BRI

THE FIRST FIVE YEARS

Biosecurity Research Institute

Kansas State University

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PRESIDENT'S LETTER

Every day our nation's food supply becomes safer because of work being done at the Biosecurity Research Institute. Kansas State University's world-renowned researchers have been taking advantage of this one-of-a-kind biosafety level-3 facility on our Manhattan campus.

Since research began our faculty and affiliated researchers have made huge strides in obtaining extramural funding supporting multidisciplinary research and training to study and combat pathogens that threaten our food supply and agriculture economy. Completed projects have delved into critical threats like pandemic H1N1 influenza, swine flu, Rift Valley fever vaccine studies, E. coli, brucellosis and tularemia.

The Biosecurity Research Institute has nearly 30 full-time staff members. This doesn't begin to include the researchers and their teams who are using the facility. In any given year, there could be as many as 140 people working in Pat Roberts Hall.

The projects under way today include wheat blast, highly pathogenic avian influenza, Rift Valley fever vaccine studies and bluetongue virus. More than just the university's own experts, collaborators from the U.S. Department of Agriculture are also taking advantage of the institute's capabilities.

Research is not the only way that the institute is making a name for itself around the world. It's also a prime destination for training and collaboration among the best researchers.

The Biosecurity Research Institute played host to researchers taking a global look at the highly contagious viral disease African swine fever. The participants included directors of laboratories and researchers from Spain, Kenya, Australia, Russia, the United Kingdom and Canada — proving that the institute and Kansas State University are world leaders in animal health and food safety research.

The institute's influence extends beyond the university in other ways, too. Look no further than at the number of collaborating organizations, like the U.S. departments of Homeland Security, Agriculture and Defense.

It should come as no surprise that the Biosecurity Research Institute is involved with the planned federal National Bio and Agro-Defense Facility to be built on the Manhattan campus. The Biosecurity Research Institute projects will jump-start some of the research planned for NBAF even before it becomes operational.

Kansas State University is striving to become a Top 50 public research university by 2025. We can't accomplish that goal without influential scientific discoveries and consequential research. Having the capabilities of the Biosecurity Research Institute at Pat Roberts Hall makes that possible.

KIRK H. SCHULZ
President
Kansas State University

DIRECTOR'S LETTER

It is a privilege to introduce this history of Kansas State University's Biosecurity Research Institute illustrating how, since 2007, university researchers and educators have worked with state, federal and private sector partners to make our world safer.

As the first land-grant university under the 1862 Morrill Act, Kansas State University has made significant contributions to our nation's agricultural industry for 150 years. Terminology and technology have changed, but the mission to improve, protect and perpetuate our food supply, and to safeguard the well-being of our crops, livestock and people, remains at the heart of the university.

The BRI concept began in 1998, when university administration received draft plans for an industry-like 10,000-square-foot, or 929-square-meter, meat processing facility capable of working on pathogens at biosafety level-3. Supported by state legislators like U.S. Sen. Pat Roberts of Kansas, university administrators expanded the plan to build a novel high-containment facility for research, education and training on plant, animal and food pathogens. The university's Homeland Defense Food Safety, Security and Emergency Preparedness Program and former university President Jon Wefald's U.S. Senate testimony titled "Agricultural Biological Weapons Threat" were ahead of their time in 1999 in highlighting existing and potential threats. The U.S. Department of Homeland Security lists several of these as priorities for future study in the National Bio and Agro-Defense Facility, or NBAF.

Having worked in and visited many laboratories, I was immediately impressed during my initial visit to the BRI by its uniqueness, accomplishments and extraordinary potential to make a real difference to what we all take for granted. As a venue for multidisciplinary, collaborative applied research, the BRI brings together people passionate about investigating and conquering pathogens affecting human health directly and indirectly. This includes crop-devastating pathogens, processed food contaminants and zoonotic agents infecting livestock and humans.

Research programs complement another personal passion — education. It is clear that administration and oversight of the BRI are fully integrated and supportive of the facility, which was brought online in a well-orchestrated progressive manner using a safety-first approach. Personnel selection and training, protocol optimization, research initiation and preventative maintenance schedules are all developed in accord.

The BRI family understands the importance of this mission and of working safely and securely. The BRI's research and educational capabilities have enabled researchers to successfully pursue funding opportunities that otherwise would have been unattainable. These direct and indirect benefits to the university are highly significant, and I anticipate greater things to come as the dedicated BRI team supports the K-State 2025 vision outlined by President Kirk Schulz.

I am impressed by many aspects of Kansas State University, including the campus camaraderie and community support. Almost everyone with whom I speak regards our success in the highly competitive NBAF site selection process as a sign of the nation's confidence in our community, and realizes that the BRI is integral to NBAF becoming operational and successful. I hope you will enjoy reading this BRI history and appreciate that the BRI is more than just a building. It is a home, with a maturing dynamic family and a diverse evolving program with a local-to-global commitment to protect agriculture and the public from biological threats.

STEPHEN HIGGS
Research Director
Biosecurity Research Institute
Kansas State University

Biosecurity Research Institute

WHO WE ARE

The BRI is a biosafety level-3, or BSL-3, and biosafety level-3 agriculture, or BSL-3Ag, facility that provides Kansas State University scientists and their collaborators with a safe and secure location to study high-consequence pathogens.

WHAT WE DO

The BRI supports comprehensive farm-to-fork infectious disease research programs that address threats to plant, animal and human health. Research at the BRI ensures a safe food supply, safeguards the public, and helps prevent major economic losses to the agriculture and food industries.

Stephen Higgs (left), BRI research director, moderates a discussion panel with international experts at a BRI symposium on African swine fever. From left to right: D. Scott McVey, supervisory veterinary medical officer for the U.S. Department of Agriculture's Arthropod-Borne Animal Diseases Research Unit; Denis Kolbasov, director of the National Institute of Veterinary Virology and Microbiology in Russia; Martyn Jeggo, director of the Australian Animal Health Laboratory; John Fazakerley, director of the Pirbright Institute in the United Kingdom; Marisa Arias, technical director of the European Union Reference Laboratory for African Swine Fever; and Richard Bishop, senior molecular biologist for the International Livestock Research Institute in Kenya.

OUR FOCUS

- Infectious diseases that threaten livestock and humans
- Pathogens that threaten food crops
- Food processing methods to bring safer foods to customers
- Biology of pathogens and diseases
- Arthropod-borne diseases

RESEARCH PRIORITIES

- Vaccine development and validation
- Pathogen-detection technology development and validation
- Plant and animal models of disease development
- Food safety protocol validation
- Ecology of foodborne pathogens
- Host resistance gene identification

FAST FACTS

- Pat Roberts Hall, home of the BRI, is a 113,000-square-foot, or 10,498-square-meter, facility that offers unique and highly advanced laboratories, training space and educational space.
- The BRI has 14 BSL-3 research laboratories and associated support spaces.
- The BRI also has BSL-3Ag large animal holding rooms and support spaces.
- Disease research at the BRI includes avian influenza, pandemic H1N1, swine influenza, Rift Valley fever vaccine studies, brucellosis, porcine reproductive and respiratory syndrome, wheat blast and more.
- Since 2008, the BRI has developed and offered 24 sessions of BSL-3 laboratory training.
- The BRI cost $54 million to build, which included local, state, federal and private funding.

John Fazakerley, director of the Pirbright Institute in the United Kingdom, listens to a presentation at the BRI during a symposium on African swine fever.

SOME OF OUR COLLABORATORS

- ABADRU, the U.S. Department of Agriculture's Arthropod-Borne Animal Diseases Research Unit
- U.S. Department of Defense
- National Institutes of Health
- U.S. Department of Homeland Security
- U.S. Army Natick Soldier Research Development and Engineering Center
- FAZD, the National Center for Foreign Animal and Zoonotic Disease Defense
- CEEZAD, the Center of Excellence for Emerging and Zoonotic Animal Diseases
- Kansas State University colleges and departments
- Kansas Bioscience Authority
- NanoScale Corp.
- National Agricultural Biosecurity Center
- National Animal Health Laboratory Network

Officials from Kansas and federal governments join Kansas State University administrators during a groundbreaking ceremony for the BRI in October 2003. From left to right: Ralph Richardson, dean of the College of Veterinary Medicine; Steve White, former dean of the College of Arts and Sciences; George Ham, former interim dean of the College of Agriculture; Jerry Moran, U.S. Senator of Kansas and former U.S. Representative of Kansas; Clay Blair, former chairman of the University Research Development Enhancement Corp.; Jon Wefald, former president of Kansas State University; Janice DeBauge, former chair of the Kansas Board of Regents; Pat Roberts, U.S. Senator of Kansas; Kathleen Sebelius, U.S. Secretary of Health and Human Services and former governor of Kansas; Steve Morris, former Kansas State Senator; Kenny Wilk, former Kansas State Representative and current member of the Kansas Board of Regents; and Ron Trewyn, vice president for research at Kansas State University.

Kirk Schulz (left), president of Kansas State University; Lynn Jenkins, U.S. Representative of Kansas; Stephen Higgs, BRI research director; Pat Roberts, U.S. Senator of Kansas; and Tom Vilsack, U.S. Secretary of Agriculture, stand in front of Pat Roberts Hall, home of the BRI.

Pat Roberts, U.S. Senator of Kansas

A blueprint for food safety

TURNING A 'BIG PURPLE BOOK' INTO A WORLD-RENOWNED RESEARCH FACILITY

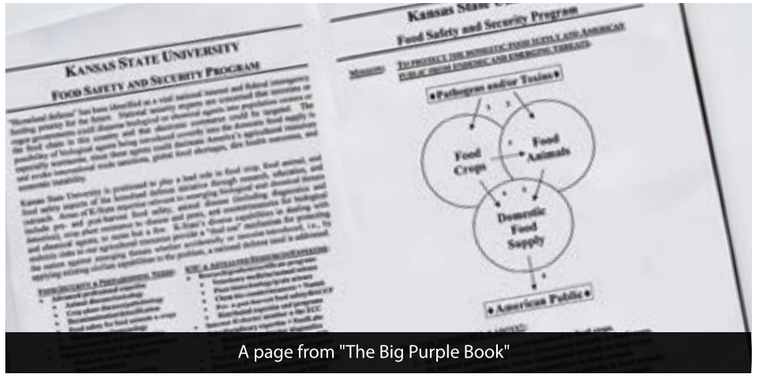
When U.S. Sen. Pat Roberts of Kansas asked to see a big campus project proposal in March 1999 during Kansas State University's annual Washington, D.C., visit, university officials saw an opportunity to showcase an idea that had been brewing for years.

Ron Trewyn, vice president for research, was and is part of the annual team that travels to the nation's capital. He said that particular year was the start of big things for the university.

"The senator said he wanted to see a big project, "Trewyn said. "I'm not sure how close he came to having a heart attack when he saw what we presented, but it was definitely no piddly project."

PAVING THE WAY

Previously in 1998, Curtis Kastner, director of the university's Food Science Institute, and Randall Phebus, professor of food safety and defense, proposed a biosafety level-3 facility.



A page from "The Big Purple Book"

Kastner said the goal was to mimic industry-like food processing practices.

"There was a need to expand on food safety research capabilities," Kastner said. "That plan was then incorporated into the BRI master plan."

University administrators created what became known as the "The Big Purple Book" — a 100-page document that outlined the university's Homeland Defense Food Safety, Security and Emergency Preparedness Program, the blueprint for today's BRI and supporting programs.

Roberts was intrigued by the idea of a facility that could help protect all sectors of the nation's food supply under one roof, and he invited the team to return in October 1999 to testify before the Senate Armed Services Subcommittee on Emerging Threats and Capabilities.

Jon Wefald, former university president, presented "The Big Purple Book" to the subcommittee, with help from Trewyn; Ralph Richardson, dean of the College of Veterinary Medicine; Robert Zeigler, former head of the department of plant pathology; James Marsden, Regents' professor of animal sciences and industry; and Jerry Jaax, associate vice president for research compliance.

Together, this team proposed a $95.2 million project that would capitalize on Kansas State University's expertise in infectious disease research to protect the nation's food supply.

"Biosafety and infectious disease research were important areas that were under-resourced and undervalued in the U.S.," Jaax said. "The team recognized how important these issues were to not only Kansas, but the nation."

ADDRESSING THE NEED

"The Big Purple Book" explained that agriculture production provides 22 million jobs in the U.S. and the agribusiness sector contributes more than $1 trillion annually to the economy —15 percent of the U.S. gross domestic product. The book went on to say that any disease infecting grain or livestock — whether intentional or by accident — could halt production or put the lives of millions of people in danger all around the world. A terrorist attack against a food crop would not even require a terrorist to set foot on U.S. soil.

"The university wanted to enhance its capabilities for developing countermeasures to these kinds of threats," Jaax said. "When we looked around, we did not see a lot of capability to do that anywhere else."

This concept developed into a proposal for a biosafety level-3 biocontainment research facility. "The Big Purple Book" outlined a facility consisting of three major infectious disease components: plant pathology, animal health and food processing.

"The idea was to go from field to fork," Jaax said. "You could look at a food pathogen in the facility and see what the effects of the disease would be in a particular food."

Kastner said the concept of integrating agricultural production and food processing — all under biosafety level-3 containment — is a first in the world.

"It is critical that our research capabilities needed to respond to agro-terrorism threats, as well as to the nation," he said.

Story continued on page 10.

"One needs only to look at research being conducted at the BRI to know that cutting-edge work is being performed that will save lives, protect our food supply, our economy and, yes, our Kansas way of life."

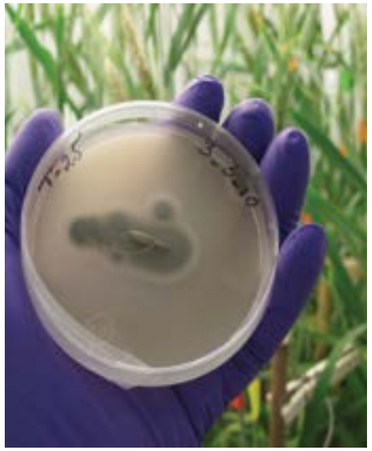
U.S. SEN. PAT ROBERTS OF KANSAS
Namesake for Pat Roberts Hall, home of the BRI

Story continued from page 9.

PLANTING THE SEED

Roberts told the team he understood the risks a biosafety threat presented to agriculture and the nation's food supply, as well as the importance of ensuring they both remain safe and reliable.

"Anything that causes food insecurity can lead to economic and political instability," Roberts said. "My number one priority is to protect,



preserve and promote our way of life in Kansas. We want to establish an economic engine that will benefit our state for generations."

In 2001 the senator began working with the university to secure federal investments for research as well as state funding for the facility.

"Our goal was to improve the state's research infrastructure to make Kansas competitive with other states," Roberts said. "I asked the Kansas Legislature to dream big."

THREAT BECOMES REALITY

The idea had trouble taking hold at first, but then came fall 2001. Nearly 3,000 individuals were killed when terrorists hijacked four airplanes on Sept. 11. One week later, on Sept. 18, letters containing anthrax spores were mailed to several news media offices and two U.S. senators, killing five and injuring 17. Jaax said these events changed the landscape and how people viewed countermeasures to bioterrorism.

"It crystalized the threat," Jaax said. "Our initiatives began before 9/11. We didn't do it because it looked like there would suddenly be funding available, but because there was a significant, continuing threat to our nation's food supply."

Roberts testified in front of the joint session of the Kansas House and Senate in early 2002, telling the lawmakers that if they could get the facility built, he would get the research funding.

The approved legislation included $40 million for Kansas State University, and approximately $14 million in federal funding was approved for fixed equipment inside the BRI. Kansas State University began construction on the BRI in 2004.

TODAY'S RESEARCH HUB

Today the BRI in Pat Roberts Hall at Kansas State University is full of activity and is a hub for infectious disease research.

Kirk Schulz, president of Kansas State University, continues to emphasize the importance of the facility. Research in the biosciences and animal health will play a key role in the university's goal to become a Top 50 public research university by 2025.

Jaax said the BRI already is paving the way for future research success.

"When you're looking at cattle, crops in the field or the food that ends up on your table, there are continuums of things that can happen," Jaax said. "Our goal with the BRI is to look at that complete spectrum. The facility reflects that idea; there is no place like it in the world." □

PROJECT TEAM

Architect of record
PGAV Architects

Audio and visual consultant
AVI Systems Inc.

Civil engineer
Schwab Eaton

Code consultant
FPC Consultants Inc.

Commissioning engineer
Clark Richardson & Biskup Engineers Inc.

Construction manager
Turner Construction Co.

Containment consultant
Biocontainment Design Services

Engineer of record
Harley Ellis Devereaux Corp.

Processing consultant
Hendon & Redmond Inc.

Structural engineer
Walter P. Moore and Associates Inc.

Building for the future

CONSTRUCTION AND DESIGN OF BRI PUTS SPOTLIGHT ON SAFETY, TRANSPARENCY

During a fall day in 2003, former Kansas State University President Jon Wefald, U.S. Sen. Pat Roberts of Kansas and former Kansas Gov. Kathleen Sebelius smiled and scooped up dirt using shovels with white and purple ribbons.

The shovels were part of the ceremonial groundbreaking for the BRI, off Denison Avenue in Manhattan, Kan. In 2004 crews would start building the most complex facility ever constructed at the university thanks to collaboration among the state, university and public during the planning, design and construction phases.

STATE SUPPORT

The Kansas Legislature created the University Research Development Enhancement Corp. in 2002 to help finance select state university capital projects like the BRI. Funding for the $54 million BRI came from revenue bonds, federal money, private cash contributions and donated services.

Westwood, Kan.-based PGAV Architects designed the BRI, while New York-based Turner Construction Co., which has an office in Kansas City, Mo., constructed the facility. Specialized consultants, including biocontainment specialists and security consultants, were part of the architectural team.

Steve Helgren, vice president of PGAV Architects, played a key role in the project.

"I'm particularly proud to have been involved with the scale and vision of this project and the collective effort from a number of people year after year to be a success," said Helgren, who was a project manager for the BRI.

Companies and consultants collaborated with representatives from the university to incorporate input and requests into the final design. The university held public meetings to provide information and to solicit feedback about the BRI from Manhattan-area residents and Kansas State University students, faculty and staff.

"Interviews, group meetings and solicitation of individual input from all stakeholders were completed in a very collaborative atmosphere, with all parties working together to produce the best facility possible," said Mike George, a senior engineer with Turner Construction and a project manager for the BRI. "Since the BRI is such a unique facility that features the ultimate in biosafety, every design element, material and building system had to be analyzed, thoroughly examined, and demonstrated to be suitable and safe for its application."

SAFETY FEATURES

The 113,000-square-foot, or 10,498-square-meter, facility was built with one recurring theme: safety.

Pat Roberts Hall, which houses the BRI, uses a box-within-a-box design and was built using federal guidelines for constructing community shelters. This design helps protect containment areas against high-force winds.

The BRI houses space for engineering controls and equipment so that the facility is always operating safely and efficiently. The BRI is plugged into different electrical substations, and a diesel generator would power on if those systems were lost to maintain safe operations.

These features — along with a complex air handling system, duplicate exhaust fans and a waste treatment system — protect the community and ensure that researchers can safely conduct research.

ON TIME, ON BUDGET

The university used an alternative method to construct the BRI rather than the traditional process of designing, bidding and building. The BRI was built using an approach known in the industry as construction management at-risk, which allows owners to choose builders before the final design is complete, guarantees a maximum price and allows the construction company to coordinate all work. This method saved the university time and money.

Turner Construction completed the BRI on schedule and within the guaranteed maximum price that the company provided to the University Research Development Enhancement Corp. board and the university.

The BRI has been benchmarked as a model for biocontainment facilities around the world. Design teams have visited the BRI to learn about biocontainment principles and practices, innovative construction methods and operational considerations.

"It's a totally unique facility unlike any other in the world for all the capabilities it has under one roof," said Ron Trewyn, vice president for research at Kansas State University. "It is a big draw for us." □

BRI fast facts

14
biosafety level-3 research laboratories at the BRI

113,000
gross square feet of building space
(10,498 square meters)

$54 million
in building costs

10,000
square feet of training and education space
(929 square meters)

5
biosafety level-3 agriculture rooms

A look at the past, a vision ahead

The need for the BRI as a comprehensive research facility has only increased with time. Here's a closer look at recent major pathogen and disease outbreaks, as well as the events that led to the development, construction and operation of the BRI.

BRI events

1999
- University officials present the BRI's blueprint, called "The Big Purple Book," to state lawmakers, then use the book to testify in front of the U.S. Senate's Emerging Threats Subcommittee.

2000
- Kansas State University officials submit the BRI funding request to the U.S. Congress.

2001
- Sen. Pat Roberts begins his push for BRI funding at the state level.

2002
- Kansas State University establishes the National Agricultural Biosecurity Center to access a vast network of interdisciplinary research.

2004
- BRI construction begins.

2006
- Pat Roberts Hall, home to BRI, is dedicated.

2007
- BRI construction is completed.

2008
- BRI research begins.

2009
- Manhattan, Kan., chosen for National Bio and Agro-Defense Facility.

2010
- Kirk Schulz becomes the 13th Kansas State University president.
- ABADRU moves to Manhattan, Kan.

2011
- BRI external advisory board is created.

2012
- BRI approved to research African swine fever and classical swine fever.
- High-profile international researchers attend the BRI's inaugural symposium on African swine fever.

2010
- CEEZAD receives $12 million award.

PLANNING PHASE

BUILDING PHASE

RESEARCH PHASE

Outbreaks and events

1993
- The first Sin Nombre hantavirus outbreak occurs in the southwest U.S.
- A shiga-toxigenic E. coli O157:H7 outbreak at Jack in the Box restaurants sickens 700 people and kills four children.

1994
- Hendra virus is first identified in Australia during an outbreak of 21 horses and two humans.
- Bovine tuberculosis is discovered in wild deer in Michigan.

1997
- Wheat blast first appears in Bolivia and kills 80 percent of the wheat production.
- H5N1 avian influenza first affects humans during a poultry outbreak in Hong Kong.

1998
- Nipah virus is first identified in Malaysia during an outbreak in pigs.

1999
- West Nile virus is first identified in the U.S. and causes a large outbreak.

2000
- A Rift Valley fever outbreak occurs in Saudi Arabia and Yemen.

2001
- Terrorists attack the U.S. on Sept. 11.
- A series of anthrax attacks using the virulent Ames strain occurs in the U.S.
- A major outbreak of foot-and-mouth disease occurs in sheep and cattle in the United Kingdom.

2003
- A global outbreak of severe acute respiratory syndrome occurs in more than two dozen countries.
- First case of bovine spongiform encephalopathy, or mad cow disease, is reported in the U.S.

2005
- Citrus greening disease — the most serious citrus disease in the world — is detected in Florida.

2006
- A virulent strain of porcine reproductive and respiratory syndrome is found in China.
- Peanut butter causes a major salmonella outbreak in the U.S.

2008
- An estimated 40,000 cases occur during two major salmonella outbreaks.

2009
- Influenza A H1N1 virus — a strain of swine influenza — spreads in North America and is declared a pandemic by the World Health Organization.
- A widespread wheat blast outbreak occurs in Brazil and reduces the national wheat crop by 30 percent.
- The first local transmission of dengue virus in the continental U.S. since 1945 begins and causes more than 85 cases.

2011
- A Listeria outbreak in cantaloupe sickens 147 people and causes 33 deaths.
- The Schmallenberg virus emerges in Europe.

2012
- A large West Nile virus outbreak occurs in 48 states in the U.S. More than 5,387 human cases are reported and more than 243 deaths occur.

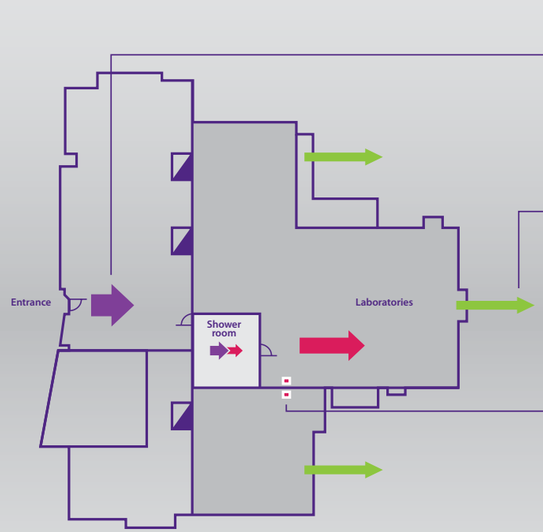
What is a biosafety level-3 facility?

A SECURE FORTRESS FOR RESEARCH

Facilities at a biosafety level-3 safely handle pathogens that may be transmitted by airborne means. The BRI building was designed with safety in mind. Multiple precautions —including security features, directional airflow and HEPA filters — help maintain safety and prevent a pathogen release.

DIRECTIONAL AIRFLOW SYSTEM

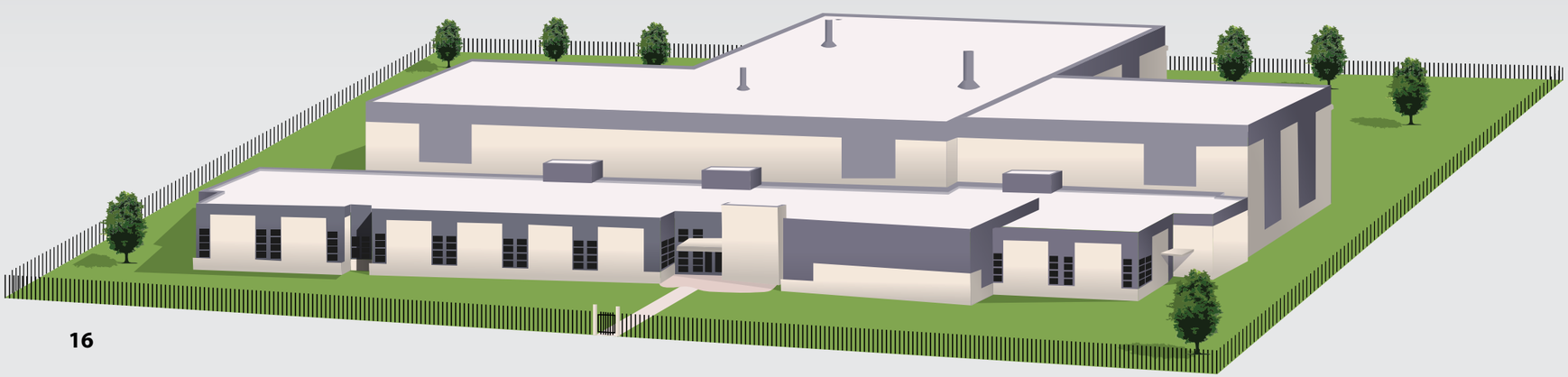
The automated building management system monitors air pressure differences between rooms and hallways and adjusts the ventilation system to ensure proper directional airflow. This creates a one-way airstream so that air moves from clean areas to more potentially contaminated areas and never recirculates to other parts of the building.



High-Efficiency Particulate Air, or HEPA, filters clean supply air that is entering the building.

HEPA filters clean exhaust air that is leaving the building.

Gauges on walls indicate the air pressure differences between rooms. Researchers are trained to read the gauge and make sure air flows correctly before entering a room or laboratory.



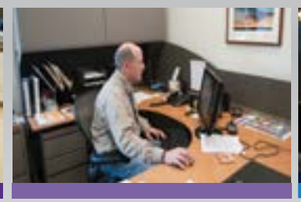
Ventilation and High Efficiency Particulate Air, or HEPA, filters
Air in the BRI is HEPA-filtered and cleaned in three stages: when it comes into the building, as it comes out of each laboratory's biosafety cabinets and as it leaves the building. The building management system supply constantly monitors exhaust fans to ensure that airflow is moving in the correct direction. Testing and certification of the ventilation system is performed annually.

Double airlock doors and showers
To enter and exit the laboratory area, personnel must pass through two doors with a shower room in between. The doors are interlocked so one door cannot be opened until the next one is closed. Upon entry into each laboratory, personnel must pass through an additional vestibule with two interlocked doors. Some laboratories also have a shower room in the vestibule. Personnel must wear approved laboratory clothing and personal protective equipment inside the biocontainment areas.

Training and education facilities
Training and education facilities total more than 10,000 square feet, or 929 square meters. The building is equipped with the latest technology and includes conference rooms with distance-learning capabilities, a modern lecture hall and an integrated training suite, which is a combined classroom-laboratory for hands-on interactive learning.

Biosafety level-3 agriculture rooms
The five biosafety level-3 agriculture rooms are designed to safely house livestock species and have extra safety features, including airtight doors; clothing change and shower spaces; double HEPA-filtered exhaust air systems; and extra sealing of walls, floors and ceilings.

Security
The facility is monitored constantly. A security station with cameras monitors the facility both day and night.



Office space
The BRI has more than 10,000 square feet, or 929 square meters, of office space for administrators, personnel and support staff.

Biocontainment laboratories
In 14 biosafety level-3 laboratories, the handling of pathogens is only performed in biosafety cabinets. Each cabinet is designed to protect workers and the environment.

Food processing facility
The unique biosafety level-3 food processing facility includes very large equipment used by the food processing industry. The facility can safely mimic commercial systems for meatpacking or produce packing and helps researchers perform food safety studies.

Julie Johnson, assistant vice president for research compliance and BRI biosafety officer, leads a training session in biosafety level-3 practices.

Video production engineers oversee operations during a presentation in the BRI.

Success starts with safety

A LOOK AT OPERATIONS AT THE BRI

Layers of planning and preparation make the BRI a safe and secure location for research that protects agriculture and public health.

"Preparedness is the key to working safely," said Julie Johnson, BRI biosafety officer and assistant vice president for research compliance. "That includes planning ahead for all possible emergencies and practicing responses, implementing rigorous facility preventive maintenance programs, having both internal and external oversight review, and ensuring that personnel are well-trained and thoroughly understand biocontainment practices."

"Mercy is very excited about the partnership we currently have with Kansas State University and the BRI. We will continue to work with Kansas State University and the BRI to ensure that we have prepared our physicians and staff appropriately to deal with medical and other response events."

JOHN BROBERG
CEO and President of Mercy Regional Health Center

ACCREDITATION AND REGULATION

Each BRI research project requires approval by university organizations and several external regulatory agencies. Internal oversight is provided by the University Research Compliance Office, which includes the Institutional Biosafety Committee and the university's Institutional Animal Care and Use Committee.

Work with infectious agents on the list of select agents is regulated by a joint program of the Centers for Disease Control and Prevention and U.S. Department of Agriculture Animal and Plant Health Inspection Service. Each new research project using select agents must be submitted as an amendment to the university's select agent registration. If the infectious agents being studied affect agricultural animals or plants, the work requires an additional permit. These approval processes usually include a site inspection. Approval must be received before the work can begin.

Similar to all other animal research facilities on campus, the BRI's animal facilities are accredited by the Association of Assessment and Accreditation of Laboratory Animal Care.

RESEARCH PREPARATION

BRI scientists and staff are well-trained in biocontainment practices. Before stepping inside a laboratory, all staff, researchers, collaborators and scientists must take a 30-hour safety course that involves hands-on practice in a simulated laboratory and participation in emergency drills. The training process includes wearing protective gear, practicing the use of safety equipment, and understanding proper procedures for entering and exiting containment areas. Everyone must be recertified every year.

MEDICAL SURVEILLANCE AND RESPONSE PLANS

A partnership between Kansas State University and nearby Mercy Regional Health Center's Occupational Health Services division provides preventative treatment and preparedness. Pathogen research is arranged months in advance, which provides ample time to prepare response plans.

Scientists must receive medical exams and necessary vaccinations before performing research. They are taught to look for any medical symptoms related to pathogens they are studying and they contact on-call medical professionals if symptoms arise. Occupational health staff, emergency services staff and physicians have toured the BRI and are trained to treat pathogen exposures.

Each month, BRI staff members communicate with Mercy Regional Health Center staff so they are aware of all pathogens being used in the facility. BRI personnel also assist with emergency response training. In 2010, personnel presented special emergency training to more than 100 first responders, including the Manhattan Fire Department, Riley County Emergency Management Services and Mercy Regional Medical Center. □

A training hub

BRI IS AN INTERNATIONAL RESOURCE FOR BIOSAFETY AND BIOCONTAINMENT TRAINING

With advanced capabilities and innovative facilities, the BRI is helping universities, businesses and organizations prepare for work in biocontainment facilities.

"The multidisciplinary research, training and educational activities that exist at the BRI make it a truly unique facility," said Stephen Higgs, BRI research director. "The capacity to work on diseases of plants, humans, and other animals and pathogens that contaminate the food chain, all under one roof, is quite extraordinary."

TECHNOLOGY

The BRI's education and training facilities total more than 10,000 square feet, or 929 square meters. The building is equipped with the latest technology and has ample space for research presentations and meetings. Facilities include conference rooms with distance-learning capabilities, a modern lecture hall and an integrated training suite, which is a combined classroom-laboratory for hands-on interactive learning.

Because of these facilities, the BRI can offer high-quality training on such topics as basic biosafety level-3 — or BSL-3 — practices, handling and identification of high-consequence pathogens, diagnosis of animal and plant disease, and containment facility operations.

Training facilities include state-of-the-art classrooms that use audio and video to connect with laboratories inside containment. This allows high-quality instruction on handling and identifying high-risk pathogens without exposing trainees to the actual agents.

TRAINING

The BRI provides researchers with knowledge and experience specific to working in a BSL-3 facility. Since 2008, the BRI has developed and offered 24 sessions of BSL-3 laboratory training, which is a required 30-hour training course for all staff, researchers, collaborators and scientists to enter BSL-3 laboratories. More than 100 participants have completed this training.

The BRI developed an online pretest in 2009 for BSL-3 training and an online training needs assessment to identify appropriate training for specific employee and researcher roles. BRI personnel also have assisted with presentations to more than 13 universities and organizations. The National Animal Health Laboratory Network has had high throughput robotics diagnostics training sessions at the BRI for organizations from more than 20 states.

In recent years, the BRI has expanded the training courses it offers. Administrators developed three training courses in 2009, seven training courses in 2010 and 17 training courses in 2011.

"The ability to conduct hands-on training scenarios under the direction of biosafety professionals in a fully equipped laboratory promotes a critical safety culture for the institute," said Scott Rusk, who organizes training sessions and manages the facility operations as director of Pat Roberts Hall, home of the BRI. □

TRAINING SESSIONS

Personnel from the following external organizations have attended training sessions at the BRI as part of the National Biosafety and Biocontainment Training Program:

- University of Puerto Rico
- Novartis Research Foundation
- U.S. Food and Drug Administration
- Universidad Nacional Autonoma de Mexico
- Battelle Memorial Institute
- SoBran Inc.
- Microbe Inotech Laboratories Inc.
- Airtech Equipment, Singapore
- University of Nebraska – Lincoln
- University of Missouri
- Texas A&M University
- Arkansas Livestock and Poultry Commission
- Purdue University

TRAINING ORGANIZATIONS

BRI facilities are used to train personnel from numerous organizations, including:

- NanoScale Corp.
- U.S. Department of Agriculture
- Arthropod-Borne Animal Diseases Research Unit
- Center of Excellence for Emerging and Zoonotic Animal Diseases
- University of Nebraska – Lincoln
- Auburn University
- Kansas State University's College of Veterinary Medicine, including the Veterinary Diagnostic Laboratory and departments of anatomy and physiology as well as diagnostic medicine and pathobiology
- Kansas State University's College of Agriculture, including the animal sciences and industry department and the plant pathology department
- Kansas State University's Food Science Institute
- Kansas State University's Comparative Medicine Group

Members of the National Agricultural Biosecurity Center from left to right: Adrian Self, administrative director; Marty Vanier, director; Ken Burton, program director; Joe Fund, project manager; and Craig Beardsley, program administrator.

Center coordinates biosecurity and research efforts

Kansas State University's National Agricultural Biosecurity Center administers programs that help protect America's food supply and address the preparation and response to threats involving the agricultural economy.

The center unites biosecurity researchers with federal, state and local agencies to provide a response to emerging agricultural threats and to share information. The center, established in 2002, proved to be a major catalyst for the BRI.

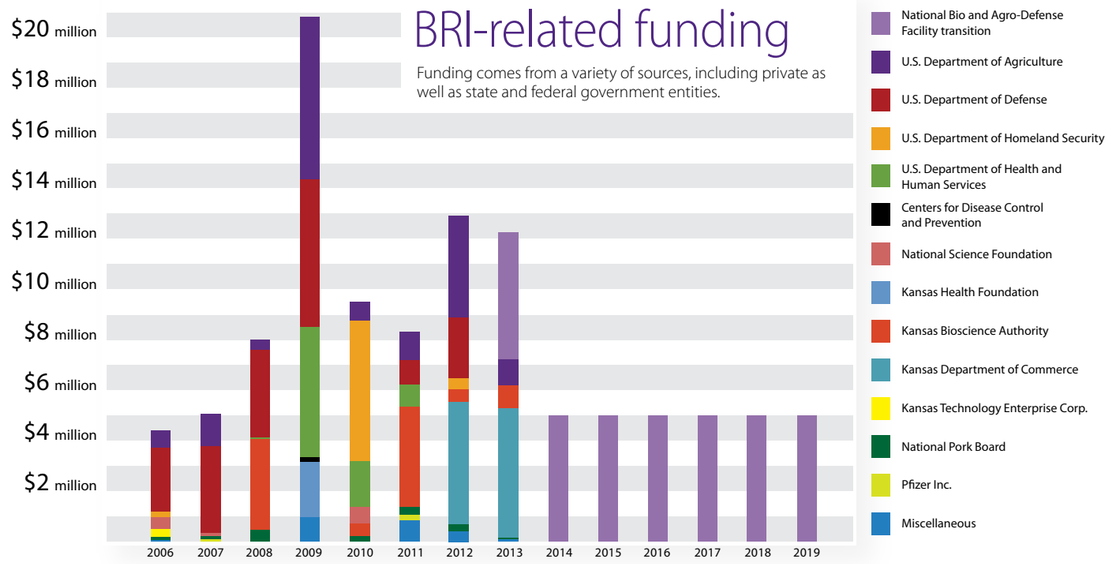
"The National Agricultural Biosecurity Center conducts programs that address diverse threats to our agricultural economies and food supplies," said Marty Vanier, director of the center. "We are pleased that our collaborative work with the BRI has supported vital interdisciplinary research to protect our nation and our world."

The center prepares diagnosticians, livestock and plant producers, and law enforcement officials to respond to agricultural threats, whether they're naturally or intentionally introduced. It assists with planning and training activities, and the center coordinates emergency preparedness exercises to test and strengthen state- and county-level response during a significant agricultural disease event. The exercises involve many departments and agencies throughout Kansas and the nation.

The center also provides a resource for regulators, policymakers and the military. It creates products that assist in providing a better understanding and response to emerging diseases and threats. The center integrates a vast network of interdisciplinary research and resources in such areas as animal disease, foodborne pathogens, plant pathogens, and environmental changes affecting agriculture and human health.

The center has extensive experience developing, implementing, and managing research projects and training programs for multiple state and federal agencies. □

FUNDING



Advancing knowledge and research

The BRI is a safe and secure location to perform comprehensive farm-to-fork research. Through its biosafety level-3 and biosafety level-3 agriculture facility, the BRI is combating threats to plant, animal and human health. The following pages highlight the numerous collaborations, teams and researchers who have performed past and present research at the BRI.

BRI

RESEARCH HIGHLIGHT

RICHARD "DICK" OBERST

Professor of diagnostic medicine and pathobiology

AFFILIATION
Kansas State University's College of Veterinary Medicine

EDUCATION
Doctorate in veterinary medicine, Oklahoma State University; doctorate in comparative pathology, University of California-Davis; bachelor's degree in microbiology, Oklahoma State University

RESEARCH INTERESTS
Developing and validating high throughput real-time polymerase chain reaction systems to detect infectious diseases and improve animal health, environmental health and food safety

HONORS AND AWARDS
Merck AgVet Award for Creativity in Teaching; faculty award from the Johnson Cancer Research Center; Air Force Commendation Medal; granted three U.S. patents; more than 50 peer-reviewed journal articles published; given more than 26 invited presentations

BRI PROJECT FUNDING
U.S. Army Natick Soldier Research Development and Engineering Center

Pathogens: plague, brucellosis, anthrax and tularemia

Protecting those who protect us

For American troops stationed on foreign soil, the dinner table may be just as dangerous as the battlefield.

Dick Oberst, professor of diagnostic medicine and pathobiology, is using the BRI to research how to effectively detoxify the dinner table from various food-based threats for U.S. soldiers. His project is titled "Facilities, methods and technologies to determine real-time biohazards in foods to validate technology readiness."

Oberst is validating tests and equipment that can quickly detect bacteria, pathogens and toxins in food. These validation methods will help deployed American troops determine if their food rations are safe to eat.

"Many of these select agents can be found in foods from either intentional or unintentional contamination during the food production process," Oberst said. "This information is especially important to soldiers because a lot of the fresh produce and consumable food they obtain in foreign countries is locally grown and processed."

The numerous agents being tested for are classified by the Centers for Disease Control and Prevention as biosafety level-3 threats. This designation means that these biological toxins in food can cause serious illness and, in some instances, death if not treated.

The BRI is equipped with technology that allows food to go through its entire production process, making it possible for Oberst to spot the exact point of contamination, document it and intervene.

The ultimate goal, Oberst said, is for the project's findings and data to be used to not only protect deployed troops from food-based threats, but also to better protect American civilians from these toxins. Food producers could use similar rapid diagnostic protocols and equipment to determine when a food is most susceptible to contamination in the production cycle and how to handle a detected contamination.

Oberst is collaborating on the project with Kansas State University's Randall Phebus, professor of food safety and defense. The project is funded through a partnership with the U.S. Army Natick Soldier Research Development and Center.

In addition to detecting biohazards in food, Oberst also is using the BRI to study tularemia, plague, anthrax and brucellosis. □

RESEARCH HIGHLIGHT

BARBARA VALENT

University distinguished professor of plant pathology

AFFILIATION
Kansas State University's College of Agriculture

EDUCATION
Doctorate in biochemistry; bachelor's degree in chemistry, both from the University of Colorado in Boulder

RESEARCH INTERESTS
Fungal molecular genetics, molecular genetics of pathogenicity and improving key cereal crops for durable resistance to fungal diseases

HONORS AND AWARDS
Mentor award for graduate students from Kansas State University's department of plant pathology, 2010; fellow of the American Association for the Advancement of Science, 2007; fellow of the American Phytopathological Society, 2007; presenter of the first John S. Karling Lecture; lecturer at the annual meeting of the American Phytopathological Society; granted three U.S. patents for her discoveries

BRI PROJECT FUNDING
U.S. Department of Agriculture's National Institute of Food and Agriculture

Pathogen: wheat blast fungus

Preparing for a devastating disease

Kansas has been lucky to avoid a major wheat disease outbreak. Barbara Valent, university distinguished professor of plant pathology, is working to reinforce that luck with science.

Valent leads a team of university and government scientists for a BRI project titled "Genome-enabled diagnosis of the wheat blast pathogens and identification of resistance resources." The researchers are working to protect Kansas and U.S. wheat fields from wheat blast fungus.

Wheat blast accounted for 30 percent of Brazilian wheat crop losses in 2009. Production areas with favorable climate conditions can experience 100 percent crop loss, Valent said.

Kansas is the largest wheat-producing state in the U.S., and the effects could be devastating to the nation's food supply and the economy if the fungus reaches Kansas fields.

"It may not matter where the strain originated, but we need to follow the populations because the foreign and mutated strains of wheat blast could have different properties and consequently different sensitivities," Valent said. "The discovery in Kentucky is not a game-changer, but it makes it more important that we are ready."

In 2011 researchers found wheat blast on a single wheat head in Kentucky.

It's unclear if wheat blast would survive in the Kansas climate, Valent said. That is the question she and colleagues are answering at the BRI, which provides a secure containment facility to study the disease.

To do this, researchers are testing the fungus on varieties of Kansas wheat and looking at which plants have the best and worst resistance. Protective traits from more resistant wheat varieties could be genetically introduced into other varieties and boost wheat crop immunity.

Valent and colleagues also are developing rapid detection tools for the fungus in case it spreads to other countries. America's wheat producers could use the tools to determine whether a crop has wheat blast or head scab, a common disease that closely resembles wheat blast.

The team also is working to train student researchers and employees at state agricultural commissions about wheat blast.

Valent is collaborating with Jim Stack and Bill Bockus, Kansas State University professors of plant pathology; and Gary Peterson and Kerry Pedley, scientists with the U.S. Department of Agriculture's Agricultural Research Service. □

RESEARCH HIGHLIGHT

RAYMOND "BOB" ROWLAND

Virologist and professor of diagnostic medicine and pathobiology

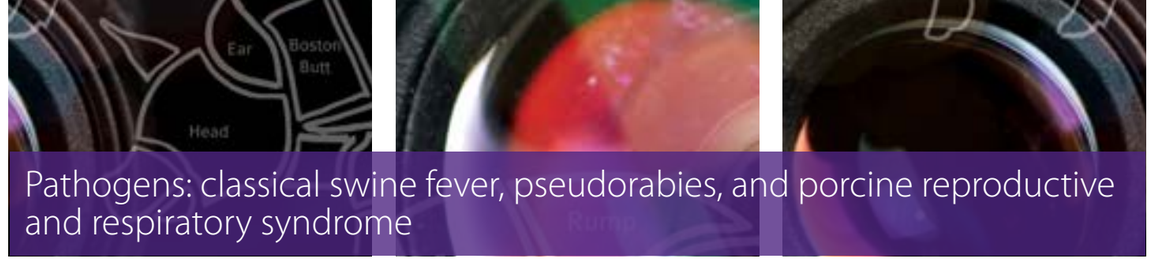
AFFILIATION
Kansas State University's College of Veterinary Medicine

EDUCATION
Doctorate in microbiology, University of New Mexico School of Medicine; master's degree in microbiology, San Francisco State University; bachelor's degree in biology, Fresno State University

RESEARCH INTERESTS
Addressing fundamental problems in infectious diseases caused by emerging and high-consequence viruses in swine

HONORS AND AWARDS
Pfizer Animal Health Award for Research Excellence, 2007; project director for U.S. Department of Agriculture's multistate Porcine Reproductive and Respiratory Syndrome Coordinated Agricultural Project; co-director of the Porcine Reproductive and Respiratory Syndrome Host Genetics Consortium; external board member for several infectious disease program projects

BRI PROJECT FUNDING
U.S. Department of Agriculture



Pathogens: classical swine fever, pseudorabies, and porcine reproductive and respiratory syndrome

Developing detection tools for deadly swine diseases

A Kansas State University research team is using the BRI to improve animal health, develop diagnostic tests and save the U.S. pork industry millions of dollars each year.

The team — led by Raymond "Bob" Rowland, a virologist and professor of diagnostic medicine and pathobiology — is studying three important and emerging swine diseases: classical swine fever, pseudorabies, and porcine reproductive and respiratory syndrome.

"The work we are doing at the BRI is developing the next generation of tools and diagnostic tests needed to detect high-consequence agents," Rowland said.

The researchers are validating a new type of swine oral fluids test for the classical swine fever virus and pseudorabies. It is a noninvasive test in which pigs chew on a rope and scientists analyze the saliva left on the rope.

"We are collecting samples to determine whether or not they are good sample sources for these diseases," Rowland said. "Nobody has done this type of research before."

Not only is the test safer for animals, but the collection method makes it easy to obtain samples from up to 30 pigs at a time.

"We get a sample that represents a population of pigs," Rowland said. "This is one of the new revolutions in surveillance. This new technology allows us to take a single oral fluid sample and test it simultaneously for as many as 50 different infectious disease agents."

Rowland also was part of a research team that discovered a genetic marker that identifies pigs with reduced susceptibility to porcine reproductive and respiratory syndrome. The disease costs the U.S. pork industry more than $600 million a year. This research was completed in a biosafety level-2 facility, and Rowland said it could be translated directly to the BRI's biosafety level-3 facility.

In the future, the BRI will be imperative in genetic studies because of its capabilities for studying large herds. Researchers want to find genes that help pigs respond better to vaccines and develop new vaccines for diseases.

Other researchers involved in the projects include Dick Hesse, director of diagnostic virology at the Kansas State Veterinary Diagnostic Laboratory and associate professor of diagnostic medicine and pathobiology, as well as several postdoctoral researchers and graduate students. □

RESEARCH HIGHLIGHT

Pathogen: pandemic H1N1

Preventing outbreaks by understanding pandemic H1N1

By taking a closer look at the pandemic H1N1 virus, Kansas State University researchers are protecting human and swine populations.

The researchers, led by Juergen Richt, Regents distinguished professor and Kansas Bioscience Authority eminent scholar, have investigated how the pandemic H1N1 virus affects mammalian host species. This has helped in understanding differences between the 2009 pandemic H1N1 and other H1N1 viruses, including the classical 1918-like H1N1 swine influenza virus.

The research is important to characterize the pandemic H1N1 virus, which causes a zoonotic disease that can easily spread among human and swine populations. The researchers studied how specific strains affect swine populations and addressed issues when some virus strains become drug-resistant.

"Zoonotic diseases do not only mean diseases that can spread from animal to human," Richt said. "They can also spread from humans to animals. Zoonotic agents go both ways."

The BRI has provided the necessary biosafety level-3 laboratory space to safely study pandemic H1N1 and other influenza viruses. For their studies in the BRI, the researchers compared host response to infection with pandemic H1N1 and classical swine influenza viruses. They performed microarray studies and compared the expression of tens of thousands of genes in the lung during the infection with the 2009 pandemic H1N1 and the classical swine influenza virus.

The researchers discovered that the 2009 pandemic H1N1 virus is more easily transmitted and sustained in swine populations than the classical swine influenza virus. It is also easily maintained in swine populations, where it can mix with other influenza viruses and create new influenza viruses with genes derived from the pandemic H1N1.

"Our strength at Kansas State University is that we are very familiar with zoonotic diseases," Richt said. "Pandemic H1N1 is another example of how important it is to work on the nexus of human and animal health."

The project involves several Kansas State University diagnostic medicine and pathobiology researchers, including Wenjun Ma, assistant professor; Derek Mosier, professor; and Qinfang Liu, postdoctoral fellow. The university researchers are collaborating with the U.S. Department of Homeland Security's Center of Excellence for Emerging and Zoonotic Animal Diseases, the University of Washington and St. Jude Children's Research Hospital. □

JUERGEN RICHT

Regents distinguished professor and Kansas Bioscience Authority eminent scholar

AFFILIATION
Kansas State University's College of Veterinary Medicine; director, U.S. Department of Homeland Security's Center of Excellence for Emerging and Zoonotic Animal Diseases

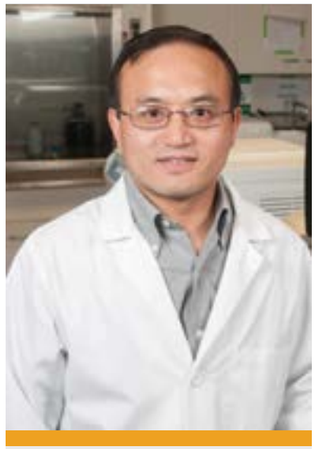
EDUCATION
Doctorate in veterinary medicine, University of Munich; doctorate in veterinary virology, University of Giessen; postdoctoral studies, Johns Hopkins University

RESEARCH INTERESTS
Developing a research program that involves a multidisciplinary approach to solving both existing and emerging animal and zoonotic disease concerns

HONORS AND AWARDS
Former lead scientist, U.S. Department of Agriculture's National Animal Disease Center; named to the prestigious scientific advisory board of the Scientific and Technical Review of the World Organization for Animal Health, the OIE, in Paris; Pfizer Animal Health Award for Research Excellence, 2011; author and co-author of more than 130 peer-reviewed articles

BRI PROJECT FUNDING
National Institutes of Health, U.S. Department of Agriculture and U.S. Department of Homeland Security

RESEARCH HIGHLIGHT



WENJUN MA

Assistant professor of diagnostic medicine and pathobiology

AFFILIATION
Kansas State University's College of Veterinary Medicine

EDUCATION
Doctorate in molecular virology, Justus-Liebig-University in Germany; master's degree in veterinary science, Chinese Academy of Agricultural Science; bachelor's degree in veterinary science, Northeast Agricultural University in China

RESEARCH INTERESTS
Viral diseases of animals, with an emphasis on emerging and zoonotic viral infections

HONORS AND AWARDS
First place in basic science presentation at Phi Zeta Research Day, 2010; German Academic Exchange Service, or DAAD, Scholarship, 2001 to 2003

BRI PROJECT FUNDING
U.S. Department of Agriculture and U.S. Department of Homeland Security

Pathogen: swine influenza

A closer look at swine influenza genetics

A group of Kansas State University researchers is studying pathogenicity and transmissibility of swine influenza viruses to help control and prevent future outbreaks.

Co-principal investigators Wenjun Ma, assistant professor of diagnostic medicine and pathobiology, and Juergen Richt, Regents distinguished professor and Kansas Bioscience Authority eminent scholar, are studying swine viruses in mice and swine.

The research provides insights on how pandemic H1N1 spreads and how vaccines can be improved. The pandemic H1N1 virus is a newer virus that was created by reassortment of North American triple reassortant and Eurasian H1N1 swine influenza viruses.

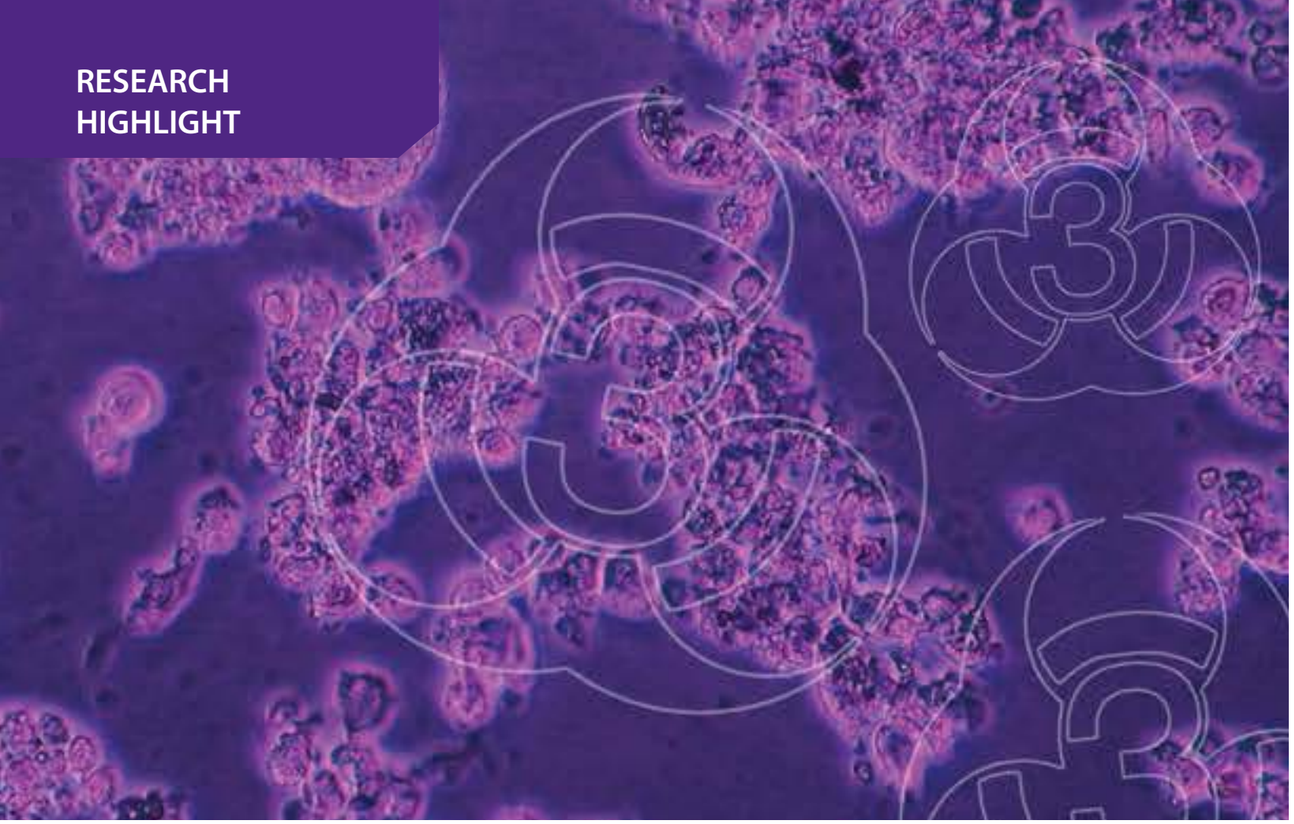
At the BRI, the researchers performed two studies involving the 2009 pandemic H1N1 virus. They investigated pathogenesis and transmission of the 2009 pandemic H1N1 in pigs and the role of the NA and M genes from Eurasian avian-like swine influenza viruses in pathogenicity and transmission of the 2009 pandemic H1N1 virus. The researchers studied how different genetic combinations affect virulence in mice and virulence and transmissibility of the virus in swine.

"We need to know what the genetic basis is for this virus being virulent and transmissible," Ma said. "These are critical questions we need to answer."

The project involves several Kansas State University diagnostic medicine and pathobiology researchers, including Derek Mosier, professor; Qinfang Liu, postdoctoral fellow; Bhupinder Bawa, research assistant professor; Wenbao Qi, visiting scholar; Huigang Shen, postdoctoral fellow; and Ying Chen, postdoctoral fellow.

The university researchers are collaborating with the U.S. Department of Homeland Security's Center of Excellence for Emerging and Zoonotic Animal Diseases, St. Jude Children's Research Hospital and Mount Sinai School of Medicine. □

RESEARCH HIGHLIGHT



SHYAMALA RAJAGOPALAN

Manager of research and project development, project principal investigator

AFFILIATION
NanoScale Corp.

EDUCATION
Doctorate in chemistry, University of California, Davis; master's and bachelor's degrees in chemistry, University of Madras in India

RESEARCH INTERESTS
Developing and characterizing novel composite materials with highly specific functional properties for well-defined end applications, nanochemistry and technology, and organometallic chemistry in organic synthesis

HONORS AND AWARDS
Best teaching assistant awards, department of chemistry at the University of California, Davis; Merit Scholarship from the Indian government; recipient of more than $8 million in research awards as a principal investigator; developer of three patents and one patent application; given 12 major lectures since 2004

BRI PROJECT FUNDING
U.S. Army Research Development and Engineering Command Acquisition Center for the Defense Threat Reduction Agency

Pathogens: anthrax, glanders and vaccinia ankara

Reducing the dangers of disaster cleanup

After a national disaster or terrorist attack, emergency workers may be at risk as they clear an area that contains dangerous contaminates. Researchers with Manhattan, Kan.-based NanoScale Corp. are working at Kansas State University's BRI to lower that risk with an innovative invention.

Shyamala Rajagopalan, manager of research and project development at NanoScale, is the principal investigator for the enhanced contaminated human remains pouch project. The team's goal is to select a material for integration with pouches to impart the property of self-decontamination and sterilization.

NanoScale researchers have tested various formulations against biosafety level-3 organisms to create the enhanced pouch that can safely transport human remains that may have been contaminated by chemical or biological agents. Pathogens that have been studied include anthrax, glanders and vaccinia ankara.

The BRI has provided training, equipment, safety supplies, guidance and laboratory space, and the BRI was instrumental in allowing the project to move forward by obtaining clearance from Kansas State University's Institutional Biosafety Committee, the U.S. Department of Agriculture, and the Centers for Disease Control and Prevention.

"At the BRI, NanoScale researchers were able to do the hands-on work and successfully apply the lessons learned to various other areas of hazard mitigation with broader purpose," Rajagopalan said.

Rajagopalan co-authored "Enhanced Contaminated Human Remains Pouch: Initial Development and Preliminary Performance Assessments," which appeared in the American Journal of Disaster Medicine.

NanoScale researchers involved in the project include Angie Iseli, Jessica Cremer, Brandon Walker, Dennis Karote, Jane Langemeier, Shuvo Alam and Eric Masden. □

RESEARCH HIGHLIGHT

Pathogens: E. coli O157:H7 and Shiga toxin-producing E. coli

RANDALL PHEBUS

Professor of food safety and defense

AFFILIATION
Kansas State University's College of Agriculture

EDUCATION
Doctorate in food science and technology; master's degree in food science and technology; bachelor's degree in animal sciences, all from the University of Tennessee

RESEARCH INTERESTS
Development and validation of technologies for detection and control of foodborne pathogens throughout the food system; profiling distribution patterns of target pathogens during food processing; modeling growth and survival of foodborne pathogens and select agents in defined food products

HONORS AND AWARDS
College of Agriculture Teaching Excellence Honoree, 2010; the National Committee for Employer Support of the Guard and Reserve Patriotic Employer recognition, 2005; Early Career Award from Gamma Sigma Delta, 1998; International Association of Milk, Food and Environmental Sanitarians Developing Scientist Award, 1993

BRI PROJECT FUNDING
U.S. Department of Agriculture and U.S. Department of Defense

Identifying biohazards, improving food safety

Randall Phebus is making food safer for consumers and the military.

Phebus, professor of food safety and defense, is leading important research at the BRI that focuses on E. coli O157:H7 and a similar group of microorganisms called non-O157 STEC, which is short for Shiga toxin-producing E. coli.

The project includes two parts: a beef trim sampling project and a large-scale grinding project.

BEEF TRIM SAMPLING PROJECT
For the beef trim sampling project, the researchers are evaluating different commercially viable sampling methods for their ability to identify STEC contamination in 2,000-pound boxes, or combos, of boneless beef trim before commercial grinding. Combo sampling methods are combined with cultural and DNA-based diagnostic assays to detect STEC.

The project is providing the beef industry and U.S. military with critical information to make decisions on how to best sample large amounts of beef trim before commercial grinding to prevent subsequent product recalls and disease outbreaks.

LARGE-SCALE GRINDING PROJECT
The BRI's large containment facility was crucial for the large-scale grinding project because the facility can simulate a representative commercial grinding system.

"We are taking industry standard practices, along with other potentially viable sampling approaches, and determining which methods provide the best likelihood of detecting contamination," Phebus said.

To study E. coli O157:H7 and non-O157 STEC, the researchers contaminate a small portion of boneless beef trim. Using commercial-size equipment, the researchers grind the contaminated trim along with a few thousand pounds of non-inoculated trim to determine how the contamination becomes distributed throughout large amounts of finished ground beef.

The project is addressing questions about how quickly a manufacturing system naturally purges itself of contamination during continuous operation and how efficiently the low-level contamination can be detected in finished ground beef.

While both organisms can contaminate meat naturally, they potentially could be used in acts of bioterrorism. The research is helping to address both possible scenarios.

"These are very important and relevant questions because when industry members are doing tests and they find contamination, the entire lot has to go to cooking operation, which constitutes a major loss in value," Phebus said. "This research will help beef processors make decisions to reduce STEC-associated risks in beef, and will provide procurement guidance to ensure security of the military's food supply."

Kansas State University's Richard Oberst, professor of diagnostic medicine and pathobiology, and Nigel Harper, research assistant professor of animal sciences and industry, are collaborating on the project, along with researchers from the University of Nebraska, Auburn University, the U.S. Department of Agriculture's Agricultural Research Service and the U.S. Department of Defense. □

RESEARCH HIGHLIGHT

WILLIAM WILSON

Research microbiologist and adjunct faculty member of diagnostic medicine and pathobiology

AFFILIATION
Arthropod-Borne Animal Diseases Research Unit, a unit of the U.S. Department of Agriculture's Agricultural Research Service; Kansas State University's College of Veterinary Medicine

EDUCATION
Doctoral and bachelor's degrees in animal science, University of Illinois at Urbana-Champaign

RESEARCH INTERESTS
Disease control strategies, arbonviruses

HONORS AND AWARDS
Helped establish the Rift Valley fever vaccine research program at the Arthropod-Borne Animal Diseases Research Unit, a unit of the U.S Department of Agriculture's Agricultural Research Service

BRI PROJECT FUNDING
Kansas Bioscience Authority, U.S. Department of Homeland Security, U.S. Department of Agriculture

Pathogens: Rift Valley fever vaccine studies

Keeping the global food supply safe and secure

Researchers at Kansas State University's BRI are helping some of the world's poorest farmers protect their livestock.

William Wilson, a research microbiologist with the Arthropod-Borne Animal Diseases Research Unit, or ABADRU, which is a unit of the U.S. Department of Agriculture's Agricultural Research Service, and a team from ABADRU, Kansas State University and the University of Wyoming are developing field and laboratory tests to differentiate animals infected with Rift Valley fever from vaccinated animals. The team is working with Snowy Range Instruments of Laramie, Wyo., and DeltaNu, a Laramie, Wyo.-based subsidiary of Intevac Inc. of Santa Clara, Calif.

Rift Valley fever primarily infects livestock but can be passed to humans through contact with blood or organs of infected animals. Mosquitoes also can transmit the virus. Although animals can be vaccinated against the disease, not all farmers have the resources to do so.

Research at the BRI helps develop medical tests to determine whether animals are vaccinated for Rift Valley fever. African countries and farmers cannot afford to vaccinate animals except during an outbreak, so rapid detection is critical to control the spread of the disease. The tests will help control the disease during an outbreak, reducing the effect on the global food supply.

"Studying this disease is extremely important to Africa's food security," Wilson said. "Furthermore, an outbreak would have a devastating impact on the U.S. if it were introduced here. The best way to control this disease is at its source before it's introduced to the U.S."

Researchers safely study the virus' s relationship with animals at the BRI in containment, the area in the building with isolated and secure laboratories.

"What makes the BRI so special is that we have the ability to work with Rift Valley fever in the U.S. using mosquitoes that transmit the virus," Wilson said. "There's no other place in the country that has the BRI's capabilities."

Kansas State University researchers include Juergen Richt, a Regents distinguished professor and Kansas Bioscience Authority eminent scholar. Other researchers include Patrick Johnson, an assistant professor at the University of Wyoming, and ABADRU researchers Barbara Drolet, D. Scott McVey and Dana Nayduch. □

RESEARCH HIGHLIGHT

D. SCOTT MCVEY

Supervisory veterinary medical officer and research leader for the Arthropod-Borne Animal Diseases Research Unit

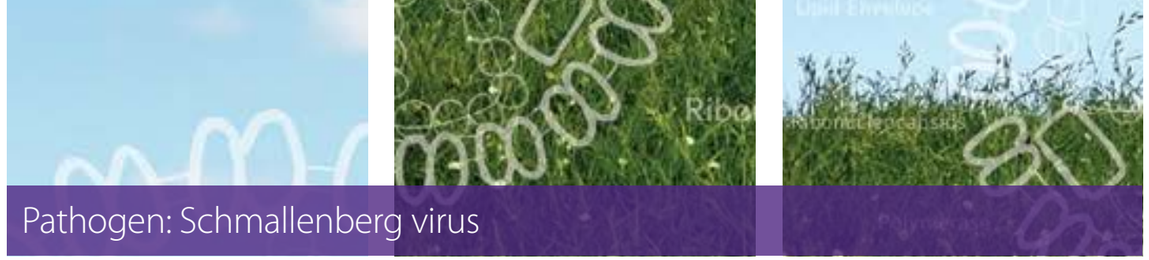
AFFILIATION
Arthropod-Borne Animal Diseases Research Unit, a unit of the U.S. Department of Agriculture's Agricultural Research Service; Kansas State University's College of Veterinary Medicine

EDUCATION
Doctorate in veterinary medicine, University of Tennessee; doctorate in veterinary microbiology, Texas A&M University

RESEARCH INTERESTS
Developing vaccines and diagnostic control measures for arboviruses

HONORS AND AWARDS
Distinguished Alumni Award, University of Tennessee College of Veterinary Medicine, 2007; SmithKline Beecham Award for Research Excellence, 1992; past president of the American College of Veterinary Microbiologists; Blue Ribbon Panel for Counter Measures for Terrorist Threats to Agriculture for the President of the United States, 2003-2004; more than 10 years developing vaccines for Pfizer Inc. and Merial

BRI PROJECT FUNDING
U.S. Department of Agriculture



Pathogen: Schmallenberg virus

Curbing emerging livestock diseases

Scientists at Kansas State University's BRI are conducting research to contain an emerging disease that is deadly to livestock.

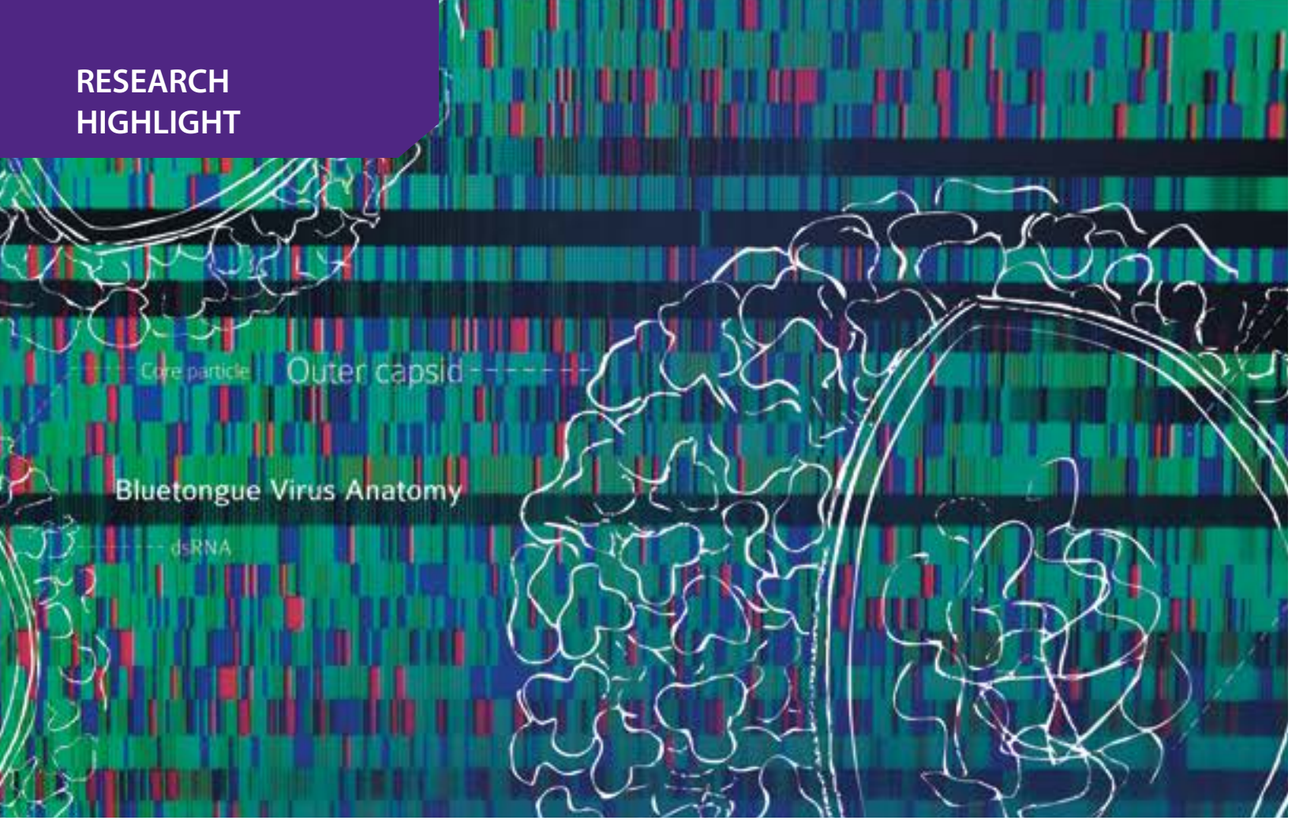
The insect-transmitted Schmallenberg virus — which currently has no formal scientific name — causes birth defects and stillbirths in cattle, sheep and goats. The virus spreads to livestock through infected midges, which are small biting flies.

D. Scott McVey, supervisory veterinary medical officer and research leader for the Arthropod-Borne Animal Diseases Research Unit, or ABADRU, is one of the researchers studying the virus and its genetic and immunological relationship to cattle, sheep and goats. ABADRU is a research unit of the U.S. Department of Agriculture's Agricultural Research Service. McVey and colleagues are developing ways to diagnose and control the virus in the BRI's isolated and secure high-containment laboratories.

The virus was first reported in Germany in November 2011. Although it is currently isolated to Western Europe, the disease is rapidly emerging in new countries and is causing considerable losses to European livestock. It has currently been detected in Belgium, France, Italy, Luxembourg, the Netherlands, Spain, Switzerland and the United Kingdom.

"While there have not been cases recorded outside of Europe, we've seen the disease spread quickly throughout that region in less than a year," McVey said. "That's a major concern, especially if it starts appearing in other continents. We're working to protect the U.S. should this threat become a global problem for animal health and the world economy."

McVey is collaborating with fellow ABADRU scientist William Wilson, as well as Juergen Richt, a Regents distinguished professor at Kansas State University and Kansas Bioscience Authority eminent scholar. In July 2012, the Center of Excellence for Emerging and Zoonotic Animal Diseases, which Richt directs, was awarded more than $860,000 from the Kansas Bioscience Authority to support research and countermeasures for the Schmallenberg virus. Richt and Wilson are the principal investigators on this grant. □



Pathogen: exotic bluetongue

BARBARA DROLET

Research microbiologist and adjunct faculty member of diagnostic medicine and pathobiology

AFFILIATION
Arthropod-Borne Animal Diseases Research Unit, a unit of the U.S. Department of Agriculture's Agricultural Research Service; Kansas State University's College of Veterinary Medicine

EDUCATION
Doctorate in viral genetics, Oregon State University; master's degree in pathobiology and bachelor's degree in microbiology, University of Wyoming

RESEARCH INTERESTS
Insect-transmitted diseases of livestock and wildlife, virus-vector-host interactions, role of insect saliva on arbovirus transmission and host immune response to infection

HONORS AND AWARDS
U.S. Department of Agriculture Agricultural Research Service Annual Merit Award, 2003 through 2011; Leadership Kansas Class of 2012

BRI PROJECT FUNDING
U.S. Department of Agriculture

Protecting the US livestock industry

Researchers at Kansas State University's BRI are studying an insect-transmitted disease that can be fatal to some animals.

They are investigating the biological relationships among exotic bluetongue virus, insects that transmit the virus and infected ruminant animals, which are grazing animals like sheep, goats and cattle. The researchers include Barbara Drolet, a research microbiologist with the Arthropod-Borne Animal Diseases Research Unit, or ABADRU, which is a unit of the U.S. Department of Argriculture's Agricultural Research Service, and a team from ABADRU. The research provides a better understanding of the genetic and immunological factors that make animals susceptible to the disease.

Bluetongue virus can kill sheep and other ruminant animals. Midges, which are small biting flies, spread the disease when they bite an infected animal and pass it to another animal.

About 26 different bluetongue viruses exist, and the disease is found everywhere in the world except Antarctica. More outbreaks are expected as temperatures continue to increase throughout the world. Bluetongue virus is a constant threat to America's livestock.

"Although this disease does not affect humans, an outbreak would have a catastrophic effect on our economy and trade with other countries," Drolet said. "This research will help protect farmers and their animals."

The name — bluetongue virus — derives from the fact that in severe cases, swelling in the head and neck can cut off circulation to the tongue, turning it blue.

Researchers are studying how the virus interacts with insects and animals at the BRI. The BRI provides isolated and secure high-containment laboratories and allows scientists to safely study all three components of arthropod-borne livestock diseases: the viruses, the insects that transmit them and the animals they infect.

ABADRU researchers include Lee Cohnstaedt, D. Scott McVey, Dana Nayduch, Mark Ruder and William Wilson. They are collaborating with Kansas State University and Colorado State University. □

The ties that bind

Scientists and organizations collaborate at the BRI to find common threads with food-borne pathogens, animal and infectious plant disease research, education and training.

U.S. Department of Agriculture

Funds Rift Valley fever vaccine studies as well as research on wheat blast and exotic bluetongue. The department also funds a $25 million Agriculture and Food Research Initiative Coordinated Agricultural Project that involves Kansas State University and focuses on collaborative research to reduce the occurrence and public health risks from Shiga toxin-producing E. coli.

Arthropod-Borne Animal Diseases Research Unit

Uses the BRI's containment laboratories for projects to study Rift Valley fever and bluetongue disease, which are transmitted by blood-sucking insects like mosquitoes and midges. The unit is part of the U.S. Department of Agriculture's Agricultural Research Service.

Center of Excellence for Emerging and Zoonotic Animal Diseases

Develops countermeasures for emerging high-priority animal diseases that can spread to humans; develops vaccines to combat diseases like highly pathogenic avian influenza and the pandemic H1N1 virus. The center partners with the U.S. Department of Homeland Security and the U.S. Department of Agriculture.

Kansas State University colleges and departments

Many BRI researchers are also Kansas State University faculty members in the College of Agriculture — including the departments of animal sciences and industry and plant pathology — and the College of Veterinary Medicine — including the departments of anatomy and physiology, clinical sciences, and diagnostic medicine and pathobiology.

Comparative Medicine Group, part of Kansas State University's Research Compliance Office

Provides animal care and veterinary oversight for several projects.

Veterinary Diagnostic Laboratory, part of Kansas State University's College of Veterinary Medicine

Offers diagnostic services and data to BRI researchers for food-producing animals.

U.S. Department of Defense

Funds research on Shiga toxin-producing E. coli.

U.S. Army Natick Soldier Research Development and Engineering Center

Funds food safety project for deployed troops to determine safety of food rations. The center is part of the U.S. Department of Defense.

National Bio and Agro-Defense Facility

BRI projects will jump-start some research planned for the federal facility once it is operational. NBAF and BRI scientists will work together closely.

Kansas Bioscience Authority

Supports BRI researchers in developing vaccines for Rift Valley fever, porcine reproductive and respiratory syndrome virus, and Schmallenberg virus. Enhances research and educational capabilities and supports BRI program expansion, including NBAF transition projects.

National Institutes of Health

Supports research on pandemic H1N1, among others.

U.S.-China Center for Animal Health

Uses BRI scientists' findings in animal disease research to accelerate the U.S. and Chinese animal health industries. Researchers with the center are working in the BRI to develop a vaccine for porcine reproductive and respiratory syndrome virus.

U.S. Department of Homeland Security

Funds new developments in Rift Valley fever research.

National Agricultural Biosecurity Center

Uses research data generated by BRI scientists to expand its information network, which contains research and training about agricultural security for scientists; directs research on food safety and security.

National Animal Health Laboratory Network

Provides laboratories and facilities to train network personnel on how to complete rapid diagnostic testing.

NanoScale Corp.

Uses the BRI to develop a novel chemical or biological agent containment pouch.

National Center for Foreign Animal and Zoonotic Disease Defense

Supports classical swine fever research.

Hao Vu, BRI biosafety specialist, leads an interactive learning activity at Kansas State University's annual open house.

Janet Napolitano (left), U.S. Secretary of Homeland Security, and Kathleen Sebelius, U.S. Secretary of Health and Human Services and former governor of Kansas, visit the BRI to discuss preventing bioterrorism in America's food supply.

Scott Rusk (left), director of Pat Roberts Hall, and Stephen Higgs, BRI research director, provide a tour of Pat Roberts Hall to Robert Gates, former U.S. Secretary of Defense.

Catherine Woteki, U.S. Department of Agriculture Under Secretary for Research, Education and Economics, leads a presentation at BRI.

A valued neighbor

BRI DEDICATED TO SERVING REGION

The BRI operates with the greater community in mind — the same way it has from its inception.

When the idea for the BRI came about in 1999, Kansas State University officials held open forums to listen to voices from the general public and campus community.

Today, the BRI's commitment to the community extends beyond operating a safe and secure facility. The institute is dedicated to outreach, education, professional development and economic growth.

The BRI serves as a cornerstone in Kansas State University's positive relationship with the community. The Princeton Review continues to rank the university among the top in the nation where campus and community relations are great.

COMMUNITY OUTREACH

Every year the BRI hosts a behind-the-scenes look at the institute during the university's open house, a family-friendly event that attracts 20,000 people to campus with exhibits, entertainment and food.

The day often includes presentations and virtual tours of the BRI, giving visitors the chance to learn more about biosafety levels. Visitors try on safety gear, learn about biocontainment operations and maintenance, and find out what it takes to work in a biocontainment facility.

Throughout the year, BRI staff members also give presentations and tours to community groups such as the local Rotary Club; Meadowlark Hills retirement community; Kansas Farm Bureau; Manhattan, Kan., Chamber of Commerce; and university faculty, students, staff and alumni.

"It's important that the university community and general public know about the research going on at the BRI," said Stephen Higgs, research director of the BRI. "Our goal is to always operate in a spirit of openness so that we can continue to have the community's trust."

PREPARING FUTURE SCIENTISTS

The BRI reaches out to school districts to help educate children and teachers. BRI staff members give tours to school organizations, including local chapters of the National FFA Organization and area high school classes.

Staff members have hosted workshops on emerging zoonotic diseases and biosafety levels for secondary school teachers on the university's Olathe, Kan., campus in the Kansas City metropolitan area.

"We want to help inspire students to become interested in science, research and learning," Higgs said. "These students could very well be the next scientists conducting BRI research that helps protect plant, animal and human health."

SHAPING FUTURE RESEARCH

The BRI is guiding future research that will keep animals and food safe. For instance, scientists from around the world visited the BRI in 2012 to update one another on African swine fever, a contagious viral disease that has appeared in Africa, Spain, Italy, Russia and the Dominican Republic.

Scientists from Spain, Kenya, Australia, Russia, the United Kingdom and Canada participated in a BRI symposium about the disease.

The BRI also helps train the next generation of researchers. Several Kansas State University students earn opportunities to assist with the institute's research projects and enhance their career prospects.

SAFETY COLLABORATION

BRI staff members and researchers work with local response teams, including Riley County Police Department, Riley County Emergency Medical Services, Manhattan Fire Department, Mercy Regional Health Center and Kansas State University Police Department.

The teams collaborate to form incident response plans and perform emergency exercises to prepare for any incidents. Response teams have toured the BRI and regularly attend biosecurity and biosafety training.

"The BRI has an ongoing partnership with local responders," Higgs said. "We continue to work with them so that everyone is prepared to deal with medical events."

FUELING ECONOMIC GROWTH

The BRI is a major player in the Kansas City Animal Health Corridor that extends from Columbia, Mo., to Manhattan. The corridor is home to the single largest concentration of animal health companies and related entities in the world. The corridor is a contributing factor to the region's growth and success.

BRI staff members participate in gatherings focused on the growth of biotechnology sectors in the area and meet with companies interested in research partnerships at the BRI and Kansas State University.

In addition, the BRI works with the Kansas State University Institute for Commercialization, the commercialization agent for the university's research foundation. The institute assists in the advancement and growth of companies, and revenues are directly reinvested into the university and regional economy.

"We pride ourselves in working closely with local, university and state leaders to secure the future of our region," Higgs said. "It's our responsibility to be a strong asset to our community, and advancing economic growth is just another way the BRI is making a difference in Manhattan and Kansas." □

Tim Huelskamp, U.S. Representative of Kansas, addresses the media at the BRI.

U.S. Rep. Kevin McCarthy of California (left) stands with Stephen Higgs, BRI research director, and U.S. Rep. Lynn Jenkins of Kansas at the BRI.

Securing the future

UNIVERSITY LEADS FOOD SCIENCE AND ANIMAL HEALTH RESEARCH

Infectious plant and animal diseases may be some of the biggest challenges for America. However, Kansas State University's BRI is on the front lines in this microscopic battlefield.

"I believe the BRI is making America safer," said Stephen Higgs, BRI research director. "We are conducting work critical to food safety and crop safety, and using education to develop the new generation of experts in these fields. We are preparing the U. S. to respond more effectively for these emerging diseases."

In addition to its integral role in disease research, the BRI is helping kick-start the federal government's premier biosafety level-3 agriculture and biosafety level-4 research facility: the National Bio and Agro-Defense Facility, or NBAF.

But the beginning of NBAF does not mean an end to research at the BRI. Instead it means new opportunities for scientists and industry, Higgs said.

While continuing to advance research at the university, the BRI will begin collaborative studies with corporations and industries. This will accelerate commercial breakthroughs in disease resistance and food safety.

"Right now we are continuing to increase our expertise and build upon our reputation so that when the requests come in asking if we can help with an important research project, we can say, 'Yes, we can do it,'" Higgs said.

CHANGING OF THE GUARD

The U.S. Department of Homeland Security plans to phase out the aging Plum Island Animal Disease Center — a major animal disease research facility in New York — with NBAF in Manhattan, Kan. NBAF is under construction on the Kansas State University campus and adjacent to the BRI, creating a collaborative environment.

During NBAF's construction, some studies that will complement those at Plum Island will be undertaken at the BRI. University and federal scientists will develop complementary projects and use them to launch research at NBAF once it opens.

"Essentially the BRI is going to be a springboard to get some NBAF research going as soon as possible," Higgs said. "As Plum Island ramps down, we are making sure that there is not a drop-off in research and training on these pathogens."

Higgs said this is important because the nation cannot afford to have a period when work is not being done on these diseases.

Scientists at both institutions are working closely, and Kansas State University scientists will begin projects related to pathogens studied at Plum Island, including classical swine fever and African swine fever. Several Kansas State University scientists, including Higgs, also have visited Plum Island.

At Plum Island Higgs discussed the research transition and transboundary animal diseases — which occur in multiple countries and are capable of being carried to new countries.

"Moving more aspects of projects from Plum Island to the BRI really opens up new possibilities for infectious disease research at the university that haven't been possible in the past," Higgs said. "These are high-priority pathogens of major concern because they are a threat to our agricultural system and health. I really see this as being a whole new era at Kansas State University." □

Tom Vilsack (left), U.S. Secretary of Agriculture; Lynn Jenkins, U.S. Representative of Kansas; Pat Roberts, U.S. Senator of Kansas; and Kirk Schulz, president of Kansas State University, stand in front of the future site of the National Bio and Agro-Defense Facility.

The future site of the National Bio and Agro-Defense Facility.

ABOUT THE NATIONAL BIO AND AGRO-DEFENSE FACILITY

- NBAF will be the U.S. Department of Homeland Security's foremost animal disease research facility.
- NBAF scientists will study pathogens classified up to biosafety level-4, the highest designation for infectious diseases and exotic agents.
- The Manhattan, Kan., location is at Kansas State University and allows for veterinary, agriculture and biosecurity collaboration and expertise.
- NBAF researchers will use the BRI for some biosafety level-3 research.

OUR LEADERSHIP

STEPHEN HIGGS
Started at the BRI: 2011

Research director of the BRI
Associate vice president for research
Virginia and Perry Peine biosecurity chair

"An important aspect of the BRI to Kansas State University is its unique combination of multidisciplinary research and educational capabilities all under one roof. Since these are available to faculty, staff and students from many departments and colleges, we can facilitate collaborative work that gives Kansas State University a competitive advantage over academic institutes when we apply for grants and contracts."

BRI RESPONSIBILITIES
Manages and grows BRI research programs; oversees delivery of BRI's biosafety, biosecurity and biocontainment education programs; leads Kansas State University's interdisciplinary agrosecurity initiatives and develops relationships with public and private-sector entities nationally and internationally to initiate collaborative research, education and training; leads the university's interactions with federal agencies to facilitate National Bio and Agro-Defense Facility research at the BRI

EDUCATION
Doctorate in ecological parasitology, Reading University; bachelor's degree in zoology, King's College, London University

PREVIOUS EXPERIENCE
Adjunct professor, department of pathology, University of Texas Medical Branch, 2011 to present; professor, department of pathology, University of Texas Medical Branch, 2006 to 2011; director, experimental pathology graduate program, department of pathology, University of Texas Medical Branch, 2006 to 2011; director, BSL-3 insectary, Center for Biodefense and Emerging Infectious Diseases, University of Texas

JULIE JOHNSON
Started at the BRI: 2006

Biosafety officer
Assistant vice president for research compliance and responsible official for campus select agent program

"One of the ideas that makes the BRI different from a noncontainment laboratory is our annual training program. You can't engineer out human mistakes, but if we continuously train people, we can ensure that we are safe and secure facility."

BRI RESPONSIBILITIES
Coordinates animal care; manages laboratory support services; oversees safety programs; coordinates internal biosafety and biosecurity training programs for the institute; and coordinates with campus safety programs to ensure the institute's compliance with all applicable safety regulations and guidelines

EDUCATION
Doctorate in molecular, cellular and developmental biology, Iowa State University; master's degree in biochemistry, Iowa State University; bachelor's degree in chemistry, St. Olaf College

PREVIOUS EXPERIENCE
Responsible official for select agent use, Iowa State University, 1997 to 2006; biosafety officer, Iowa State University, 1996 to 2006; co-chair, Iowa Biosecurity Council, 2003 to 2006

SCOTT RUSK
Started at the BRI: 2006

Director of Pat Roberts Hall

"The BRI provides new opportunities for enhanced research programs at the university. The biocontainment capabilities are unique, which contribute to continued growth and leadership in the areas of agriculture and public health."

BRI RESPONSIBILITIES
Coordinates policy development and management of biocontainment operations in support of the BRI research programs; manages and supervises operational support programs for security, information technology, business office and biocontainment performance of the facility; works closely with the BRI research director, biosafety officer and principal investigator teams in planning research program needs; contributes to training and education program development and delivery

EDUCATION
Master's degree in veterinary microbiology and preventive medicine, Iowa State University; bachelor's degree in biology, University of Northern Iowa

PREVIOUS EXPERIENCE
Associate director and operations manager, BRI, Kansas State University, 2006 to 2007; biocontainment operations and management specialist, Flad Architects, 2003 to 2006; assistant center director, U.S. Department of Agriculture National Animal Disease Center, 1999 to 2003

JIM STACK
Started at the BRI: 2006

Director of the BRI, 2006-2008
Professor of plant pathology
Director of Great Plains Diagnostic Network

"The Biosecurity Research Institute at Pat Roberts Hall is a unique, world-class research facility where scientists develop an understanding of, and mitigation measures for, the organisms that threaten ecosystem health and human well-being."

BRI RESPONSIBILITIES
Was responsible for research and education programs and facility staff; continues supervising funded research at the BRI

EDUCATION
Doctorate in plant pathology, Cornell University; master's degree in plant pathology, University of Massachusetts; bachelor's degree in plant pathology, University of Massachusetts

PREVIOUS EXPERIENCE
Professor, department of plant pathology, Kansas State University, 2006 to present; director, Great Plains Diagnostic Network, Kansas State University, 2004 to present; director, Biosecurity Research Institute, Kansas State University, 2006 to 2008

BETH MONTELONE
Started at the BRI: 2008

Interim director of the BRI, 2008-2011
Associate dean of the College of Arts and Sciences
Professor of biology

"The BRI's unique biocontainment capabilities provide scientists with opportunities to do research that can be done in few other places or nowhere else at all. The BRI is important to Kansas State University because it is helping the university become a center for infectious disease research with particular importance to agriculture."

BRI RESPONSIBILITIES
Recruited and supported scientists and research projects; further developed education and outreach efforts; works with outreach and education for funded research at BRI

EDUCATION
Doctorate in biology, University of Rochester; master's degree in biology, University of Rochester; bachelor's degree in biology, Rensselaer Polytechnic Institute

PREVIOUS EXPERIENCE
Co-director, Women in Engineering and Science Program, Kansas State University, 2010 to 2011; interim research director and Peine professor of biosecurity, Biosecurity Research Institute, Kansas State University, 2008 to 2011; associate dean, College of Arts and Sciences, Kansas State University, 2004 to present

ADVISORY BOARD

GUY PALMER
Guy Palmer is the Creighton chair and director of the Washington State University School for Global Animal Health and the Regents professor of pathology and infectious diseases. Palmer's goal is to improve the control of animal diseases with direct impact on human health and well-being. He currently directs a multi-institutional research effort studying genetic change in microbial pathogens and the risk for shifts in disease pattern and emergence.

JAN SARGEANT
Jan Sargeant is the director of the Centre for Public Health and Zoonoses at the University of Guelph in Ontario, Canada. Sargeant has performed research in areas of agri-food public health, policy research in microbial food safety, perception of risk of gastrointestinal illnesses, food and water safety, and the role of veterinary medicine in public health. She is developing a research agenda focused on policy and outcome evaluation issues in the prevention of zoonotic disease.

ALFONSO TORRES
Alfonso Torres is the associate dean for public policy in the College of Veterinary Medicine at Cornell University. Torres was the deputy administrator for Veterinary Services of the U.S. Department of Agriculture Animal and Plant Health Inspection Service and U.S. chief veterinary officer and delegate to the World Organization for Animal Health. Torres was the director of Plum Island Animal Disease Center from 1996 to 1999, following three years as chief of the Foreign Animal Disease Diagnostic Laboratory there.

BEHIND THE SCENES

BRI staff

Facilities engineering group

Information technology group

Administrative group

Education officer

Research support group

Security group

Support staff essential to BRI

They oversee critical biocontainment systems and coordinate complex research support logistics.

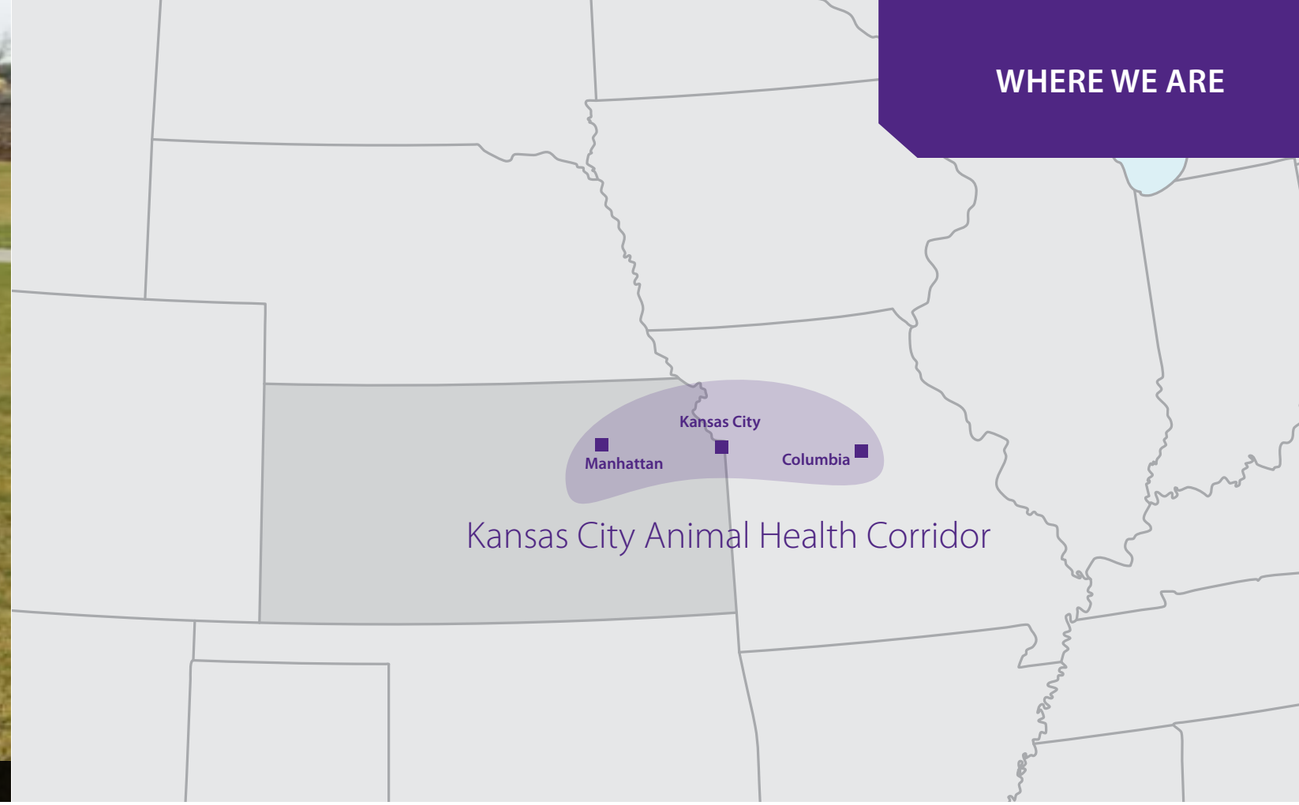
The BRI support staff members are integral to the research center, and they ensure the building remains safe, secure and operational. These employees also complete safety-training courses.

"Without our outstanding support staff, high-level research on food safety and animal health would not be possible," said Scott Rusk, director of Pat Roberts Hall, home of the BRI. "Our world-class support staff matches the world-class scientists who conduct research here. We all uphold the values of teamwork, excellence, diversity and respect."

Support staffing areas include:

- Administrative
- Facilites engineering
- Information technology
- Research support
- Security
- Education and training

WHERE WE ARE



A local look

The BRI is nestled in a prime area for research and big ideas. Take a closer look at the campus, city and region.

A RESEARCH LEADER

Kansas State University is a leader in animal health and food safety research, and is home to one of the nation's best veterinary schools. U.S. News and World Report ranks the university as one of the Top 75 public colleges in America. More than 24,300 students from all 50 states and more than 100 countries attend the university. Kansas State University is a national leader among public universities in its total of Rhodes, Marshall, Truman, Goldwater and Udall scholarship winners.

LOOKING FORWARD

K-State 2025 is an aggressive strategic plan by Kansas State University to become a Top 50 public research university by 2025. One of the plan's goals is to further boost research activity at the university.

BIG IDEAS IN A CLASSIC COLLEGE TOWN

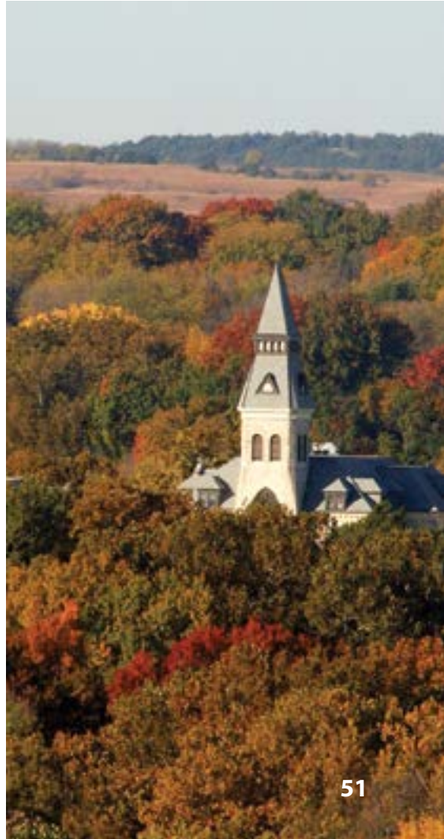
Manhattan, Kan., rates as one of the best college towns in the U.S. Business Facilities magazine ranks Manhattan the No. 2 place in America for economic growth potential, citing research activity as a reason why. Manhattan is the best small place in the country for business and careers, according to Forbes magazine.

ANIMAL HEALTH CONCENTRATION

Kansas State University and Manhattan help anchor the world's largest concentration of animal health companies that stretches from Columbia, Mo., to Manhattan. These animal health companies in the Kansas City Animal Health Corridor generate more than a third of the global sales for the $19 billion animal health industry.

GETTING HERE

Manhattan is easily accessible via main interstates and highways. Located off of Interstate 70, Manhattan is about a two-hour drive from Kansas City, Mo. The Manhattan Regional Airport offers daily commercial flights to and from Chicago and Dallas.



LEARN MORE ABOUT THE BRI

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