



Research Today



Chief Scientist Vision: *Be the Premier DHA Clinical Research & Training Site*

VOLUME 8, ISSUE 3

JANUARY 2025

Published by: Chief Scientist's Office
59 MDW/ST
(210) 292-2097
(DSN 554)

Exciting News from the 59 MDW Clinical Research and Investigations Support (CIRS) Laboratory

Author: 59th Medical Wing Chief Scientist's Office, Science & Technology

Exciting News from CIRS Laboratory
pg. 1

MHSRS Enables New Collaboration
pg. 2– pg. 3

Veterinary Histopathology
Pg. 3

Blood Volume Analyzer
pg. 4

Challenges of Airway Management in Combat
pg. 5

Exploring Hypobaric Exposure
pg. 6

President's Bronze Volunteer Service Award
pg. 7

Brain Imaging for Pre-Flight Medical Screening
pg. 8

Deputy Director for the Trauma and Clinical Care Directorate
pg. 9

South Texas Veterans Health Care System
pg. 10

Technology Transfer (T2) at 2024 MHSRS
pg. 11

Center for Advanced Molecular Detection (CAMD) Monthly Scientific Presentations
pg. 11

HJF Nonprofit Works with 59th MDW
pg. 12



We are thrilled to announce the latest enhancements to our laboratory capabilities. The views of the Simoa HD-X Analyzer and of the Ella Automated Immunoassay System are not necessarily the official views of, or endorsed by the U.S. Government, the Department of Defense, or the Department of the Air Force. No Federal endorsement of Simoa HD-X Analyzer and of the Ella Automated Immunoassay System is intended.

We have recently integrated two state-of-the-art fully automated immunoassay platforms that allow for multiplex or singleplex analysis of inflammatory markers. These new platforms significantly expand our ability to conduct immunoassays on specimens from rats and mice.



Introducing the Simoa HD-X Analyzer: Our laboratory is now equipped with the cutting-edge Simoa HD-X Analyzer, a fully automated bead-based immunoassay platform known for its exceptional sensitivity. With up to 1000 times greater sensitivity than traditional immunoassays, this analyzer opens up new possibilities for research and investigations.

The Ella Automated Immunoassay System, a next-generation benchtop instrument designed to revolutionize traditional ELISA methods. The Ella system automates all assay steps using microfluidic cartridges, drastically reducing setup time and allowing for rapid processing in just 90 minutes, compared to the hours required by traditional ELISA methods. Don't miss out on the opportunity to leverage these advanced technologies for your research needs. Contact us today to explore how our expanded capabilities can support your work.

Our current offerings include a range of multiplex assays for rats and mice. For the SIMOA platform, we provide assays such as Chemokine (MCP-1, MIP-1 α , MIP-2, MIP-3a) and Cytokine Panel 1 (RAT) (IFN- γ , IL-1 β , IL-2, IL-6, IL-10, KC, TNF α). The Ella platform offers an even broader menu of biomarkers for mice and rats, including Angiopoietin-2, CCL2/JE/MCP-1, CCL5/RANTES, CD25/IL-2 R α , Chitinase 3-like 1, Cystatin C, FGF-21, Flt-3 Ligand/FLT3L, and many more.

Both platforms also feature extensive testing menus for human specimens, with ongoing developments for porcine specimens. If you are interested in learning more about these exciting capabilities, please feel free to reach out to Mr. Manuel Caballero (manuel.caballero13.civ@health.mil).

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MHSRS Enables New Collaboration to Create Ability to Generate IV Solutions In the Field on Demand

Author: Dr. Scott Walter



Pictured above: representatives from TDA Research Inc and DesiCorp Inc. conducting an impromptu demonstration of how their individual technologies can be integrated to create in field IV solutions.

The 2024 Military Health System Research Symposium (MHSRS) was held 26–29 August, 2024 in Kissimmee, Florida and was attended by over four thousand individuals with very diverse backgrounds: military, government, academia, non-profit organizations, industry, foundations, and so much more. The primary objective of this annual medical science symposium is to exchange information on health care and medical research and development (R&D) that focuses specifically on addressing the unique medical needs of the warfighter. This dynamic and incredibly impactful forum facilitates collaborations and partnerships that enable

applications of R&D breakthroughs to create new, advanced medical capabilities for the military and civilian communities as well. Attended by medical industry experts and leaders in their fields, they offer updates on the latest solutions on the market or under development from 100+ leading manufacturers and suppliers, as well as companies on the forefront of technology, who attend this event and are committed to advancing and improving the unique medical needs of the warfighter.

One such encounter that occurred at this MHSRS was the collaboration of two companies to develop a product that will require proprietary technologies to develop an advanced medical capability that may be a gamechanger for the military. The military has desired the ability to generate sterile water for injection (SWFI) quality water in the field for decades using onsite potable water. This ability to create SWFI would allow medics to reconstitute medications and intravenous (IV) solutions on demand to treat patients at or near the point of injury. The ability to remove the water from medications reduces the weight and volume of the medications medics are required to carry with them, allowing them to carry more capability into a fight and reducing the logistical costs. Removal of the water also extends the shelf life of these medications to several years, reducing waste from expired medications.

One company leading the way with developing small, portable SWFI production systems is TDA Research, Inc. They utilized several Department of Defense (DoD) Small Business Research Innovation (SBIR) awards to develop a system that can produce SWFI. While their proprietary filtration technology is viable and proven, they have yet to find a DoD end user willing to commit to the fielding a system. One company making breakthroughs in IV bag designs is DesiCorp Inc. who partnered with Fuji Film Corporation to bring their breakthrough thin film materials into the United State market. One aspect of their novel thin films is a material that emulates the non-reactive properties and vapor protection of glass and ceramics while providing flexible membrane that can laminate and protect a fieldable product. The technology is already commercially available in Japan, with over 10 years of real-world market validation storing Zosyn antibiotics.

Continue..

With both companies attending MHSRS 2024, a meeting was facilitated by the 59th Medical Wing's Chief Scientist's Office to explore the possibilities of a establishing a cooperative effort between the two companies to utilize their respective expertise and novel products to create a new medical capability desired by the military. End user representatives from the Air Force Special Operations Command (AFSOC) and Air Mobility Command (AMC) were also present to discuss field medic needs and requirements, while offering feedback and early design inputs.

As a result, TDA Research and DesiCorp Inc. partnered to create a medical capability that has never before existed: a dual chamber bag for rehydration of freeze-dried-medications coupled to a SWFI generation cartridge for in-theatre production. The light-weight, low-cost prototype has a resealable opening on one end that allows end users to fill with potable water, which flows through a single-use, integrated SWFI cartridge into the first, fluid chamber of the dual chamber bag. The second chamber of the dual chamber bag holds the freeze-dried medications in powdered form and is separated by a frangible seal which is ruptured by the end user to allow the SWFI and medication to mix just before use. The frangible seal also protects the SWFI cartridge during the filling of the bag, allowing the SWFI cartridge to be reused to generate SWFI for multiple medications. End users can produce SWFI into the first chamber and either rupture the frangible seal right away for immediate use, or wait to rupture the seal and store the SWFI to stockpile medications ahead of time. The SWFI reconstitutes the powder into a liquid medication, ready for use within a couple of minutes. The newly formed team plans to submit this concept for a SBIR award later this year or early next year.

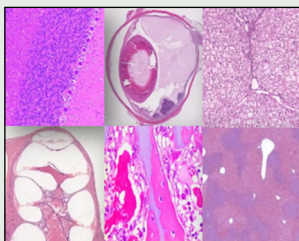
“With this capability, our medics can carry more medications further downrange without the added weight of the liquids.” Said Mr. Dan Dumas, the deputy chief of Head Quarters AFSOC Medical Modernization branch. He added “Since we’ll never deploy into a situation or location without adequate drinking water, it would enable our medics to ‘live off the land’ without carrying liquid medications.”

Company representatives estimate this capability could be made available in under 3 years as their technologies are mature. They also postulated that this field-fillable IV bag could also be used to carry and rehydrate freeze-dried human plasma and possibly other blood products in the field once those products are approved by the US Food and Drug Administration (FDA).

Veterinary Histopathology

The Pathology Section of Clinical Investigations and Research Support (CIRS) 59th Medical Wing

Author: 59th Medical Wing Chief Scientist's Office, Science & Technology



The Pathology Section of Clinical Investigations and Research Support (CIRS), 59th Medical Wing provides comprehensive pathology expertise and support for the maintenance of animal model development, pathogenesis studies, and testing and evaluation of therapeutic measures of military importance.

The Pathology section is comprised of one military board-certified veterinary pathologist and one civilian histotechnologist to provide necropsy, H&E histology, diagnostic pathology support, and imaging support to investigators. This section regularly supports investigators from around Joint Base San Antonio and partner institutions, such as Tri-Service Research Laboratory, Institute of Surgical Research, and Bridge Preclinical Testing Services (Bridge PTS), with tissue processing and histology support. This section is building out its digital pathology capabilities to foster increased collaboration and support to other military research facilities around the world. This capability makes up part of an AAALAC Accredited Animal Care and Use Program.

Necropsy support includes postmortem examination; diagnostic necropsy; lesion identification and interpretation; tissue collection, fixation, and trimming; medical photography; and training for research teams. The histology services include tissue processing, tissue paraffin embedding, paraffin block cutting, slide staining, slide cover-slipping, histochemical staining, and tissue archiving.

We recommend and encourage investigators to consult with the pathology section early in the project planning stages or study design process to discuss their study and how to best apply pathology services to reach the aims of the study. Please consult with the Chief of Pathology, MAJ Ginger Hammett, for any questions related to pathology support. **Please consult with histotechnologist, Mrs. Heather Brown, for any questions related to histology support at <heather.l.brown82.civ@health.mil>**

59th Medical Wing Assisting with Development of Next Generation Tracer System for Commercial Point-of-Care Blood Volume Analyzer

Author: Dr. Scott Walter



The 59th Medical Wing, Office of the Chief Scientist (59 MDW/ST), is supporting the development of a point of care advanced blood volume analyzer that will aid medics with treating wounded servicemembers who experienced a loss significant amount of blood from trauma. When medics encounter these patients, they may immediately begin resuscitation with blood or plasma products available and will often measure the patient's blood pressure and heart rate to help assess the need for additional resuscitation and fluids by increasing volume. However, blood pressure and heart rate may not lead to accurate assessments (i.e.: measure blood pressure may be due to vasoconstriction instead of volume expansion), and could result in under or over resuscitation (hypo and hypervolemic). This condition may inhibit healing and possibly cause additional injuries and health complications such as fluid leakage into the lungs. Overall, quickly, and accurately restoring the patient to correct blood volume is critical to optimizing patient outcomes, healing, and recovery.

Back in the late 1990s, the Daxor Corporation, a global leader in blood volume measurement technology, developed the BVA-100™ Blood Volume Analyzer diagnostic device that was cleared by the US Food and Drug Administration (FDA) to provide safe, accurate, objective quantification of blood volume status and composition. Their technology uses Albumin I-131 radiopharmaceutical as a trace element to measure blood volume rapidly and accurately for guiding resuscitation management over a broad range of medical and surgical conditions. The tracer is injected intravascularly and once it has fully circulated in the bloodstream, a series of small blood samples are drawn and processed by the BVA-100. The device automatically calculates patient blood volume by comparing the concentration of undiluted tracer prior to injection to the tracer concentration diluted in the patient blood samples. The BVA-100 test provides clinicians with accurate, actionable data to optimize treatment plans and individualize care improving outcomes and reducing duration and cost of care.

While highly effective, a non-radiopharmaceutical was sought to expand acceptance for other applications and users. Daxor Corporation began development on a non-radioactive indicator tracer for their BVA-100 system and partnered with the 59 MDW/ST to utilize AFWERX Small Business Innovation Research (SBIR) awards to develop this capability. Dr. Jack Hutcheson, PhD, the 59 MDW/ST's Lead Scientist for Trauma and Clinical Care Research and project Technical Point Of Contact (TPOC) noted "It's been very exciting to work with Daxor Corporation to help them take the next step with developing their novel blood volume analysis technology that will address military capability gaps and civilian trauma care for improving clinical decision making, quick selection of optimal treatment options, and maximizing health care."

At the successful completion of a phase II SBIR project in 2023, the Daxor Corporation with 59 MDW/ST support targeted a submission to the highly competitive AFWERX Tactical Funding Increase (TACFI) opportunity which awards government funding to match private investment funding. The teams partnered with the Center for Sustainment of Trauma and Readiness Skills (C-STARS) program at Cincinnati, OH as the end user. Colonel Valarie Sams, the Director for C-STARS, Cincinnati reported "Current diagnostics used to guide combat casualty care resuscitation and transfusion are unable to provide timely and accurate information that can facilitate precise treatments. This complex clinical scenario is further compounded by limitations in battlefield care resources, especially during prolonged field care, multi-domain operations, and en-route critical care. This technology will help mitigate this gap, improve outcomes, and save lives."

On 6 August 2024, the Daxor Corporation proposal was awarded a \$1.9M two-year contract from the AFWERX TACFI opportunity to advance the development of their novel fluorescent tracer and optical sensing technology into a next-generation point-of-care blood volume analyzer for military and civilian applications. The ongoing partnership with the 59 MDW/ST and C-STARS will continue to accelerate the development of their innovative technology, enabling precise blood volume measurement faster and more accessible in both combat casualty care and civilian use.

This blood volume analysis (BVA) diagnostic is revolutionizing current health care practices by equipping and enabling medical teams to quickly make more informed choices about fluid resuscitation and blood transfusions, improving patient survival rates and overall outcomes. The results are healthier patients who recover faster with fewer complications, improved quality of living, and shorter hospital stays which reduces health care costs for all.

Achievements Spotlight

Honors and Recognition

Challenges of Airway Management in Combat and Austere Environments

Author: 59th Medical Wing Chief Scientist's Office, Science & Technology



Medics from the 59th Medical Wing's and Brooke Army Medical Center's Extracorporeal Membrane Oxygenation and Critical Care Air Transport Teams care

We are pleased to extend our congratulations to Dr. Craig Nowadly (Major, USAF), Miss. Nola Shepard, Dr. Montane Silverman (CPT, USARMY) and Dr. Jason Rall, for their publication in the Journal of the American College of Emergency Physicians (JACEP) presenting their innovative translational research study that examines the efficiency of oxygenation through a portable oxygen concentrator (POC) device. The Journal of the American College of Emergency Physicians (JACEP) remains a source for cutting-edge studies and practical insights in the field of emergency medicine. Every month, JACEP releases articles that have been peer-reviewed and cover a range of topics related to emergency care, from developments to discussions on policies.

The research aimed to evaluate the performance of man-portable POCs in austere and resource-limited environments. Their study compared the oxygenation capabilities of these portable devices to traditional oxygen delivery systems in scenarios mimicking real-world emergencies. By exploring how well these POCs can support oxygenation in critical situations, the research highlights the potential advantages and limitations of using such technology in field settings.



FIGURE 2. Low-flow oxygen setup. Portable oxygen concentrator (POC) (Oxygen tubing #2) connects to low-flow reservoir (#3) of the ventilator (#4). Finally, the ventilator is connected to the patient using ventilator circuit (#5).

Their discoveries provide perspectives that may impact the advancement of medical devices in fields like military healthcare services, emergency medical responses, and remote healthcare solutions of the future. This research is vital in emergency care and battlefield treatment scenarios where efficient and lightweight oxygen supply systems can make a critical difference between survival and fatality.

We congratulate them on their contribution to advancing the field and dedication to improving patient outcomes in challenging environments.

For more information <https://pubmed.ncbi.nlm.nih.gov/39253303/>

Honors and Recognition

Impressive Contributions to Exploring Hypobaric Exposure in Aviation and Special Operations

Author: 59th Medical Wing Chief Scientist's Office, Science & Technology



A recent appreciation letter praised the work carried out by Dr. Paul Sherman and his research team from the National Atlantic Treaty Organization Science and Technology Organization Support Office (NATO STO CSO) on studying the effects of exposure on pilots and special operations personnel working at high altitudes. This letter represents the culmination of the NATO Human Factor in Medicine (HFM) research task group, chaired by Dr. Paul Sherman from 2015 to 2023.

The team's commitment and methodical approach have not only improved scientific understanding but also significantly improved the safety and well-being of individuals in these crucial professions.

The research team meticulously outlined their objectives demonstrating a systematic strategy for addressing the issue of hypobaric exposure. They examined the problem across domains ensuring that their study encompassed the diverse challenges faced by aviators and special operations personnel working at high altitudes. By delving into the underlying pathophysiology through genomic studies the team established a foundation, for comprehending how physiological and genetic factors impact individuals' responses to hypobaric conditions.

The significance of this study cannot be overstated, as it directly affects the safety, health and operational efficiency of pilots and special operations personnel at altitudes. Exposure to conditions entails risks such as decompression illness and cognitive impairments which can imperil mission success and lives. The team's commitment to understanding these challenges and devising risk reduction strategies reflects their professionalism and dedication to supporting those in service.

The letter, from the HFM Panel conveyed gratitude for the contributions of the research team. Their work embodies a culture of excellence and collaboration that defines NATO STO CSO. The HFM Panel takes pride in being associated with such a forward-thinking team, whose passion and expertise have significantly propelled medicine forward.

In summary the remarkable research done by the team showcases their pursuit of excellence. Their thorough and methodical approach, combined with a focus on applications has established a foundation for enhancing the safety, health and operational efficiency of aviators and special operations personnel at high altitudes. Their contributions hold not only importance but also offer substantial practical benefits that directly impact those in service. The HFM Panel expresses appreciation, for the team's commitment, knowledge, and steadfast dedication to advancing medicine.

Congratulations Dr. Sherman!!

Honors and Recognition

Dr. Robert Gerhardt Honored with the President's Bronze Volunteer Service Award

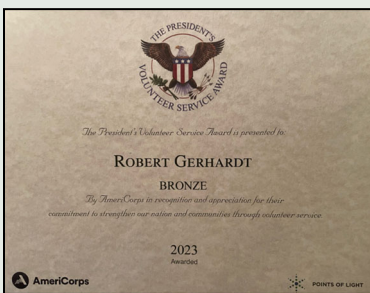
Author: 59th Medical Wing Chief Scientist's Office, Science & Technology



Dr. Gerhardt recently received the President's Bronze Volunteer Service Award recognizing his commitment to volunteering and community service. This esteemed honor is a part of the President's Volunteer Service Award (PVSA) initiative, designed to commend those who have dedicated time and energy to benefitting their communities. Dr. Gerhardt receiving the Bronze Award underscores his dedication to serving others, showcasing his passion, for enhancing lives and fostering well-being.

The President's Bronze Volunteer Service Award honors people who have dedicated their time to volunteering for 100 to 249 hours within a year. Dr. Gerhardt receiving this award marks an accomplishment and highlights the value of volunteer work in engaging with the community. His efforts have positively influenced lives showcasing the difference one person can make in society.

One of the standout aspects of Dr. Gerhardt's volunteerism is his ability to connect with people. His approach to service is characterized by empathy, compassion, and a genuine desire to help others succeed. Dr. Gerhardt has been a mentor to countless individuals, offering guidance, support, and encouragement to those in need. His mentorship has empowered others to pursue their own goals and aspirations, creating a ripple effect of positive change that extends beyond the immediate impact of his volunteer hours.



The President's Bronze Volunteer Service Award serves as a fitting recognition of Dr. Gerhardt's contributions and is also a reminder of the collective power of volunteerism. Dr. Gerhardt's example shows us that each hour spent in service to others can make a significant difference, and that through our collective efforts, we can create stronger, more resilient communities.

As we celebrate Dr. Gerhardt's achievement, we are reminded of the importance of service and the positive change it can bring. His dedication and commitment to volunteerism are an inspiration to us all, and we congratulate him on this well-deserved honor. Dr. Gerhardt's receipt of the President's Bronze Volunteer Service Award is not only a recognition of his past efforts but also a call to action for all of us at 59th Medical Wing to continue finding ways to serve and support our communities.

Congratulations Dr. Gerhardt!!

Honors and Recognition

Expert Guidance Sought on Interval Brain Imaging for Pre-Flight Medical Screening

Author: 59th Medical Wing Chief Scientist's Office, Science & Technology



The Medical Standards and Health Evaluation Working Group (MSHEWG) for the International Space Station program has critically reviewed brain imaging protocols for previously screened healthy individuals. Brain imaging is conducted at the time of selection and then once more before flight, provided no imaging has been completed within the two years preceding the mission. However, a proposal from National Aeronautics and Space Administration (NASA) suggests eliminating the pre-flight imaging requirement, streamlining processes, reducing costs, and minimizing time burdens. They argue that, historically, no disqualifying conditions have been identified during these screenings.

While the potential for operational efficiency is appealing, the internal team at the MSHEWG expressed reservations about the rationale. Although the incidence of disqualifying conditions—such as aneurysms—may be low, the consequences of missing such a finding could be catastrophic. The broader concern is that other serious, yet infrequent, pathologies may be overlooked if the imaging frequency is reduced.

To address these concerns and seek an informed consensus, on September 05, 2024, the Chair of the Medical Standards and Health Evaluation Working Group invited Dr. Paul Sherman, a leading expert in the field of neuroimaging, to contribute insights on the subject. Specifically, Dr. Sherman provided guidance on what constitutes a reasonable interval between imaging tests to detect interval changes in otherwise healthy individuals. Dr. Sherman recommended baseline screening magnetic resonance imaging/magnetic resonance angiography (MRI/MRA) and the Quarter 3 year screening exams.

The next step in the review process involves collaboration among all relevant agencies to establish a consensus. This consensus is expected to be based on a comprehensive understanding of the current evidence, with Dr. Sherman's expertise playing a pivotal role in shaping the recommendation. By ensuring all parties are equipped with shared, up-to-date information, the MSHEWG aims to reach a decision that balances the importance of safety with operational efficiency.

Dr. Sherman's presentation provided data and analysis to guide this discussion, ensuring that any policy changes prioritize the astronauts' health and the mission's operational integrity.

Congratulations Dr. Sherman!!

Honors and Recognition

Welcoming Our Newest Team Member Deputy Director for the Trauma and Clinical Care Directorate Dr. Madeliane Paredes, Ph.D

Author: 59th Medical Wing Chief Scientist's Office, Science & Technology



As we approach the new fiscal year, we are excited to announce and welcome the Trauma and Clinical Care Directorate new Deputy Director and Senior Scientist for the Joint Austere Medicine Research portfolio, Dr. Madelaine Paredes, Ph.D. With an impressive background Dr. Paredes has over 23 years of dedicated research experience including over 10 years of involvement in military medically related research projects. She received her Bachelor of Science degree in Microbiology from the Los Andes University in Bogota, Colombia, and her Ph.D. in Cellular and Structural Biology at the University of Texas Health Science Center San Antonio. Dr. Paredes brings a wealth of experience and has provided leadership across multiple sites to include the University of Texas Health Science Center, the DHA Institute of Surgical Research, Naval Medical Research Unit - San Antonio, and the Tri-Services Research Lab, prior to becoming a contract senior scientist with the 59th Medical Wing Science and Technology Division.

Prior to taking on this new assignment as Deputy Director, Dr. Paredes was engaged as a Senior Scientist for the Clinical Resuscitation, Emergency, Science, Triage, & Toxicology (CREST2) portfolio working alongside Colonel Joseph Maddry, focusing work on intravascular and extracorporeal resuscitation methods and technologies. In this role, she will be instrumental in driving forward our mission and ensuring continued innovation and excellence in our research efforts.

In her new role as Deputy Director and Senior Scientist, Dr. Paredes will no doubt make substantial and lasting contributions to the quality of work, the welfare of our staff, and to the furthering of the mission of the Trauma and Clinical Care Research (TCCR) directorate. Her arrival on the scene is most welcome.

We look forward to the vision and leadership that Dr. Paredes will bring to the team, and we are confident that their contributions will further enhance our work. Please join us in welcoming them to the team!

Welcome to the team!!

59th MDW Chief Scientist's Office and the Center for Personalized Medicine at the South Texas Veterans Health Care System Explore Potential Collaborations

Author: 59th Medical Wing Chief Scientist's Office, Science & Technology

The Joint Integrative Clinical Medicine (JICM) Directorate of the 59 MDW Chief Scientist's Office's facilitated a meeting to explore potential collaboration with the Center for Personalized Medicine at the South Texas Veterans Health Care System. This facility features two individual separate Biogenics Research Chambers that utilize clean room technology and custom distribution systems that can deliver a controlled bolus of 6 different validated allergens for testing.



These chambers provide a unique avenue to study allergic reactions, assess efficacy of new pharmacologics, and improve our understanding of how environmental factors and allergens contribute to asthma and other allergic diseases in a controlled environment. As it relates to DoD research, one of the FY23 Restoral funded studies at the 59 MDW Chief Scientist's Office is evaluating resilience to spatial disorientation in pilots and how those that are susceptible to an allergic response to aeroallergens may be more likely to develop spatial disorientation symptoms because of environmental stressors including demonstrating the relationship of spatial disorientation and allergic rhinoconjunctivitis.



The Butler Clinical Research Unit (BCRU) and Center for Personalized Medicine in a collaboration with the South Texas Veterans Health Care System and UT Health-San Antonio offers laboratory space and inpatient/outpatient exam rooms within the same facility. This conjoined space allows for clinician scientists and researchers to work directly with patients and patient samples all within the same unit for continuity of care.

The Center for Personalized Medicine has the capability to conduct large-scale genomic/transcriptomic (RNA-seq, scRNA-seq, WGS), epigenetic, epidemiologic, molecular biology, and translational research in multi-disciplinary research areas. They are currently focused on studying immune resilience (an individual's genetic predisposition to getting an infection and the severity of it), inflammatory stress, chronic heat stress, allergen challenge research, and infectious disease. A DoD Restoral project at the 59 MDW Chief Scientist's Office associated with this lab is looking at the effects of chronic heat stress on accelerated biological aging and immune resilience with respect to gender differences in warfighters.



There are several areas of overlap that align with the capabilities of BRCU and the Biogenics Research Chamber that fit into the JICM directorate. Specifically, their research involving infectious disease, translational research, precision medicine, and disease prognostics. The BRCU and Center for Personalized Medicine have a track record of collaborating with the DoD and VA and is interested in

59 MDW Office of Research and Technology Applications highlights importance of Technology Transfer (T2) at 2024 MHSRS

Author: 59th Medical Wing Chief Scientist's Office, Science & Technology

The Technology Transfer (T2) process is key for enabling the sharing of military innovations with other sectors and enhancing their adaptability and utility.

The 2024 Military Health System Research Symposium (MHSRS), held in August,



provided an opportunity for the 59th MDW ORTA to highlight one of their recent T2 efforts in the breakout session "From Theory to Practice: Transitioning S&T Findings into Actionable Knowledge." Dr. Beth Drees gave an oral presentation in this session, entitled "Technology Transfer (T2) Provides Law Enforcement with Lifesaving Access to DHA Medical Innovation" with co-authors Dr. Scott Walter and James Weissmann, also from the 59th MDW ORTA, and Major Savannah Jumpp, currently of the 86th MDS, Landstuhl Regional Medical Center.

The presentation provided an example of how military-developed healthcare solutions can improve civilian emergency response capabilities and enhance public health, DHA successfully shared a key training tool that the Maryland State Police Aviation Command (MSPAC) adopted to save lives of injured civilians.

The Blood Product Administration Scenario and toolkit was developed by Air Force Major Savannah Jumpp while serving at the 60th MDG at Travis Air Force Base in California, with funding from the TriService Nursing Research Program. This simulation-based scenario was originally designed for training military medical personnel to handle and administer blood products in challenging environments and emergency situations. Its effectiveness was confirmed in a study published in "Worldviews of Evidence-Based Nursing". The toolkit has been implemented for training in 76 Military Treatment Facilities (MTFs) across the DHA enterprise.

MSPAC sought to adapt this toolkit for training their helicopter medics, who often operate in austere conditions. The 59th Medical Wing's Office of Research and Technology Applications (ORTA) facilitated their adoption of the tool by negotiating a Use and Training Agreement which granted MSPAC access to the toolkit while safeguarding DHA's intellectual property and allowing the DHA to benefit from any future improvements. In July 2023, MSPAC implemented the "Blood on Board" project across all its command bases, making Maryland the first state to provide this lifesaving service on a statewide scale.

The project's success highlights the versatility of military medical innovations in addressing public health needs. By transferring military-developed knowledge to civilian use, initiatives like this improve public health and safety.

Center for Advanced Molecular Detection (CAMD)

Monthly Scientific Presentations

The Center for Advanced Molecular Detection (CAMD) has been hosting monthly Scientific Presentations since January of 2021. These presentations have undergone significant evolution since their inception, initially involving scientists solely within the 59th MDW Science and Technology group.

The format of these presentations can be either in person or virtual, thereby greatly increasing the accessibility and participation of a wider range of individuals. Those interested in participating or attending these scientific presentations can contact the CAMD Director, Dr. Susana N. Asin, at Susana.n.asin.civ@health.mil or by phone at 210-292-0504.

Nonprofit Works with 59th MDW to Fund Military Medical Research

Author: 59th Medical Wing Chief Scientist's Office, Science & Technology



JOINT BASE SAN ANTONIO-LACKLAND – The Henry M. Jackson Foundation (HJF), a nonprofit organization dedicated to advancing military medicine, collaborated with the Air Force's 59th Medical Wing Office of the Chief Scientist, Science & Technology (59MDW/ST), to provide the Clinician Scientist Investigator Opportunity Network (CSION) up to \$50,000 each year in 2022, 2023 and 2024 to fund DHA requirements-driven proposals developed by the CSION fellows.

The program shepherds promising active-duty clinicians whose work has practical applications on the path of becoming clinician-scientists. As HJF supports research and education throughout the military medical community and 59MDW/ST focuses on assisting clinical investigators and growing their research experiences, this endeavor will assist these awardees in developing their research portfolios and becoming future military research leaders.

In 2024, HJF funded three CSION proposals:

The first awardee is CSION Fellow U.S. Air Force Maj. Theodore Hart, M.D., funded for the project "Localization of Noncompressible Torso Hemorrhage Using Minimally-Invasive Endovascular Techniques to Detect Battlefield Relevant Injuries in Swine (*Sus scrofa*): A Pilot Study." This study aims to develop a method to initially detect and localize injuries to aortic branch vessels and solid organs in a minimally-invasive, endovascular manner. The goal is to facilitate less morbid, less resource-intensive, semi-automatic endovascular treatments in the forward hospital environment.

The second awardee is CSION Fellow U.S. Army MAJ Ryan McMahon, M.D., funded for the project "Defining the Prolonged Care Capability Gap – Quantifying the Critical Task Skill Advancement from Generalist to Surgical Physician Assistant." This study aims to quantify the capability of a generalist physician assistant to correctly prioritize common post-operative complications and to identify the difference in ability following formal surgical training. The overall goal is to increase DoD capability and capacity to provide sustained damage control surgery and resuscitative care throughout the continuum of care.

The third awardee is CSION Fellow Army Civilian Dr. Craig Woodworth, PsyD., funded for the project "Qualitative Interviews on the Process of Processing in Written Exposure Therapy." This study aims to examine the mechanisms of change in trauma processing with written exposure therapy (WET) and identify reasons for favorable and unfavorable outcomes following completion of this intervention. The overall goal is to (1) provide support for implementation guidelines and optimize patient outcomes for healthcare providers delivering WET, (2) provide continued support for its use as a recommended trauma-focused intervention in the clinical practice guidelines (CPGs) for PTSD, (3) enhance didactic training and education materials on WET for behavioral health and other military professionals to encourage broader dissemination, improve access to and quality of care, and address the health, performance, and readiness of service members.

The CSION program is unique in that it is tri-service, Corps neutral, has no service obligation, and is focused on its research mission rather than degree granting. The pipeline a CSION fellow follows is tailored to the needs of the military mission. With no service obligation, motivated members are offered a non-financial incentive to remain in a career tract specifically designed to retain research-focused medical academics in the military. The program is supported by the 59th MDW Office of the Chief Scientist, Science & Technology (ST), and all their partners with the United States Army Institute of Surgical Research (USAISR), San Antonio Military Health System (SAMHS), SAUSHEC, and Naval Medical Research Unit San Antonio (NAMRU-SA) to provide mentors willing to train and mentor clinician scientists in all areas of (DHP RDT&E) programmatic research.

HJF is proud to support these three CSION Fellows on their path to making a real-world difference in the health outcomes of military members and in furthering research on these important topics.

Science and Technology Contact Information



Our Vision

Grow Medical Leaders, Drive Innovations in Patient Centered Care and Readiness

Our Mission

Conduct clinical studies and translational research and apply knowledge gained to enhance performance, protect the force, and advance medical care and capabilities

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