



Naval Medical Research Unit San Antonio
JBSA Fort Sam Houston, Texas



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NAMRU-SA MISSION

"To conduct medical, craniofacial, and directed energy biomedical research, which focuses on ways to enhance the health, safety, performance, and operational readiness of Navy and Marine Corps personnel and addresses their emergent medical and oral/facial problems in routine and combat operations."

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NAMRU-SA RESEARCHERS ATTEND MHSRS

Ms. Flisa Stevenson, MS

Naval Medical Research Unit San Antonio (NAMRU-SA) researchers joined more than 1,500 military medical clinicians and scientists to attend the 2014 Military Health System Research Symposium at the Harbor Beach Marriott in Fort Lauderdale, Florida on Monday, Aug. 18.

The four-day Department of Defense conference brings together scientific military, academia, industry leaders, and researchers from around the globe to discuss advancements in research and health care developments in the areas of combat casualty care, military operational medicine, clinical and rehabilitative medicine, and military infectious disease programs. It also provides a scholarly environment for planning and development of future studies aimed at optimizing care for warfighters.

Keynote speakers included Dr. David Smith, Deputy Assistant Secretary of Defense for Force Health Protection and Readiness; Lt. Gen. Douglas Robb, director of the Defense Health Agency; Rear Adm. Bruce Doll, director for the DHA's Research, Development, and Acquisition and Deputy Commander of USAMRMC; and Vice Adm. Matthew



NAMRU-SA Team at MHSRS, (from left to right) CDR Forest Sheppard, Dr. Rene Alvarez, CAPT Rita Simmons, Dr. JohnSimecek, Mr. Roy Dory, and Dr. Mauris DeSilva.

Nathan, Surgeon General of the Navy. The concept of success through collaborations between military services and external partners was emphasized, along with being fiscally efficient, pursuing smaller projects, and taking a very directed, hands-on-approach with sponsors.

Military scientists were cautioned against working alone and encouraged to work together within their command and across disciplines. Within the new model researchers should look to collaborate. "This is about a unified approach, rather than a unified command," said Rear Adm. Doll. "The...way ahead is through process improvement, consolidated mission functions, and shared services."

"Interservice collaborations and being fiscally efficient characterizes NAMRU-SA's approach to the business of research, and are key reasons why sponsors are excited about our capabilities and what we are doing," says NAMRU-SA Commanding Officer Rita G. Simmons.

(Continued on page 3)



NAMRU-SA DISCUSSES TRANSLATIONAL BIOMEDICAL ENGINEERING AT BMES



Ms. Flisa Stevenson, MS

The Biomedical Engineering Society (BMES) hosted their annual conference in San Antonio, TX from Oct 22-25 and featured Navy Medical Research Unit San Antonio (NAMRU-SA) researchers in an engaging panel discussion entitled, "Overcoming Challenges and Obstacles for Clinical Translation: From Bench to Bedside."

Military medicine has always focused much more on applied research and advanced medical technology designed to save lives today. Thus, it is not surprising that NAMRU-SA was invited to provide a military perspective as part of a new session at BMES on translational research, research that intends to make findings from basic science useful for practical applications that move from "bench to bedside" or laboratory experiment through clinical trials to point-of-care-patient application.

When it comes to practical applications emerging from research focused on the critical care needs of the

warfighters —NAMRU-SA's capabilities and translational approach to research and development are well positioned to improve wounded warrior outcomes.

Dr. Mauris N. DeSilva, nanomaterials expert in the Maxillofacial Injury and Disease Dept., Craniofacial Health and Restorative Medicine Directorate, and Mr. Roy Dory, Biomedical Engineer in the Expeditionary and Trauma Medicine Dept., Combat Casualty Care Directorate, discussed NAMRU-SA's experience, successes and challenges in military related translational biomedical engineering.

Dr. DeSilva and Mr. Dory's presentation revealed NAMRU-SA's unique multi-disciplinary and collaborative environment where the focus is on translational research using existing and novel devices and technologies to improve wounded warrior outcomes.

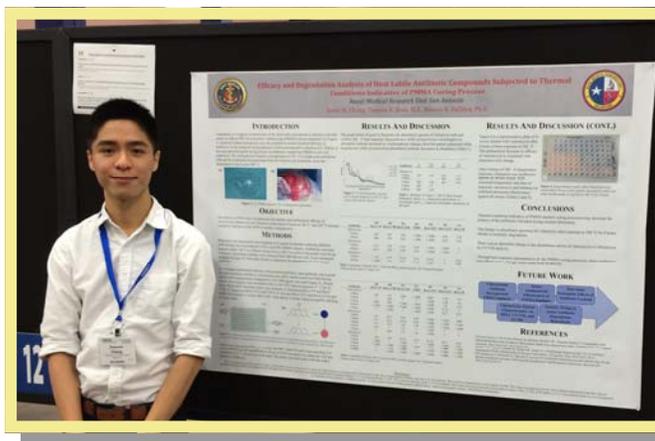
The BMES Industry Committee will be looking at making translation a more prominent component at future meetings.

NAMRU-SA 2014 SUMMER INTERN PRESENTS POSTER AT BMES

Ms. Tamara Hess, MS

In September 2014, Jason Chang's poster was selected out of 385 submittals from undergraduate research programs, to present at the Biomedical Engineering Society (BMES) annual meeting, this past October in San Antonio, Texas. With a record-breaking 861 oral presentations in 161 platform sessions, and 1635 posters —Chang was honored to present at one of the largest BMES meetings to date.

Chang presented a poster on his work "Efficacy and Degradation Analysis of Heat Labile Antibiotic Compounds Subjected to Thermal Conditions Indicative of PMMA Curing Processes". This research was conducted as



NAMRU-SA 2014 summer intern, Mr. Jason Chang, presents his poster at the 2014 BMES annual meeting in San Antonio, Texas.

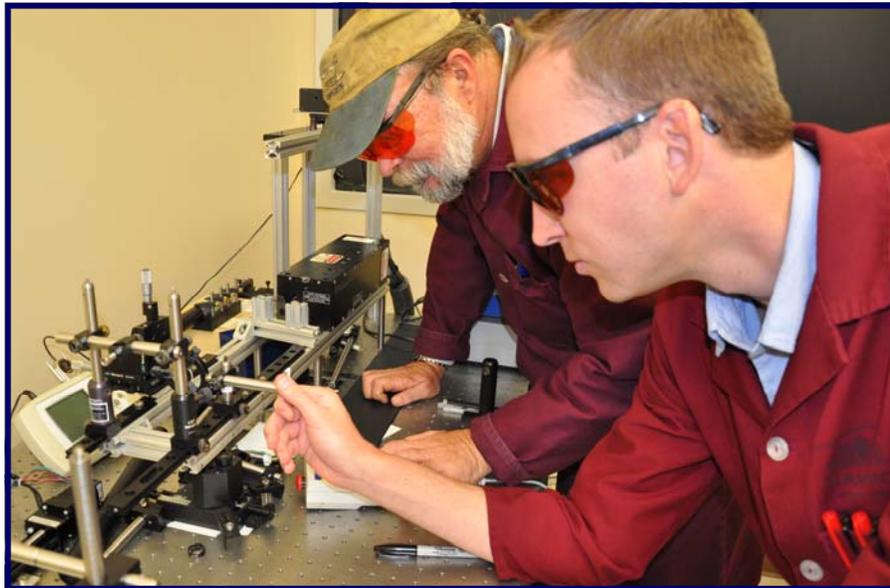
part of his summer internship through Naval Research Enterprise Internship Program at The Naval Medical Research Unit- San Antonio (NAMRU-SA). The 10

week internships are designed to encourage students to pursue scientific careers and expose them to research and technology efforts within the Department of Navy (DoN).

NAMRU-SA sponsored Chang to take part in a project aimed at antibiotic incorporation into polymethyl methacrylate (PMMA), a transparent and rigid plastic, which is used for cranial implants. Specifically, he was involved in assessing antibiotic activities before and after exposure to temperatures

representative of the curing process of PMMA.
(Continued on page 4)

LASER-INDUCED PHOTO-THERMAL TREATMENT COULD ERADICATE ANTIBIOTIC RESISTANT BACTERIA



Dr. Chase Watters (front) and Mr. Norm Barsalou investigate how pulsed laser irradiation would maximize bacterial biofilm destruction.

Chase M. Watters, PhD

The golden age of antibiotics is drawing to a close, as the development of new antibiotics diminishes and bacteria increasingly resist antimicrobial therapy. The primary reason for this antibiotic resistance crisis comes down to time; it can take up to 20 years to develop an antimicrobial, while wide spread antibiotic resistance can develop in 2 years or less. The rate of antibiotic resistance increases with the misuse of antibiotics such as when patients do not complete the full antibiotic regimen or when antibiotics are inappropriately prescribed for conditions like viral infections, on which antibiotics have no effect.

Antibiotic resistance in bacteria refers to transferable genetic mutations, which confer protection against antibiotics to future bacterial generations. Along with conventional multi-drug resistant (MDR) microorganisms, the formation of bacterial biofilms poses a significant hindrance to the treatment of wound infections. Biofilms can be thought of as bacterial cities, with a sugary coating that protects the bacteria from antibiotics and the immune system, similar to a wall garnering protection to a city.

An alternative way to counteract these antibiotic resistant bacteria and biofilms is with physical therapies like heat, light, and sound waves; where antibiotic resistance is overcome, the bacterial biofilm wall can be

damaged, and worries of mechanical resistances is unlikely. This strategy is being pursued by researchers at the Naval Medical Research Unit San Antonio (NAMRU-SA) with pulsed laser irradiation combined with targeted energy absorbing nanoparticles for multi-drug-resistant *Staphylococcus aureus* (MRSA). *S. aureus* is one

of the leading causes of infections in United States deployed personnel, and thus a prime research target.

Researchers working in Dr. Millenbaugh's lab--in the Craniofacial Health and Restorative Medicine Directorate--hope this will significantly decrease the viability of the bacteria in planktonic and biofilm forms via the generation of "nano-explosions" that cause physical damage to the bacterial cell and the biofilm matrix. This approach could prove effective at eradicating pathogens, regardless of their level of antibiotic resistance. If successful, this new treatment regime will give health care providers an alternative, non-pharmaceutical approach to treating combat wounds.

The on-going research at NAMRU-SA hopes to better protect the warfighter in the future from the challenges of fighting MDR infections, by packing a laser filled-punch against numerous antibiotic resistant bacteria.

(Continued from page 1)

NAMRU-SA at MHSRS

NAMRU-SA presented seven posters and participated in several working group sessions at the conference. The presentations and the conference setting provided NAMRU-SA researchers the opportunity to meet directly with sponsors and military medicine colleagues, to reaffirm relationships and explore new collaborations.

NAVY EXTREMITY TOURNIQUET EVALUATION HELPS STANDARDIZE TOURNIQUETS USED ACROSS SERVICES

Mr. Roy E. Dory, MS

Analyses of casualties early in the wars in Iraq and Afghanistan revealed extremity hemorrhage to be a leading cause of potentially survivable death on the battlefield.

Traditionally, tourniquets designed to control hemorrhage were used by

special operation forces and some conventional forces on a unit basis; however, in response to compelling statistics, the US Central Command issued a directive in 2005 that all deployed military persons must carry an extremity tourniquet. Since implementation of the directive, a significant reduction has been seen in the number of deaths attributed to hemorrhage at the extremities, across services.

Relatively simple in design, numerous tourniquets are currently on the market. Operational testing of candidate models is critical to ensure US warfighters carry the most effective devices. A joint services Tourniquet Working Group was established in 2010 to standardize safety, efficacy, and operational requirements for extremity tourniquets. The engineering team in the Expeditionary and Trauma Medicine Department at Naval Medical Research Unit San Antonio (NAMRU-SA) has taken a leading role in implementing those joint consensus requirements in ongoing device evaluations.

NAMRU-SA engineers recently began evaluating two newly developed tourniquets, designed to control arterial hemorrhage caused by traumatic limb injury. The test team is currently recruiting participants with both medical and non-medical backgrounds to apply the tourniquets to instrumented mannequin limbs in simulated operational conditions. Pressure sensors imbedded in the mannequin limbs indicate when sufficient pressure is generated by the tourniquets to fully occlude blood flow. The performance of the devices is gauged by the amount of time it takes to achieve occlusive pressures, and the participants also provide valuable feedback regarding the strengths and



weaknesses of the tourniquet designs.

The US Army funded project will generate quantitative and qualitative performance data that will help standardize tourniquets used across services. The outcomes of the assessment will aid the warfighter and ensure the fielding of only the most effective tourniquet systems.

NAMRU-SA evaluating a tourniquet designed to control arterial hemorrhage caused by traumatic limb injury.

(Continued from page 2)

NAMRU-SA 2014 Summer Intern at BMES

Chang worked with a dental laboratory in the Oral and Maxillofacial Surgery Clinic at San Antonio Military Medical Center (SAMMC) and gained knowledge of the use of Micro CT through the USAF Dental Evaluation and Consultation Service.

The internship on Joint Base San Antonio Fort Sam Houston (JBSA) provided a unique opportunity for Chang to not only work with the DoN, but also understand military medicine and how services integrate with one another in the research field.

Chang toured the Center for the Intrepid, a wounded warrior rehabilitation facility, and the U.S. Army Institute of Surgical Research Burn Center located within SAMMC hospital. On those visits, he learned just how resilient our warriors are and how the projects at NAMRU-SA align with the distinct needs of our warfighters and the end goals of enhancing health and addressing emergent medical and oral/facial problems in routine and combat operations.

Chang is a senior pursuing a bachelor's degree in biomedical engineering at the University of Texas at Dallas. According to Chang, his scientific interests were broadened by working with the NAMRU-SA Craniofacial Health and Restorative Medicine Directorate under Dr. Mauris DeSilva and it was an experience he would highly recommend to other students.

NAMRU-SA LEADS A MULTI-DISCIPLINARY COLLABORATION TO ADAPT CRANIAL IMPLANT DESIGNS TO REDUCE POST-SURGICAL INFECTIONS

Mauris N. DeSilva, PhD

Between 15 and 30% of battlefield wounds sustained in Iraq and Afghanistan involve the head and neck. Traumatic Head and Brain Injury (THBI) treatment often involves a craniotomy to remove damaged tissue and/or relieve intra-cranial pressure. Follow-up craniotomy care typically includes cranial implant surgery to replace lost bone tissue. Cranioplasty outcomes are often complicated by serious postoperative infections; and these infections are complex, difficult to treat, and can lead to the removal of the original implant. All this is due to the accumulation of bacteria on the implant, and the formation of biofilms created by drug resistant bacteria –making post-cranioplasty infections a major concern for military medicine.

Researchers at Naval Medical Research Unit San Antonio (NAMRU-SA), Southwest Research Institute (SwRI), and Walter Reed National Military Medical Center (WRNMMC) are collaborating with neurosurgeons, and oral and maxillofacial surgeons from San Antonio Military Medical Center (SAMMC) to design and develop novel cranial implants. One implant project features a design that is driven by biomorphic topography that could reduce or even eliminate post-surgical infections in cranioplasty patients. The topographic surface design utilizes a mathematical concept for developing bio-material, where nanostructures manipulate the hydrodynamics on the surface of the implant preventing biofilms.

Nature has shown that topographical features on skin, such as with the fast-swimming shark, are capable of preventing bacteria from adhering to surfaces. In order to use topographic patterns as antiseptic mechanisms, the collaborators are working to determine if vortex particle entrapment can be reduced and therefore, reduce the risk of bacterial attachment and microfouling. The team is combining simulation

and experimentation to observe virtual biofilms interacting with mathematically generated structures, and then fabricate those structures for verification and characterization of nanostructures that are most resistant to *in-vivo* biofilm formation.

The NAMRU-SA/SwRI collaboration met on 25 October, to plan the next steps based on the initial modeling and experimental results. With NAMRU-SA's unique expertise in nano surface patterning methods and SwRI's superior capabilities in 3D simulation modeling, NAMRU-SA's goal is to develop a protocol for fabricating an enhanced implant where post-surgical infection rates are reduced or eliminated. The results will be relayed to the collaborating surgeons and engineers at Walter Reed National Military Medical Center, San Antonio Military Medical Center (neurosurgery and oral and maxillofacial surgery departments), and United States Air Force 59th Medical Wing, to fabricate new enhanced—infection resistant, titanium implants.



NAMRU-SA Principal Investigator, Dr. Mauris N. DeSilva (2nd from left) with the NAMRU-SA cranial implant design team.

VISITORS AND TOURS

THE GERMAN NAVY SURGEON GENERAL

Flisa Stevenson, MS

The German Navy's senior medical officer visited the Naval Medical Research Unit San Antonio's (NAMRU-SA) biomedical facilities on 23 Oct, 2014 during a cross-country tour of U.S. Navy Medicine Education and Training operations.

Rear Admiral Hans Wolfgang von der Heide-Kattwinkel, Surgeon General of the German Navy, in his first visit to NAMRU-SA, received a brief on the command's scope and research capabilities before touring the Combat Casualty Care (CCC&OM) and Operational Medicine, and Craniofacial Health and Restorative Medicine (CH&RM) Directorates, the key research arenas for NAMRU-SA.

Von der Heide-Kattwinkel, was accompanied by Dr. Lutz Nolde, Germany Navy, Branch Chief, Navy Medical Education and Training. The visitors heard presentations by representatives from each directorate discussing the innovative research underway at NAMRU-SA. Dr. John Simecek, Acting Director of CCC&OM, began the tour at the Tri- Services Research Laboratory, where Navy scientists test and evaluate hemorrhage control and resuscitative agents, including in-vitro and in-vivo evaluation; synthetic cadavers (Syndavers) and HapMed Tourniquet training mannequins.

CDR Forest Sheppard, surgeon and Head of Expeditionary and Trauma Medicine Department explained, "Hemorrhage remains the leading cause of potentially survivable casualty deaths, and we are investigating what pharmaceutical agents will be most beneficial to military casualties." NAMRU-SA is at the forefront in developing a model to facilitate the development and meaningful evaluation of human-derived therapeutics for uncontrolled severe hemorrhage. "No one else is doing what we are doing," says CDR Sheppard.

The tour continued at NAMRU-SA laboratories at the Battlefield Health and Trauma Research Institute, where the visitors met representatives from the CH&RM Directorate to learn about core capabilities and current research underway in preventive dental care, novel wound healing dressings, and multi-drug resistant infection control. Scientists briefly described studies



NAMRU-SA Commanding Officer, CAPT Rita G. Simmons and Rear Admiral Hans Wolfgang von der Heide-Kattwinkel, during a tour of NAMRU-SA biomedical laboratories.

using surface enhanced Raman spectroscopy to identify bacteria and viruses in blood. The technology can also be used to differentiate between antibiotic-resistant bacteria from any part of the body. The tour concluded with additional presentations from the CCC&OM Directorate discussing new studies in molecular biology and immunology based assay research to better understand the body's reaction to trauma.

Von der Heide-Kattwinkel, said that he was absolutely impressed with the depth and breadth of the research being conducted at NAMRU-SA. The scientists are proud of what they do here and the passion and commitment was evident from each person he met.



CDR David Leal, CH&RM Directorate, demonstrates a laser device adapted by NAMRU-SA's biomaterials researchers, to allow dentists to view 3-D images of subtle discrepancies and cracks in a tooth, otherwise undetectable via regular dental exam.



CAPT Jonathan Stahl (front, left), Head, Maxillofacial Injury and Disease Dept, under the CH&RM Directorate welcomes American and Canadian Dental Association leaders to NAMRU-SA facilities; as American Dental Association President-elect Maxine Feinberg (second from right) and the group listens to his overview of NAMRU-SA's research projects involving cooperative work with other military branches.

THE AMERICAN DENTAL ASSOCIATION

Flisa Stevenson, MS

In the spirit of collaboration, Naval Medical Research Unit – San Antonio's (NAMRU-SA) Craniofacial Health and Restorative Medicine (CH&RM) researchers joined with officers from U.S. Army, Navy and Air Force Dental Corps to welcome leaders from the American Dental Association (ADA) and the Canadian Dental Association (CDA) to Joint Base San Antonio - Fort Sam Houston on 8 Oct for a tour of the state-of-the-science research being conducted at the facility.

ADA President Charles Norman, President-elect Maxine Feinberg, Executive Director Kathleen O'Loughlin, Dr. Marshall Gallant of the VA Medical Center in Orlando, FL., and several leaders from the Canadian Dental Association and the Canadian Forces Dental Services; spent a half-day touring, Brook Army Medical Center Oral and Maxillofacial Surgery Clinic, the Institute for Surgical Research, and NAMRU-SA -- on the day before the opening of the ADA 2014 – America's annual dental meeting.

CAPT Jonathan Stahl, Head, Maxillofacial Injury and Disease Dept, under the CH&RM Directorate, led the

VISITORS AND TOURS

delegation and welcomed the visitors to NAMRU-SA. Navy scientists showcased some of the innovative research in preventive dental care, novel wound

healing bandages, and infection control underway at NAMRU-SA.

Visitors learned about the adaptation of a laser-based device known as an optical coherence tomography that will allow dentists to see subtle discrepancies and cracks in a tooth that are unable to be detected during a regular dental exam. CAPT Stahl talked about the lab's electrospinner device and the development of a novel wound healing dressing that will improve the rate of wound healing and reduce scar formation of wounds.

The group was then introduced to a device NAMRU-SA researchers are evaluating called surface enhanced Raman spectroscopy, which can provide medics with a tool to quickly identify dangerous bacteria and viruses. Scientists are hoping this tool can identify specific bacteria in as little as 15 seconds and help complete the prep and identification process in as little as fifteen minutes. The ADA and CDA leaders also learned that the Navy is at the forefront of efforts to minimize the release of dental wastewater contaminants into the environment with a study focused on the development of an improved chairside amalgam separator.

NAMRU-SA showcased ongoing research to develop and patent new devices that helps ensure servicemen and women get the best medical care possible. In this tour ADA and CDA visitors learned how improving dental readiness could significantly increase individual medical readiness and enhance the health, safety, performance, and operational readiness of Navy and Marines personnel.

On August 22nd , 2014 the Navy Dental Corps celebrated its 102nd anniversary.

<http://navymedicine.navylive.dodlive.mil/archives/6698>

NAMRU-SA PRESENTATIONS & PRODUCTS

Burdette, A. J., Alvarez, R., (2014). Evaluation of Innate Biomarkers in Saliva for Diagnostic Potential of Bacterial and Viral Respiratory Infections, Military Health System Research Symposium, Fort Lauderdale, FL.

DeSilva, M. N., (2014). Magnetic Nanoparticle Based Approach for Externally Controlled Corneal Endothelial Repair, Military Health System Research Symposium, Fort Lauderdale, FL.

Dory, R. E., Cox, D. D., Endler, B., (2014). Test and Evaluation of Compression Bandages Using a Human Tissue Equivalent, Military Health System Research Symposium, Fort Lauderdale, FL.

Kotanen, C. N., Martinez, L. A., Alvarez, R., (2014). Rapid Detection of Multi-drug-Resistant Microorganisms by Surface Enhanced Raman Spectroscopy in Human Serum, Military Health System Research Symposium, Fort Lauderdale, FL.

Martinez, L. A., Burdette, A. J., Dory, R. E., Alvarez, R., (2014). Development of Evaluation of an Ozone-based Portable "Point-of-Care" Field Sterilizer System, Military Health System Research Symposium, Fort Lauderdale, FL.

Simecek, J. W., Wojcik, B., Humphrey, R., Guerrero, A., Fedorowicz, A., Szeszel-Fedorowicz, W., Colthirst, P. M., DeNicolo, P., (2014). The Severity of Dental non-battle Injuries in Deployed US Army Personnel May 2009 through December 2012, Military Health System Research Symposium, Fort Lauderdale, FL.

Yuan, T. T., Nagy, A. M., Forbes, N. A., DeSilva, M. N., (2014). Effects of Silver Nanoparticles on the Growth and Attachment of Methicillin-Susceptible *Staphylococcus aureus* and Methicillin-Resistant *Staphylococcus aureus*, Military Health System Research Symposium, Fort Lauderdale, FL.

BLOGROLL

Dec 15, 2014. Armed with Science -- The Official U.S. Defense Department Science Blog. Meet the Scientists: Dr. Phillip Vernon. "Naval Medical Research Unit San Antonio (NAMRU-SA) is a Navy research facility focusing on interdisciplinary biomedical sciences to improve medical outcomes related to combat casualty care and craniofacial health and restorative medicine. This unique approach to research would not be possible without our broad team of scientists and clinicians from across the United States encompassing molecular and cellular biologists, biomedical engineers, microbiologists, immunologists, physiologists, and clinicians (from trauma surgeons to dentists)."

<http://science.dodlive.mil/2014/12/15/meet-the-scientists-dr-phillip-vernon/>

Nov 4, 2014. Navy Medicine LIVE Blog-- The Official Blog of the U.S. Navy and Marine Corps Health Care. On the Front Line of Improving Treatment for Wounded Warriors: Dr. Madelaine Paredes. "When I started college as a microbiology student in my native country of Colombia, I never imagined where my career would take me through the years. The desire to learn and discover biology had started earlier in my childhood years looking at microbes and plant cells under a microscope in my biology classes. It was then as a young scientist that I developed a profound passion for research

and the joy of understanding many biological processes in great detail."

<http://navymedicine.navylive.dodlive.mil/archives/7413>

IN THE MEDIA

NAMRU-SA was recently featured in the 2014, Fourth Quarter issue of **Combat & Casualty Care Magazine**-- A Tactical Defense Media publication that focuses on the latest techniques in applied tactical combat casualty care (T3C) for trauma victims.

See the Unit Profile NAMRU-SA, **Readiness Through Research**. Combat & Casualty Care Editor Kevin Hunter spoke with Commander Forest R. Sheppard, head of the Expeditionary and Trauma Medicine Department, Combat Casualty Care and Operational Medicine Directorate at NAMRU-SA, about how the unit works to enhance the health, safety, performance, and operational readiness of Navy and Marine Corps personnel, and address their emergent medical problems in both routine and combat operations.

[Combat & Casualty Care Magazine Article](#)

COMMANDING OFFICER'S CORNER

CAPT Rita G. Simmons, PhD, MSC, USN

To preserve a medically ready force, strategic collaboration is emerging as an imperative for success in military medical research. This issue of the Science Quarterly (formerly the Science Journal) concludes a productive FY14 with a focus on collaboration as the *new normal* in how we conduct the business of Navy medical research and development.

Our cover story reports on NAMRU-SA's experience at the Military Health Systems Research Symposium and notes Rear Admiral Bruce Doll's imperative on the path forward for those in the military medical community and our industry partners. Rear Admiral Doll called for a unified approach through inter-service collaboration across disciplines.

I am pleased to say that, the purposeful integration of scientific disciplines and an equally important interdisciplinary view of the problem under investigation is the cultivated mindset at NAMRU-SA. When visitors tour NAMRU-SA they are excited to see the level of interdisciplinary work being conducted with purpose and passion.

Our projects are developed within interdisciplinary teams involving biomedical engineers, cell biologist, immunologists, mechanical engineers, biomaterials experts and dentists. This model of strategic

collaboration allows teams to reach their full creative potential and maximize their results.

In each article you will see examples of our brand of multidisciplinary collaboration in all projects within teams, between NAMRU-SA Directorates, across branches of services, to partnerships with industry.

Our collaborative culture and purposeful crossing of disciplines leads to the innovative solutions and the product driven research we present in this issue. In this past quarter, we have also taken the lead to provide a military perspective on translational research at an industry conference and hosted numerous tours of our facilities, including a visit by the German Navy Surgeon General and the American Dental Association.

With a total of 45 new products emerging from NAMRU-SA in FY14, I can respectfully say we have had a dynamic year. Bravo Zulu to our team and I look forward to a great FY15.



**CAPT Rita G. Simmons, PhD,
MSC, USN
Commanding Officer**

TAKING THE HELM OF NAVY MEDICINE'S COMBAT CASUALTY CARE & CRANIOFACIAL HEALTH RESEARCH



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