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Researchers Sequence Bat Genomes, Gain Insights That Could Be Used to Mitigate Viral Infections in Humans

SILVER SPRING, Md. – A team of researchers from the Naval Medical Research Center ([NMRC](#)) worked with international partners to sequence the genome of two bat species. This sequence data could eventually be used to mitigate viral infections in humans and lead to vaccines for deadly viruses. The study was published, December 20, 2012, online in *Science*.

Over the past decade and longer, bats have been implicated as reservoirs of a number of deadly viruses. Until recently, little was known of the

bat's immune system or why bats can carry viruses like Nipah, Hendra, Ebola and others that kill mammals like horses, cats and humans and yet not get sick.

"We sequenced the entire genome of two very different bats and did comparisons between the two and with other mammals," said Dr. Kimberly Bishop-Lilly, deputy head of NMRC's Biological Defense Research Directorate Genomics Program. "We found that there are some key differences in genes that affect the bat's

(Continued on page 4)



BDRD Genomics Department, from left: Kimberly Bishop-Lilly, Jimmy Griffin (back), Regina Cer (front), Cassie Redden, Kathleen Verratti, Lt. Vishwesh Mokashi (back), Biswajit Biswas, Matthew Henry (front), Kenneth Frey (back), Truong Luu, Javier Quinon.

NMRC Commanding Officer's Message

Readiness, Value, Jointness - Navy Medicine's Strategic Priorities.

2013 started with significant anxiety about the "fiscal cliff," sequestration and the potential impact of these national budgetary concerns on Navy Medical Research. It appears we have pulled back from the cliff, but decisions about sequestering a large portion of the DoD budget have only been pushed off for two months, and the likelihood of additional funding cuts and operational restraints is increasing. These fiscal realities should not cause us to panic about the future of Navy Medical Research, but should make us examine how we are doing business and increase our focus on one of Vice. Adm. Nathan's strategic priorities in the Navy Medicine business plan: VALUE. The value of a product or activity is not just a function of its cost but also of its worth or benefit.

It is safe to say sailors and Marines continue to reap many benefits from Navy Medicine's biomedical research. Recent projects have ranged from cataloguing and characterizing the health of deployed personnel, allowing for the development of risk reduction models; to the development of vaccines to prevent infectious diseases; to the application of biomedical markers of a patient's immune response to guide surgical treatments of combat wounds. Work on disorientation, fatigue and environmental exposures provide specific benefits in reducing mishaps and minimizing the potential risks of deployment. Collaborations with partners around the world are allowing us to detect and respond to infectious disease threats earlier. These research successes not only protect, treat and rehabilitate our warfighters, but also represent a force multiplier and are having an impact on national security and global health.

As we move into 2013, we need to recognize that there are going to be budgetary and operational challenges, but we also need to stay focused on the opportunities we have for conducting meaningful, beneficial research. With a sustained commitment to research and collaborations, important scientific findings and technological advances can be translated into products for the fleet and the general population. We'll pay attention to budgetary realities, but we should not get distracted by them. Let's continue to focus on the work. Within that success lies our value.

NMRC Commanding Officer sends,
John W. Sanders III, CAPT, MC, USN



NAMRU-2 Commanding Officer's Message

Greetings from sunny Hawaii, NAMRU-2 Pacific's temporary home since summer 2010! For those in Navy Medicine unfamiliar with NAMRU-2, we are the "nomadic" lab. Since our relocation to Hawaii, we have made significant progress towards our next move - back to Southeast Asia. We have more work to do, but I am confident that by this time next year, NAMRU-2 will be celebrating the holidays at our newest home (and seventh headquarters location) in Asia.

Of the three OCONUS medical research units, NAMRU-2 is the oldest NAMRU currently operating. NAMRU-2, commissioned at the Rockefeller Institute, New York, June, 23 1944, began a circuitous path through several countries in East and Southeast Asia. Following NAMRU-2's establishment, the unit was relocated to Guam in January 1945 to study infectious diseases affecting U.S. servicemembers engaged in the battle for the Pacific. The unit was disestablished in September 1947 and reestablished in 1955, this time in Taipei, Taiwan. NAMRU-2 stayed in Taipei for the next 24 years. During the Taiwan years, NAMRU-2 operated laboratory detachments in Manila, the Philippines; a detachment in Da Nang, Vietnam; and a detachment in Jakarta, Indonesia. In 1979, following the U.S. recognition of the People's Republic of China, NAMRU-2's headquarters moved from Taipei to Manila, where it remained until 1991. In early 1991, amid growing concerns regarding the security of U.S. personnel in the Philippines, NAMRU-2 moved once again, this time to Jakarta, Indonesia, leaving a detachment in the Philippines which remained operational until June 1994. (A detachment had been in place in Jakarta since 1970.) NAMRU-2 would call Jakarta home for the next 21 years. While in Jakarta, detachment laboratories were opened in Phnom Penh, Cambodia and in Singapore, both currently operational. Following growing political challenges in Indonesia, NAMRU-2 ceased operations June 10, 2010, and relocated to the naval base at Pearl Harbor, Hawaii, where we currently operate. Hawaii was always intended as a temporary site while command personnel work with Navy Medicine leadership and the U.S. Pacific Command to find our next home.

NAMRU-2 is poised again to wander to its seventh home, where we will continue our significant and important mission of studying infectious disease threats of military importance and developing interventions to mitigate those threats within U.S. Pacific Command's area of operations.

CAPT G. B. Schoeler, MSC, USN
Commanding Officer, NAMRU-2 Pacific



President's Cambodia Visit Means Long Hours for NAMRU-2

From NAMRU-2 Public Affairs

PHNOM PENH, Cambodia – Personnel from the U.S. Naval Medical Research Unit No. 2 Detachment Phnom Penh ([NAMRU-2 Det PP](#)) supported the East Asia Forum in Phnom Penh, Cambodia, November 19-20, 2012. The East Asia Forum provides a platform for discussions on Asian economic and public policy for leading experts on the region. The visit by President Barack Obama marked the first-ever visit by a sitting U.S. President to Cambodia.

While the visit by President Obama, Secretary of State Hillary Clinton, and Secretary of Defense Leon Panetta along with numerous high-ranking U.S. governmental officials, was short, the lead-up to the event involved thousands of man-hours of preparation by the NAMRU-2 Det PP and U.S. Embassy staff. NAMRU-2 Det PP personnel also had the opportunity to attend the meet-and-greet event with President Obama.

NAMRU-2 Det PP staff served a variety of functions during the East Asia Forum. Cmdr. Steven Newell, lab director, served as the POTUS (President of the United States of America) bilateral control officer working with White House staff in the preparation of the designated U.S. bilateral meeting spaces inside the Peace Palace (Royal Cambodian Government, offices of



President Obama meeting the children of NAMRU-2 Det PP families at the meet and greet.

Prime Minister Hun Sen). Cmdr. Ilin Chuang, medical officer, served as control officer for U.S. Ambassador to Cambodia William Todd to ensure not only Todd's attendance at each official gathering with proper clearance and access, but also to arrange screening, transportation and pre-positioning of vehicles in multiple locations. Lt. Michael Prouty, science officer, was an assistant Secretary of State bilateral control officer and was responsible for

the logistical preparations for the U.S. Secretariat meeting room. Lt. Gavin Ford, medical officer, assisted the medical liaison officer in the U.S. Embassy and spent time in the health clinic seeing patients in the days leading up to and through the visit. Ford was on call 24/7 during this period to respond to acute medical cases involving anyone in the traveling parties or the standing embassy community with the exception of pediatric cases.

NAMRU-3 Assists in Fighting Yellow Fever Outbreak in Sudan

SUDAN—An outbreak of Yellow fever in Sudan has resulted in a total of 732 cases of acute febrile illness and 165 deaths since early September 2012. In November, the Sudanese Ministry of Health formally requested urgent assistance from the World Health Organization (WHO). As a Collaborating Center for Emerging and Re-emerging Infectious Diseases and as a WHO reference laboratory for the Eastern Mediterranean Region, the U.S. Naval Medical Research Unit No. 3 ([NAMRU-3](#)) responded to this request to provide humanitarian assistance. Working in coordination with the U.S. Embassy Defense Liaison Office in Sudan, NAMRU-3 sent four locally employed staff to work with WHO and Ministry of Health teams in Khartoum. They provided laboratory confirmation of Yellow fever and flavivirus diagnostic training as well as training to conduct Yellow fever vector surveillance and control. The [\(Continued on page 13\)](#)



NAMRU-3's Rania Kaldas, far left, conducts molecular training. Photo by Dr. Alia Zayed.

Navy Researcher Receives International Achievement Award

From NAMRU-Dayton Public Affairs

DAYTON, Ohio - The International Society for Regulatory Toxicology and Pharmacology annually presents an award to an outstanding individual in recognition of contributions and achievements in the resolution of public environmental concerns with a specific interest in international scientific development in toxicology. The society recently hosted the 2012 awards ceremony in Washington, D.C. Dr. Gary Burin, Senior Managing Toxicologist of Technology Sciences Group Inc. (TSG), presented the society's 2012 International Achievement Award to Dr. Michael Gargas, Director of the Environmental Health Effects Research Directorate at the Naval Medical Research Unit-Dayton ([NAMRU-Dayton](#)). Gargas was given

the award for his career work in pharmacokinetics and its application in risk assessment for addressing environmental issues, both nationally and internationally.

Gargas is also an adjunct assistant professor in the Department of Pharmacology/Toxicology and the Department of Environmental Health at Wright State University. He has served on the editorial board of *Toxicology and Applied Pharmacology* and is an active member of the Society of Toxicology and the Society for Risk Analysis.

On learning of his award, Gargas said he felt privileged to be in the company of distinguished past recipients. This exceptional honor is a positive reflection on NAMRU-Dayton and the Navy Medicine research and development enterprise.



Dr. Michael Gargas (left) accepts the 2012 International Achievement Award from Dr. Gary Burin.

Gaining Insights That Could Be Used to Mitigate Viral Infections

(Continued from page 1)

immune system and the way it deals with DNA damage. These differences may have come about as a byproduct of the evolution of flight. For instance, we found differences in a gene called c-rel, which plays a role in the innate immune system and in DNA damage response, which is a target for virus interactions."

Researchers are beginning to see that there are some key differences between a bat's immune system and that of a human. The more they investigate those differences, the closer they will get to coming up with novel antiviral strategies for people.

Bishop-Lilly pointed out that bats are very ancient mammals and have some unique characteristics like flight, hibernation and echolocation. At the time the NMRC researchers began their work, only one bat genome sequence was available, the *Myotis lucifugus*, the little brown bat, which has not been shown to be a vector for any of the very deadly emerging viruses. The researchers then sequenced the genome of the giant flying fox, a kind of bat that has been shown

to carry those types of viruses, as well as the genome of another bat, *Myotis davidii*, and made a comparison to learn more about what gives the bat the ability to carry a deadly virus without getting sick.

"Genomic research is very valuable to biomedical research because all the traits that make up a person, essentially all the traits that influence a person's susceptibility to a given disease, are encoded in their genome," said Bishop-Lilly. "It is essentially the blueprint for health and diseases. The more we understand the genetic basis for health and diseases, the more possibilities there are for designing drugs to treat or prevent diseases. By studying how traits like the bat's innate immunity have evolved in the genome, we can come up with creative new ways to prevent or treat viral infections."

Collaborating with researchers from the Uniformed Services University of the Health Sciences in Bethesda, Md., the Australian Animal Health Laboratory, the Beijing Genomics Institute, the Wuhan Institute of Virology and the University of Copenhagen, the NMRC

team made significant progress. The results of the study, "Comparative analysis of bat genomes provides insight into the evolution of flight and immunity," have been published in *Science* online.

"This study opens the door for further investigation into the relatively unique biology of bats and how their bodies interact with microbes," said Bishop-Lilly. "Our hope is that other scientists can build upon these findings through further comparative genomics and that our findings together will hopefully lead to the design of antiviral drugs in the future."

There are a wide range of applications for genomic research, from discovering novel disease-causing microorganisms to characterizing individuals' genomes and coming up with specific therapies. At NMRC, researchers are currently using genomic research to address other areas as well by looking for biomarkers of bioweapons exposure in humans with the aim of developing new assays, characterizing strain collections, and developing bioinformatics pipelines to help make high-throughput sequencing fieldable.

NAMRU-3 Novel Coronavirus Diagnostic Support in Jordan

From NAMRU-3 Public Affairs

CAIRO - In collaboration with the U.S. Centers for Disease Control and Prevention (CDC), the World Health Organization (WHO), and the Jordanian Ministry of Health (MoH), the U.S. Naval Medical Research Unit No. 3 ([NAMRU-3](#)) is engaged in the regional response to the novel Coronavirus.

Since September 2012, nine cases of a newly identified severe acute respiratory syndrome (SARS)-like coronavirus have been reported in the Middle East. All patients were severely ill, and five died. Cases were initially reported in Qatar and Saudi Arabia. NAMRU-3 responded to an April 2012 request from Jordan's MoH and the regional WHO office to assist with a severe acute respiratory infection outbreak among health care workers at

Zarqa Hospital north of Amman, Jordan. Two NAMRU-3 laboratory technicians were dispatched to Jordan for diagnostic support. However, no etiologic agent was identified at the time.

After identification of the first novel Coronavirus cases in September 2012, Jordan's MoH shipped stored samples from the April 2012 disease cluster to NAMRU-3 for further testing. NAMRU-3 was instrumental in the retrospective diagnosis of the April 2012 cluster using newly developed CDC reagents. Researchers were able to confirm two cases with novel Coronavirus in this cluster. Jordan's MoH representatives were immediately notified of the results. Working closely with the Jordan's MoH, NAMRU-3 ensured timely reporting of the cluster by International Health Regulation

standards. Respiratory surveillance protocols at NAMRU-3 have been modified to include testing for the novel Coronavirus, and a retrospective analysis of all severe acute respiratory infection samples from the region is underway.

Dr. AbdelLatif Warikat of Jordan's MoH expressed his appreciation for the technical and training support given by NAMRU-3, saying, "This support has enabled the Ministry of Health to improve its labs and to perform unprecedented testing for detecting infectious and respiratory diseases." He added, "This cooperation has helped in creating a laboratory that helps in the early detection of several diseases, whose effect is to decrease the spread of infectious diseases and lessen their danger to public health."

Happy New Year from the NMRC Ombudsman!

I hope you had a nice holiday and had an opportunity to enjoy the season with family and friends. Personally, I always have a sense of renewal following the holidays and like many of us, I usually have a resolution for the new year. Be it big or small, each year I'm often looking to improve my fitness level, better organize my finances, or I have some other goal that meets the moment. Because fitness and financial goals are often targets for the new year, I wanted to share with you a few resources to help those resolutions stick.

The first resource comes from Military.com and includes tips on reaching that fitness level you have in mind this New Year. From recruiting friends for help to putting your resolution in writing, the eight straightforward pieces of advice from the article below are sure to get you off on the right foot.

<http://www.military.com/military-fitness/nutrition/make-your-new-years-resolutions-stick>

Perhaps your goal this year is a financial one. Financial success, in part, comes from managing your credit. If you are looking to get your credit under control in 2013, look no further. Military.com has an article entitled "5 Credit Resolutions to Make Before New Year". The link is below:

<http://www.military.com/money/personal-finance/credit-debt-management/5-credit-resolutions-to-make-before-new-year.html>

On a more sober note, late December brought the tragic news of a suspected suicide in Afghanistan of a Navy SEAL commander. Sad events like this remind us that we should all know the signs of stress that can lead to suicide. If you are unsure of what those signs are, take a moment to watch the new public service announcement posted on the White House's website. If you or someone you know may be contemplating suicide, help is available. Contact the Military Crisis Line through [Militarycrisisline.net](http://militarycrisisline.net) or by calling 1-800-273-8255, press 1. The Military Crisis Line is staffed by professionals who can help 24/7.

I wish you and your family a happy 2013 and I hope that the new year brings to you peace and happiness. For those of you who have had to endure this new year's celebration with a deployed loved one, your sacrifice has not gone unnoticed and I hope that the arrival of 2014 sees you reunited.

As always, if you are in search of other resources or assistance, please don't hesitate to contact me. I can be reached by phone at (301) 233-9789 or by email at NMRC.Ombudsman@gmail.com.

Have a Fine Navy Day!
Alexandra Mora
NMRC Ombudsman

U.S. Ambassador to Egypt Visits Minya University Hospitals

From NAMRU-3 Public Affairs

CAIRO - The U.S. Ambassador to Egypt Anne W. Patterson visited Minya University Hospitals November 25, 2012, as part of the "Program to Improve Quality and Safety of Healthcare in Egypt." The ambassador was able to see first-hand the U.S. Naval Medical Research Unit No. 3 ([NAMRU-3](#)) Global Disease and Detection Program's (GDD) project to improve quality and safety of healthcare in Egypt, which is supported through an inter-agency agreement between the U.S. Agency for International Development (USAID) and the Infection Control Unit/GDD at NAMRU-3.

The project assists the government of Egypt in ongoing efforts to establish a national surveillance program for hospital-acquired infections and antimicrobial resistance. The surveillance program will help hospitals implement prevention activities to reduce transmission of hospital infections and reduce morbidity and mortality of patients admitted to hospitals. The program is currently implemented at 28 hospitals in Egypt, including 93 intensive care units and 1,003 intensive care unit beds in five geographically representative governorates (Cairo, Alexandria, Minya, Luxor and South Sinai).

Upon arriving at the Minya University Hospital, Patterson was greeted by Prof. Dr. Abdo El-Labban, the director general of the Minya University Hospitals, and NAMRU-3's Dr. Maha Talaat. The hospital director gave an overview of the hospitals and acknowledged the



From left: U.S. Ambassador Anne Patterson, Minya Hospital nurse, and Dr. Mohamed Abdel Razeq. The nurse is showing the Ambassador how she uses the personal digital assistant (PDA) to enter data for patients suspected of having an infection as well as how the PDA acts as a decision support tool in the definitive diagnosis of infection. Photo by Christine Giallongo, USAID.

technical support provided by NAMRU-3 to develop a surveillance program for hospital-acquired infections, noting that Minya University Hospitals did not have an organized infection control (IC) program prior to the involvement of NAMRU-3. They also noted the excellent quality of the IC training programs developed and provided by NAMRU-3's GDD.

Patterson congratulated the administrators and staff of the hospital, stat-

ing that she had observed their obvious dedication to their patients. While visiting the hospital, she was able to see NAMRU-3's participation in developing the IC program in Minya University, recognizing the importance of safety of medical procedures, especially to prevent transmission of viral hepatitis in Egypt. Maha explained to her how important it was to empower nurses in the hospitals to promote IC and safety in the hospitals.

Lt. Cmdr. Stephen Lizewski Recruits NMRC Summer Interns

POTOMAC, Md.—[NMRC](#) participates in the Science and Engineering Apprenticeship Program (SEAP) and the Naval Research Enterprise Internship Program (NREIP), both of which are sponsored by the Office of Naval Research. SEAP and NREIP provide paid summer internships to high school or college students interested in performing research at NMRC or other Navy laboratories where research is conducted. Lt. Cmdr. Stephen Lizewski, the deputy department head of Malaria, has taken the reins of the SEAP and NREIP student programs at NMRC and has initiated a campaign to advertise SEAP to local high schools.

"Our goal is to have the largest and most diverse student population to apply for the SEAP and NREIP internships," said Lizewski. "The goal of SEAP and NREIP is to provide students with a hands-on, state-of-the-art research experience that might place students on a service path as a civilian or uniformed service member in the Navy."

Students who perform research during the summer months at NMRC will work with a mentor on a short project and present their results at a poster session at the end of the programs.

Navy Medicine Supports Global Biosurveillance Strategy

By Rachael Tucker, *health.mil*

As part of a federal biosurveillance initiative to counter threats from attacks involving biological agents, the spread of infectious diseases and food-borne illnesses, the Navy is conducting advanced research and coordinating resources at a new office for global health engagements.

In July 2012, the White House issued a National Strategy for Biosurveillance, which called for a collaborative international effort involving the Department of Defense, the World Health Organization (WHO), the U.S. Centers for Disease Control and Prevention and partner nations to gather, analyze and interpret data that can lead to early detection and response to biological threats to human and animal health.

DoD participation includes advanced biosurveillance research at the Naval Medical Research Center (NMRC) in Silver Spring, Md., in collaboration with a global network of Naval Medical Research Units in the Pacific, North Africa and Latin America.

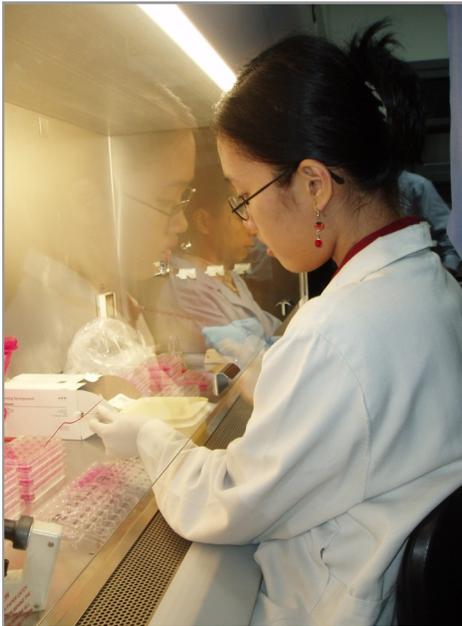
With 1,600 employees in eight labs around the world, NMRC and the NAMRUs have been progressing in vaccine production and testing, pandemic disease detection and prevention strategies and support for the development of a biosurveillance system in partner nations. Past Navy research efforts have demonstrated the value of biosurveillance.

In 2009, the [\[Naval Health Research Center\]](#) detected the H1N1 virus on the U.S.-Mexico border. “NAMRU-2, NAMRU-3 and NAMRU-6 played an integral role in tracking the spread of H1N1 and analyzing the environmental and climatic conditions that affect the spread of the virus,” NMRC commanding officer, Capt. John W. Sanders said.

A Department of Health and Human Services (HHS) report stated that H1N1 had the potential to become the deadliest pandemic influenza virus since 1968.

More recently, a Cambodian

outbreak of Enterovirus 71, which causes hand, foot and mouth disease, led to the death of more than 50 children. Sanders said that NAMRU-2 aided the Cambodian Ministry of Health in its response to the infectious disease.



NAMRU-2 lab. U.S. Navy photo.

The partnership between the Navy and the Cambodian Ministry of Health is just one among many global partnerships helping to strengthen biosurveillance worldwide. Building biosurveillance systems in both resource-limited and rich countries is a strategic imperative.

“In a country with very limited capacity, the NAMRU may start by helping local public hospitals design a systematic collection of samples and have samples sent to one of [NMRC’s] central labs to provide results while they build internal lab capacity,” Sanders explained.

The NAMRUs’ role varies from constructing biosurveillance systems in resource-deficient countries to supporting large-scale surveillance efforts in resource-rich countries. By developing and enhancing the biosurveillance systems of partner nations, the Navy ensures a more secure global response to infectious

diseases.

While NMRC and the NAMRUs are leading the biosurveillance research and development work globally, they are a part of the larger Navy Bureau of Medicine and Surgery’s (BUMED) 63,000 person enterprise.

In early 2012, in an effort to coordinate the Navy’s various global health operations, Vice Adm. Matthew Nathan, Navy Surgeon General and chief, BUMED, and Rear Adm. Michael H. Mittelman, deputy chief, BUMED and deputy surgeon general, envisioned an office where everything comes together.

The Navy Medicine Office of Global Health Engagement was chartered on October 1, 2012. Cmdr. Glen Diehl, special assistant to the surgeon general of the Navy, now heads the new office.

Diehl said the office serves to provide direct operational support to the warfighter; enhance “man, train and equip,” efforts so the research and development community, including NMRC and the NAMRUs, has the most capable staff; and synchronize communications strategy and policy across global health engagements.

Located at BUMED in Falls Church, Va., the Navy Medicine Office of Global Health Engagement is “uniquely poised to see across all of these lanes within Navy Medicine,” Diehl explained.

Diehl said he coordinates with health attachés throughout the DoD, HHS and WHO community and “brings back that information to the Naval enterprise and Dr. Woodson [assistant secretary of defense for Health Affairs]” to keep everyone informed and engaged in the current operations.

The Navy Medicine Office of Global Health Engagement and the research organizations, NMRC and the NAMRUs, not only support the White House’s strategy for biosurveillance, but also the other military services in a larger global health mission to secure health and safety worldwide.

NMRC Trains Biological Detection Team at Air Force Base

By Senior Airman Benjamin Wiseman, 36th Wing Public Affairs

ANDERSEN AIR FORCE BASE, Guam – “Out of sight; out of mind” is never the policy of the 36th Medical Group lab detection team, who work year-round to ensure Airmen here are always prepared in case of a biological attack or a medical epidemic.

The 36th MDG lab technicians take proficiency exams to stay current on training for biological attacks or a medical epidemic. The proficiency test examines not only the technician, but the entire detection process.

Every lab technician is required to take a hands-on test and a written test for identifying agents. Each quarter, the lab technicians rotate to take the proficiency test. This ensures everyone in the laboratory is able to identify and process biological agents.

“This process is not like riding a bicycle or tying your shoe. It is not that simple,” said Maj. Philip Bossart, 36th MDG Diagnostic and Therapeutic Flight commander. “If we don’t practice this process, a critical step might get forgotten or the wrong agent might be identified. A mistake would impact the base’s mission, its people and possibly the local community. This is why we train as seriously as we do.”

“If we don’t practice this process, a critical step might get forgotten or the wrong agent might be identified. A mistake would impact the base’s mission, its people and possibly the local community. This is why we train as seriously as we do.”

The testing process starts with unidentified biological agents being sent from the [Naval Medical Research Center](#) to Andersen, where lab technicians screen and identify the unknown agent.

“Luckily, the 36th MDG lab hasn’t encountered a real world situation here,” said Bossart. “But because of



Tech. Sgt. Anthony Lowman, 36th Medical Group biological detection team chief, prepares denatured biological samples during proficiency training. The 36th MDG laboratory is tested every quarter to ensure their personnel, equipment and identification procedure is proficient in case of a biological attack or medical outbreak. Photo by Senior Airman Benjamin Wiseman.

their training, we will be ready.”

With a recently acquired extraction kit, the bio-detection team can now identify a wide variety of biological agents and contaminants. The new kit allows them to rapidly identify the agent and give base leadership more time to respond in case of a medical epidemic or attack.

identify it in two to four hours. We then give base leadership the results, and they determine the course of action depending on the agent present.”

Denatured biological agents are used during the proficiency tests. These agents are safe to the user and the public, but still the team takes every precaution as if they were real.

“All agents are tested in a geographically separated containment area from the medical group that has its own contained ventilation system,” said Lowman. “This way the base is safe from any samples we may be testing.”

The biological detection teams advise Airmen to refrain from handling any possible biological agents.

“If you come upon a possible biological agent, whether it is white powder or something else, don’t collect a sample or bring it to the medical facility,” said Bossart. “Keep away, secure the surrounding area and call 911. Our emergency response professionals are trained to handle these types of hazards.”

NAMRU-San Antonio CO Meets Business, Research Community

From Naval Medical Research Unit-San Antonio Public Affairs

FT. SAM HOUSTON, Texas – One of the newest Navy senior officers in San Antonio had the opportunity to meet and get to know the local business and research community. Capt. Rita G. Simmons, the new commanding officer of Naval Medical Research Unit-San Antonio ([NAMRU-San Antonio](#)), received two invitations to speak to various groups soon after her arrival.

A local group of south Texas and San Antonio business members informally known as 'The Breakfast Club' invited Simmons to discuss NAMRU-San Antonio's mission. While gathering at a local restaurant, the group of 20 community leaders was surprised to learn there is a growing Navy presence as well as a premiere Navy Medical research and development facility in the Alamo city.

"It was great to get to know the community's business leaders and make them aware of the Navy community here," said Simmons after the



Capt. Rita G. Simmons (standing, left), NAMRU-San Antonio commanding officer, answers questions about the unit's mission and capabilities during a meeting of 'The Breakfast Club,' a group of San Antonio business and community leaders.

meeting. "We never know where our newfound connections could benefit one another. Some of the people at the meeting were ex-military and already had a familiarity with Navy Medicine's Research and Development Enterprise. Some were hearing about our mission for the first time."

"I thoroughly enjoyed Capt. Simmons' remarks and learned quite a bit," said Phil Bakke, a San Antonio real estate developer and one of the members of the group. "We really appreciated her taking the time to speak to us."

When Simmons visited a local research and development facility a few days later, NAMRU-San Antonio's capabilities were even more significant to the audience. Simmons presented the command's briefing to researchers and staff at the Southwest Research Institute (SwRI) during a Veterans Day ceremony. The 1,200 acre facility, with two million square feet of laboratories, welcomed Simmons as their keynote speaker for the audience of about 90 veterans and military supporters.

"SwRI was a great opportunity for me to showcase NAMRU-San Antonio and the Navy Medicine R&D Enter-

prise mission," said Simmons. "We've already seen prospects for cross-collaboration and information-sharing meetings to take place in the near future as a result of the SwRI meeting. They are very understanding of our mission to support the warfighter, since they already have many aerospace-related projects being conducted or planned."

"The Institute was delighted to have Capt. Simmons as guest speaker for our Veterans Day event. We were impressed with the work being done by the Navy in San Antonio and realized we have certain similar interests that we hope to explore," said Craig Witherow, Director of Communications and Business Development at SwRI. "Capt. Simmons was a fine speaker and represented the Navy well."

NAMRU-San Antonio's mission is to conduct medical, dental and directed energy biomedical research that focuses on ways to enhance the health, safety, performance and operational readiness of Navy and Marine Corps personnel and addresses their emergent medical and dental problems in routine and combat operations.



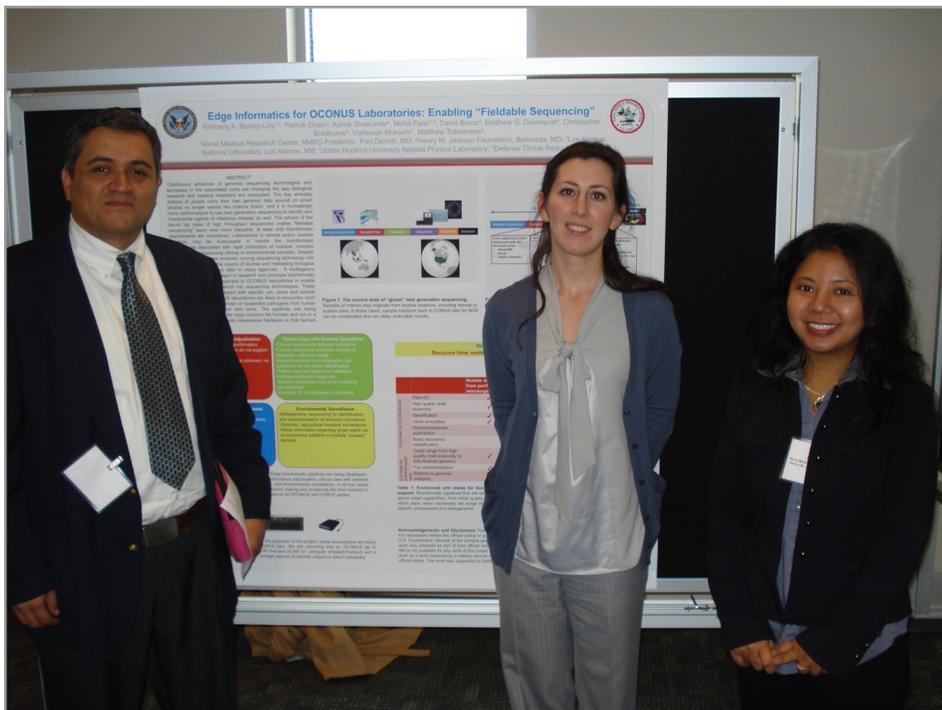
Capt. Simmons presents NAMRU-San Antonio's command briefing at the SwRI Salute to Veterans.

Genomics Researchers Present Poster at NICBR Symposium

FREDERICK, Md. – As part of the National Interagency Confederation for Biological Research (NICBR) Symposium and Workshop on bioinformatics, Naval Medical Research Center (NMRC) researchers presented a poster on efforts that could enable benchtop genomic sequencing in Navy Medicine's overseas laboratories in the not-so-distant future.

"Despite the inherent challenges involved, moving sequencing technology into the field and closer to the source of diverse and interesting biological samples is an attractive idea to many agencies," said Lt. Cmdr. Guillermo Pimentel, deputy director of NMRC's Biological Defense Research Directorate (BDRD).

Laboratories in remote or austere locations may be ill-equipped today to handle the bioinformatics requirements associated with rapid production of massive, complex datasets from sequencing clinical or environmental samples. As next-generation sequencing becomes commonplace, bioinformatic solutions become more complex. Now, through NMRC's fieldable program sponsored by the Defense Threat Reduction Agency, basic bioinformatic analysis may soon be available to the overseas laboratories. This means shorter turnaround time for



NMRC scientists presenting EDGE Bioinformatics poster at meeting. From left: Jesus Hererra, Dr. Kimberly Bishop-Lilly, and Regina Cer.

actionable information. For instance, agents of disease outbreaks in remote locations can be identified and characterized closer to the source. Less time spent on logistics, such as transport of highly infectious organisms, could mean less elapsed time between

notification of an outbreak and the receipt of actionable information, potentially saving lives.

"The day when millions of people carry their own genomic data around on smart phones no longer seems like *(Continued on page 13)*

NAMRU-2 Pacific Reflects on 2012, Anticipates the New Year

By Lt. Cmdr. Dustin Harrison

NAMRU-2 PACIFIC, Hawaii – During 2012 the U.S. Naval Medical Research Unit No. 2 (NAMRU-2) Pacific activities expanded quite significantly. We initiated projects in Vietnam, where we are evaluating malaria drug resistance and will be conducting acute respiratory illness surveillance. Studies continue to expand in Cambodia. We have also been funded for entomology work in Lao and Cambodia, so there should be no shortage of projects this year. As if that weren't enough, NAMRU-2 Det Phnom Penh even started a running club!

Although the proposed headquar-

ters move back to Southeast Asia has appeared at times to be moving at glacial speeds, significant progress has been made. Coinciding with a realignment within BUMED and standing up the M2 code, which is responsible for Navy Medicine research and development and headed by Rear Adm. Bruce Doll, progress for the relocation of the command has made great strides.

In 2012, we welcomed the arrival of several new members to the NAMRU-2 community. Capt. John Gilstad, Executive Officer, joined the headquarters. Lt. Mike Prouty and Lt. Gavin Ford joined the laboratory in Cambodia, and we said goodbye to Capt. Bill Rogers, who retired from the Navy after more than

20 years of exceptional service. Capt. (sel) Patrick Blair arrived in Singapore, and we bade farewell to Cmdr. Gary Brice, who transferred to the Naval Health Research Center, San Diego.

And last, but certainly not least, we found out we are losing our Commanding Officer, Capt. George Schoeler, who will leave us early in the new year to take on a new challenge as Deputy Director of the Medical Service Corps. Schoeler's replacement will be Capt. Carlos Lebron, a microbiologist with prior NAMRU-2 experience.

In all it has been a very good year for us out here in the Pacific and Southeast Asia. We wish you all the best for the new year!

NAMRU-3 Scientists are Guest Lecturers at Cairo University

From NAMRU-3 Public Affairs

CAIRO - For the fall semester in the Chemistry Department at Cairo University, two U.S. Naval Medical Research Unit No. 3 (NAMRU-3) staff members served as guest lecturers for an undergraduate biotechnology/biomolecular chemistry course in Biosafety and Genetically Modified Organisms. Dr. Hanan El Mohammady and Dr. Samar Tadros worked with the Cairo University Biotechnology Program Head, Dr. Kohar Garo, Professor of Zoology and a former research collaborator with NAMRU-3, and the program coordinator, Professor Dr. Ahmed Helmy Elwahy, to develop the course curriculum. The topics included general laboratory safety, introduction to biosafety, personnel protective equipment, good laboratory practices, containment, spills, disinfection-sterilization and waste management, ergonomics, bio-risk assessment, and genetically modified organisms (GMO). This course was a first for Egyptian undergraduate biotechnology/biomolecular chemistry majors.

Cairo University student Aya Farghally commented on her reasons for studying biotechnology. "Choosing biotechnology as a career was very challenging because of the lack of awareness we have in Egypt about it. Attending the Biosafety and GMO course this year was really very useful to me. I learned the basics of laboratory safety and how to control hazards



Dr. Samar Tadros (far right) with Cairo University students at the NAMRU-3 lab. Photo by Rafi George.

Disease Research Program laboratories in December to learn more about the biosafety requirements in the laboratories and how to make the biosafety elements the first protection barrier against infection.

El Mohammady, head of the Bacterial and Parasitic Disease Lab at

standards under which it accomplishes that mission."

After passing the final exam prepared by El Mohammady and Tadros, the students will receive special certificates from Cairo University for completion of the NAMRU-3 segment of the curriculum.

Tadros, the NAMRU-3 safety officer, said, "Before the course, students had some misconceptions about NAMRU-3, but after taking the course and visiting our lab, they better understand what NAMRU-3 is doing for Egypt. They also appreciated being welcomed by Capt. Oyofa [NAMRU-3 commanding officer] and started asking about possible job opportunities when they graduate."

Discussions are ongoing for the next step to develop the biosafety curriculum at Cairo University with plans to include further lectures and regularly recurring workshops with input from NAMRU-3 staff.

"NAMRU-3 does a lot of training inside and outside Egypt as part of our mission, but this course was a new experience for me...The students were also introduced to NAMRU-3, learning about its mission in the region and the standards under which it accomplishes that mission."

inside the lab environment, which will prevent it from harming the outer environment. I also learned professional lab practices and ergonomics that could really help me a lot in my career as a scientist."

The class of 41 fourth-year students also had the opportunity to visit NAMRU-3's Bacterial and Parasitic

NAMRU-3, said, "NAMRU-3 does a lot of training inside and outside Egypt as part of our mission, but this course was a new experience for me. I am pleased to share in this type of activity, especially getting to interact with the undergraduates. The students were also introduced to NAMRU-3, learning about its mission in the region and the

Jerry Morris, NMRC's Facilities Program Manager, Retires

By John Leconte

SILVER SPRING, Md.—Jerry Morris is a Vietnam veteran who served the U.S. for 36 years. For almost thirty of those years, he supported the global development and expansion



Jerry Morris (right) with the NMRC Commanding Officer.

of naval medical research.

Morris started working at the Naval Medical Research Institute in the Unmanned Undersea Research Program when it was located on the campus of the National Naval Medical Center, Bethesda, Md. His expertise in leading a team of engineers, designers and technicians in the construction of multiple unmanned hyperbaric research facilities utilizing hydrogen as the primary pressurization gas resulted in the successful demonstration of operations at a simulated depth of 4,000 feet of seawater. The findings of such research were groundbreaking.

He later served as the facilities program manager at the Naval Medical Research Center (NMRC). Morris played a key role in the successful execution of two congressionally mandated Base Realignment and Closure (BRAC) actions that had an impact on the command. Following the implementation of the complex realignment and closure actions required of the Department of Navy in BRAC 2005, Morris's leadership and effective management skills were recognized by the Commander, Naval Installations Command. Morris also led the planning and execution of the recapitalization of the laboratories in the U.S. and overseas and secured the funds for the construction and maintenance projects for the facilities. Morris retired from Civil Service at the end of December 2012.

Retirement Ceremony for Capt. Thomas Richie, Malaria Dept. Head

SILVER SPRING, Md.—December 21, 2012, Capt. Thomas L. Richie had his retirement ceremony at the Naval Medical Research Center (NMRC) with a large host of family and friends in attendance to share the moment with him.

After graduating from Haverford College with a Bachelor of Science degree in biology, he began working for the National Geographic Society Nepal Primate Expedition investigating the behavior of free-ranging rhesus monkeys in the Hindu and Buddhist temples of Kathmandu. Prior to his commission into the Navy, he traveled the world, exploring high-altitude vegetation in the Canadian Rockies, Nepal Himalayas, New Zealand Southern Alps and Peruvian Andes.

The start of his naval career began in 1992, inspired by a visit to Dr. Stephen Hoffman (Capt. Ret.) and Dean Larry Laughlin (Capt. Ret.). Stationed at the Naval Medical Research Unit No. 2-Jakarta, Indonesia, Richie was head of the Department of Clinical Studies. During his six and a half years there, he and his colleagues conducted research on malaria epidemiology, severe malaria pathophysiology, malaria drug resistance and acquisition of naturally acquired immunity, focusing on transmigrant populations and hospitalized malaria patients in that part of the world.

In 1999, Richie was assigned to NMRC under Dr. Hoffman, where he served as the director of the Clinical Trials Research and co-founded the NMRC Clinical Trials Center at the Walter Reed National Naval Medical Center. In 2004, he became the head of the Malaria Department and overall director of the Navy Malaria Program. His many achieve-

ments, not all listed, include the discovery of novel vaccine antigens, the development of cutting-edge humanized mouse models, and the development of a DNA/adenovirus-vectored vaccine generating the most potent sterile immunity ever induced by a gene-based vaccine in humans. He will be officially retired in April 2013.



Dr. Larry Laughlin, Dean, School of Medicine, Uniformed Services University of the Health Sciences; Capt. John Sanders, NMRC Commanding Office; Capt. Thomas Richie, Head of NMRC Malaria Department; and Dr. Stephen Hoffman, Chief Executive and Scientific Officer of Sanaria, Inc. Photo by Renard Richie.

NAMRU-3 Assists in Fighting Yellow Fever Outbreak in Sudan

(Continued from page 3)

NAMRU-3 team tested samples from over 130 patients for Yellow fever and many other viruses.

Dr. Jaouad Mahjour, WHO Director of Communicable Disease Control, said, "This was an extraordinary effort rendered by the NAMRU-3 staff. The laboratory confirmation of Yellow fever as the cause of the outbreak played a key role in determining the scale of the WHO Yellow fever vaccination campaign in Sudan." Mahjour further commented, "The collaboration between the Viral and Zoonotic Disease Program and the WHO

Regional Office for the Eastern Mediterranean will benefit all our 23 member states in the region in building their laboratory capacity for early detection of any major public health event that threatens our regional health security."

To assist the Sudanese Ministry of Health Malaria Control Program prepare for the proper and prompt measures to be taken for the Yellow fever outbreak in Darfur, the NAMRU-3 team conducted custom-designed training to prepare the Sudanese Malaria Control Program for disease-causing vector surveillance, identifica-

tion and detection. The first phase of this training was specifically designed for quick identification of target vectors, such as the Aedes mosquito, and to be able to properly document and report this data to assist in focusing on the appropriate vector control response. The second phase was geared to hands-on training to detect arboviruses in the collected mosquito specimens via polymerase chain reaction. Training and supplies provided by NAMRU-3 diversified diagnostic capabilities at the National Public Health Lab in Sudan and enhanced entomologic surveillance measures.

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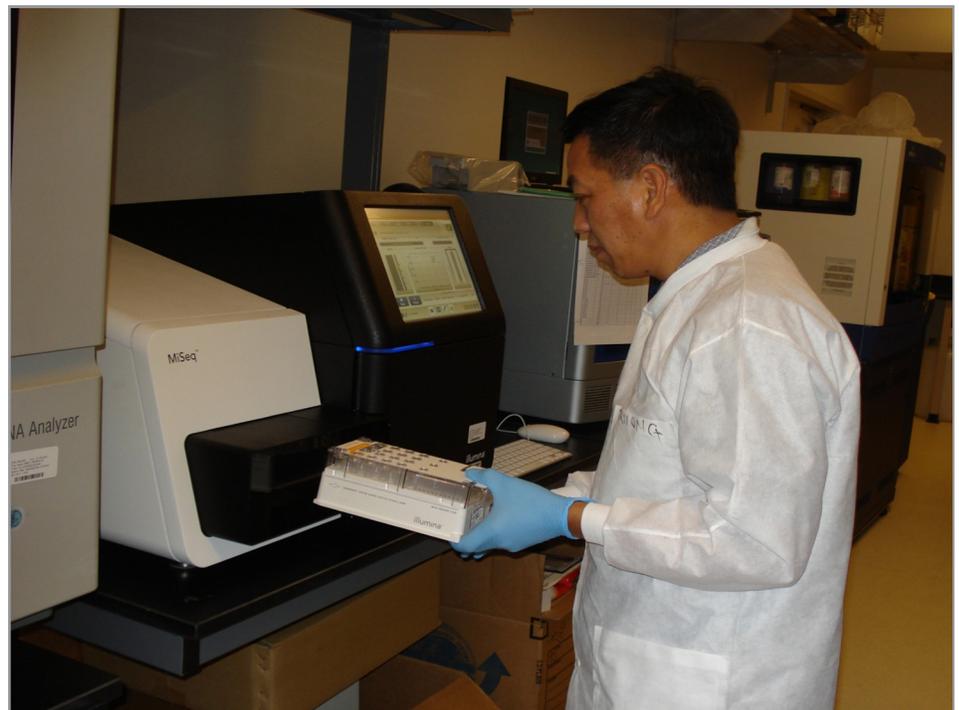
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science fiction," said Dr. Kimberly Bishop-Lilly, deputy head of BDRD's Genomics Program. "It is increasingly more commonplace to use next-generation sequencing to identify and characterize agents of infectious diseases as well. Continuous advances in genomic sequencing technologies and decreases in the associated costs are changing the way biological research and medical treatments are conducted."

The bioinformatic solutions in development will perform a number of basic tasks such as data quality control, background subtraction, genome assembly and identification of nearest neighbor, with workflows for use cases and sample types, and will be accessed via a graphical user interface, which will make them user friendly.

In a multiagency collaborative effort, researchers from other government agencies and businesses are working closely with the NMRC team to research and prototype bioinformatic pipelines that could be deployed to overseas military laboratories to enable successful adoption of benchtop sequencing technologies.

"These pipelines are being developed with specific use cases and sample types in mind that the laboratories are likely to encounter, such as characterization of unknown or sus-



Truong Luu prototyping a putative next generation sequencing platform for EDGE bioinformatics.

pected pathogens from human clinical samples like blood and urine," said Lt. Vishwesh Mokashi, deputy head of BDRD's Genomics Program.

With an eye on the future, NMRC is striving to improve field detection kits, develop better antibodies, make full use of new vaccine delivery technologies and assist international partners in

detecting and handling natural or man-made infectious disease threats. Researchers have undertaken a large-scale high-throughput genomics effort sequencing all agents closely related to classic bio-threat agents. The genomics laboratory has the capacity to sequence 100 bacterial genomes or more per year.