mconroy@memphis.edu .

Sponsored and funded by the Division of Research and Innovation with additional support from the Marcus W. Orr Center for the Humanities. Digital Humanities Methods is a community of research scholars at the University of Memphis.

 THE UNIVERSITY OF
MEMPHIS. | Research and Innovation

The University of Memphis is an Equal Opportunity/Affirmative Action University. It is committed to the education of a non-racially identifiable student body. UCM2019F19B9

DIGITAL HUMANITIES COMMUNITY OF RESEARCH SCHOLARS

DIGITAL HUMANITIES METHODS WORKSHOPS

TUESDAYS | 3–4:30 PM

UC FOUNTAIN VIEW BOARDROOM, 352 UNIVERSITY CENTER



JANUARY 29

Creating a Digital Archive for Teaching

Dr. Christine Eisel | History

Dr. Will Thompson | World Languages
and Literatures

FEBRUARY 26

Tools for Corpus Linguistics

Dr. Romy Ghanem | English

Dr. Liz Lane | English

MARCH 26

Maps and Mapping in the Humanities

Dr. Catherine Phipps | History

APRIL 9

Project Breakout Sessions

New Projects and Project
Ideas Welcome

APRIL 23

Working Collaboratively and
Project-Based Funding

Dr. Keri Brondo | Anthropology

Dr. Melanie Conroy | World Languages
and Literatures

Dr. Donal Harris | English

For more information, contact
Dr. Melanie Conroy at mconroy@memphis.edu.

Sponsored and funded by the Division of Research and Innovation with additional support from the Marcus W. Orr Center for the Humanities. Digital Humanities Methods is a community of research scholars at the University of Memphis.



Research and Innovation

The University of Memphis is an Equal Opportunity/Affirmative Action University. It is committed to the education of a non-racially identifiable student body. UOM739-FY16/9

Spring 2019 Achievements

14 members (faculty & graduate students)

Our website:

<https://blogs.memphis.edu/dighum/>

Active workshop series (partnered with the Marcus Orr Center for the Humanities)

Hired intern to post to social media and film events

(<http://tinyurl.com/UMDHcors>)

Hired research assistant to review grant opportunities

DIGITAL HUMANITIES COMMUNITY OF RESEARCH SCHOLARS

DIGITAL HUMANITIES METHODS WORKSHOPS

TUESDAYS | 3–4:30 PM

UC FOUNTAIN VIEW BOARDROOM, 352 UNIVERSITY CENTER



JANUARY 29

Creating a Digital Archive for Teaching

Dr. Christine Eisel | History

Dr. Will Thompson | World Languages
and Literatures

FEBRUARY 26

Tools for Corpus Linguistics

Dr. Romy Ghanem | English

Dr. Liz Lane | English

MARCH 26

Maps and Mapping in the Humanities

Dr. Catherine Phipps | History

APRIL 9

Project Breakout Sessions

New Projects and Project
Ideas Welcome

APRIL 23

Working Collaboratively and
Project-Based Funding

Dr. Keri Brondo | Anthropology

Dr. Melanie Conroy | World Languages
and Literatures

Dr. Donal Harris | English

For more information, contact
Dr. Melanie Conroy at mconroy@memphis.edu.

Sponsored and funded by the Division of Research and Innovation with additional support from the Marcus W. Orr Center for the Humanities. Digital Humanities Methods is a community of research scholars at the University of Memphis.



Research and Innovation

The University of Memphis is an Equal Opportunity/Affirmative Action University. It is committed to the education of a non-racially identifiable student body. UOM739-FY16/9

Fall 2019 Plans

Host **THATCamp** (informal conference) on digital humanities in the Midsouth

Grow membership and develop off-campus partners and partners on other campuses (Greater Memphis area DH Consortium)

Plot Fall 2019 workshop series

Create working groups and apply for funding identified this semester

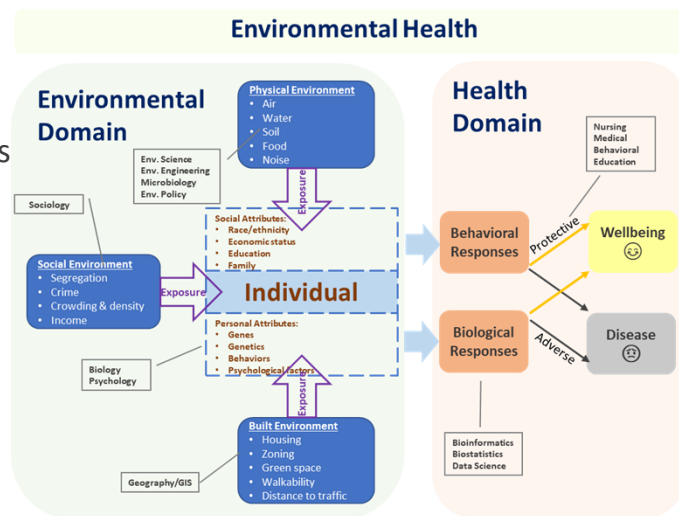
Memphis Environmental Health Research Community (MEHRC)

- Overall Goal:

Understand how exposures to chemicals and their interactions with non-chemical stressors and socioeconomic status cause environmental health disparities in vulnerable and/or disadvantaged populations at varying life stages.

► Research Topics

1. Co-exposure to multiple environmental and social stressors
2. Environmental health disparities
3. Knowledge to action



MEHRC Scholars



Dr. Angela Antipova

Geography



Dr. Pratik Banerjee

Microbiology
Food Science



Dr. Hoi Sing Chung

Nursing



Dr. Cheryl Goudie

Biology
Env. Education



Dr. Wesley James

Sociology



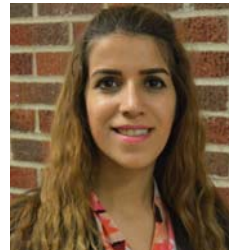
Dr. Chunrong Jia

Env. Health
Air Pollution



Dr. Joyce Jiang

Biostatistics



Dr. Maryam Salehi

Env. Eng.
Water Pollution



Dr. Larry Smith

Env. Regulation

Progress

- Meetings
 - March 19, 2019. Seminar: Chemical and non-chemical stressors and health, by two Harvard professors
 - March 21, 2019. Environmental Health Poster Session with Harvard-JPB Environmental Health Fellows
 - April 16, 2019. MEHRC group meeting
- Projects
 - Characterizing Community Exposure to Polycyclic Aromatic Hydrocarbons (PAHs) in a Tri-State Area. Funded by EPA.
 - Antimicrobial Chemicals and Resistance Genes in Indoor Environments. Funded by JPB Foundation.
 - Environmental Exposure Reduction (REER) in a Multicomponent Asthma Intervention. Funded by MRC.

Progress

- Grant submissions:
 - Promoting Safe and Healthy Learning Environments in Early Childhood Learning Centers. Submitted to Urban Child Institute
 - Applications of statistical learning methods in studying profiles and health effects of co-exposures to complex environmental chemical mixtures. Submitted to FIT
 - Profiles of Chemical Contaminants and Antibiotic Resistance in Surface Soil of Urban Community Gardens. Submitted to FIT
- Manuscripts preparations:
 - Socioeconomic and environmental determinants of asthma prevalence in Shelby County schools
 - Built environment and school performance
 - Classification of volatile organic compound (VOC) profiles by microenvironment using machine learning methods
 - Aromatic compounds at gas stations represent a nontrivial outdoor exposure source



MID-SOUTH
LGBTQ+
ARCHIVE

Current Project LGBTQ+ Archive

- Seed Collection from OUTMemphis
- Features archival film footage from 1969 Miss Gay Memphis Pageant
- Collaborating with other local LGBTQ+ Organizations to grow the archive
- Plans to enhance collection with oral histories (opportunities for graduate student research)

Fall Event (F 10/25)

- De-centering Stonewall
 - Keynote Speaker – Nikki Lane
 - Local LGBTQ+ History Panel
 - On-campus drag event commemorating the 1969 Miss Gay Memphis Pageant (collaborating with Stonewall Tigers)
- Collect material from community for the archive

CoRS Members

- Brigitte Billeaudeau – UofM Libraries
- Robby Byrd – Journalism & Strategic Media
- Michael Medcalf – Theatre & Dance
- Susan Nordstrom – Counseling, Ed Psych & Research
- Virginia Solomon – Art
- Craig Stewart – Communication & Film
- Matthew Thomann – Anthropology
- Cookie Woolner - History





POVERTY CoRS

Elena Delavega, PhD, MSW
May 2, 2019

The aim of the Poverty CoRS – henceforth called the **UM Poverty Research Collaborative (UMPRC)** – is to foster ongoing collaboration to create an incubator for innovative ideas and the development of projects on an annual basis. The UMPRC will operate on the basis of a sustained model with a very strategic system for papers that can be adapted based on faculty needs and availability

The Author Agreement

- A fundamental feature of the UMPRC
- One per project
- Defines rights and responsibilities

CoRS Member	Discipline	Related interests & contributions
Dr. Elena Delavega	Social Work CONVENER	<ul style="list-style-type: none"> • The demographics of poverty in Memphis. She is the author of the popular Memphis Poverty Fact Sheet, updated yearly. • Structural causes of poverty. • Attributions of poverty and their effect on social services.
Dr. Debra Bartelli	Public Health	<ul style="list-style-type: none"> • Relationship of poverty to health across the lifespan as well as an interest in its effects on child brain development. • Strong relationships with community organizations that serve the poor & marginalized.
Dr. Bert Burraston	Criminology	<ul style="list-style-type: none"> • Reentry through the lens of criminal sociology. • Advanced skills in research methodology and quantitative statistics.
Dr. Amy T. Campbell	Cecil C. Humphreys School of Law	<ul style="list-style-type: none"> • The intersection of structural economic inequity, racial inequity, and health inequity. • Utilization of data to inform a systemic (systems transformation) approach to address persistent poverty.
Dr. Ty Dooley	Public and Nonprofit Administration	<ul style="list-style-type: none"> • Equity, community development, and social justice with a specific focus on at-risk populations. • Research expertise in quantitative and qualitative methods and archival data sources (e.g., census data)

CoRS Member	Discipline	Related interests & contributions
Prof. Demetria Frank	Cecil C. Humphreys School of Law	<ul style="list-style-type: none"> • Intersection between law and culture, prisoner rights, and bias in the youth and criminal justice systems. • Director of Project MI, a policy and research collaborative that aims to transform the youth and criminal justice systems through community engagement, and by providing strategic youth justice advocacy, policy advisement, and developing local youth supports.
Dr. Andrew Guthrie	City & Regional Planning	<ul style="list-style-type: none"> • Transit planning for social equity. • Research expertise in mixed and qualitative methods.
Dr. Hirschi	Social Work	<ul style="list-style-type: none"> • Understanding power, including the role of power in racism, oppression, and stigma. • Research expertise in quantitative and qualitative methods.
Dr. Danielle Vance-McMullen	Public and Nonprofit Administration	<ul style="list-style-type: none"> • Nonprofit organizations' fundraising and finances and donations by individuals. • Approaches to efficiently directing funds to nonprofits impacting equity and poverty-reduction goals.
Dr. Sharon Wrobel	Public and Nonprofit Administration	<ul style="list-style-type: none"> • Social policy program evaluation and analysis, with a specific interest in education and health policy and equity. More recently, she has expanded her focus to include comparative analyses of social and economic policy in the Latin Caribbean.

Data Project

- Spearheaded by the Cecil C. Humphreys School of Law
- Author Agreement in progress
- Funding
- Three meetings to date

Blame Index

- Collaborative project between Social Work and Public Administration
- Author Agreement in progress
- Two meetings to date
- Shovel-ready project

Center for social justice & Healing

Convener: Idia Thurston, PhD
Assistant Professor
Department of Psychology



Beverly Bond
History



Shelby Crosby
English



Sylverna Ford
University Libraries



Andre Johnson
Communication



Brian Kwoba
History



Artina McCain
Music



Ladrica Menson-Furr
African & Af Am Studies



Steven Nelson
Education



Idia Thurston
Psychology



Terrance Tucker
English

TEAM OF SCHOLARS

Vision & GOALS

- The Center for Social Justice & Healing is a research affinity group exploring **social, environmental, economic, and physical** influences that determine the health and well-being of people and communities in the MidSouth
- We focus on exploring, discussing, and creating innovative, collaborative, interdisciplinary, resilience-focused solutions for complex community problems related to **healing from social injustice**
- By linking **artists, educators, historians, psychologists, religious leaders**, and more, we are learning from diverse experiences while sharing interests in understanding and developing solutions to solve important problems of social injustice in our community from a strength-based perspective of healing
- We aim to engage community partners, graduate students, and thought leaders in interdisciplinary discourse via **panel discussions, workshops, and scholarship** on several healing themes
- By exploring these concepts in **bimonthly meeting** in interdisciplinary spaces, opportunities for creating community, future scholarship, research papers, and grants are being formed

PLANNED ACTIVITIES

Allyship (Shelby, Idia, & Full Team)

- Exploring the who, what, how, and why of being an ally

Truth & Reconciliation as a tool for social justice & healing (Beverly & Andre)

- Exploring places and spaces where T & R has and has not occurred, does it work, and the cyclical nature of social injustice

Black Liberatory Practices and Education as healing (Steven, Terrance, & Brian)

- The role of critical race theory, liberative education, and black feminist movements in alternative patterns of healing

Black Religion as Trauma and Healing (Andre & Terrance)

- Black liberation theology and ways to redefine theology that leads to liberation of people of all faiths

Slavery and Sounds (Artina, Beverly, & Shelby)

- The role of history, collective memory, arts and music in healing from social injustice

Research as healing (Ladrica, Steven, & Sylverna)

- Exploring the process of research engagement at multiple levels as a source of meaning making and healing from social injustice

Faculty Retreat (Full team)

- Practice what we preach – engaging in a healing conference



Development of Online Course for High Performance Computing Best Practices

Prof. Nathan J. DeYonker

Department of Chemistry

ndyonker@memphis.edu / 678-2029

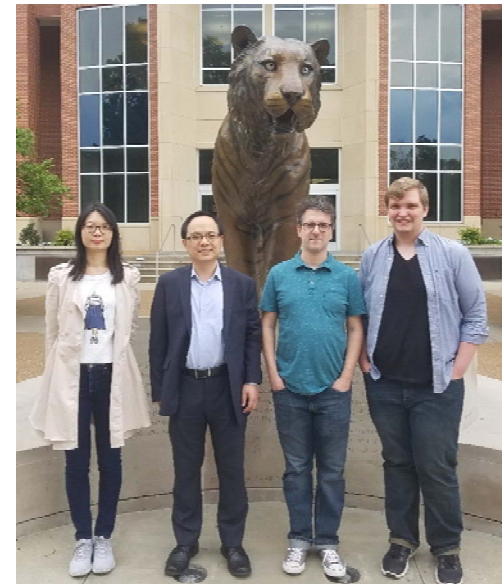
April 25th, 2019

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
- 11 members of Community
 - Staff & Faculty in CAS/Engineering/Public Health/ITS

Outcomes

- Identified two graduate students who will lead construction of modules (**Need one more!**)
- Learning objectives are outlined
- Dialog started with Roy Bowery and Kate Sharpe at UM Global
 - Separating proprietary materials for students from staff/faculty training
 - eCourseware setup and instructional design assistance
- Piloting in Spring or Summer 2020



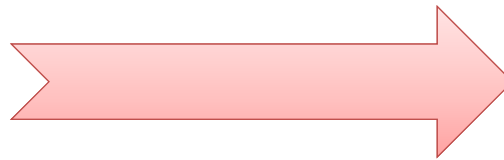
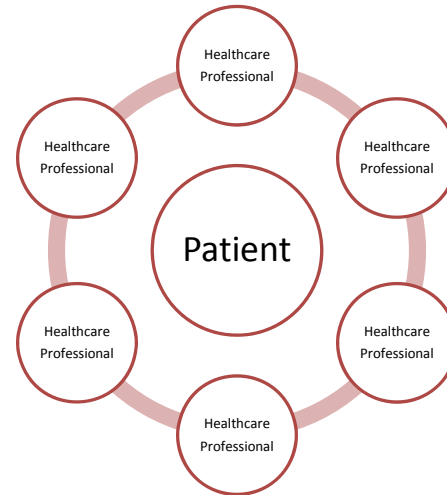


Team-Based Healthcare

CoRS Lightning Talks
Naomi Eichorn, PhD, CCC-SLP
April 26, 2019

THE UNIVERSITY OF
MEMPHIS

Broad Goal

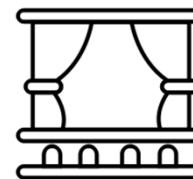


Broad Goal

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



SOUTHERN
COLLEGE OF
OPTOMETRY



CoRS Group

Audiology

Debbie Moncrieff, PhD, CCC-A
School of CSD, UM

Education

Beverly Cross, PhD
College of Education, UM

Music

Jason Caplan
The Bridge Institute

Nursing

Shirleatha Lee, PhD., RN, CNE
LCON, UM

Optometry

Melissa Zarn, O.D.
Southern College of Optometry

Theater

Caroline Sposto
Savvy Civility

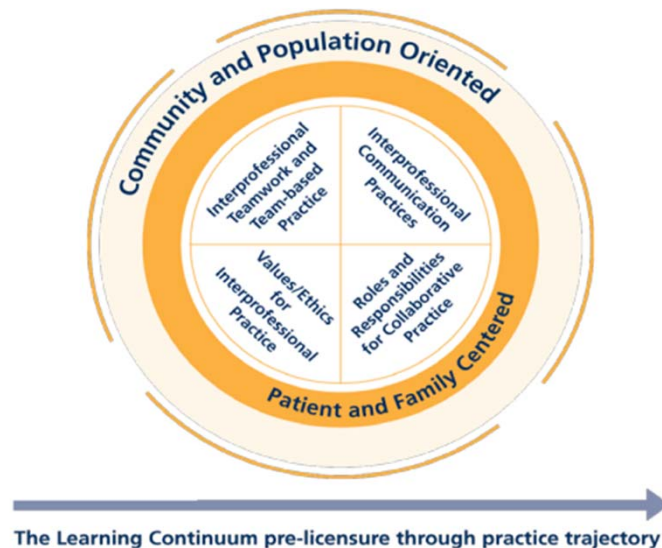
Public Health

Marian Levy, DrPH, RD, FAND
School of Public Health, UM

Speech-Language Pathology

Naomi Eichorn, PhD, CCC-SLP
School of CSD, UM

Progress: Pilot IPE Course



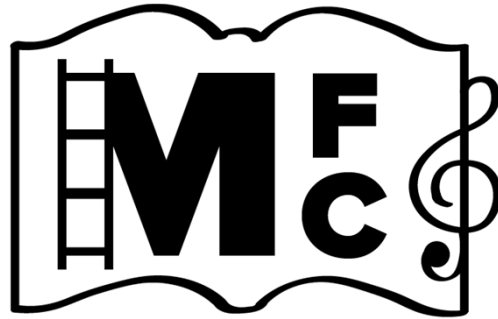
- Summer 2019
- Team-based activities
- Experiential learning
- "About, with, from" other professions
- Online and in-person activities
- Engagement with community
- Innovative application of Performing Arts
- Flexible framework, scalable
- Multiple assessments
- Multiple perspectives
- Pilot data for larger proposals

Thank you!
neichorn@memphis.edu

Memphis Film and Music Collective

Bringing together filmmakers, musicians,
and historians

Joel Roberts
Music Librarian
University of Memphis



- Website (www.memfilmmusic.org)
- [Promo video](#)
 - Produced by the Corporate/Promotional Video Production class (COMM 4222)
- Commissioned composer for promo video
- Upcoming film competition will encourage pairing filmmakers, student composers, and researchers by awarding small monetary prizes to be used for film production

University Schools

Research Consortium

Convener : Remy Debes, Philosophy

PEOPLE

- Sally Gates Parish – Associate Vice President Educational Initiatives
- Remy Debes (Philosophy)
- Stephanie Ivey (Engineering)
- Alfred Hall (College of Education)
- Ken Ward (Public Health)
- Deb Tollefsen (Philosophy)
- Jason Braasch (Psychology)
- Sarah Petschonek (Volunteer Odyssey)
- Brain Ruggaber (Theater and Dance)
- Lawrence Blackwell (Hattiloo Theater)
- Carolyn Kaldon (CREP)
- Chip Morrison (IIS)
- Wilson Waller (Building Box)



UNIVERSITY
MIDDLE
UNIVERSITY OF MEMPHIS

Sally Gates Parish
(Educational Initiatives)

```
graph TD; A[Sally Gates Parish (Educational Initiatives)] --- B[Lipman Early Education]; A --- C[Campus Elementary]; A --- D[University Middle]; A --- E[University High]
```

Lipman Early
Education

Campus
Elementary

University
Middle

University High



University Schools

University Schools: Home to the UofM's Youngest Tigers

Laboratory Schools of the University of Memphis



University Middle School

Apply to University Middle

Registration for Fall 2019 is closed. Learn more about the application process.

Learn More

Read what makes us a new kind of school

University Schools

Learn more about our Pre-K through Middle laboratory schools

Contact Us

[About](#) [Apply](#) [News](#) [Research](#) [Employment](#) [Contact Us](#)

[Home](#) > [Middle School](#) > [Research](#)

Conducting Research within the Middle School

Thank you for your interest in conducting research at University Schools. To schedule an observation or visit to a University School, a service learning partnership, a course-based partnership, or an internship/volunteer experience, please **contact the school directly**. For research purposes, please adhere to the following procedural guidelines:

Step 1: Register with the University Schools Research Consortium

Complete the form below before proceeding to next steps.

What Next?

First

- Organize with school leadership (May)
- Brainstorm Grant Sources

Second

- Plan Major Networking Event for the Fall - To Grow Membership and Connect with Funding
- Begin Basic Data Collection

Water Safety Community



Microbiology



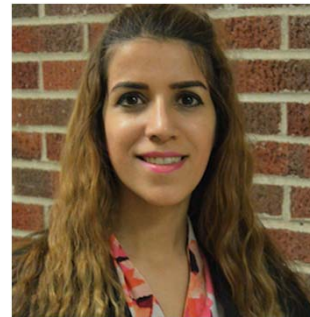
Dr. Shawn Brown
Biological Sciences

Risk Assessment



Dr. Chungrong Jia Public
Health

Water Quality



Dr. Maryam Salehi, Civil
Eng.

Industry



Zack Daniel, CDM
Smith.

Analytical Chemistry



Dr. Gary Emmert
Chemistry Dep.

Analytical Chemistry



Dr. Paul Simone
Chemistry Dep.

Wastewater



Dr. Larry Moore Civil
Eng.

Mission: Create an interdisciplinary community and pursue novel engineering and scientific research related to the water chemical and microbial dynamics.

Aim to enhance water quality and protect the public health.

Proposals submitted:

- (1) Salehi M, Brown S, Exploring Coupled Physical, Biological and Chemical Processes that Control Heavy Metals Fate and Transport through Plastic Plumbing Materials, Submitted to (NSF-CBET), March 2019
- (2) Jia C, Banerjee, P, Salehi M, Jiang Yu, Profiles of Chemical Contaminants and Antibiotic Resistance in Surface Soil of Urban Community Gardens, Submitted to Agriculture Cluster, U of M, April 2019

