BREAKING BARRIERS

WVU Rockefeller Neuroscience Institute

The cover image combines the outline of the “The Boundless Brain” mural of the human brain that adorns the lobby of the Rockefeller Neuroscience Institute Innovation Center, and the landscape of Edmond, WV.

Edmond, West Virginia

MESSAGE FROM THE EXECUTIVE CHAIR

Dear Colleagues,

Since its inception in 2018, the Rockefeller Neuroscience Institute (RNI) has been transforming the landscape of care and innovation for those with neurological and mental health conditions in West Virginia, Appalachia, and across America.

The RNI is growing in every area, from faculty to facilities, education and research, to new regions and programs. In 2020, a challenging year in the face of a pandemic, the RNI team provided a coordinated continuum of patient care with over 55,000 virtual and 150,000 in-patient visits across 46 states. We have added 73 faculty and two new Departments (Neuroscience and Neuroradiology) in three years, and we continue to recruit the best clinicians and the brightest minds in science.

RNI researchers use the latest technologies to advance foundational and translational research to tackle public health challenges such as addiction and dementia. We were the first in the U.S. to use deep brain stimulation for opioid addiction, and the first to use focused ultrasound to open the blood brain barrier in Alzheimer’s disease with promising initial results. The RNI team is also pioneering the use of focused ultrasound for targeted therapeutics to the brain as well as modulation of the brain to reduce cravings in addiction. We are exploring new ways to treat addiction and chronic pain with virtual reality, improving stress quantification, brain health, and human performance using wearables and artificial intelligence. These advances have led to impactful outcomes in ways that were not previously possible.

Deeply rooted in a culture of passion, purpose, and collaboration, the RNI strives to advance brain health and patient care, to break barriers, and to seek cures for the incurable. I am inspired by the profound commitment of more than 1,100 RNI team members who provide hope for those impacted by neurological and mental health conditions. I thank our team, WVU leadership, our supporters, and the Rockefeller family, whose vision and generosity has made our work possible.

We hope you enjoy learning more about the RNI and get a glimpse of the natural beauty of West Virginia.

With warm regards,

Ali R. Rezai, MD
Executive Chair, RNI
John D. Rockefeller IV Chair in Neuroscience

DEAR FRIENDS,

The Rockefeller Neuroscience Institute is solving the mysteries around conditions that have extinguished spirits, shortened lives, and afflicted loved ones.

One of these conditions – Alzheimer's disease – robbed my mother, Blanchette Hooker Rockefeller, of her ability to appreciate the most treasured parts of her life. Her world was anchored by her loved ones, art, music, and so much more. But when this relentless disease took hold, the light from within her blue eyes dimmed, and was eventually gone forever.

While me and my sisters, Hope, Sandra, and Alida, felt helpless, we also became emboldened to find a way to allow her legacy to live on. We did so by founding this Institute, which we hoped would save others from enduring such pain. Today, in the heart of Appalachia, the Rockefeller Neuroscience Institute is meeting that mission.

Here, state-of-the-art facilities are teeming with brilliant minds doing work that reaches around the globe. Here, we are making groundbreaking progress with first-in-the-world treatments and research that promise a healthier today and tomorrow. Here, we are saving and enriching lives.

In her life, Blanchette Rockefeller was a vanguard in the art world. In her honor, the Rockefeller Neuroscience Institute is a vanguard for new advances in brain health. It is a fitting tribute, bringing hope to families like ours.

Be well,

Jay Rockefeller Sharon Rockefeller

Jay and Sharon Rockefeller

"As a land-grant university, West Virginia University is rooted in purpose. The WVU Rockefeller Neuroscience Institute reflects our values in ensuring better lives for all. Whether people are afflicted with Alzheimer's disease, opioid addiction or a range of other neurological disorders, Dr. Ali Rezai and his team are developing trailblazing innovations and treatments that embody the Mountaineer spirit."

E. GORDON GEE, JD, EdD
President, West Virginia University

"At WVU Medicine, we pride ourselves on 'leading healthcare, here and everywhere.' Nowhere is that more evident than in the WVU Rockefeller Neuroscience Institute. Not only is the team there working to address the health disparities – like opioid addiction – that are rampant in our state, but they are tackling issues – like Alzheimer's disease and movement disorders – that affect people around the globe. And, they're not just initiating work that is the first of its kind for the state; they're pioneering treatments that are the first in the world. We're proud to count the clinicians and researchers at the WVU Rockefeller Neuroscience Institute among our WVU Medicine family, and we look forward to seeing them change healthcare in West Virginia, across the country, and throughout the world."

ALBERT L. WRIGHT, JR. PharmD, MHA
President and CEO, West Virginia University Health System

◄ Pictured L-R: Albert Wright, Jr.; Ali Rezai; Sharon Percy Rockefeller; Sen. John D. "Jay" Rockefeller IV; Charles Rockefeller; Clay Marsh; Laurie Erickson; Gordon Gee.

OUR MISSION

Improving lives by pioneering advances in brain health.

At the RNI, we are breaking barriers and combating public health challenges. Our mission is driven by a sense of purpose and passion to help people in West Virginia, Appalachia, and the country by easing the burden of disease and giving hope.

Seneca Rocks, WV

MEETING THE MOMENT

SERVICE WVU meets the call of our mission to serve the state with an entrepreneurial spirit. Clay Marsh, MD, WVU Vice President and Executive Dean for Health Sciences, who serves as the State's COVID Czar, tapped experts across the University and led the COVID task force. Through innovative collaborations with partners from small pharmacies to the National Guard, the state rolled out the most successful vaccination effort in the country.

PATIENT CARE Clinicians have gone above and beyond to see people where and when they needed help. From ramping up new telestroke sites and virtual visits to instituting flexible hours, RNI found new ways to serve patients. Televisits rose by 732% in 2020, totaling 56,519 visits by teleconference or by phone for patients without internet access.

RESEARCH Utilizing our AI-driven human operating system research framework, we rapidly deployed a study to better understand and predict the impact of health, wellness, and disease.

EDUCATION Our academic team persevered in a challenging teaching and learning landscape by offering virtual classes, addressing stressors facing faculty and staff, and devising novel ways to reach future students.

WVU MEDICINE BY THE NUMBERS

WVU Medicine is the state's largest health system, comprised of 24 hospitals across four states.

1,378,035
Clinic Visits

68,235
Surgeries

303,985
Emergency Room Visits

1,782
Inpatient Beds

5,693
Births

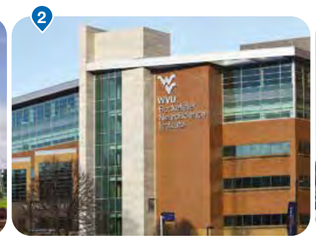
8,028
Students

*Annual Numbers

THE RNI FACILITIES

"Through the support of University and health system leadership, the Rockefeller Neuroscience Institute has grown rapidly, offering comprehensive, integrated care for patients and families from 46 states."

KARYN WALLACE, MBA, Vice President, Neuroscience



THE RNI FACILITIES ON THE WVU HEALTH SCIENCES' MAIN CAMPUS IN MORGANTOWN

57	18	6	47	126	7
Neuro Inpatient Beds	Neuro Critical Care Beds	Epilepsy Monitoring Beds	Inpatient Psychiatric Beds	Clinic Rooms	MRI Scanners

Other RNI Locations

- Center for Hope and Healing Residential Treatment Center
- Eastern Campus:
  - Berkeley Medical Center
  - Jefferson Medical Center
  - Outpatient Clinics - Martinsburg, WV and Hagerstown, MD
- Fairmont Medical Center
- Uniontown Hospital
- United Hospital Center
- United Summit Center
- Wheeling Hospital
- University Town Center Clinic
- William R. Sharpe, Jr. Hospital
- WVU Medicine Sleep Evaluation Center
- WVU Medicine Spine Center

RNI GROWTH

2017 - 2020

Our commitment to quality and our values empower our momentum for sustainable growth into the future.

Patient visits
up 36%

Surgical volume
up 48%

Faculty growth
up 102%

Publications
up 190%

Donors
up 212%

Grants
up 305%

North Fork Valley, WV

RNI BY THE NUMBERS 2020

Departments

1. Behavioral Medicine and Psychiatry
2. Neurology
3. Neuroradiology
4. Neuroscience
5. Neurosurgery

Multidisciplinary Clinics and Programs

- Addiction
- Brain Injury and Concussion
- Epilepsy
- Headache
- Memory Health
- Movement Disorders
- Neuromodulation
- Neuro-Oncology
- Sleep
- Spine
- Stroke

750
Clinical, Research, and Administrative Team Members

177
Faculty Members

115
Residents, Postdoctoral Fellows, and Graduate Students

64
Advanced Practice Providers

151,582
Total In-Person Patient Visits

56,519
Virtual Visits

6,030
Surgeries and Procedures

25,721
MRI Exams

17
Practice Locations

"Since the Rockefeller family conceived of this Institute, the RNI has benchmarked impressive advancements in every measure of success. Those advancements translate into the most important metric: improved lives."

ROCHELLE GOODWIN, JD
Vice President, Strategy and Policy

RESEARCH AND INNOVATION

At the RNI, we innovate by bridging foundational research with cutting-edge technologies and clinical trials. In doing so, we advance neuroscience and improve the lives of our patients. Our multidisciplinary team of physicians, scientists, and engineers collaborate with external academic, industry, government, and foundation partners to tackle important health issues.

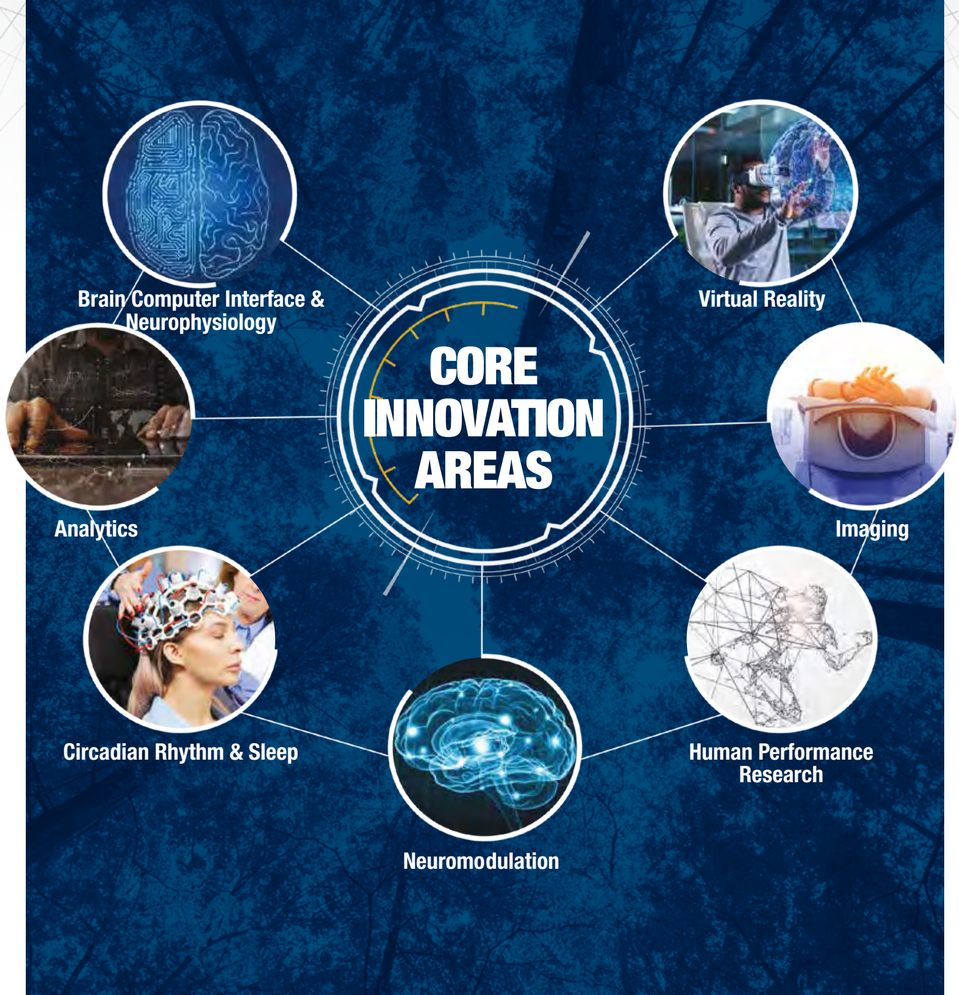
The RNI connects education, care, discovery, and innovation with the spirit of service and strength of a top-tier research university (R1 designation) to fulfill our mission of improving health and wellness, today and tomorrow.

The RNI core innovation areas are focused efforts that leverage the latest technologies to advance translational research. We are exploring new applications in neuromodulation, brain and spine computer interface, and integrating circadian rhythm into all aspects of our clinical research. We couple these technologies with advanced data and imaging analytics that integrate our clinical services with our research data backbone. This allows us to not only help those with neurological disorders but advance the field of neuroscience. Our leadership reflects this connected mission and vision of our land grant university.

PETER KONRAD, MD, PhD
Executive Director,
Clinical and Translational
Neuroscience Research

RANDY NELSON, PhD
Executive Director,
Basic and Foundational
Neuroscience Research

VICTOR FINOMORE, PhD
Executive Director,
Research Operations



2020 BY THE NUMBERS

178
Peer-Reviewed Publications

16.2 M
in Awarded Grants

90+
Clinical Research Protocols

EXAMPLES OF NEUROMODULATION CLINICAL TRIALS

Focused Ultrasound

- Blood brain opening for Alzheimer's disease
- Blood brain opening for Glioblastoma
- Neuromodulation for Addiction

Transcranial Magnetic Stimulation

- Alzheimer's disease
- Stroke rehabilitation
- Chronic pain
- Addiction
- Human performance enhancement

Virtual Reality

- Chronic pain
- Stroke recovery
- Alzheimer's disease
- Addiction
- Skill acquisition

RESEARCH AND INNOVATION

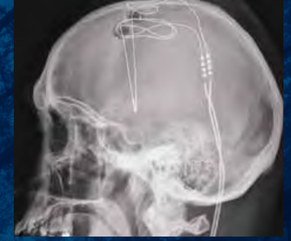
TACKLING PUBLIC HEALTH CHALLENGES

The Rockefeller Neuroscience Institute has broken barriers with several first-in-the-U.S clinical trials tackling public health challenges such as Alzheimer's and addiction. The RNI team is inspired by the courage of our patients and their families who selflessly embark on these groundbreaking studies. In addition to these firsts, we are committed to forging new solutions by using the latest technologies for rapid learning and innovative solutions for people today.

FIRST-IN-THE-U.S. TRIAL FOR ADDICTION

Deep Brain Stimulation (DBS)

Gerod Buckhalter, 33, struggled with opioid and benzodiazepine addiction since he was 15. With multiple overdoses and relapses, he was unable to stay sober for more than four months. In 2019, the RNI initiated a National Institute of Drug Abuse-sponsored study and collaboration with Medtronic, performed the first-in-the-U.S. human trial of DBS of the nucleus accumbens for opioid use disorder. Gerod has been sober since the procedure.



(L-R): Gerod on the morning before his surgery with his parents; Surgical procedure; Skull X-ray with DBS implants in the nucleus accumbens

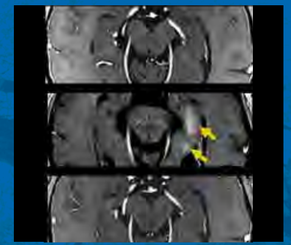
JAMES MAHONEY, PhD
Director of Addiction Neuromodulation Research

Scan the QR codes to read more.

FIRST-IN-THE-U.S. TRIAL FOR ALZHEIMER'S DISEASE

Focused Ultrasound

Judi Polak, a neonatal nurse practitioner was diagnosed with Alzheimer's at age 58. In 2018, she was the first in the U.S. to participate in a human trial sponsored by Insightec, utilizing focused ultrasound to safely and reversibly open the blood brain barrier (BBB) in the hippocampus and entorhinal cortex. She embodies optimism and hope for herself and for others. Two and a half years after the procudure, Judi has shown reduction in beta amyloid in the hippocampus and no worsening of her Alzheimer's symptoms.



(L-R): Judi Polak and her husband, Mark Polak, MD; Focused ultrasound Insightec helmet; MRI demonstrating BBB opening and closure (arrows show gadolinium enhancement)

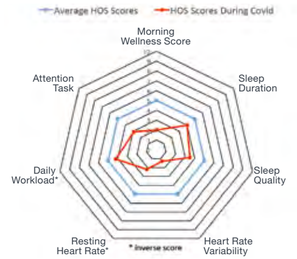
MARC HAUT, PhD
Director of Memory Health Clinic and Aging Research

Scan the QR codes to read more.

RESEARCH AND INNOVATION

HUMAN OPERATING SYSTEM AND ANALYTICS

Researchers at the RNI utilize wearable devices, custom phone apps, medical health information, advanced data analytics, and artificial intelligence to better understand the Human Operating System (HOS). This HOS concept measures changes in the autonomic nervous system, motor, sensory, cognitive, behavioral functions, and circadian rhythms as related to health and disease states. Multiple elements of the HOS are monitored in real time throughout the day via wearable devices and phone-based apps. This continuous data, processed in an advanced cloud-based analytics platform, gives RNI clinicians and researchers insight into a person's state of health and potential treatment and recovery options.



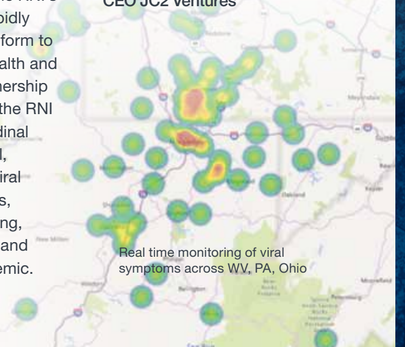
Example of changes to participant's HOS when sick with COVID-19.

HOS DURING COVID-19 PANDEMIC

At the beginning of the COVID-19 pandemic, the RNI's HOS research team rapidly pivoted to create a platform to monitor and predict health and viral infections. In partnership with Oura (smart ring), the RNI team collected longitudinal data from physiological, cognitive, wellness, and stress measures, and the occurrence of viral symptoms. The HOS platform was deployed in health care workers, first responders, and University personnel. The results are promising, demonstrating changes in the HOS linked to COVID viral infection and broader wellness related to stress and burnout linked to the pandemic.

"The past year brought unprecedented uncertainty - especially in public health. In this moment of crisis, the Rockefeller Neuroscience Institute team focused on a global need for new solutions and prevailed. By combining groundbreaking scientific research, data analysis and skill, they bridged the gap between idea and health outcomes for our friends, our family, our coworkers, and, often, our fellow West Virginians. I am humbled to support their efforts."

JOHN CHAMBERS
Chairman Emeritus, Cisco,
CEO JC2 Ventures



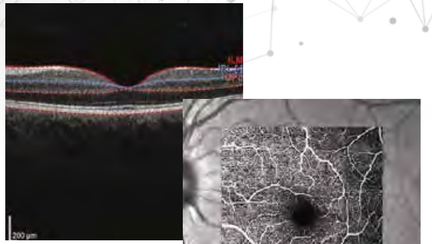
Real time monitoring of viral symptoms across WV, PA, Ohio

The RNI HOS platform was deployed in 2,700 participants in 2020 with more than

100 M

data points across multiple states.

Scan the QR code to read more.



High resolution OCT-A imaging of the retinal layers and vasculature

HEALTHY AGING AND ALZHEIMER'S

The HOS framework is also being applied to dementia and Alzheimer's patients and their caregivers in the RNI's Memory Health Clinic. This study models changes in physiological, cognitive, stress, and behavior to better understand disease onset and progression in order to provide more timely and effective interventions and support. Working with the WVU Eye Institute, we are exploring advanced imaging and machine learning techniques and to use Optical Coherence Tomography Angiography (OCT-A) as a window into the brain to predict cognitive decline due to Alzheimer's.

CHRONIC PAIN

Ongoing studies are modeling changes in self-reported pain level and quantifying the efficacy of pain treatments such as spinal cord stimulation. HOS changes are being measured before and after treatment to gain greater insights on how chronic pain affects the whole person with the goal of optimizing treatment.

ADDICTION

To support patients in treatment for Opioid Use Disorder, the RNI is exploring how day-to-day changes in the HOS are related to health and stress changes that result in increased drug cravings. The objective is to learn how to model this data to help prevent relapse by optimizing treatment and support options.

Enrollment of participants in HOS studies with RNI Health App and wearable devices.

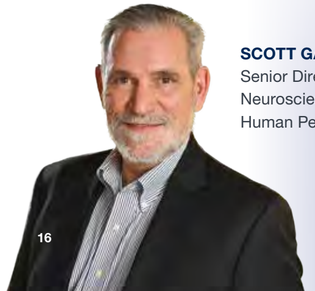
RESEARCH AND INNOVATION

APPLIED NEUROSCIENCE AND HUMAN PERFORMANCE

Photobiomodulation: red and near-infrared light to accelerate healing and recovery.

Neuroscientists and engineers at the RNI's Human Performance Innovation Center use an array of physiological, biomechanical, and cognitive measurements to gather data from athletes and military service members. Combining these data sources with advanced analytics provides both a new understanding of the physiology and psychology of brain health, as well as insights into factors to improve readiness, performance, and recovery.

The RNI applied neuroscience researchers use the latest technology to optimize athletic and military performance and recovery. Studies on range of motion, muscular strength, perceptual-motor, and gait in injured athletes are being translated to help those with Parkinson's disease, traumatic brain injuries, stroke, and other conditions. Additionally, knowledge from studies utilizing advanced recovery methods such as float-restricted environmental stimulation therapy or photobiomodulation are being explored to help patients suffering from chronic pain and other injuries.



SCOTT GALSTER, PhD
Senior Director, Applied Neuroscience Research and Human Performance

Float therapy balances the autonomic nervous system, improving sleep and reducing stress and anxiety.

The RNI works with 25,000 athletes and military members.

13 military units

14 NCAA D-1 and professional athletic teams

JOSH HAGEN, PhD
Director, Human Performance Innovation Center

WVU WOMEN'S SOCCER

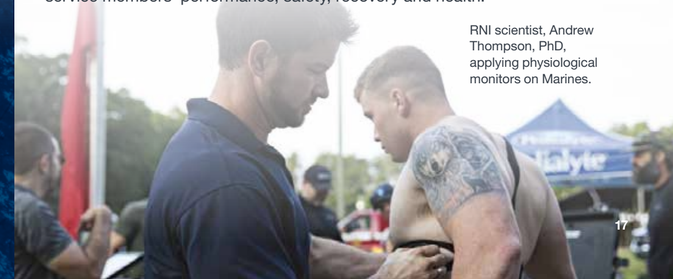
WVU Women's Soccer team is one of many professional and collegial athletic teams that utilize the RNI's Human Performance Innovation Center's comprehensive human performance (CHP) framework. Assessments conducted by our research team provide insight into improvements in player safety, performance, and the reduction of injuries. This includes cardiovascular, biomechanics, sleep, cognitive, and psychomotor measurements.

An example of the CHP, the Dynavision system is a tool for peripheral vision and perceptual motor performance assessment and training. The WVU athletes have seen improvement in peripheral vision in as little as six weeks. Such gains are shown to both boost performance and reduce the probability of getting a concussion.

The US Marines High Intensity Tactical Training Championship is a 3.5 day competition of the 38 top marines out of 180,000 from across the world. These select Marines compete in seven combat-focused strength and conditioning events that test strength, power, speed, tactical skills, and cognitive abilities.

USMC HIGH INTENSITY TACTICAL TRAINING (HITT) CHAMPIONSHIP

The RNI team deployed our CHP framework to monitor, in real time, the safety of participants in the US Marines HITT championship for heat stress. In addition to predicting and preventing heat stress, measurements of physiology, cognition, and muscular strength were identified to be indicative of success in the competition. This provides an innovation opportunity to fundamentally change how performance is measured in tactical environments. The RNI is currently working with every branch of the U.S. military in research and technology development, aimed at optimizing service members' performance, safety, recovery and health.

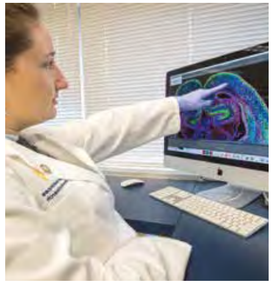


RNI scientist, Andrew Thompson, PhD, applying physiological monitors on Marines.

DEPARTMENT OF NEUROSCIENCE

RANDY NELSON, PhD
Department Chair

The Department of Neuroscience is the RNI hub for foundational research and preclinical models. The RNI's wide-ranging research is the springboard for translational technology and breakthrough science. Their findings are woven throughout every RNI department and discipline, and inform the development of new treatments, innovative devices, and education and training.



Clinicians in all specialty areas partner with the team to advance next-stage clinical research and discoveries and collaborate with neuroscientists to provide better outcomes for patients in West Virginia and beyond.

We also provide rich opportunities for training the next generation of scientists through access to outreach efforts and special initiatives.

The department's research spans various areas of neuroscience:

- neurocircuits
- stroke
- neurodegeneration
- addiction
- human performance

Since formation in 2019, we have grown to 52 faculty

CENTER FOR FOUNDATIONAL NEUROSCIENCE RESEARCH AND EDUCATION

The new WVU Center for Foundational Neuroscience Research and Education's cross-departmental structure reflects the interdisciplinary nature of cutting-edge neuroscience. The Center facilitates shared resources and coordination between disciplines to promote innovation and education campus wide.

"This sort of cross-campus initiative is where universities are going and provides more resources to pursue outstanding foundational neuroscience research and train exceptional PhD students," says Randy J. Nelson, PhD, Department chair and Center director.

FACES OF RNI

"Coming from Nigeria, I was attracted to WVU by the cohesiveness of its community. There's a sense of teamwork at WVU that I didn't find anywhere else. From recruiting talent to producing great research, I see the RNI bridging so many therapeutic challenges that could be beneficial to the patients I'll treat one day."

DIVINE NWAFOR
Neuroscience PhD/MD Student

"I'm inspired by the opportunity to expose others to neuroscience, and that's something that the RNI has prioritized. The Institute is not only passionate about its work, but committed to the Morgantown community and getting others excited about the brain."

DEIDRE E. O'DELL
Neuroscience PhD Candidate

A. COURTNEY DEVRIES, PhD

JAMES SIMPKINS, PhD

XUEFANG "SOPHIE" REN, MD

ERIN WINSTANLEY, PhD

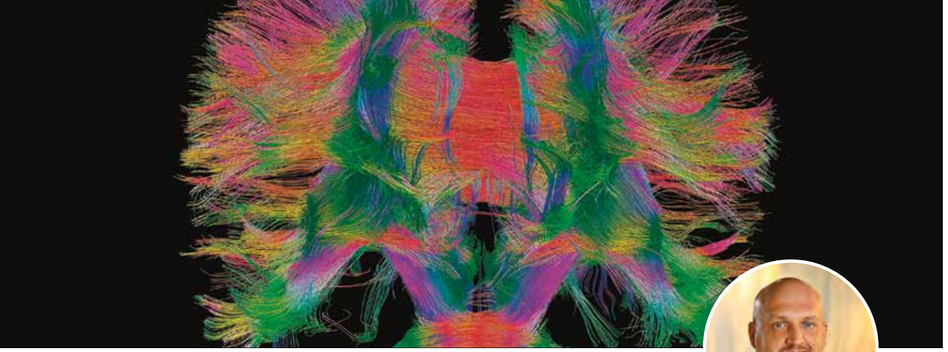
TRANSLATIONAL RESEARCH FRONTIERS

Researchers in the WVU School of Medicine, A. Courtney DeVries, PhD, and James Simpkins, PhD, were recently awarded over $11 million for a five-year competing renewal of their previous Stoke CoBRE Phase II P20 award from the National Institute of General Medical Sciences. Their study examines the physiological and emotional cascade of events that result from stroke-related changes in the brain, and has potential to decrease morbidity and mortality related to stroke and aid development of preventive strategies and treatments.

Recently published research by Xuefang "Sophie" Ren, MD, has the potential to profoundly impact stroke treatment. Dr. Ren and her team demonstrated that blood substitution therapy protected the brains of mice from immune responses that cause neural damage after a stroke, and also expanded the window for stroke treatment. These findings will be used when formulating human clinical trials moving forward.

A recent study by Erin Winstanley, PhD, showed that rural women with substance use disorders may have experienced significantly more childhood trauma than their male counterparts. Findings by Dr. Winstanley, an associate professor in the departments of Behavioral Medicine and Psychiatry and Neuroscience, have the potential to inform both treatment plans for substance use disorders and strategies for early intervention and prevention.

Dolly Sods Wilderness, WV



DEPARTMENT OF NEUROLOGY

DAVID WATSON, MD
Department Chair

The Department of Neurology provides comprehensive, interdisciplinary care for stroke, movement disorders, headaches, epilepsy, multiple sclerosis, cancer, and neurodegenerative conditions such as Alzheimer's disease. The WVU Neurology team expands their services beyond the Morgantown campus each month, and provides care in a minimum of four locations in rural West Virginia. Without the efforts of the WVU Neurology team, many of these patients would not have access to specialized care for complex illnesses. The Neurology team performed over 500 patient visits at these locations in 2020.

TMS PROGRAM

The transcranial magnetic stimulation (TMS) program consists of three state-of-the-art TMS laboratories. All systems utilize integrated neuronavigation, electroencephalography, electromyography, and virtual reality. The main area of focus is development of innovative treatments for conditions across neuroscience domains, including Alzheimer's, stroke rehabilitation, chronic pain, addiction, and human performance enhancement.

WVU HEADACHE CENTER

Through multicenter clinical trials for novel treatments, the Headache Center's multidisciplinary specialists provide the latest care for patients, such as neuromodulation for migraines. Our clinicians also work with primary care physicians statewide on alternatives to opioids in headache treatment.

MEMORY HEALTH CLINIC

The WVU RNI Memory Health Clinic offers comprehensive, individualized diagnosis and treatment for dementia, while providing support for caregivers. Early diagnosis can prove critical for successful treatment outcomes and provide hope for dementia patients and their caregivers. The WVU RNI Memory Health Clinic is the only multi-disciplinary specialty clinic in the state of West Virginia focused on:

- Specific diagnosis of the type of dementia
- Diagnosis of underlying conditions
- Development of a comprehensive treatment plan for the patient
- Addressing of patient's caregiver/family needs
- Access to groundbreaking clinical research trials

Memory Health Clinic Patients
↑280%

FACES OF RNI

"Being an inaugural member of the Women in Neuroscience leadership program was an honor. It's empowering to know that Dr. Watson and others at RNI recognize the value, skills, and perspectives that women bring to leadership roles."

MELANIE WARD, MD
Assistant Professor, Neurology

"After working at WVU for more than 20 years, it's exciting to see so much growth, research, and new opportunities to help patients. Having lost grandparents to memory disorders, I'm energized by the RNI's nationally-recognized memory health work, which is serving patients every day."

BECKY DEWITT
Clinic Manager

Telestroke and teleneurology consults

↑77%
from 2018 to 2020

27
telestroke locations

TELESTROKE PROGRAM

RNI neurology telemedicine locations have tripled since 2017, providing patients in Appalachia critical access to hospitals. Twenty-seven telestroke and teleneurology locations across West Virginia, Ohio, Pennsylvania, and Maryland connect neurology physicians with rural hospitals, offering specialized care. By collaborating across the region, RNI neurologists quickly provide the most advanced treatment modalities for stroke, headache disorders, and general neurology.

"In 2018, I was surprised to hear other medical systems had 22 telestroke partner hospitals. We only had five at the time. Today, **we are exceeding our goal with 27 telestroke locations!**"

LAWRENCE GEORGIANA, RN
Director, Ancillary Services

The Joint Commission
American Heart Association
American Stroke Association
CERTIFICATION
Meets standards for
Comprehensive Stroke Center

2019 GET WITH THE GUIDELINES STROKE GOLD PLUS

RNI has the only Joint Commission Certified Comprehensive Stroke Center in the state of West Virginia.

Lindy Point Overlook, WV

DEPARTMENT OF NEUROSURGERY

MARK R. LEE, MD, PhD, MBA
Department Chair

The Department of Neurosurgery provides comprehensive care for cerebrovascular conditions, epilepsy, cancer, spinal abnormalities, chronic pain, and movement disorders. The neurosurgical team is also at the forefront of pediatric neurosurgery with three pediatric neurosurgeons. RNI neurosurgeons are leaders in robotic technology, minimally invasive procedures, laser ablation, and focused ultrasound. In three years, our team has grown from 12 to 22 neurosurgeons to become a national destination for complex surgeries, and expanded research infrastructure for innovations in technology.

FOCUSED ULTRASOUND (FUS) WORLD LEADER

The WVU team has become a world leader in noninvasive focused ultrasound procedures for essential tremor and Parkinson's disease. The team is also pioneering innovative research with first-in-the-U.S. for Alzheimer's disease and addiction.

Patient Story: Don Wahl's essential tremor caused involuntary shaking that prevented him from working as a mechanic, or even feeding himself. After High-Intensity Focused Ultrasound (HIFU), to the deep brain structure of the thalamus, Don was immediately tremor-free.

Spine program growth
↑25%
from 2018 to 2020

More than
70
Focused Ultrasound (FUS) procedures

FACES OF RNI

"I chose the RNI because it rewards creativity and offers a chance to help build something special. I feel empowered to pursue projects which elevate the quality of neurosurgical care, particularly the children, of West Virginia. The field of neurosurgery is challenging but incredibly rewarding, and I aim to show young women it is not only possible, but natural, to pursue a career in the field. The RNI provides the culture and support to accomplish that."

KIMBERLY HAMILTON, MD
Neurosurgeon

at the forefront of **pediatric** neurosurgery

PATIENT STORY

Joe Runels
Pediatric Epilepsy Patient

Joe Runels, age 17, and his family traveled from Georgia to the RNI for treatment of his drug-resistant epilepsy. During his laser thermal ablation surgery, a surgical robot placed electrodes into his brain to identify where his seizures originated. Then the surgical team precisely placed a small laser fiber to the epileptic brain tissue, and ablated it without opening the skull. Joe was discharged from the hospital the day after his successful procedure.

VIRTUAL REALITY

WVU Medicine Berkeley Medical Center recently became the first hospital in West Virginia to acquire the Surgical Theater's Precision Virtual Reality® platform. This technology utilizes virtual and augmented reality, creating a reconstructed, 360° VR model, based on imaging. Jonathan H. Sherman, MD, says the Surgical Theater gives patients a better understanding of the location of their tumor and how the surgical team will safely resect it.

IORT NATIONAL LEADER

As the first site in the U.S. to treat a glioblastoma patient with intra-operative radiotherapy (IORT), WVU is a national leader for brain tumor cases, allowing for immediate radiation after surgery. Christopher P. Cifarelli MD, PhD, has been published in peer-reviewed journals and developed an international IORT patient registry.

The Potomac River, WV

DEPARTMENT OF NEURORADIOLOGY

ANSAAR RAI, MD, PhD, MBA
Department Chair

Our Neuroradiology Department is one of the first independent neuroradiology academic departments in the country. The department has 10 full-time clinical faculty, three PhD faculty, one nurse practitioner and one research nurse coordinator.

10
full-time neuroradiologists

The department has a nationally recognized neurointerventional service for minimally invasive treatment of head, neck and spine pathologies. Innovative clinical trials put the program at the forefront of managing cerebrovascular diseases, complementing the vascular and skull base neurosurgical programs.

The team recently conducted first-in-human treatment of brain aneurysms using a novel device, and performed the first U.S. case using a new embolic agent for treatment of chronic subdural hematoma. The RNI is one of the only centers in the region offering access to these novel clinical trials.

The Department interprets over
50,000
advanced neuroimaging studies using advanced MRI and CT scanners

The Neurointerventional service completes
100+
acute stroke interventions and endovascular aneurysm therapy each and
100+
percutaneous spine procedures annually.

PATIENT STORY
Claudia Brewer

After a life-threatening stroke, 70-year old Claudia Brewer underwent a delicate intracranial stent procedure to open up a severely narrowed left artery resolving her condition. This first of its kind resolution of limb-shaking transient ischemic attack was published by the team and Claudia has remained symptom free since the procedure.

RNI's work with Focused Ultrasound for Alzheimer's Disease was selected for editorial commentary in *Radiology*.

Scan the QR codes to read more.

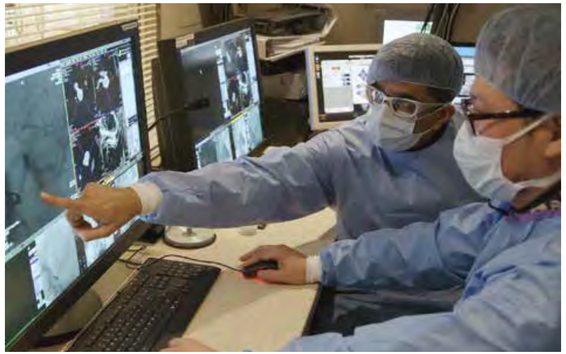
FACES OF RNI

"I came here from Emory University because of the **national reputation for genuine collaboration and a standard of excellence**. I've stayed because of the RNI's unique combination of growth, professional recognitions, and unparalleled clinical and academic support."

ABDUL RAHMAN TARABISHY, MD, Neuroradiology Program Director

"Successfully completing our first **Low Intensity Focused Ultrasound procedure for Alzheimer's** disease was incredible. A colleague described it as 'our version of walking on the moon.' Now, we're focused on new breakthroughs in focused ultrasound and ways to discover new treatments."

DREW RAGER, MRI Manager

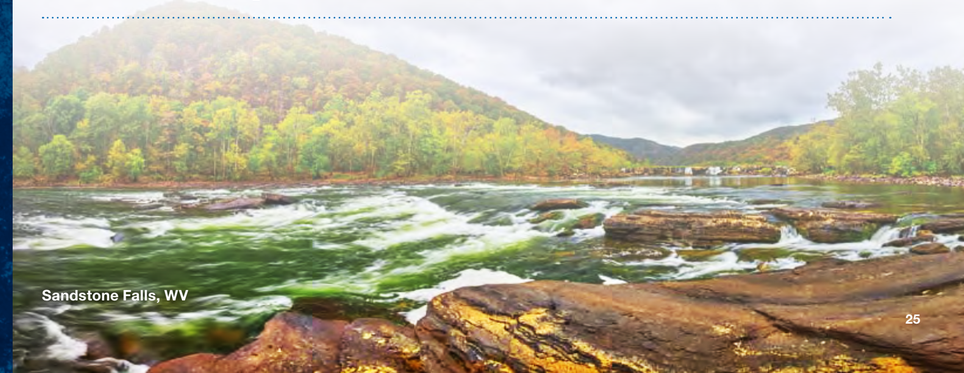


FELLOWSHIP PROGRAMS

We offer two nationally-accredited fellowship training programs. The first is in Diagnostic Neuroradiology, accredited by the American College of Graduate Medical Education (ACGME); the second is in Endovascular Neurosurgery, accredited by the Committee on Advanced Subspecialty Training (CAST). Fellows are engaged in resident education programs in Radiology, Neurosurgery and Neurology.

7	6	2	2
MRI Scanners	CT Scanners	PET/CT Scanners, GE PET Trace Cyclotron	Biplane Neuro IR suites, Hybrid IR/CT suite

One of the **1st** independent neuroradiology academic departments in the country



Sandstone Falls, WV

DEPARTMENT OF BEHAVIORAL MEDICINE AND PSYCHIATRY

JAMES H. BERRY, DO
Department Chair

The Department of Behavioral Medicine and Psychiatry provides hope in the Appalachian region for patients ranging from children to elderly adults dealing with a range of emotional and psychological issues, including substance use and addiction.

Our research in addiction medicine, rural health, and opioid use disorders is changing lives and providing specialized educational opportunities. Groundbreaking studies on focused ultrasound, deep brain stimulation, and transcranial magnetic stimulation develop innovative treatments for patients and provide a greater understanding of the neurobiology.

Recognizing that our most valuable resource is our providers, the Department of Behavioral Medicine spearheaded efforts to ensure healthcare workers' mental health was supported during the pandemic. Our team ensured that resources were available, and our Healthy Healers initiative was directed at advancing provider wellbeing.

RNI supports in-person and virtual mental and behavioral health services to treat anxiety, depression, and other mental health challenges.

58
addiction treatment beds

16
crisis stabilization beds

21
telepsychiatry locations offering help across rural Appalachia

FACES OF RNI

"My 14 years of service here are especially profound because I'm the product of two people who suffered from polysubstance addiction. I was blessed to be adopted by my grandmother, but it was difficult to watch my birth parents suffer through addiction without the ability to help them. Now, I see patients come in without having one sober day, and with the help of our resources, can celebrate years of sobriety."

CAESAR SUTTON,
Medical Care Assistant

"I'm proud of the RNI's patient-first focus. We advocate for our patients and remove barriers to care. Whether it's transportation, medication, or West Virginia Medicaid coverage, we do all we can to get patients the care they deserve. At the RNI, you don't just work 9 to 5, you work until your patient gets the care they need."

OLIVIA HIGDON
Case Manger, Addiction and Adult Outpatient Services

THE CENTER FOR HOPE AND HEALING

The Center for Hope and Healing (CHH) provides treatment for substance use disorders in a residential setting. CHH offers six beds for detoxification and 42 residential treatment beds across two locations. Our team of physicians specializing in addiction medicine and psychiatry provide substance use disorder residential care for up to 28 days. Patients at CHH are offered a continuum of care from medication-assisted treatment to family support services and mindfulness-based practices.

SUPPORTING RURAL PATIENTS

ROBERT BOSSARTE, MA, PhD

A **$14.5 million award** from the Patient-Centered Outcomes Research Institute is transforming the way we treat depression. In a collaboration between the WVU School of Public Health and the RNI Department of Behavioral Medicine and Psychiatry, world expert Robert Bossarte, MA, PhD, is leading the way toward improved success for depression treatment in rural areas.

The Extension for Community Healthcare Outcomes (ECHO) Memory Health program improves health outcomes while reducing geographic barriers across West Virginia. The model provides front-line clinicians in rural areas with support to manage patients in their communities. Primary care and rural providers present de-identified cases to an interdisciplinary panel of experts (from neurology, radiology, geriatrics, psychiatry and psychology, palliative care, nursing, and social work), and also receive mentoring in the management of memory health conditions, such as Alzheimer's.

COMPREHENSIVE OPIOID ADDICTION TREATMENT (COAT) PROGRAM

The Comprehensive Opioid Addiction Treatment (COAT) program is a novel group-based treatment model that incorporates medication management with psychosocial interventions for opioid use disorder. RNI is equipping and mentoring rural clinicians throughout West Virginia in the COAT model to provide much-needed care in local communities.

UNITED SUMMIT CENTER

In coordination with WVU Medicine and the RNI, United Summit Center (USC) provides comprehensive mental health care servicing north central West Virginia. USC's School-Based Services program gives students the opportunity to speak with a behavioral health professional in the familiarity of their school environment through group and individual meetings during the school day. The Residential Substance Abuse Treatment Services for Women is composed of 18 beds between two units: the Pregnant and Post-Partum Women's Unit (PPW) and the Women's Residential Unit. The programs focus on the unique needs of adult women, expectant mothers, and post-partum mothers with substance use disorder and mental illnesses.

Spruce Knob, WV

OUTREACH

PHOTO: Tim Rhodes Photography

SUPPORTING PARTNERS FROM ALZHEIMER'S TO MS

During Alzheimer's & Brain Awareness Month, the RNI Innovation Center went purple to support the more than 50 million people fighting dementias worldwide. Whether joining the local Azlheimer's Association walk or supporting the Walk to end Multiple Sclerosis, the RNI stands with our community partners and champions. From the classroom to the clinic to the street, we walk the walk.

BRAIN CAMP

This week-long summer camp serves high school students with an interest in learning about the brain. Campers interact with neuroscience faculty, undergraduate and graduate students, researchers, and clinicians, and they learn about neuroscience degrees and career pathways including graduate school and medical fields such as dentistry, nursing, and allied health.

BRAINS AND BOOKS

Last year the Brains and Books program brought books and resources to more than 150 members of the public through local libraries.

SERVICE: FROM THE STATE FAIR TO THE STATE CAPITOL

Students and faculty attend events around the state, from the state fair to the West Virginia Capitol during the State Legislative Session to feature family-friendly Train our Brains neuroscience activities to teach the community about the brain.

THE ROCKEFELLER CRITICAL ISSUES FORUM:

A LEADERSHIP EXCHANGE TO MOVE DIGITAL HEALTH POLICY

The inaugural forum hosted by the RNI and Senator and Mrs. Rockefeller convened leaders in academia, industry, policy, ethics, advocacy, and government to address emerging issues around digital health data that may shape policy in government, technology, and healthcare.

WOMEN IN NEUROSCIENCE

The Rockefeller Neuroscience Institute's Women in Neuroscience Leadership program aims to improve the representation of women in leadership roles at WVU Medicine and in the Rockefeller Neuroscience Institute by providing leadership opportunities and fostering the development of current and future leaders. Inaugural leaders include:

COURTNEY DEVRIES-NELSON, PhD

KARI LAW, MD

RASHI MEHTA, MD

CARA SEDNEY, MD

MELANIE WARD, MD

FEED OUR BRAINS

WVU Neuroscience students lead this local outreach program to help middle and elementary school students learn about their brains, the importance of healthy food for brain development, and hopefully inspire a love for science. The program also helps pay off overdue student lunch balances.

"When artists and scientists work together towards a common goal, we can produce powerful results. I'm inspired by the work of the Rockefeller Neuroscience Institute and hope to continue its collaboration with the Aoki Foundation. Together, we work towards a world where degenerative brain diseases do not exist, and where science and technology play a direct role in extending the healthy lives of ourselves and our loved ones."

STEVE AOKI
World-renowned DJ and two-time Grammy-nominated producer

IN THE NEWS

Since 2018, people throughout the world have learned about the innovative research and discoveries happening in West Virginia at the RNI through national and international media outlets.

2.6 billion
reach

4,000
stories in 2020 in major newspapers, magazines, and websites:

The Washington Post · abcNEWS · BBC · Becker's Hospital Review · The New York Times · The Wall Street Journal · NBC News · PBS NewsHour · Business Insider · CBS News · DailyMail.com · The Dr's · Financial Times · Good Morning America · TechCrunch · KDKA-TV

"West Virginia University is embracing the global need for University-driven innovations aimed at solving our most pressing challenges. This is the true spirit of WVU's Rockefeller Neuroscience Institute. RNI's cutting-edge clinical trials, AI-driven data analytics, and foundational research bring a new level of understanding to the integrated balance and flow of health, education, and economy necessary to optimize our lives."

CLAY B. MARSH, MD
Vice President and
Executive Dean for
WVU Health Sciences

New River Gorge Bridge, WV

WVU Rockefeller Neuroscience Institute

Spring 2021

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