

MEETING THE CHANGING THREAT
THROUGH MILITARY MEDICAL RESEARCH



MHSRS
2024

Breakout Sessions

Thursday, 29 August



MHS Military Health System
health.mil

BREAKOUT SESSIONS

Thursday, 29 August | 0845 – 1045

Innovative Technologies and Devices for Treatment of Battlefield Wounds in Prolonged Care to Prevent Infection

Moderators: Arthi A. Amin, Ph.D., LTC Sheila Johnson, USA, Brian Coyne, B.S.

LOCATION: Sun A

- 0845 – 0900** **Introduction** (MHSRS-24-NA-08)
Presenters: Arthi A. Amin, Ph.D., LTC Sheila Johnson, USA
- 0900 – 0915** **Histological Analysis of Cortical Bone Following Standard and Novel Treatments Against Biofilms** (MHSRS-24-13392)
Presenter: Dustin Williams, Ph.D.
- 0915 – 0930** **Development of Klebsiella Synthetic Phages to Overcome the Resistance to Promote Wound Healing Process** (MHSRS-24-12237)
Presenter: Alexander M. Ditzel, Ph.D.
- 0930 – 0945** **Phage-Mimicking Nanoparticles, Conjugated to Antimicrobial Peptides or Antimicrobial Polymers, Exhibit Broad-Spectrum Antibacterial Activity Against ESKAPE Pathogens in Liquid Phase or Immobilized Phase** (MHSRS-24-13533)
Presenter: Prakash D. Nallathamby, Ph.D.
- 0945 – 1000** **Transdermal Delivery of High Molecular Weight Antibiotics to Deep Tissue Infections via Droplet Micromist Technology Device (DMTD)** (MHSRS-24-12964)
Presenter: Hongmin Sun, Ph.D.
- 1000 – 1015** **Multi-Modal Polymer Technology for Multi-Modal Point of Injury Infection Prevention and Wound Management** (MHSRS-24-13346)
Presenter: Lucas Duncan, M.S.
- 1015 – 1030** **Antibacterial Efficacy of a Chitosan-Based Hydrogel Loaded with Epsilon-Poly-L-Lysine and Poly(I:C)-Extracellular Vesicles for the Control of Polymicrobial Extremity Wound Infections in a Porcine Polytrauma Model** (MHSRS-24-11743)
Presenter: Lisa Pierce, DSc
- 1030 – 1045** **A Novel, Reverse-phase-shifting, Thermoreversible Foaming Hydrogel Containing Antibiotics for the Treatment of Traumatic Tissue Injuries in a Swine Model – A Pilot Study** (MHSRS-24-11592)
Presenter: Ross I. Donaldson, M.D., MPH

Clinical Studies to Advance Combat Casualty Care

Moderators: Kimberly B. Pope, Ph.D., George Jiang, M.D.

LOCATION: Sun B

- 0845 – 0900** **Does Hypertonic Saline After Damage Control Laparotomy Improve Primary Fascial Closure? A Multi-Center Randomized Control Trial** (MHSRS-24-11762)
Presenter: 2ndLt Mayar Osman, USAF
- 0900 – 0915** **A Multicenter, Prospective Study of Calcium Derangements on Arrival After Major Traumatic Injury** (MHSRS-24-11419)
Presenter: Susannah E. Nicholson, M.D., M.S.
- 0915 – 0930** **Noninvasive Ventilation for Preoxygenation During Emergency Intubation** (MHSRS-24-11473)
Presenter: Adit Ginde, M.D., MPH

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BREAKOUT SESSIONS

Thursday, 29 August | 0845 – 1045

- 0930 – 0945** **ProPatch: A Next-Generation Patient Monitor and Results from Trauma Intensive Care Unit Patients**
(MHSRS-24-10852)
Presenter: Alexi Charalambides, Ph.D.
- 0945 – 1000** **Safety and Efficacy Findings from a pProspective, Case-controlled Evaluation of oLlceridine for Moderate or sEVEre Pain in Patients with Acute Burn Injuries (RELIEVE)** (MHSRS-24-13557)
Presenter: David Hill, Pharm D
- 1000 – 1015** **Acute Epithelial and Adaptive Immunologic Responses Risk-Stratify Organ Failure in Multiply Injured Patients**
(MHSRS-24-13037)
Presenter: Todd McKinley, M.D.
- 1015 – 1030** **Non-Operative Treatment of Humeral Shaft Fractures with Immediate Functional Bracing versus Coaptation Splinting and Delayed Functional Bracing: A Retrospective Study** (MHSRS-24-12393)
Presenter: Maaz Muhammad, M.D.
- 1030 – 1045** **Interim Prospective Study Analysis of Mobile Health Applications to Discern the Presence of mild Traumatic Brain Injury in a Civilian Trauma Population** (MHSRS-24-11852)
Presenter: Neeraj Badjatia, M.D.

Managing Fatigue in the DoD: Methodologies for Sleep and Circadian Measurement

Moderator: Malena B. Rone, Ph.D.

LOCATION: Sun C

- 0845 – 0900** **Studying the Circadian Clock and Sleep Homeostasis Using Proteomic Data** (MHSRS-24-12465)
Presenter: Adrien Specht, M.S.
- 0900 – 0915** **Using the Brain's Default Mode Network to Predict Cognitive Fatigue During Prolonged Wakefulness**
(MHSRS-24-12547)
Presenter: COL William Killgore, USAR
- 0915 – 0930** **Transcranial Electrical Synchronization of Slow Oscillations to Enhance Deep Sleep at Home for Healthy Adults**
(MHSRS-24-10989)
Presenter: Kyle Morgan, Ph.D.
- 0930 – 0945** **Focused Ultrasound Neuromodulation of the Thalamus to Increase Alertness and Improve Reaction Time**
(MHSRS-24-13456)
Presenter: Cameron Good, Ph.D.
- 0945 – 1000** **Towards Glymphatics Measurement in the Frontal Cortex Using Near-Infrared Spectroscopy (NIRS) and a Link to Sleep Apnea** (MHSRS-24-11766)
Presenter: CDR J. Kent Werner, USN
- 1000 – 1015** **EEG Markers from Routine Sleep Discriminate Individuals Who Are Vulnerable or Resilient to Sleep Loss**
(MHSRS-24-12072)
Presenter: Jaques Reifman, Ph.D.
- 1015 – 1030** **Correlations between Physiological Sleep Metrics Collected Using Wearable Devices and Self-reported Fatigue: A Demonstration of the Potential of High-dimensional Physiological Landscape Mapping using Source-agnostic Big Data** (MHSRS-24-11111)
Presenters: Ashley Mason, Ph.D., Ben Smarr, Ph.D.
- 1030 – 1045** **The Importance of Good Sleep and Supportive Leadership During Arctic Operations** (MHSRS-24-12217)
Presenter: MAJ Rachell Jones, USA

BREAKOUT SESSIONS

Thursday, 29 August | 0845 – 1045

Applications of Artificial Intelligence in Psychological Disorders

Moderator: Ruoting Yang, Ph.D.

LOCATION: Sun 4

- 0845 – 0900** **Biomarker Panel to Objectively Distinguish Different Stage of Alzheimer’s Disease Using a Machine Learning Algorithm: Biomarker Discovery Process at Binomial Decision Point (2BDP) (MHSRS-24-10879)**
Presenter: Nabarun Chakraborty, MBA
- 0900 – 0915** **Multimodal Molecular Features Correlating with Key Clinical Characteristics of PTSD in Army Veterans and Active-Duty Military Personnel (MHSRS-24-12676)**
Presenter: Seid Muhie, Ph.D.
- 0915 – 0930** **Deep Learning Identifies DNA Methylation Signatures of PTSD in Military Personnel (MHSRS-24-12834)**
Presenter: Ruoting Yang, Ph.D.
- 0930 – 0945** **Individual Physiological Response Profiles Distinguish between PTSD and Non-PTSD in Military Participants (MHSRS-24-13098)**
Presenters: Nicolas Ricka, Ph.D., Denis Fompeyrine, Ph.D.
- 0945 – 1000** **Measuring the Effectiveness of AI Wearables and a Synchronized Mental Wellness Mobile App on Symptoms of Mental Health in Military Service Members (MHSRS-24-12478)**
Presenter: Brandi Walker, Ph.D.
- 1000 – 1015** **Core Epigenetic Module Biomarkers Among Various PTSD Subtypes (MHSRS-24-12840)**
Presenter: Dewayne Dixon, Ph.D.(c)
- 1015 – 1030** **Comparison of ChatGPT vs. Human-coded Machine Learning Prediction of Autism Spectrum Disorder (MHSRS-24-12645)**
Presenter: Lt Col Cubby Gardner, USAF
- 1030 – 1045** **Forecasting Stress with Biomarkers and Wearable Sensors (MHSRS-24-11958)**
Presenter: Himanshu Thapliyal, Ph.D.

Advances in Blast Polytrauma: Implications to Warfighter Function and Combat Casualty Care

Moderators: Michael J. Urban, Ph.D., Pamela VandeVord, Ph.D.

LOCATION: Coastal A

- 0845 – 0900** **The Effect of Blast Overpressure Exposure on the Development of Gene Markers of End Organ Injury and Muscle Tissue Osteo-chondrogenesis in a Combat Applicable Model of Complex Lower Limb Trauma (MHSRS-24-11410)**
Presenter: CDR Philip Spreadborough, Royal Navy, United Kingdom
- 0900 – 0915** **Cutaneous Burn Injury Represents a Major Risk Factor for the Development of Traumatic Ectopic Bone Formation Following Blast-Related Extremity Injury (MHSRS-24-11284)**
Presenter: CDR Philip Spreadborough, Royal Navy, United Kingdom
- 0915 – 0930** **Novel Method for Evaluation of the Effects of Rotary Wing Transport on a Large Animal Polytrauma Model (MHSRS-24-11360)**
Presenter: Rachel Kinsler, M.S.

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BREAKOUT SESSIONS

Thursday, 29 August | 0845 – 1045

- 0930 – 0945** **Directional Blast-Induced Polytrauma and Military-Relevant Stress Effects on Acute Craniofacial Pain, Lower Extremity Pain, and Behavior in Rodents (MHSRS-24-12796)**
Presenter: Michael Urban, Ph.D.
- 0945 – 1000** **Biomechanical Mechanisms and Pathophysiology-based Human Lumbar Spine Human Injury Probability Curves from Blast Loading Using Clinical Classification of Injuries (MHSRS-24-11456)**
Presenter: Narayan Yoganandan, Ph.D.
- 1000 – 1015** **Investigation of Blood-Brain Barrier Permeability Changes following Blast Overpressure Exposures Using Protein-templated Fluorescent Metal Nanoclusters (MHSRS-24-12305)**
Presenter: Venkata (Rama) Kakulavarapu, Ph.D.
- 1015 – 1030** **Potential Biomechanical Scaling Metrics for Primary Blast across Multiple Species (MHSRS-24-12746)**
Presenter: YungChia Chen, Ph.D.
- 1030 – 1045** **Indirect Traumatic Optic Neuropathy Induced by Primary Blast: A Fluid-Structure Interaction Study (MHSRS-24-11877)**
Presenter: Jose Colmenarez, M.S.

Military Injury Biomechanics for the Prevention of Behind Helmet and Behind Armor Blunt Trauma

Moderators: Frederick T. Brozowski, M.S., Thuvan Piehler, Ph.D.

LOCATION: Coastal C

- 0845 – 0900** **Two Lethal Cases of Behind Armor and Behind Helmet Blunt Trauma (MHSRS-24-13397)**
Presenter: CPT Ben Levi, IDF
- 0900 – 0915** **Characterization of Deep Tissue Contusions from Behind Armor Blunt Trauma (MHSRS-24-11904)**
Presenter: Alexander Stotka, B.S., Ph.D.(c)
- 0915 – 0930** **Lung Injury Risk Curves from Behind Armor Blunt Trauma Using a Live Swine Model (MHSRS-24-11491)**
Presenter: Narayan Yoganandan, Ph.D.
- 0930 – 0945** **Structural Scaling between Human and Swine Cadaver for Behind Armor Blunt Trauma Injury Criteria (MHSRS-24-12620)**
Presenter: Cameron Bass, Ph.D.
- 0945 – 1000** **Review of Impact Systems for Development of Generalized Injury Risk Curves Related to Behind Armor Blunt Trauma (MHSRS-24-11553)**
Presenter: Narayan Yoganandan, Ph.D.
- 1000 – 1015** **The Effects of Armor Fit and Body Habitus on Behind Armor Blunt Trauma Risk (MHSRS-24-13468)**
Presenter: Alexander Iwaskiw, M.S.
- 1015 – 1030** **Characterization and Projected Operational Injury Outcomes of Behind Armor Blunt Trauma in the Lower Abdominal Region (MHSRS-24-13332)**
Presenter: Nadeau Hahne, M.S.
- 1030 – 1045** **Finite Element Ovine Thorax Model (FE-OTM) Validation for High-Rate Non-Penetrating Blunt Impact (NPBI) Environment (MHSRS-24-12134)**
Presenter: Julliette Caffrey, M.S., Ph.D.(c)

BREAKOUT SESSIONS

Thursday, 29 August | 1115 – 1315

Update in Emerging Infectious Diseases of Military Importance: Predicting and Preventing Future Outbreaks in Military Settings

Moderators: CAPT Andrew G. Letizia, USN, Simon Pollett, MBBS

LOCATION: **Coastal A**

- 1115 – 1130 **Using Regional AMR Surveillance to Monitor and Predict Rates of Multidrug and Extensively Drug-Resistant ESKAPEE Pathogens in Southeast Asia** (MHSRS-24-13536)
Presenter: MAJ Sidhartha Chaudhury, USA
- 1130 – 1145 **Exploring the Blood Microbiome of Acute Febrile Illness Patients Using Next-Generation Sequencing** (MHSRS-24-12667)
Presenter: Shirley Nimo-Paintsil, Ph.D.
- 1145 – 1200 **Wastewater Surveillance Insights from the Field: Translating Globally Deployed, Commercial-Ready Technologies for Force Health Protection and Readiness** (MHSRS-24-11364)
Presenter: Cecilia Prator, Ph.D.
- 1200 – 1215 **A Rapid Host Response Blood Test for Bacterial/Viral Infection Discrimination Using a Portable Molecular Diagnostic Platform** (MHSRS-24-13523)
Presenter: Christopher Wodos, Ph.D., MPH
- 1215 – 1230 **A Wearable Photonic Device for Distinguishing Bacterial and Viral Infections** (MHSRS-24-12171)
Presenter: Zuan-Tao Lin, Ph.D.
- 1230 – 1245 **Qualitative Profiling of Specific Orthohantavirus Epitopes Using Domain Programmable Arrays (DPA)** (MHSRS-24-12458)
Presenter: Raina Kumar, M.S.
- 1245 – 1300 **Discovery of Dual Functional Immunomodulatory and Intrinsic Antiviral Drugs Against Coronavirus Diseases** (MHSRS-24-13213)
Presenter: Giulia Monticone, Ph.D.
- 1300 – 1315 **Integrated, Rapid Antibody Discovery and Cell Line Development to Truncate Timelines for Manufacturing Readiness** (MHSRS-24-12382)
Presenter: Talita Mitchell, Ph.D.

Novel Strategies for Treatment of Shock or Blood Failure: Blood and Blood Products

Moderator: Michael Adam Meledeo, Ph.D.

LOCATION: **Coastal C**

- 1115 – 1130 **Prehospital Pooled Frozen Solvent Detergent Plasma in a Nonhuman Primate Polytrauma Hemorrhage Model** (MHSRS-24-11569)
Presenter: Alejandra Lorenzen, B.S.
- 1130 – 1145 **Early Cold Stored Platelet Transfusion in Severely Injured Patients: Results of a Randomized Clinical Trial** (MHSRS-24-10900)
Presenter: Jason Sperry, M.D.
- 1145 – 1200 **VS-101, a Next-Generation PEGylated HBOC, Improves Survival from Severe Transient Hemorrhagic Shock in Rats** (MHSRS-24-12365)
Presenter: Bjorn Song, Ph.D.

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BREAKOUT SESSIONS

Thursday, 29 August | 1115 – 1315

- 1200 – 1215** **The USCENTCOM Walking Blood Bank Performance Benchmark and Anticipated Benefit of Universal Low Titer Type O Screening (MHSRS-24-10945)**
Presenter: Lt Col Andrew Hall, USAF
- 1215 – 1230** **VBI-1 Intraarterial Infusion of Phospholipid Nanoparticles: Addressing Neurological Challenges in Severe Hemorrhagic Shock (MHSRS-24-13029)**
Presenter: Philemon Shallie, Ph.D.
- 1230 – 1245** **A Novel APEX™ Additive Solution for Extended Storage Whole Blood Maintained Hemostatic Function Throughout 56 Days of Cold Storage (MHSRS-24-11678)**
Presenter: Kristin Reddoch-Cardenas, Ph.D.
- 1245 – 1300** **The Novel Anticoagulant Diethylenetriamine Pentaacetic Acid (DTPA) Improves Platelet Count and Hemostatic Function Compared to Citrate in Refrigerated, Stored Whole Blood (MHSRS-24-11075)**
Presenter: Maj Maximilian Feth, German Armed Forces
- 1300 – 1315** **Investigation of the Historical Use of Postmortem Blood Transfusion in Military Medicine and Review of Current Ethical and Regulatory Considerations (MHSRS-24-13535)**
Presenter: Richard Gonzales, M.S.

Solutions Addressing Behavioral Health Clinician Shortage - Leveraging Telebehavioral Health

Moderators: Sharmila A. Chari, Ph.D., Tim Hoyt, Ph.D., MBA

LOCATION: Sun A

- 1115 – 1130** **How Often Do Non-Behavioral Health Soldiers Offer Behavioral Health Support? (MHSRS-24-13132)**
Presenter: Katie Nugent, Ph.D.
- 1130 – 1145** **Social-Emotional, A.I.-Powered Avatars in Extended Reality Simulations: Solutions Addressing Behavioral Health Clinician Shortages for the Warfighter (MHSRS-24-11146)**
Presenter: Clint Carlson
- 1145 – 1200** **Adaptation of Rational Thinking, Emotion Regulation, and Problem Solving (REPS) as a Mental Fitness Mobile Application (MHSRS-24-12881)**
Presenter: Jessica LaCroix, Ph.D.
- 1200 – 1215** **A Low-profile Wearable Device and Configurable Software Platform Providing On-demand Telebehavioral Health and Supporting Optimized Care of Patients for Substance Abuse Disorder with Comorbid Psychiatric Illness in Military and Civilian Populations (MHSRS-24-12021)**
Presenter: Scott Pappada, Ph.D.
- 1215 – 1230** **Bridging Behavioral Sleep Medicine Capability Gaps in the DHA/DoD: Effectiveness of a Digital Clinical Decision Support Platform (MHSRS-24-11468)**
Presenter: Anne Germain, Ph.D.
- 1230 – 1245** **The Effectiveness and Applicability of a Heart Rate Variability Assessment and Training Telemedicine System in Remote Settings (MHSRS-24-13292)**
Presenter: Lauren Scroggs, Ph.D.
- 1245 – 1300** **Development of a Novel Diagnostic Test for Post-Traumatic Stress Disorder: A Pilot Study (MHSRS-24-12514)**
Presenter: Audrey Reider, M.S.
- 1300 – 1315** **Vision and Path Toward Enhancing Medical Readiness Through Artificial Intelligence (MHSRS-24-11882)**
Presenter: Ellie Gordon, B.A.

BREAKOUT SESSIONS

Thursday, 29 August | 1115 – 1315

Musculoskeletal Injury Prevention: Highlighting Vulnerable Warfighters

Moderator: Joseph G. Wasser, Ph.D.

LOCATION: Sun B

- 1115 – 1130** **Increases in Musculoskeletal Diagnosis Rates Corresponding with the Transition to the Army Combat Fitness Test (MHSRS-23-11781)**
Presenter: Josh Kazman, M.S.
- 1130 – 1145** **Timing of Radiologically Confirmed Bone Stress Injuries by Severity During U.S. Army Basic Combat Training: The ARMI Study (MHSRS-24-12051)**
Presenter: Patrick Cummings, M.S.
- 1145 – 1200** **Route of Hormonal Contraception Administration Modifies Stress Fracture Risk in Early-Career Female U.S. Army Soldiers (MHSRS-24-12507)**
Presenter: Emily Ricker, Ph.D.
- 1200 – 1215** **Emotion-Focused Coping, but Not Performance Psychology, Is Related to Self-Reported Musculoskeletal Pain During Training in Marine Corps Officers (MHSRS-24-12795)**
Presenters: Maria Canino, Ph.D., Nikki Barczak-Scarboro, Ph.D.
- 1215 – 1230** **The Influence of Therapeutic Exercise on Subsequent Occurrence of Lower Extremity Musculoskeletal Dysfunction Within One Year of a Low Back Pain Diagnosis in the Military Health System (MHSRS-24-12718)**
Presenter: Daniel I. Rhon, PT, DSc, Ph.D.
- 1230 – 1245** **Biomechanical Study of Different Surgical Approaches to Prevent Secondary Injury for Warfighters: A Finite Element Analysis (MHSRS-24-12008)**
Presenter: Hoon Choi, Ph.D.
- 1245 – 1300** **Variations in Treatments and Outcomes for Musculoskeletal Disease Patients in the Navy Medicine Temporary Limited Duty (LIMDU) Program (MHSRS-24-11854)**
Presenter: Alicia Watson, MPH
- 1300 – 1315** **Using the Practical, Robust, Implementation and Sustainability Model (PRISM) Implementation Framework to Guide Musculoskeletal Injury Prevention Strategy Development in United States Marine Corps Infantry Training (MHSRS-24-12451)**
Presenter: Joshua Waters-Jackson, ATC, TSAC-F

BREAKOUT SESSIONS

Thursday, 29 August | 1115 – 1315

Challenges and Opportunities of High Volume, Prolonged Medical Mobility and CASEVAC During Large Scale Combat Operations

Moderators: Lt Col Nelson Pacheco, USAF, Rachel Kinsler, M.S.

LOCATION: Sun C

- 1115 – 1130** **Preliminary Field Evaluation of Assistive Devices on Carry Distance and Time During Two-Person Litter Transport Scenarios** (MHSRS-24-12809)
Presenter: Alexis S. Stewart, M.S.
- 1130 – 1145** **A Human Performance Model of Aeromedical Evacuation Missions** (MHSRS-24-11142)
Presenters: Suma Subbarao, M.S., Gina Calloway, Ph.D.
- 1145 – 1200** **Recreating the Vigorous Warrior and Clean Care Exercises In-Silico: A Proof-of-Concept Study for the Digital Transformation of Military Medical Support** (MHSRS-24-11614)
Presenter: Mehdi Benhassine, Ph.D.
- 1200 – 1215** **Assessment of Remote Patient Management System Clinical Monitoring in a Ground Simulation of an Airborne Casualty Evacuation Transport Environment** (MHSRS-24-11155)
Presenter: Amy Lloyd, M.S.
- 1215 – 1230** **Diaphragmatic Neurostimulation Is Feasible and Safe in Deeply Sedated ARDS Patients - A Novel Solution for En Route or CASEVAC Transportation** (MHSRS-24-10951)
Presenter: Thiago Bassi, M.D., Ph.D.
- 1230 – 1245** **AeroVitalGuard/4TDS En-Route Care Management System** (MHSRS-24-12882)
Presenter: Christopher Nemeth, Ph.D.
- 1245 – 1300** **En Route Casualty Care (ERCCC) in Ukraine / Critical Care Transport Post Damage Control Surgery (DCS) in Large Scale Combat Operations (LSCO)** (MHSRS-24-11305)
Presenter: John Quinn, M.D., MPH, Ph.D.
- 1300 – 1315** **Pilot Evaluation of Central Monitoring Impact on Time to Event Recognition During Large Volume Air Transport Simulations** (MHSRS-24-12245)
Presenter: Maj Nicholas Villalobos, USAF