KENT STATE UNIVERSITY

EXPANDING UNIVERSITY INITIATIVES

THE BRAIN HEALTH RESEARCH INSTITUTE

What do early detection of Alzheimer's disease, learning strategies for at-risk students, safe and effective weight loss methods, new treatments for common forms of infertility, and the opioid epidemic have in common? They're all topics being elevated by Kent State's nationally recognized efforts in brain health.

The Brain Health Research Institute (BHRI) is a collaborative effort that taps passionate faculty members from across the university – not just in science-based departments, but in social sciences, the arts and humanities – to bring together their unique strengths as they step up to solve these brain-related challenges and more.

INTERDISCIPLINARY APPROACH

The BHRI builds on a longstanding tradition of neuroscience research at Kent State, and also represents a new and different way of promoting interdisciplinary research about the brain and training for the next generation of scientists. The Institute is the home of innovative training for undergraduate students, graduate students and postdoctoral fellows in an environment that combines hands-on access, experience and mentorship with knowledge, resources and opportunities.

The complexity of the brain and brain-based diseases motivates us to collaborate across fields and bring together researchers and scholars with diverse backgrounds and expertise. Kent State is unique in the wide range of disciplines in which brain research is conducted, representing faculty from multiple departments and colleges across our eight campuses.

IMPROVING LIVES THROUGH RESEARCH

The BHRI is crucial to advancing education, research and outreach that will take our work beyond Kent State and into applications that can improve lives everywhere.

INTEGRATED SCIENCE BUILDING LOWER LEVEL: FUTURE HOME FOR BHRI

Front lobby rendering

Lab rendering

TA/GA workspace rendering

BRAIN HEALTH AS A WINDOW INTO DISEASE

The Institute is built on the core vision that in order to fully understand the causes of brain diseases and treat and heal diseased brains, we first need to understand the organization and functioning of the normal, healthy brain. The majority of research on the brain is performed at academic health centers and, not surprisingly, is primarily focused on treating the diseased brain. We take a different approach — one which begins with basic discovery research about the brain which can then be translated into new treatments for brain diseases.

"COLLABORATORIES" - A DIFFERENT KIND OF RESEARCH SPACE

To foster interdisciplinary research about the brain, we are taking a different, non-traditional approach to space, creating shared core facilities we call "collaboratories". With state-of-the-art equipment and flexible lab space, BHRI collaboratories will enable researchers from diverse disciplines to bring their collective talents to bear on important, unresolved questions about the brain and brain diseases.

TRAINING THE NEXT GENERATION

A major BHRI goal is to foster and support training for the next generation of researchers, doctors, teachers and others who will carry on our efforts to improve brain health and cure brain disease. The new undergraduate neuroscience major at Kent State provides a basis for this training with 49 majors enrolled in its first year. In addition, we have created the BHRI Undergraduate Fellows Program, a two-year experience that provides a mentored, research-intensive undergraduate experience in neuroscience. Fellows study the brain and have an assigned mentor to help them achieve their goals and pursue successful careers in academic or pharmaceutical research, healthcare or other science-related professions.

SOCIETAL IMPACT OF BRAIN-BASED DISORDERS

Kent State researchers are working to better understand these problems and train the next generation of scientists, doctors and inventors:

Alzheimer's disease will cost more than

$1 trillion

each year by 2050.

1 in 5

adults meets the criteria for experiencing a mental health condition each year.

Someone dies every

8 seconds

from an opioid overdose.

Stress due to the COVID-19 pandemic has negatively impacted the brain health of children and adolescents, especially from families in economically impoverished communities.

Less than

1 in 3

children with a learning disorder will successfully graduate from college.

NATIONALLY RECOGNIZED FOR RESEARCH

Kent State is recognized nationally for research on memory and is applying this expertise in innovative ways including how protein changes in the brain lead to Alzheimer's disease and how to help stroke victims learn to talk again. We are also studying how diet and exercise might boost brain power as people age and how to help athletes recover from concussions and other brain trauma.

Kent State is recognized as a national leader in mental health for stress/trauma research. Research projects have included:

- Studying how trauma leads to PTSD
- Investigating how chemical changes in the brain can cause depression
- Exploring the dynamics of emotional eating and obesity and high rates of stress
- Studying psychological disorders in college students

BRAIN HEALTH RESEARCH INSTITUTE
at Kent State University

Research Themes

Brain Health as a Window into Disease

Brain Control of Movement and Sensation

Theme/Focus:

Motor Skills and Movement

Special Senses (Hearing/Vision)

Spinal Pathways and Peripheral Nerves

Examples of Associated Diseases/Disorders:

Neurodegenerative Disorders

Speech/Hearing Disorders

Spinal Cord Injury

Traumatic Brain Injury

Brain Basis of Emotion and Cognition

Theme/Focus:

Brain Wellness and Aging

Cognition, Learning and Education

Neuroscience of Creative Activities

Social Behavior

Examples of Associated Diseases/Disorders:

Alzheimer's Disease and Dementia

Cognitive Impairment

Drug and Behavior Addictions

Neuroendocrine Brain

Theme/Focus:

Reproduction

Metabolism

Stress

Examples of Associated Diseases/Disorders:

Infertility

Obesity

Polycystic Ovary Syndrome

Post-Traumatic Stress Disorder

Undergraduate Fellow Nathan Ritchey, ‘23

Nathan Ritchey was pursuing a degree in mathematics when he began working with Dr. Lique Coolen in her neuroscience lab. “Working with Dr. Coolen opened my eyes to so many things and I have loved every moment of my research experience,” Nathan said. “The Brain Health Research Institute has given me a great opportunity to get involved in research and I now plan on having my own research lab once I graduate.”

Nathan’s research has focused on patients with spinal cord injuries. “There are 400,000 people in the U.S. that have spinal cord injuries and we are looking to develop new treatments to improve their quality of life,” said Nathan.

As a recipient of a Summer Undergraduate Research Experience (SURE) scholarship and a BHRI Fellow, he had the ability to work in a lab instead of working in another part time job. “This experience has helped me learn where I belong and that I want to make a difference in the world,” Nathan said.

Nathan Ritchie, ’23

Major: Mathematics and Neuroscience

Fellows Capstone Projects: *Increasing Quality of Life for Spinal Cord Injury*

Undergraduate Fellow Taylor Joseph, ‘21

Taylor Joseph is an exercise science major and plans to pursue a career as an occupational therapist after graduation. She participated in the Summer Undergraduate Research Experience (SURE) working with Dr. Angela Ridgel on two research projects.

“My first project was conducting research to determine how menopause affects age-group athletes. Because of the pandemic, we used an online survey to gather information from respondents,” Taylor said. “As a Brain Health Research Institute Fellow, I learned about proper data collection, how to edit my work, write papers and how to give research presentations.”

Her work in the lab provided the opportunity for her to conduct individual investigation and allowed her to gain hands-on experience working with treatments for Parkinson’s Disease. “We looked at how different intensity of exercises affected Parkinson’s patients’ mental health,” said Taylor. “This knowledge will really help me as I prepare for a career as an occupational therapist to develop new and innovative ideas to make therapy more beneficial and enjoyable for my patients.”

Taylor Joseph, ’21

Major: Exercise Science

Fellows Capstone Projects: *How Menopause Affects Age-Group Athletes and How Exercise Type and Intensity Affect Parkinson’s Disease Patients*

WHY IS PHILANTHROPIC SUPPORT NEEDED?

Philanthropic support is more than simply important; it is essential if we are to make this vision a reality. We are engaging in an innovative philanthropic campaign to secure funds for our program and capital needs. There are a number of areas in which private philanthropic support will make a significant impact.

These strategic investments will extend our ability to conduct cutting-edge research and train students using advanced techniques and equipment. These include:

- **Research Collaboratories (human cognition, EEG, advanced microscopy)**
- **Endowed Directorship, Professorships, Fellowships and Scholarships**
- **Immersive research experiences through the BHRI Undergraduate Fellow Program**
- **Targeted Funding for High Impact, Promising Research**
- **Community Outreach Activities**

The bottom line is simple: We need supporters who share our understanding of the importance of the Brain Health Research Institute and support our vision for the future to lean forward and say "yes" to support the work of this Institute that is important and transformative. This will impact our current students and faculty, our alumni and the future of brain health both in Ohio and across the globe. We need your support to make our future *Forever Brighter*.

For more information or to discuss a philanthropic donation, please contact us. (**brainhealth@kent.edu** or **330-672-1855**)

www.kent.edu/supportbrainhealth

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