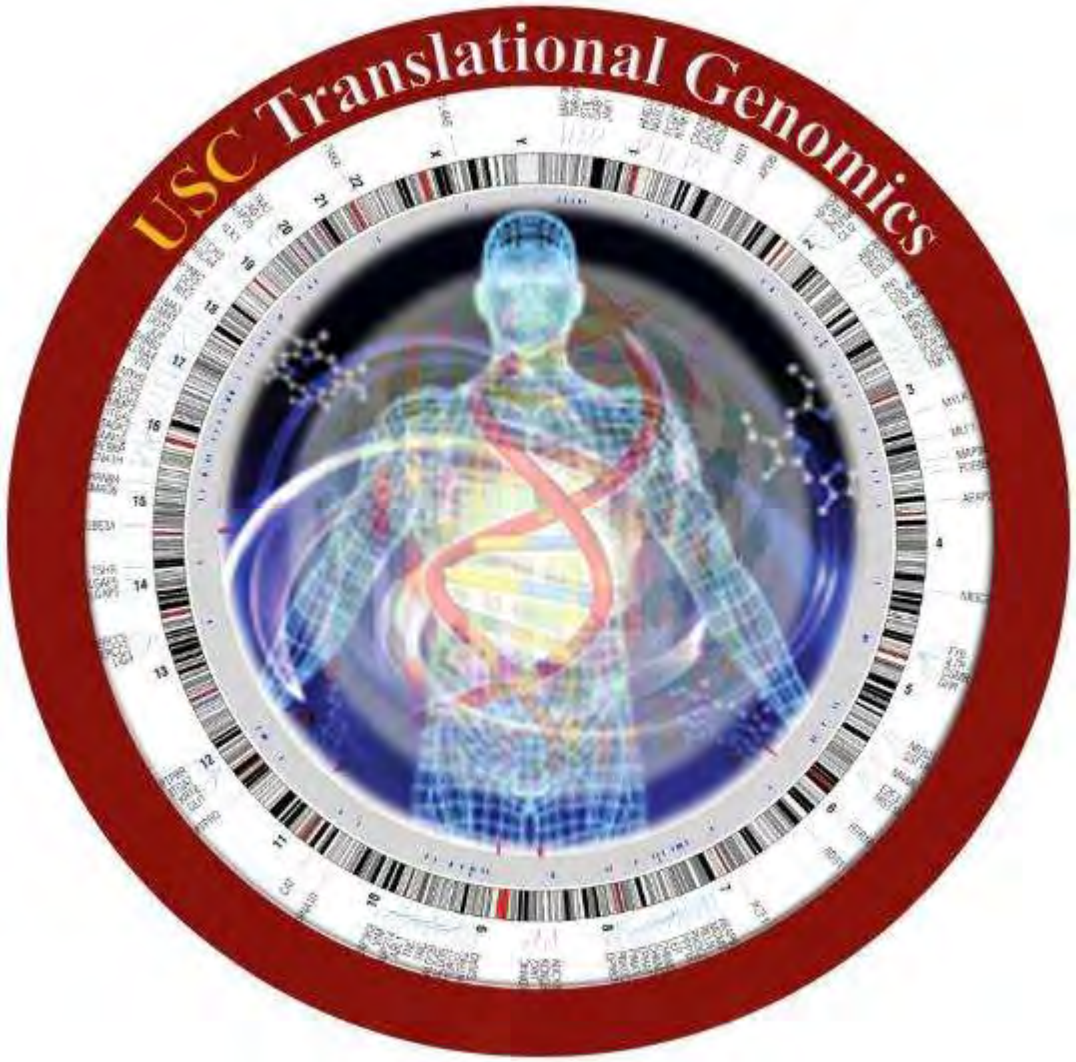
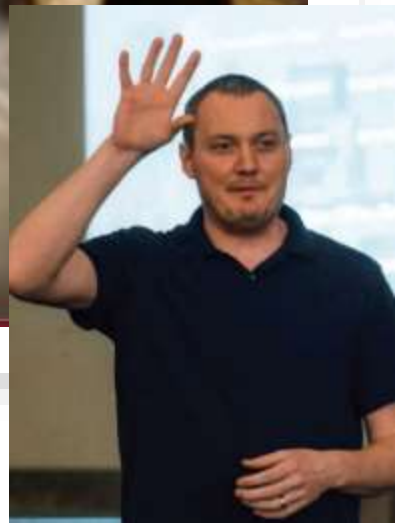
Accelerating improvements in healthcare at USC KSOM through intentional integration between basic discovery research and clinical science!




Education/Training

Carol Lin, Ph.D.
Associate Professor
Masters in Translational Biotechnology



David Craig, Ph.D.
Professor
Masters in Translational Biomedical Informatics

FOUNDATIONS IN BIOMEDICAL INFORMATICS (PART 1)

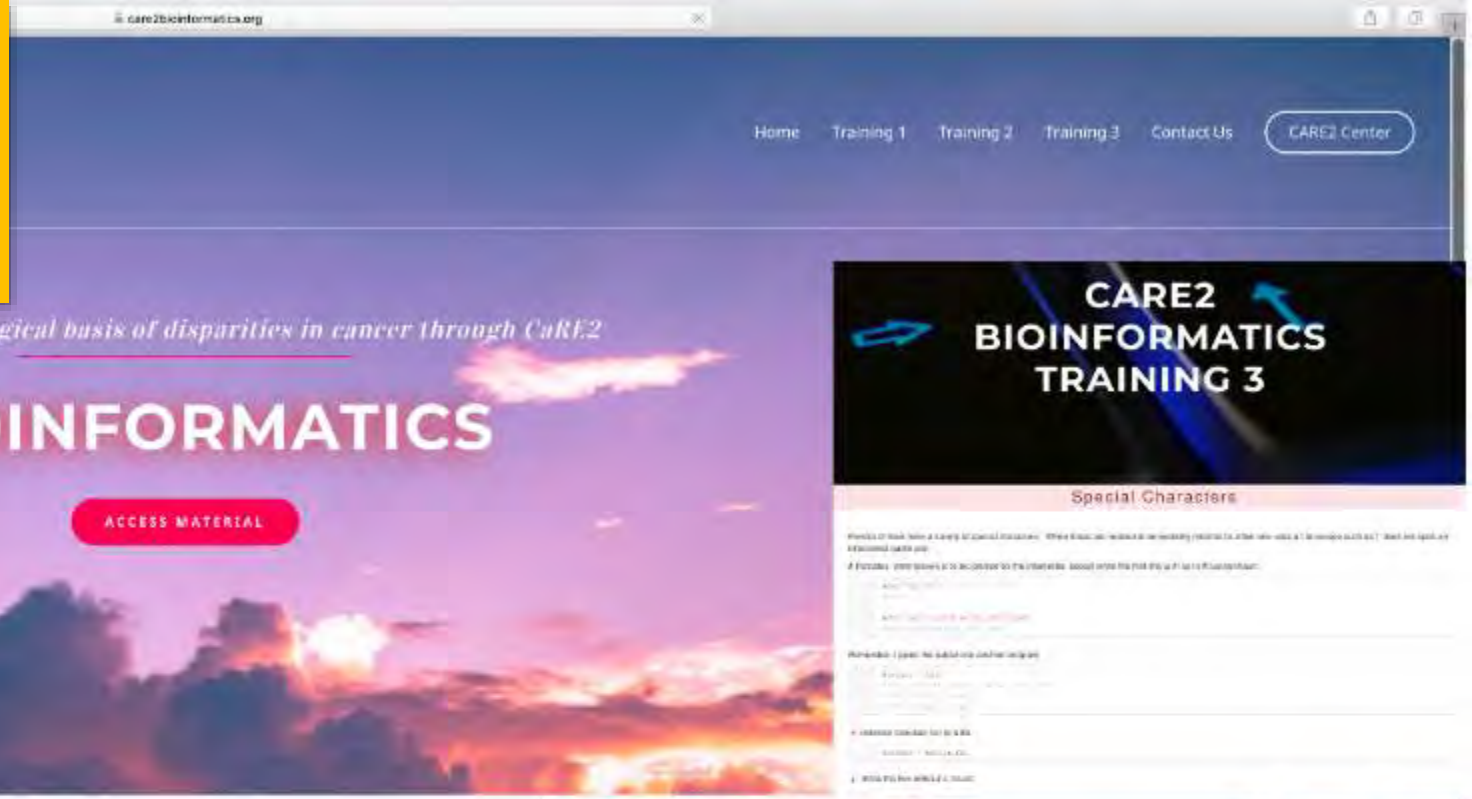
Webinar by
Enrique J. Velazquez-Villarreal, M.D., Ph.D., M.P.H., M.S.
February 2020
Date and Time TBA

LEARN MORE

FOUNDATIONS IN BIOMEDICAL INFORMATICS (PART 2)

Webinar by
Enrique J. Velazquez-Villarreal, M.D., Ph.D., M.P.H., M.S.
March 2020
Date and Time TBA

LEARN MORE



"I'm proud that we will be helping lead the way nationally toward advancing cancer health equity"

- John D. Carpten, Ph.D.

"MORE-MATERIAL" RELATED WITH BIOINFORMATICS & CANCER HEALTH DISPARITIES

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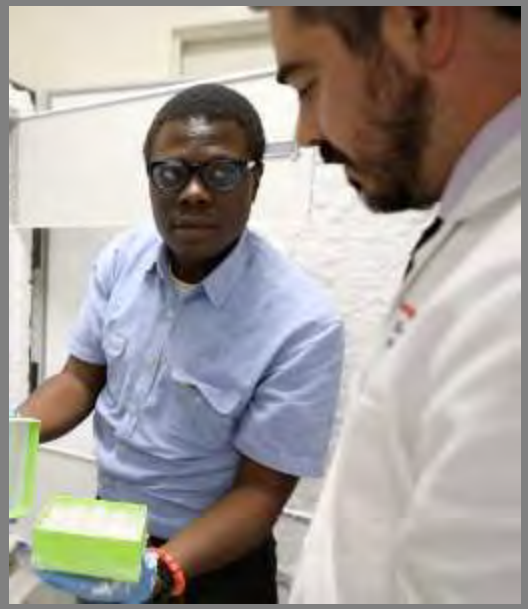
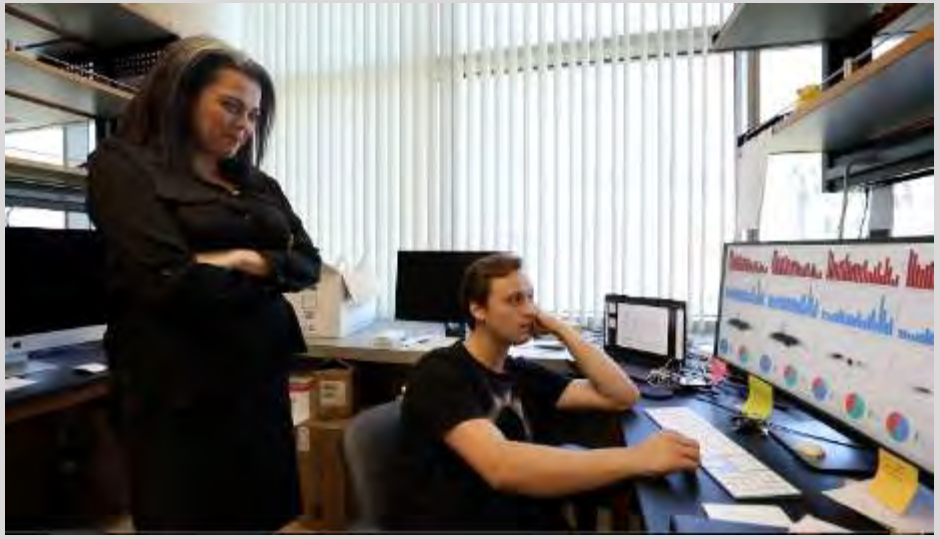
Keck School of
Medicine of USC

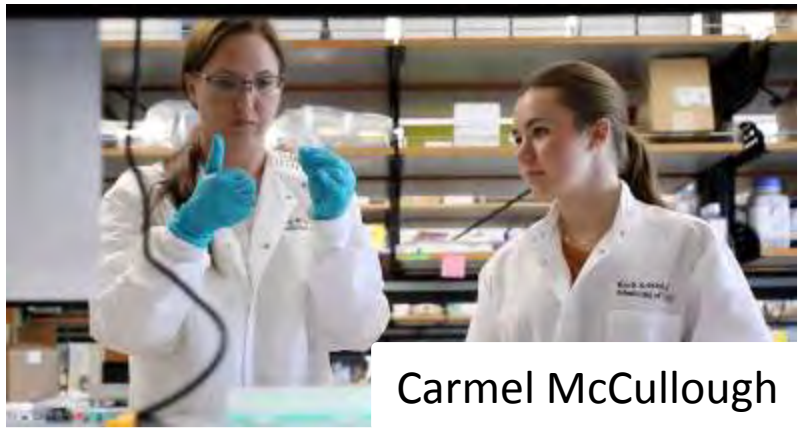




Ben Tew, PhD

Lee Gibbs, PhD

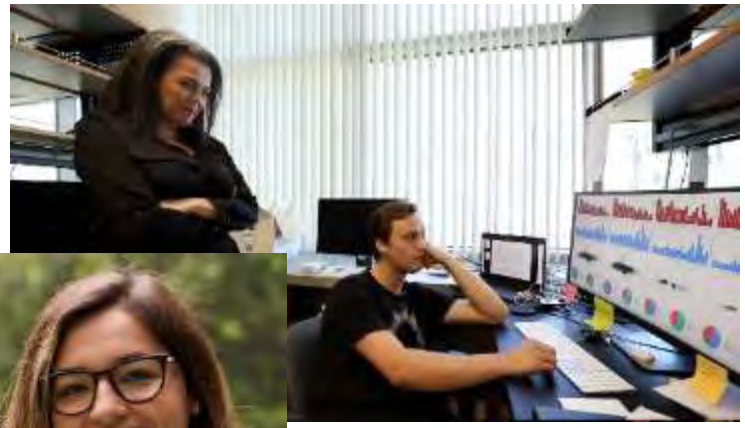
Fullbright Fellow
Solomon Rotimi, PhD
Covenant University, Nigeria



Carmel McCullough

Heather Miller, MD

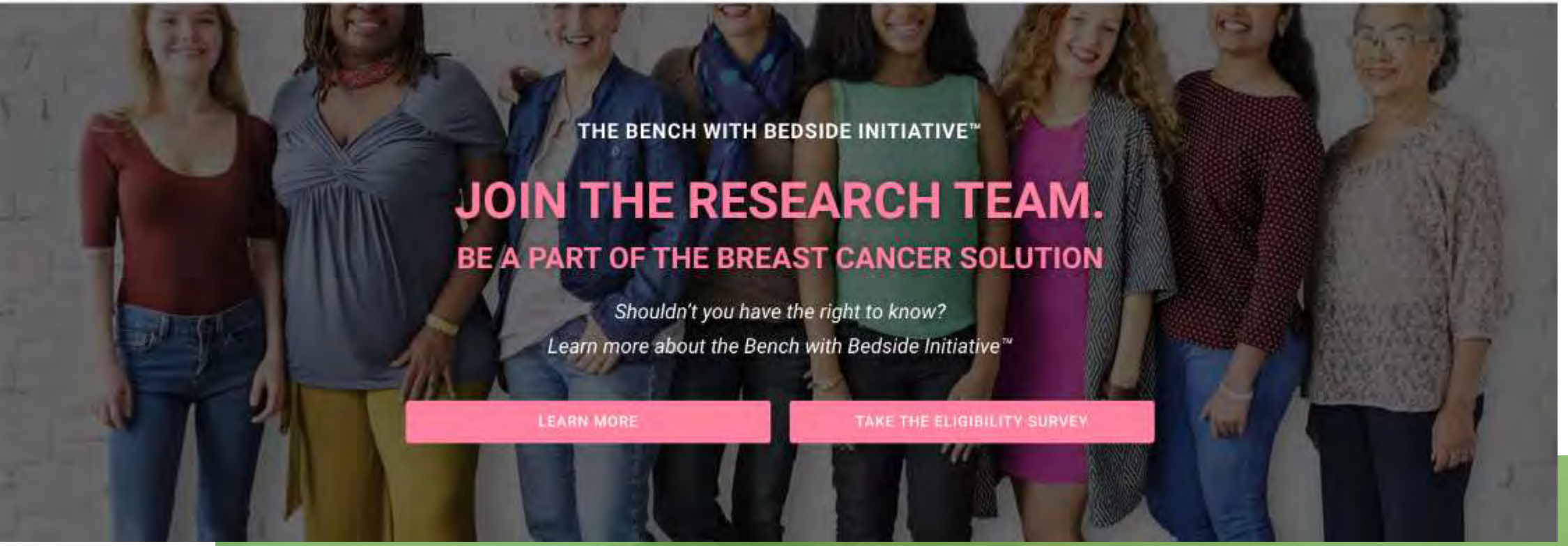
Rania Bassiouni, PhD



David Buckley

Michelle Webb


Service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SPOTLIGHT ON NEUROSCIENCE

Finding Missing Pieces in the Brain

BROOKE E. HJELM

Assistant Professor of Clinical Translational Genomics
Department of Translational Genomics
Keck School of Medicine of the University of Southern California

After creating a new method for identifying large mitochondrial genome deletions, Brooke Hjelm now investigates the connections between mitochondrial dysfunction and neurological disorders in unique ways.

What drew you to genomics and neuroscience?

I am obsessed with technology applications, so I have experience in a lot of different fields: plant biology, infectious disease, vaccine development, stem cells, genomics, and neuroscience. I am fascinated with the inner workings of living organisms and manipulating them into laboratory tools.

Going into neuroscience was a happy accident. Initially, my interest was in genomics. Genomics technology is such a fast-moving field that it changes dramatically within months. It is an exciting area because scientists are always discovering something new. My graduate work was in neurogenomics at the Translational Genomics Research Institute. In David Craig's lab, I learned both the wet lab and the dry lab components of genomics research. I ended up falling in love with the brain, but probably for different reasons than a lot of other neuroscientists.

What do you love about the brain?

I like that neurons are post-mitotic, so every cell has its own fixed genome; if something goes wrong, there is almost no opportunity to fix it. Additionally, different neurological diseases may have the same phenotype because they converge at the circuitry level, rather than the molecular level, which makes the genomics data complex.

Another thing that interests me is the differences throughout tissues of the body and how those differences can determine what part of the body gets a disease. Because of that, I have been involved in a lot of RNA work focusing on different brain regions, including single cell RNA sequencing and spatial gene expression profiling.

What is your current research focus?

My most recent research has been on complex neurological disorders. I have been working on Alzheimer's and Parkinson's diseases since I was in graduate school, and diseases related to psychiatric disorders, such as schizophrenia and major depression, since my postdoctoral fellowship at the University of California, Irvine. I am also studying the mitochondrial genome, which has led my research into new areas both within and outside the brain.

How do mitochondrial genomes affect brain function?

The tricky thing about mitochondria is that they are polyploid, so every cell can have thousands of mitochondrial DNA molecules. This is a backup system. If you have a problem with one molecule, the cell will tolerate it as long as the "bad genomes" are kept at a low threshold. However, mitochondrial genomes with deletions are smaller, so they have a replication advantage. The "bad" proportion can get larger over time to the point where the cell cannot generate enough energy. If you get these cells in certain parts of the brain, you may get a phenotype like depression. Although we typically think of DNA as something that is the same throughout the body, the structure of the mitochondrial genome can change a lot from one tissue to another. I looked at this variation to determine what tissue-specific diseases might be caused by mitochondrial dysfunction.

During my postdoctoral fellowship in Marquis Vawter's lab, I analyzed next-generation sequencing (NGS) data from mitochondrial PCR amplicons to find large deletions. We knew that the deletions existed, but no one had a good way to get at the bulk of this information from NGS data. DNA

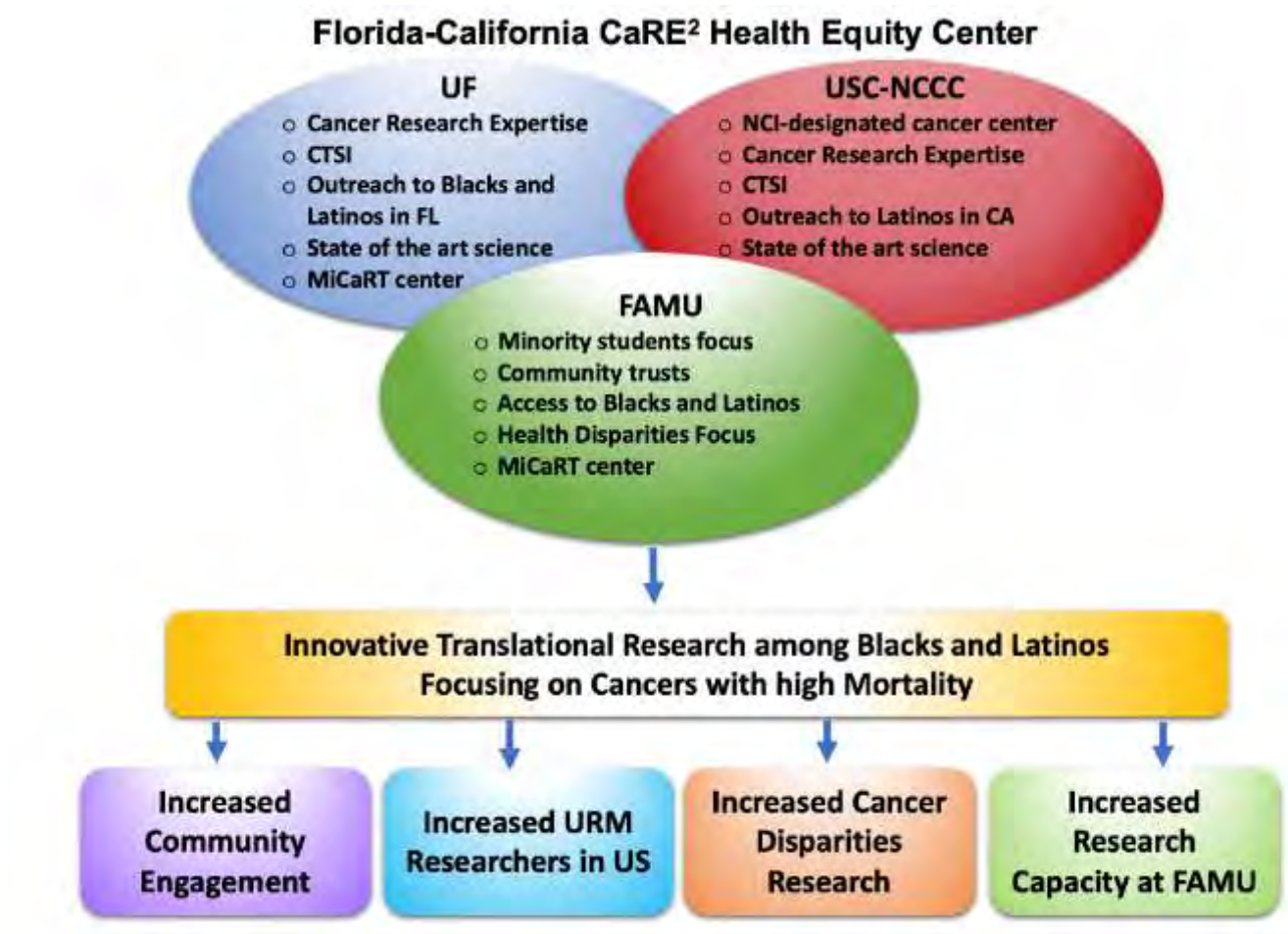
AACR 110th Annual Meeting Program Chair, Atlanta, GA, April 2019

The National Cancer Institute awarded a five-year, $16 million U54 grant to create a cancer health equity center through a Triad partnership between USC, FAMU, and the University of Florida that will conduct research on cancer health disparities, train underrepresented minorities and perform community outreach among underrepresented minorities and the medically underserved.

FLORIDA - CALIFORNIA

CaRE²

CARE² HEALTH EQUITY CENTER


Florida-California CaRE² Health Equity Center
UF
Cancer Research Expertise
CTSI
Outreach to Blacks and Latinos in FL
State of the art science
MiCaRT center
USC-NCCC
NCI-designated cancer center
Cancer Research Expertise
CTSI
Outreach to Latinos in CA
State of the art science
FAMU
Minority students focus
Community trusts
Access to Blacks and Latinos
Health Disparities Focus
MiCaRT center
Innovative Translational Research among Blacks and Latinos Focusing on Cancers with high Mortality
Increased Community Engagement
Increased URM Researchers in US
Increased Cancer Disparities Research
Increased Research Capacity at FAMU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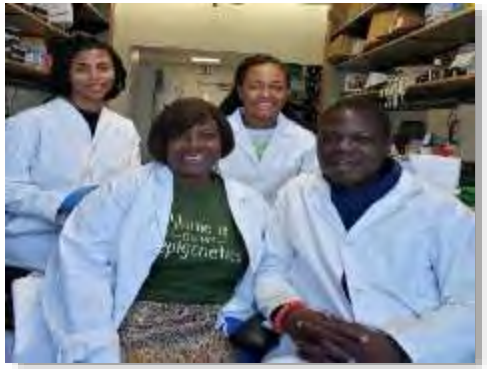
CARE² HEALTH EQUITY CENTER

CaRE² Partnership Structure and Workflow



Florida-California CaRE² Health Equity Center

Administrative Core
Scientific & Administrative Leadership and Overall Oversight of all Components

Outreach Core
Dissemination of Findings & Integration of Community Members & Advocates

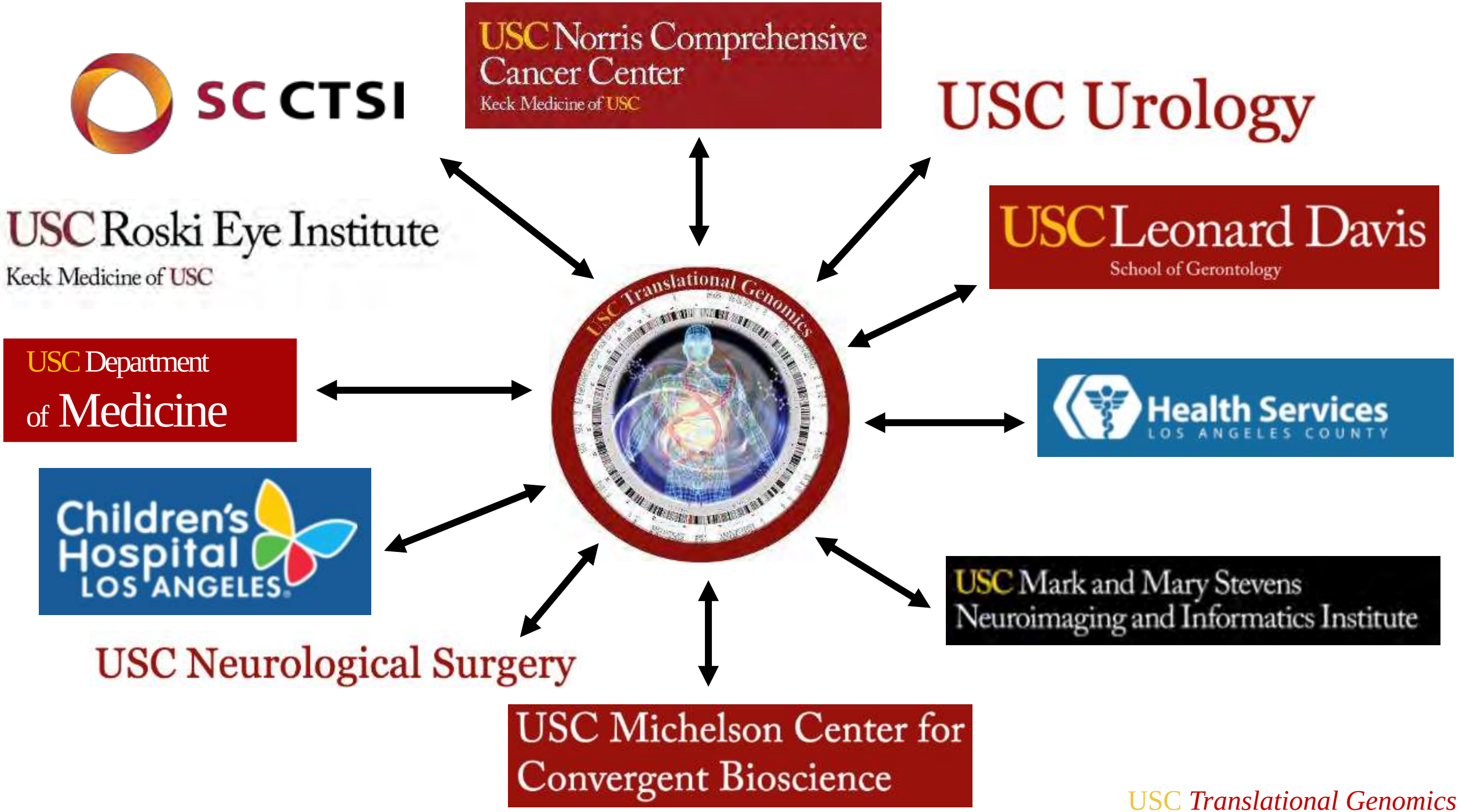
Tissue Modeling Core

Research Education Core
Training of URM students, post-bacs, post-docs and ESI

Translational Research on Cancer Disparities in Blacks and Latinos

Bioinformatics, Statistical and Methodological Core

Planning and Evaluation Core
Assess all projects and activities towards benchmarks


SC CTSI
USC Norris Comprehensive Cancer Center
Keck Medicine of USC
USC Urology
USC Roski Eye Institute
Keck Medicine of USC
USC Leonard Davis School of Gerontology
USC Translational Genomics
USC Department of Medicine
Health Services
LOS ANGELES COUNTY
Children's Hospital LOS ANGELES
USC Mark and Mary Stevens Neuroimaging and Informatics Institute
USC Neurological Surgery
USC Michelson Center for Convergent Bioscience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NSF National Science Foundation
WHERE DISCOVERIES BEGIN
FOUNDATION
LUMINIST


USC Translational Genomics