2018 TRANS-INSTITUTIONAL PROGRAM
AWARD RECIPIENTS

Data Science Visions (VRA)

Participants:
College of Arts and Science: **Andreas Berlind**
School of Medicine (Clinical): **Yu Shyr**
Blair School of Music
Divinity School
Law School
Owen School of Management
Peabody College
School of Engineering
School of Medicine (Basic Sciences)
School of Nursing

Data science is closely related to "big data", which focuses on particularly large and complex datasets, but data science is more focused on the process of learning from, and making decisions based on, the data rather than the size of the dataset itself. Data science can be applied to smaller datasets as well. Data science is revolutionizing many academic fields, while in industry it is emerging as critical training for careers in the new information-based economy. This program aims to build a trans-institutional institute in data science that promotes and facilitates data-driven research in all schools and departments through interdisciplinary collaboration. It will also develop both formal and informal trainings in data science to give our students at all levels a competitive advantage in their future careers.

A Sychrotron-like X-ray Source for Structural Biology at Vanderbilt – VRA

Participants:
School of Medicine (Clinical): **Raymond Blind**, James Crowe, Borden Lacy
College of Arts and Science: Lauren Buchanan, Brandt Eichman, Richard Haglund, Janet Macdonald
School of Medicine (Basic Science): Walter Chazin, Stephen Fesik, Tina Iverson

Despite the development of new structural techniques such as Cryo-EM, X-ray crystallography remains the dominant method used in all structural biology. However, the rate of X-ray discovery is limited by long queues and maintenance downtime of synchrotron radiation sources, which are enormous federally run facilities. A new type of home radiation source called MetalJet now allows data to be collected locally on campus, dramatically expediting and expanding the entire structural biology enterprise. With this investment, Vanderbilt has the opportunity to seize the lead in the previously impossible structural biology and academic structure-based drug design. An on-site device will increase the university's rate of discovery and provide a unique educational experience for Vanderbilt students.

Digital Cultural Heritage Research Cluster – ViA

Participants:
College of Arts and Science: **Tracy Miller, Lynn Ramey**, John Janusek, Jane Landers, Ole Molvig, Betsey Robinson
Blair School of Music: Joy Calico
Divinity School: David Michelson
School of Engineering: Robert Bodenheimer

Inspired by UNESCO's mission to protect cultural heritage in danger of destruction, this program will harness expertise across multiple disciplines and schools at Vanderbilt to develop new digital methods for identifying, studying and preserving historic cultural expressions. This project connects humanistic research with emergent digital technologies for the creation and manipulation of 3-D models, immersive digital environments and complex databases and data formats capable of modeling the heterogeneous and complex forms of humanistic data. These resources will support digital research and next-generation undergraduate and graduate education on cultural heritage. Faculty will unify traditional disciplinary-specific university infrastructures to foster and maximize the impact of Digital Cultural Heritage projects already underway, while fueling new initiatives.

The Initiative for Personalized Microbial Discovery and Innovation – ViA

Participants:
School of Medicine (Clinical): **Maria Hadjifrangiskou**, **Jonathan Schmitz**, Suman Das, Jane Ferguson, Borden Lacy, Jill Pulley
College of Arts and Science: Brian Bachmann, Seth Bordenstein, Gary Sulikowski
Law School: James Blumstein
School of Medicine (Basic Science): David Weaver

From drug-resistant pathogens to therapeutic probiotics, microorganisms ('microbes') dramatically impact all human life, and a deeper understanding of human-microbe relationships will generate new therapies to improve health and treat infections. However, just as every human individual is profoundly unique, so too is there tremendous diversity among the microbes that reside within our bodies, both beneficial commensals and detrimental pathogens that cause infections. This program addresses this critical area for trans-institutional learning, interfacing experts from across the university with existing resources for personalized medicine and science. By championing pilot projects and fostering a collaborative community, this program strives to generate both knowledge and technologies from the unique microbes of individual women and men.

Vanderbilt Initiative for Interdisciplinary Geospatial Research – ViA

Participants:
College of Arts and Science: **Steven Wernke**, Andreas Berlind, Nicole Creanza, T.S. Harvey, Tiffiny Tung
Law School: Michael Newton
School of Engineering: Yevgeniy Vorobeychik
School of Medicine (Clinical): Carolyn Audet, Catheryne Clouse, Stephen Deppen

Many of the biggest challenges facing humanity, and the biggest research questions facing faculty from across disciplines, have significant spatial dimensions that require sophisticated geospatial thinking, technology, modeling and analysis. Effective geospatial research and education requires intentionally transdisciplinary programs aimed at producing creative and innovative geospatial thinking. This program

will coordinate disparate research efforts across campus, enhance Vanderbilt's geospatial facilities, and catalyze transdisciplinary projects that immerse students in impactful research. Program faculty will develop consultation resources and assess Vanderbilt's long-term research and teaching needs, with the goal of eventually establishing of a geospatial center.

Vanderbilt Initiative for the Study of Antimicrobial Resistance Drivers – ViA

Participants:
School of Medicine (Clinical): **Carlos Grijalva**, **Leigh Howard**, John Dunn, Kathryn Edwards, Marie Griffin
College of Arts and Science: Seth Bordenstein, Avery Dickins de Giron
Peabody College: Jessica Perkins

This project aims to challenge the existing paradigm and expand the understanding of the environmental drivers of antimicrobial resistance through research and teaching activities. This program will place Vanderbilt at the forefront of efforts to disseminate awareness, educate and identify effective strategies to reduce the global threat of antimicrobial resistance. The goal of the project is to increase institutional and community awareness of the problem of antimicrobial resistance, understand the environmental sources of antimicrobial resistance, design effective strategies to modify unwarranted practices, and generate an informed global framework for assessments of antimicrobial resistance and its impact on human health and our environment.

VCL Intersectional Study of Black Women and Girls in Society – ViA

Participants:
Peabody College: **Nicole Joseph**
College of Arts and Science: Christy Erving, Rena Robinson, Claudine Taaffe
Divinity School: Stacey Floyd-Thomas, Phillis Sheppard, Emilie Townes
Law School: Karla McKanders

This transdisciplinary hub of research, discovery and teaching activities will center on elevating and understanding structural barriers and forms of resilience that black women and girls experience across various social contexts in society, and how intersectional interventions might be created to expand opportunities and increase pathways to success. The program's focus on black women's and girls' voices, perspectives and social experiences shifts this crucial population from the margins to the center. By creating, evaluating and synthesizing cutting-edge scholarship, this initiative will build upon and significantly expand current efforts happening around the country to position Vanderbilt as a world leader.