



NATIONAL STRATEGIC
RESEARCH INSTITUTE

at the University of Nebraska

The background of the cover is a composite image. The top half features a large, semi-transparent blue overlay of a soldier's head wearing a full protective suit, including a helmet and goggles. The bottom half shows three soldiers in camouflage uniforms and helmets, equipped with night vision goggles and communication devices, in a desert-like environment. One soldier is in the foreground, looking towards the camera, while two others are slightly behind him, one looking to the side and the other partially obscured.

COMBATING WEAPONS OF MASS DESTRUCTION

Delivering relevant, innovative solutions
in advancing the science of Combating
Weapons of Mass Destruction

NSRI.NEBRASKA.EDU

NATIONAL STRATEGIC RESEARCH INSTITUTE



"The National Strategic Research Institute at the University of Nebraska in partnership with the United States Strategic Command and the Department of Defense is providing our nation with cutting edge mission-essential research and development capabilities in Combating Weapons of Mass Destruction. The science of countering WMD being conducted in Nebraska will help to ensure the United States' safety and preparedness to respond to national security threats."

Admiral Cecil D. Haney,
Commander, USSTRATCOM



UNIVERSITY OF
Nebraska

"This partnership between the National Strategic Research Institute at the University of Nebraska and United States Strategic Command is an extraordinary development for our university, our state and our nation. The research being conducted at the NU campuses, as a result of the NSRI leadership and collaboration with the Department of Defense, strengthens our national security, enhances the critical defense system in place at USSTRATCOM and recognizes the world-class research at the University of Nebraska."

Hank M. Bounds, Ph.D.
President, University of Nebraska

Weapons of Mass Destruction (WMD)

are a serious, persistent threat to the United States and its global partners. Combating WMD (CWMD) is a complex, technically-demanding effort that requires cooperation from military personnel and first responders to get faster solutions across a broad spectrum of WMD threats.

The United States Strategic Command (USSTRATCOM) is the lead combatant command for integrating and synchronizing CWMD efforts. USSTRATCOM chose to partner with the University of Nebraska's National Strategic Research Institute (NSRI) due to NSRI's unique expertise and established record of excellence in defense research. The partnership resulted in USSTRATCOM sponsoring the University of Nebraska as a University Affiliated Research Center (UARC).



The success of NSRI is driven by our nationally and internationally recognized researchers and research partnerships with other universities and agencies. The NSRI research community includes over 350 researchers in diverse disciplines and state-of-the-art facilities to generate innovative, real-world solutions. NSRI has established and developed a research portfolio to address the research needs and advance the mission of USSTRATCOM:

Conduct global operations in synchronization with other combatant commands and appropriate U.S. government agencies to detect, deter and prevent strategic attacks against the U.S., its allies, and partners and to be prepared to deliver warfighting capability to defend the nation.

NSRI partners with federal agencies to generate cutting-edge research solutions in the prevention, detection, protection, response, and recovery from WMD threats by:

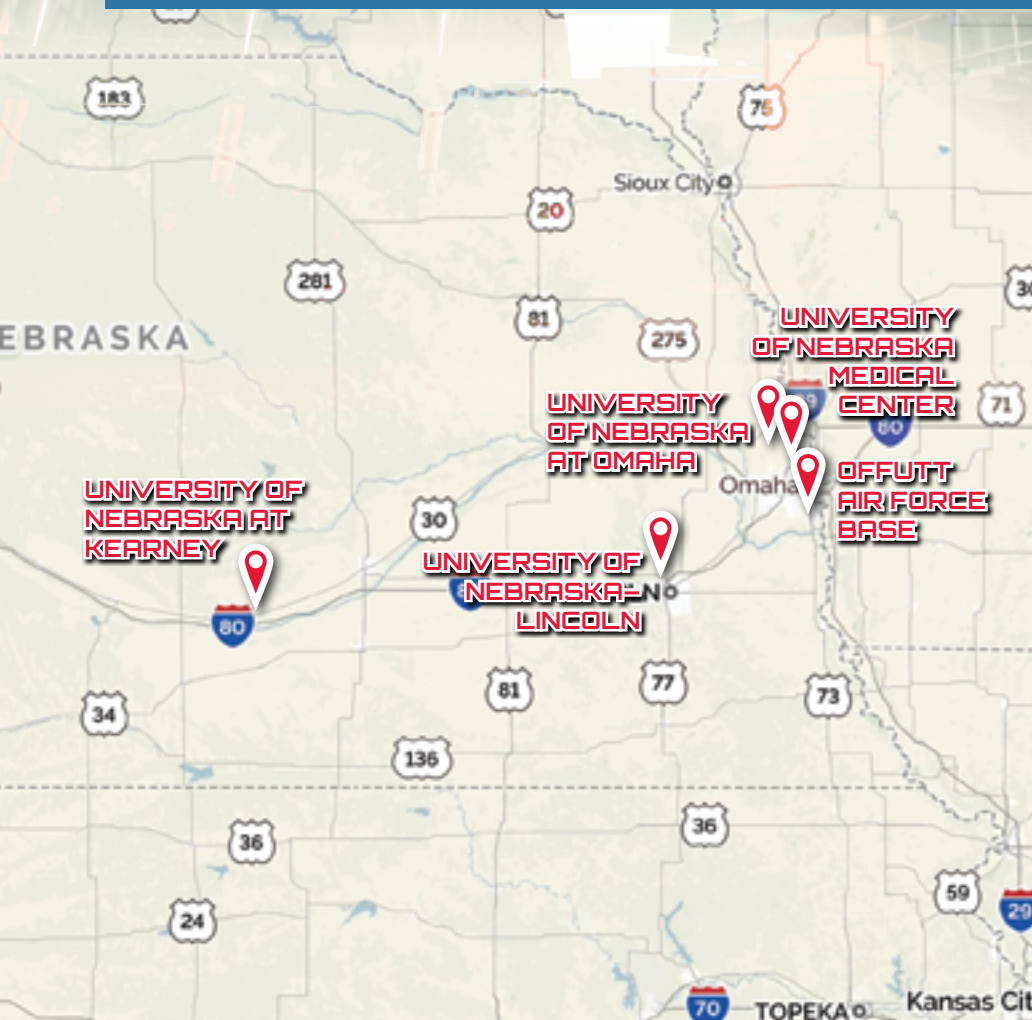
- Conducting relevant research to address CWMD mission gaps
- Anticipating emerging/unexpected CWMD threats and rapidly respond with focused, collaborative concepts and capabilities
- Delivering game changing solutions to the warfighter addressing the toughest CWMD mission challenges

NSRI is invested in strengthening its capabilities to truly address the Department of Defense (DoD) research needs and meet our CWMD research responsibilities. We are confident that you will find NSRI to be a productive, trusted partner in advancing your research by bringing high-impact, mission-critical solutions to you. To discuss opportunities specific for your needs, please contact a member of our team at nsri.nebraska.edu.

THREE NATIONAL NSRI LOCATIONS:

NSRI AT THE UNIVERSITY OF NEBRASKA

984238 Nebraska Medical Center
Omaha, NE 68198-4238



NSRI AT USSTRATCOM

U.S. Strategic Command
Headquarters, located at
Offutt Air Force Base, Nebraska



NSRI NATIONAL CAPITAL REGION (NCR) FIELD OFFICE

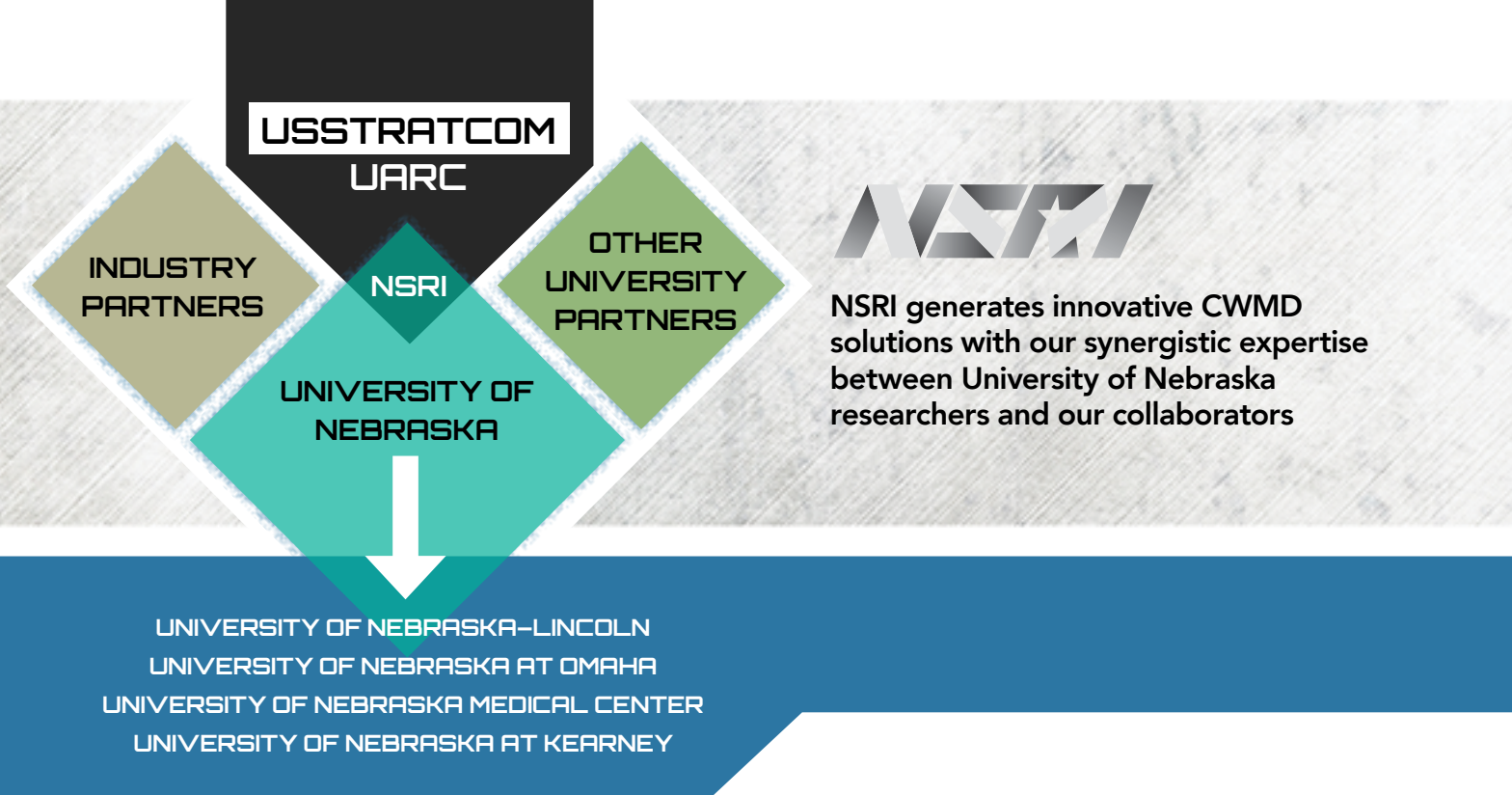
9070 Junction Drive Suite F
Annapolis Junction, MD 20701-1141



A person wearing a white lab coat and a face mask is working with a piece of equipment. The equipment has a label that reads 'CANBERA MODEL BP100'. The person is holding a small object, possibly a sample, and is looking at it. The background is a plain, light-colored wall.

Five Core Research Competencies

NSRI partners with federal agencies, non-governmental organizations (NGO's), ally foreign research institutions, national laboratories and other universities to generate innovative research solutions in the prevention, detection, protection, response and recovery from Weapons of Mass Destruction.



NSRI generates innovative CWMD solutions with our synergistic expertise between University of Nebraska researchers and our collaborators

We recognize that Department of Defense (DoD) research needs are urgent. To expedite the pace of innovation, NSRI has forged strategic partnerships with other universities, national laboratories, and industry to form an effective team with a diverse blend of research expertise. We truly believe that collaboration allows NSRI to be responsive in delivering relevant, innovative solutions in advancing the science of CWMD.

The NSRI research portfolio is structured into five research competencies:

- 1 MEDICAL PASSIVE DEFENSE AGAINST WMD**
Developing medical innovations and countermeasures from discovery and design to manufacturing, bio-containment and clinical treatment.
- 2 NUCLEAR DETECTION & FORENSICS ADVANCING**
rapid, accurate, and field deployable nuclear detection & forensics technology.

- 3 DETECTION OF CHEMICAL & BIOLOGICAL WEAPONS**
Integrating tools and methods for genomic, proteomic, bioinformatics, and nanotechnology for accurate and rapid detection of new and emerging agents.
- 4 CONSEQUENCE MANAGEMENT**
Innovating consequence management solutions to protect, respond, and restore infrastructure from a chemical, biological, radiological, or nuclear incident.
- 5 SPACE, CYBER, & TELECOMMUNICATIONS LAW**
Providing research and legal expertise to generate judicious, scholarly solutions for evolving questions in space and cyber regulation.



MEDICAL PASSIVE DEFENSE AGAINST WEAPONS OF MASS DESTRUCTION

N NSRI has the expertise, facilities, and resources to rapidly develop medical countermeasures (MCM) from exploration, design, and development to piloting, manufacturing and clinical trial execution. Our research has a demonstrated record of performance in

- + Design and development of select agent vaccines
- + Novel preventative and prophylactic treatments for neurotoxins
- + Innovative approaches to vaccine and drug delivery including nano-scale drug delivery

- + Research & development of personal protective equipment providing therapeutic countermeasures for military and civilian use

Extensive research expertise and equipment facilitates broad characterization of pathogens, identification of molecular targets, and evaluation/design of novel MCMs. We also have two biological production facilities that support initial scale-up feasibility studies to phase I clinical trials.

NSRI RESEARCH CAPABILITIES - MEDICAL DEFENSE AGAINST WMD'S





NUCLEAR DETECTION & FORENSICS

Our researchers are pioneering the development of novel technologies to detect nuclear materials and radiation signatures to increase speed, accuracy and sensitivity over current methods; capable of field-deployment; and technologies that are safer for operators. With world-class facilities, such as the extreme light laboratory, our researchers are truly at the forefront of nuclear detection and forensics research. This research has nuclear security implications, applications for our nation's nuclear arsenal, and impacts both military and civilian nuclear operations.

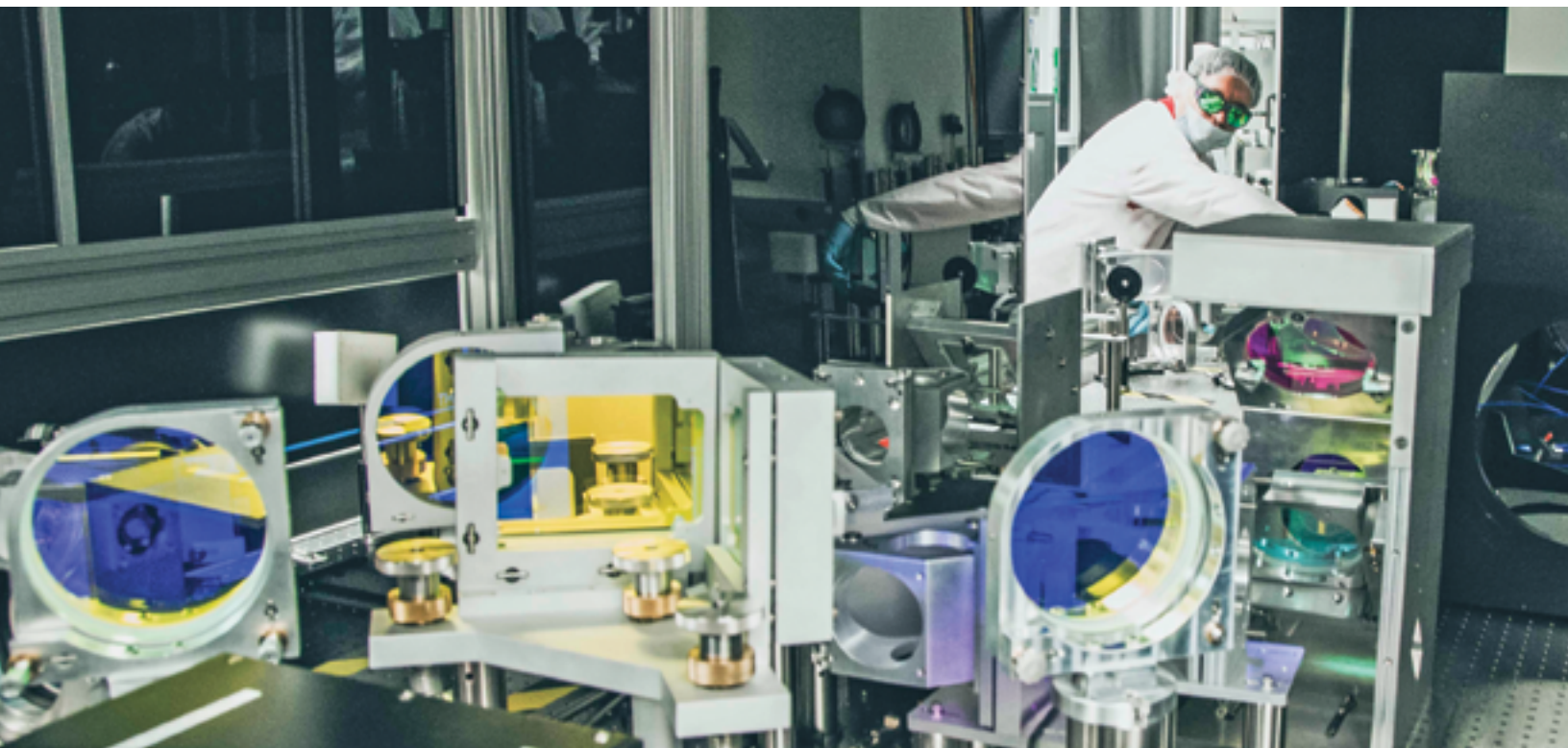
DETECTION

The detection of shielded, illicit special nuclear material is a significant challenge for our national security. NSRI researchers are engaged in developing:

- ✦ Innovative methods of active interrogation.
- ✦ Advancing current technologies such as photon sources to develop a portable, "surgeable" system.
- ✦ Detectors that span the technology spectrum—from 'proof of principle' devices to advanced user-friendly, handheld instruments for field use.

FORENSICS

NSRI prioritizes discovering current technological gaps and R&D solutions for distinguishing properties of nuclear material. Although identifying nuclear signatures is technically demanding and requires a high level of expertise, NSRI is committed to advancing our nation's nuclear forensics capabilities for security and to support nuclear attribution through basic and applied research endeavors.



DETECTION OF CHEMICAL & BIOLOGICAL WEAPONS

NNSRI has extensive expertise in the detection and identification of chemical and biological agents; furthermore, NSRI/NU is internationally known for developing clinical methodologies to detect exposure to bioagents and nerve-agents. The objectives of NSRI's research in rapid detection are to develop methods and tools that can detect both known and unknown threats that are accurate, field-deployable, provide rapid results, detect bioactive levels, and require minimal training to use.

Unique to NSRI is:

- ✦ Development of autonomous and adaptive sensing—from the development of theoretical platforms to optimizing matured assays.
- ✦ Partnership with government agencies to advance molecular assays with existing DoD technologies.
- ✦ Repositories of select agents and capable facilities to both characterize these agents and evaluate therapies.

- ✦ Synergistic relationship with the nationally recognized Nebraska Public Health Lab known for chemical and biological agent detection, assay development and training.
- ✦ Expertise in genomics, transcriptomics, proteomics, metabolomics and bioinformatics

Our nation's ability to detect and identify the deliberate use or natural emergence of pathogens depends on our technological capabilities. NSRI is actively pursuing the development of tools and methods to advance and integrate technologies enabling early detection, identification, and situational awareness of existing or potential threats.





CONSEQUENCE MANAGEMENT

Providing targeted emergency services and assistance to protect, respond, and restore is a critical component of infrastructure support and integrity when facing a chemical, biological, radiological, or nuclear incident. Our researchers have unique expertise in:

- + Decision support software
- + Disaster mitigation
- + Hazard modeling
- + Real-time bio-surveillance monitoring
- + Public health laboratory diagnostics tools
- + Collaboration science
- + Forecasting models
- + Tele-health solutions
- + Infrastructure modeling and vulnerability assessment
- + Information assurance (cyber)
- + "Green" decontamination technologies

- + Ontological approaches to forecast cyber-attacks
- + Novel methodologies for determining sources of cyber attacks
- + Malefactor decision making

NSRI has designed a research agenda that seeks to anticipate the actions of malefactors and natural disasters and provide action plans to mitigate the effects of these events.

Cutting-edge information technology and the use of diverse, distributed data sources facilitates responsiveness to a wide array of disasters. Our expertise extends across military and civilian applications and provides methodologies to prevent loss of information due to software faults or human malefactors, as well as the ability to track successful cyber-attacks back to the source.



SPACE, CYBER, & TELECOMMUNICATIONS LAW

This emerging legal frontier will have significant impact on our nation's future. The infusion of space, cyber, and telecommunications (SCT) law expertise at NU allows NSRI to connect leading scholars of this discipline with various federal agencies. NU provides expert instruction and research on all major space and cyber regulation from formal binding treaties, to "soft law," "rules of the road," national space legislation and regulations, and even state and local regulation of space and cyber activities. The University of Nebraska provides experience and research on all major space regulation in the United States and has advised governments throughout the world on:

- + Space traffic management
- + Space asset security
- + Legal protocol development
- + Cyber and telecommunications risk management
- + Cyber law

Due to the unique expertise resident at NSRI/NU, our faculty researchers have significant experience in the various types of law and regulation. Our researchers are able to explore possibilities and problems with any particular proposed legal solution and explore options to binding legal solutions.



"We must work hard to ensure that we can deter conflict from extending to outer space. We simply cannot risk denied access to a domain that is so vital to U.S. national security."
—ADM Haney

ALL HAZARDS RESPONSE TRAINING

"Effectively responding to any incident requires sound communication and coordination with local and federal partners. Exercises like NSRI's All Hazards Response Training go a long way to ensure you are prepared to meet those challenges that our world presents today and tomorrow."
—US Government Client

The mission of protecting warfighters and emergency responders is in the crosshairs of research efforts at the NSRI. From the laboratory to the field, the NSRI is bridging the counter Weapons of Mass Destruction (WMD) mission space.

NSRI All Hazards Response Training (AHRT) directors and multi-discipline programs provide Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) training scenarios across nationwide & international sites inside real-world, operational facilities, orchestrated by a cadre of subject matter experts. NSRI's precision in AHRT National Level Exercises (NLEs) improve the counter-WMD preparedness of government agencies, law enforcement, public health and first responder personnel.

Established primarily to increase collaboration between Civil Support Teams (CSTs) and their local, state and federal assets that would normally respond to an act of terrorism in their home states, AHRT is one of the most requested counter-WMD preparedness training programs across the nation. Participating agencies benefit through improving communication and increasing cooperation between agencies while decreasing the number of non-credible samples collected by the responding agency.

NSRI AHRT instructors have provided training, exercise venue and guidance on all aspects of WMD response to over 3000+ individuals and 130+ agencies.



A wide-angle photograph of the Durham Research Center II building, a large, multi-story brick structure with numerous windows. The building is situated in an urban environment with other modern buildings in the background. In the foreground, there is a landscaped area with a curved path, greenery, and a small parking lot with a few cars. The sky is overcast.

State-of-the-Art Research Facilities

The University of Nebraska's world-class facilities and researchers find solutions to the most pressing Combating Weapons of Mass Destruction challenges.

BIOLOGICAL PRODUCTION DEVELOPMENT FACILITIES (BPDFS)

From pilot studies to phase I clinical trial manufacturing, the BPDFs are a combined 26,000 square feet class 10,000 to 100 clean room areas, compliant with both GMP and GTP regulations facilities. NSRI/NU also has a nano-GMP production facility.

FEATURED RESEARCH CENTERS & FACILITIES



BIOIMAGING FACILITIES

Combined bioimaging facilities include state-of-the-art instrumentation including MRI, MRS, SPECT, PET, CT, SPECT/CT, MEG, MSI, DTI, tDCS, sMRI, fMRI, fNIRS, EEG, ECoG and automated visualization for 2D and 3D imaging.

BIO SAFETY LEVEL THREE (BSL-3) FACILITIES

We conduct basic research in multiple BSL-3 facilities with A-BSL-3 capabilities.

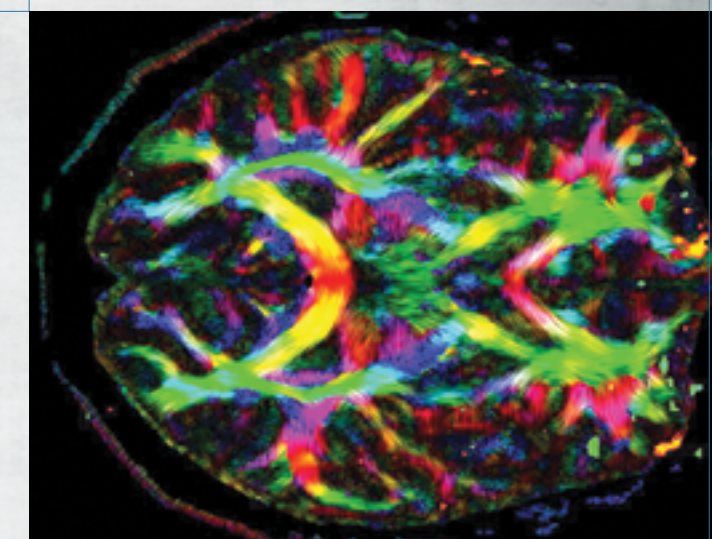


CENTER FOR BIOSECURITY, BIOPREPAREDNESS, AND EMERGING INFECTIOUS DISEASES (CBBEID)

State-of-the-art technology approaches to detect bioterrorism agents, identify emerging infectious diseases, maintain communication with health-care professionals, and track sources of antibiotic resistance.

CENTER FOR BRAIN, BIOLOGY AND BEHAVIOR (CB3)

This highly interdisciplinary center investigates brain injuries to the heritability of social attitudes and the neurological basis of decision-making. Concussion research is a cornerstone of CB3 work.



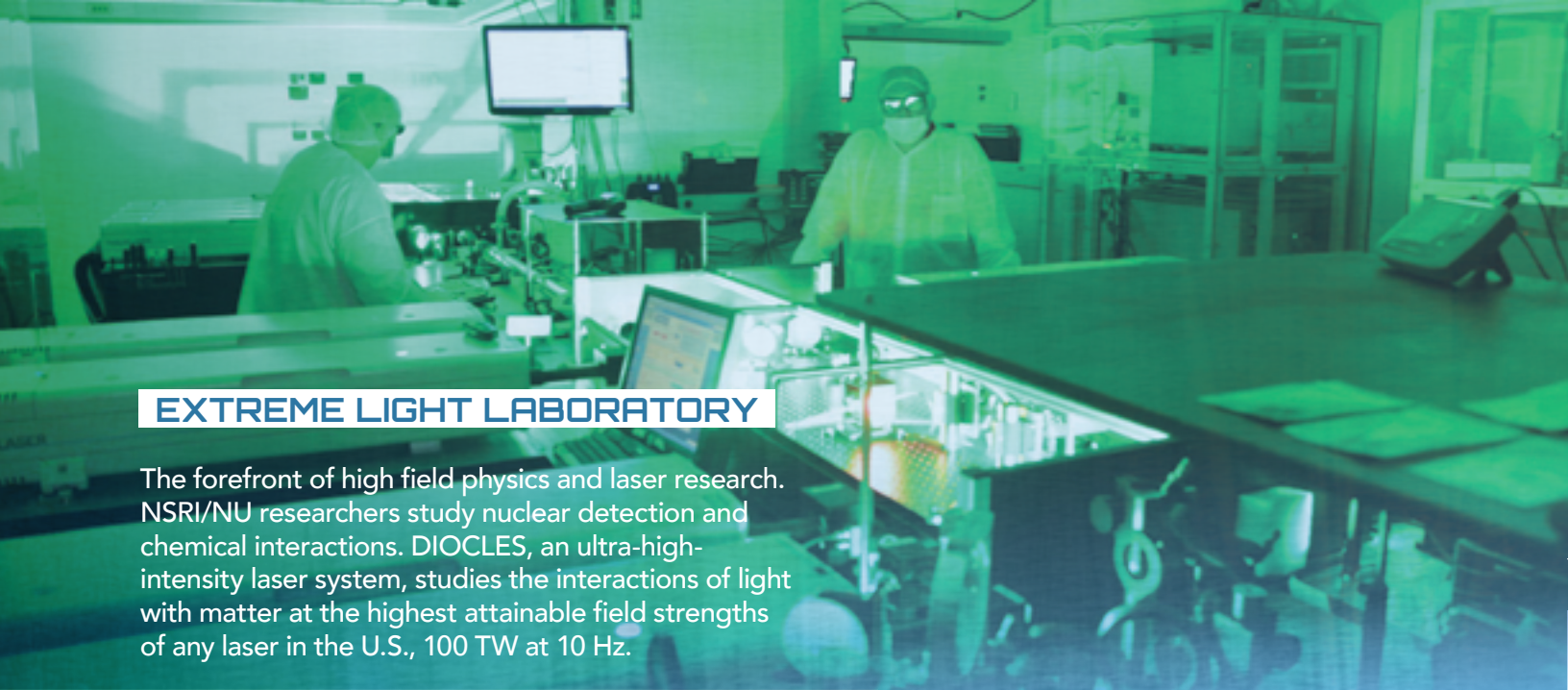
CENTER FOR DRUG DELIVERY AND NANOMEDICINE (CCDN)

World-class interdisciplinary drug delivery and nanomedicine program integrating established expertise in drug delivery, gene therapy, neuroscience, immunology, pharmacology, vaccine therapy, cancer biology, polymer science and nanotechnology.

COMMERCE AND APPLIED BEHAVIOR LAB (CAB LAB)

A unique facility designed to capture and analyze rich neurophysiological drives and research violent extremist organizations, cognitive strategic management, and automation and human cognition decision making in response to stress and crisis.





EXTREME LIGHT LABORATORY

The forefront of high field physics and laser research. NSRI/NU researchers study nuclear detection and chemical interactions. DIOCLES, an ultra-high-intensity laser system, studies the interactions of light with matter at the highest attainable field strengths of any laser in the U.S., 100 TW at 10 Hz.



NEBRASKA TRANSPORTATION CENTER (NTC)

Facilitates collaboration between university researchers, industry leaders, and government entities. NTC integrates transportation research, education and technology transfer programs across the four NU campuses, making it one of the largest university transportation centers in the region. This unique arrangement fosters interdisciplinary collaboration by bringing together top faculty with different areas of expertise to solve larger transportation issues.

NEBRASKA BIOCONTAINMENT UNIT

Designed to provide the first line of treatment for people affected by bioterrorism or extremely infectious naturally occurring diseases. It's the largest facility of its kind in the U.S.



NEBRASKA CENTER FOR MATERIALS AND NANOSCIENCE (NCMN)

Nationally recognized center of excellence investigating atomic manipulation, nanoscale dimensions, self-assembly, ordered nanoarrays, quantum dots, quantum computing, nanomechanics, nano-optics, nanoelectromechanical systems, and molecular design.



PETER KIEWIT INSTITUTE (PKI)

Peter Kiewit Institute (PKI) is a cutting-edge educational and research institute of the University of Nebraska that promotes collaboration and solution development in engineering and information technology. Current research focuses on the intersection between data analytics and civil infrastructure, cybersecurity, automated decision support, architectural engineering, and biomedical informatics. The IT Innovation program housed at PKI finds IT solutions to real-world problems and moves these solutions to the marketplace.



ROBOTICS AND MECHATRONICS LAB

From creating robotic safety markers for highways and tiny surgical instruments to sophisticated mechanisms for future planetary exploration, researchers, in partnership with NASA and other agencies, are on the cutting edge of the robotics field.



THE LOYALTY AND RETURN BUSINESS OF OUR SPONSORS ARE THE PRIMARY METRICS BY WHICH NSRI MEASURES SUCCESS

77%

of the Principal Investigators on active projects
have completed previous research through NSRI

64%

of awarded task orders were continuations of
previous NSRI-awarded research projects

Our sponsors choose to continually partner with NSRI for their research needs due to our world-class facilities and unique research expertise in biomedical science and CWMD.

CONTRACTING WITH NSRI

NSRI primarily receives funding via task orders using a non-competitive, Indefinite Delivery/Indefinite Quantity (IDIQ) contract with a maximum ceiling of \$84 million and a period of performance through September 20, 2017. However, NSRI may also receive funding via grants and other direct contract vehicles. O&M, RDT&E, and procurement funding may be used as appropriate. NSRI's UARC status and Integrated Team Process (ITP) allows for a unique, collaborative process with potential sponsors that significantly reduces the timeline of the traditional contracting process.

OUR MISSION

To provide innovative and customer-focused research and development solutions for complex national security requirements to Combat Weapons of Mass Destruction.

OUR VISION

To be the Lead Combating Weapons of Mass Destruction University-Affiliated Research Institution, delivering relevant mission-essential research and development solutions to the warfighter, Department of Defense and other national security agencies.



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RELEVANT

Exploit University of Nebraska capabilities to conduct relevant research in addressing CWMD mission gaps



COLLABORATIVE

Collaborate with other universities, agencies, and communities of interest to deliver effective research solutions



INNOVATIVE

Deliver game-changing solutions to the toughest CWMD mission challenges



FORWARD-THINKING

Anticipate emerging/unexpected CWMD threats and readily respond with focused collaborative concepts and capabilities



RESPONSIVE

Leverage the NSRI UARC sole source contract vehicle to expedite CWMD research requirements



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