

EXTREMITY WAR INJURIES XIV

Emerging Combat and Readiness Research

January 22-23, 2019 • Washington, DC



Grantor & Exhibitor Acknowledgements

Gold

DePuy Synthes - Grantor
Flexion Therapeutics - Grantor
Sparta Science
Stryker Orthopaedics
Vericel Corporation

Silver

Acumed - Grantor
Arthrex Inc
Zimmer Biomet - Grantor

Exhibitor

NUTEK Orthopaedics, Inc.
ZetrOZ "sam Systems"

Message from the Program Co-Chairs



Dear Colleagues:

We would like to welcome you to the Society of Military Orthopaedic Surgeons (SOMOS) / Orthopaedic Trauma Association (OTA) / American Orthopaedic Society for Sports Medicine (AOSSM) 2019 Research Symposium, Extremity War Injuries XIV: Evolving Combat Care and Readiness Research Symposium (EWI XIV).



For the fourteenth annual EWI event, the program is divided into six general sessions: Each session will have 4-5 didactic presentations, followed by questions and answers. There will be small group discussion breakout sessions at the end of each day. There will also be concurrent Trauma and Readiness tracks.

The SOMOS, OTA, and AOSSM have all given their support to EWI XIV to promote its dual aims of strengthening existing collaborations with the military and to also promote the most important new advances. We anticipate continuing on the strong tradition of previous EWI conferences that have been so important in improving the care of extremity trauma and influencing future research work. This year's conference is notable for continued emphasis of readiness issues that are the focus of the sports medicine community.

We look forward to another EWI meeting that will lead to new collaborations, improve the care of military and civilian patients, and help drive the future work aimed at improving the care of our patients and of all participants. Thank you for your involvement.

Respectfully,

LTC Jonathan F. Dickens, MD
Robert V. O'Toole, MD
EWI Symposium Co-Chairs

How to Download the Meeting App

1. Click on the [App Store](#)
2. Search, "[DTMS](#)"
3. Download "[DTMS Meeting Programs](#)"
4. Click: [Open](#)
5. "[DTMS](#)" Would Like to Send you Notifications: Click: [Allow](#)
6. Once the app downloads, click "[EWI XIV](#)"

Keynote Speakers



Vice Admiral Raquel C. Bono

Commissioned in June 1979, Vice Admiral Bono obtained her baccalaureate degree from the University of Texas at Austin, and attended medical school at Texas Tech University. She completed a surgical internship and a General Surgery residency at Naval Medical Center Portsmouth, and a Trauma and Critical Care fellowship at the Eastern Virginia Graduate School of Medicine.

Her senior officer assignments include: Executive Assistant to the 35th Navy Surgeon General and Chief, Bureau of Medicine and Surgery; Commanding Officer, Naval Hospital Jacksonville; Chief of Staff, Deputy Director, Tricare Management Activity; Deputy Director, Medical Resources, Plans and Policy, Chief of Naval Operations; Command Surgeon, U.S. Pacific Command; Director, National Capital Region Medical Directorate, Defense Health Agency and the 11th Chief, Navy Medical Corps.

Vice Admiral Bono is a Diplomat of the American Board of Surgery and has an Executive MBA from the Carson College of Business at Washington State University. Her personal decorations include the Defense Superior Service Medal (three), Legion of Merit Medal (four), Meritorious Service Medal (two), and the Navy and Marine Corps Commendation Medal (two).



Rear Admiral Bruce L. Gillingham

Rear Admiral Bruce L. Gillingham is a native of San Diego. He holds a Bachelor of Arts in Cultural Anthropology (with high honors) from the University of California, San Diego and a Doctor of Medicine from the Uniformed Services University of the Health Sciences. He is an inductee in the medical honor society of Alpha Omega Alpha.

Rear Admiral Gillingham completed a surgical internship and an orthopedic residency at Naval Medical Center San Diego. He also completed subspecialty training as a pediatric orthopedic surgeon at the Hospital for Sick Children in Toronto, Canada in 1995. Additionally, he is qualified as an undersea and diving medical officer.

He has served in various positions throughout Navy Medicine including Director of Pediatric Orthopedic and Scoliosis Surgery, Associate Orthopedic Residency Program Director, and Director of Surgical Services. While assigned to Naval Medical Center San Diego, he was instrumental in establishing the Comprehensive Combat and Complex Casualty Care Center (C5).

Rear Admiral Gillingham currently serves as the Director of Medical Resources, Plans and Policy (N0931) at the Office of the Chief of Naval Operations. His personal awards include the Legion of Merit (seven), Meritorious Service Medal, Navy and Marine Corps Commendation Medal (two), and Navy and Marine Corps Achievement.



Terry M. Rauch, PhD

Dr. Terry M. Rauch is currently the acting Deputy Assistant Secretary of Defense for Health Readiness Policy and Oversight (HRP&O). In addition, he serves as the HRP&O Director of Medical Research and Development (R&D) for deployment medicine and force health protection.

Dr. Rauch also represents the DoD R&D community in international health agreements and domestic federal and non-government partnerships in an effort to better serve missions, and enhance medical readiness for 2.3 million servicemembers through cross-collaborations.

Dr. Rauch has more than 35 years of experience in many facets of the Military Health System and has held numerous senior-level positions in the Army and the Office of the Secretary of Defense. After retiring from the U.S. Army in October 2005 at the rank of Colonel, he joined the Science Applications International Corporation (SAIC) as a Senior Principal Life Scientist. At SAIC, he focused on comprehensive strategic planning and analysis for the Office of the Secretary of Defense on matters relating to defense biomedical research, development and acquisition investment strategies and their supporting infrastructure.

Dr. Rauch received a Bachelor of Science degree in psychology from the University of Cincinnati, where he also earned his PhD in biology and psychology.

Extremity War Injuries XIV

Emerging Combat and Readiness Research

Grand Ballroom A unless otherwise indicated

Symposium Co-Chairs: LTC Jonathan F. Dickens, MD and Robert V. O'Toole, MD

Scientific Director: CDR Scott M. Tintle, MD

EWI Oversight Chair: Andrew H. Schmidt, MD

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American Academy of Orthopaedic Surgeons and the Society of Military Orthopaedic Surgeons. The American Academy of Orthopaedic Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

The American Academy of Orthopaedic Surgeons designates this live activity for a maximum of 14.25 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

January 21, 2019

9:00 am - 5:00 pm	STaR Meeting	3:00 pm - 5:30 pm	EWI Symposium Check In (Foyer)
-------------------	---------------------	-------------------	---------------------------------------

January 22, 2019

6:30 am	EWI Symposium Check In (Foyer)	8:20 am - 8:45 am	KEYNOTE SPEAKER Current Challenges and Opportunities for the DHA VADM Raquel C. Bono, MD Director, Defense Health Agency
6:30 am - 7:00 am	Coffee (Grand Ballroom B)		
7:00 am - 7:05 am	Symposium Welcome Robert V. O'Toole, MD University of Maryland School of Medicine	8:45 am - 9:00 am	Discussion
7:05 am - 7:15 am	EWI 2019: Why Are We Here and Meeting Goals LTC Jonathan F. Dickens, MD Walter Reed National Military Medical Center	9:00 am - 9:20 am	BREAK (Grand Ballroom B)
7:15 am - 7:45 am	Breakfast/Industry Update *CME Not Available Zimmer Biomet (Grand Ballroom A) Innovative Concepts in External Fixation Jason Nascone, MD		General Session I: Research Gaps and Funding Priorities Moderators: Ellen MacKenzie, PhD and LTC (P) Benjamin Kyle Potter, MD
7:45 am - 7:55 am	Past, Present and Future of EWI James R. Ficke, MD Johns Hopkins University	9:20 am - 9:30 am	Gaps and Priorities in Clinical and Rehabilitative Medicine COL Ann Nayback-Beebe, FNP, PhD US Army Medical Research and Materiel Command
7:55 am - 8:05 am	Current Funding Status: How It Works and How to Succeed Andrew N. Pollak, MD University of Maryland	9:30 am - 9:40 am	Gaps and Priorities in Combat Casualty Care LTC David Johnston, PhD US Army Medical Research and Materiel Command
8:05 am - 8:20 am	Discussion	9:40 am - 9:50 am	Gaps and Priorities in Military Operational Medicine CDR Chris Steele US Army Medical Research and Materiel Command
		9:50 am - 10:00 am	Discussion Session I Speakers

Extremity War Injuries XIV

Emerging Combat and Readiness Research

Grand Ballroom A unless otherwise indicated

January 22, 2019

10:00 am - 10:25 am **KEYNOTE SPEAKER**
DoD Research Priorities
 Terry M. Rauch, PhD
 Acting Deputy Assistant Secretary of
 Defense for Health Readiness Policy and
 Oversight

10:25 am - 10:35 am **Discussion**

10:35 am - 10:55 am **BREAK** (Grand Ballroom B)

General Session II: Collaborative Stakeholders in Combat and Readiness Research

Moderators: Robert V. O'Toole, MD and LTC Daniel J. Stinner, MD

10:55 am - 11:05 am **METRC: Where We've Been, What's on the Horizon**
 Michael J. Bosse, MD
 Carolinas Medical Center

11:05 am - 11:15 am **Extremity Amputation Center of Excellence**
 John C. Shero, MHA, FACHE
 Extremity Amputation Center of
 Excellence

11:15 am - 11:25 am **Institute of Surgical Research: Translational Readiness for the Wounded Warrior**
 Joseph C. Wenke, PhD
 San Antonio Military Medical Center
 Institute of Surgical Research

11:25 am - 11:35 am **National Trauma Research Action Plan (NTRAP) What Is It?**
 Eileen Bulger, DMed
 Harborview Medical Center

11:35 am - 11:45 am **Optimizing Performance in the Military: Lessons Learned from the Consortium for Health and Military Performance**
 Patricia Deuster, PhD
 Uniformed Services University of the
 Health Science

11:45 am - 11:55 am **Knowledge Skills Abilities**
 CAPT Eric Elster, MD
 USU-Walter Reed National Military
 Medical Center

11:55 am - 12:10 pm **Questions and Answers**
 Session II Speakers

12:10 pm - 12:40 pm **Lunch/Industry Update**
 *CME Credit Not Available
Sparta Science (Grand Ballroom A)
 Enabling Military Readiness with
 Machine Learning
 Phil Wagner, MD & General Spider
 Marks

12:40 pm - 1:10 pm **Dessert in Exhibit Hall**
 (Grand Ballroom B)

General Session III: Regenerative Medicine

Moderators: John M. Tokish, MD and LTC Leon Nesti, MD, PhD

1:10 pm - 1:20 pm **Shaping the Delivery of Regenerative Medicine Products for Military Applications**
 LTC Leon Nesti, MD, PhD
 Walter Reed National Military Medical
 Center

1:20 pm - 1:30 pm **4 Dimensional Bioprinting: The Future is Now**
 Vincent Ho, MD
 Walter Reed National Military Medical
 Center

1:30 pm - 1:40 pm **What Is On The Horizon With Orthobiologics?**
 John M. Tokish, MD
 Mayo Clinic

1:40 pm - 1:50 pm **Can We Predict PTOA: Imaging and Biomarker Applications**
 Constance Chu, MD
 Stanford University

1:50 pm - 2:00 pm **Biologic Options to Mitigate Post Traumatic Osteoarthritis**
 Johnny Huard, PhD
 The University of Texas Health Science
 Center at Houston Steadman Phillipon
 Research Institute

2:00 pm - 2:10 pm **Discussion**

2:10 pm - 2:15 pm **Overview of EWI Tracks and Small Group Breakouts**
 CDR Scott M. Tintle, MD
 Walter Reed National Military Medical
 Center

2:15 pm - 2:20 pm **Transition**

Extremity War Injuries XIV

Emerging Combat and Readiness Research

Grand Ballroom A unless otherwise indicated

January 22, 2019

Track A: Trauma Grand Ballroom A

Moderators: Ellen Mackenzie, PhD and Lt Col
Christopher T. LeBrun, MD

Disaster Preparedness

- 2:20 - 2:30 pm **Maintaining Readiness on the Homefront**
David C. Teague, MD
University of Oklahoma College of Medicine
- 2:30 pm - 2:40 pm **Osseointegration**
Jonathan A. Forsberg, MD, PhD
Walter Reed National Military Medical Center
- 2:40 pm - 2:50 pm **Acute Compartment Syndrome: Lessons Learned from PACS**
Andrew H. Schmidt, MD
Hennepin Healthcare
- 2:50 pm - 3:00 pm **Discussion**
- RESEARCH HIGHLIGHTS**
- 3:00 pm - 3:05 pm **Poor Specificity of Perfusion Pressure Thresholds For Diagnosing Acute Compartment Syndrome**
Andrew H. Schmidt, MD
Hennepin Healthcare
- 3:05 pm - 3:10 pm **Knee Disarticulation versus Transfemoral Amputations: Functional Outcomes**
LT Benjamin W. Hoyt, MD
Walter Reed National Military Medical Center
- 3:10 pm - 3:20 pm **Discussion**

Track B: Readiness and Return to Duty Grand Ballroom C

Moderators: Constance Chu, MD and Asheesh Bedi, MD

PTOA and Biologics

- 2:20 pm - 2:30 pm **ACL Tears and OA: More than Instability**
Robert H. Brophy, MD
Washington University in St. Louis
- 2:30 pm - 2:40 pm **Early Intervention after Trauma: The Role of Biologics**
Alan Getgood, MD
Western University
- 2:40 pm - 2:50 pm **Preventing and Treating PTOA in the Wounded Warrior and Athlete**
Kenneth L. Cameron, PhD
United States Military Academy
- 2:50 pm - 3:00 pm **Discussion**
- RESEARCH HIGHLIGHTS**
- 3:00 pm - 3:05 pm **Anterior Cruciate Ligament Reconstruction Reinitiates an Inflammatory Cascade Associated with Biomarkers of Cartilage Breakdown and Worse Sports Function and Knee Mechanics**
Cale Jacobs, PhD
University of Kentucky
- 3:05 pm - 3:10 pm **Use of Simvastatin Hydroxy Acid in Meniscal Tear Repair: A Pilot Study**
Brian Grawe, MD
University of Cincinnati College of Medicine
- 3:10 pm - 3:15 pm **Biologically Regulated Marrow Stimulation by Blocking TGF- β 1 With Losartan Oral Administration Results in Less Fibrotic Cartilage Healing: A Rabbit Osteochondral Defect Model**
Hajime Utsunomiya, MD, PhD
Steadman Philippon Research Institute (SPRI)
- 3:15 pm - 3:20 pm **Discussion**

Extremity War Injuries XIV

Emerging Combat and Readiness Research

Grand Ballroom A unless otherwise indicated

January 22, 2019

3:20 pm - 3:40 pm **BREAK** (Grand Ballroom B)

BREAKOUT SESSIONS

3:40 pm - 4:55 pm **Breakout Group 1: Acute Compartment Syndrome and Open Fractures in the Prolonged Field Care Environment**

Portrait Room

Moderators: LTC Jean Claude D'Alleyrand, MD / Robert V. O'Toole, MD

Breakout Group 2: Biologics and Post Traumatic Osteoarthritis: Early Interventions to Mitigate Long Term Sequelae

Hillwood Room

Moderators: John M. Tokish, MD / Connie Chu, MD / LTC Jonathan F. Dickens, MD

4:55 pm - 5:10 pm

5:10 pm - 5:25 pm

5:30 pm - 7:00 pm

7:00 pm

Breakout Group 3: Alternatives to Opioids in Orthopaedics

Freer Room

Moderators: Thomas F. Higgins, MD and MAJ Michael Patzkowski, MD

Breakout Group 4: Strategic Opportunities for Military and Civilian Collaboration

Sackler Room

Moderators: James R. Ficke, MD/ LTC Melvin D. Helgeson, MD/ LTC Daniel J. Stinner, MD

Breakout Group Reports

Questions and Answers

Reception/Scientific Poster Session
(Foyer & Grand Ballroom B)

EWI Faculty Dinner
(Capitol Ballroom)

Extremity War Injuries XIV

Emerging Combat and Readiness Research

Grand Ballroom A unless otherwise indicated

January 23, 2019

6:30 am **EWI Symposium Check In** (Foyer)

6:30 am - 7:00 am **Coffee** (Grand Ballroom B)

7:00 am - 7:05 am **Welcome / Review of Day Two**
CDR Scott M. Tintle, MD
Walter Reed National Military Medical Center

General Session IV: DoD Research Priorities

Moderators: LCDR Scott Wagner, MD and CDR Scott M. Tintle, MD

7:05 am - 7:20 am **Prolonged Field Care: What Is It?**
Col Todd Rasmussen, MD
Uniformed Services University

7:20 am - 7:35 am **Defining Readiness in the Military**
Paul Pasquina, MD
Walter Reed National Military Medical Center

7:35 am - 7:45 am **Discussion**

7:45 am - 8:15 am **Breakfast/Industry Update**
*CME Credit Not Available

Arthrex Inc. (Grand Ballroom A)
Innovations in Sports Medicine for Our Most Elite Athletes

Knotless Repair for Labral Instability
John M. Tokish, MD
InternaBrace™ for Ultimate Knee Ligament Fixation
Asheesh Bedi, MD

8:15 am - 8:20 am **Transition Time**

Extremity War Injuries XIV

Emerging Combat and Readiness Research

Grand Ballroom A unless otherwise indicated

January 23, 2019

Track A: Trauma Management Grand Ballroom A

Moderators: Jean Claude D'Alleyrand, MD and Robert V. O'Toole, MD

Major Trauma

- 8:20 am - 8:30 am **Critical Issues Managing Orthopaedic Trauma Infection**
Robert V. O'Toole, MD
University of Maryland School of Medicine
- 8:30 am - 8:40 am **Lower Extremity Amputation: Where Are We in 2019?**
LTC (P) Benjamin Kyle Potter, MD
Walter Reed National Military Medical Center
- 8:40 am - 8:50 am **Update on Upper Extremity Transplant**
Jaimie T. Shores, MD, FACS
Johns Hopkins University
- 8:50 am - 9:00 am **Amputee Nerve Management**
Jason M. Souza, MD
Walter Reed National Military Medical Center
- 9:00 am - 9:10 am **Opportunities in Military and Civilian Trauma Collaboration**
LTC Daniel J. Stinner, MD
Fort Campbell, KY
- 9:10 am - 9:20 am **Questions and Answers**
- 9:20 am - 9:45 am **BREAK** (Grand Ballroom B)

RESEARCH HIGHLIGHTS

- 9:45 am - 9:50 am **A Multicenter Randomized Trial Evaluating Intrawound Vancomycin Powder for Reducing Surgical Site Infection After Fracture Surgery**
Robert O'Toole, MD
University of Maryland School of Medicine
- 9:50 am - 9:55 am **Early Outcomes of Osseointegrated Implants in Transhumeral and Transfemoral Amputations**
2LT Colin Harrington, BA

Track B: Readiness and Return to Duty Grand Ballroom C

Moderators: John M. Tokish, MD and Brett Freedman, MD

Readiness Injuries to the Tactical Athlete

- 8:20 am - 8:30 am **Transforming Care for the Soldier Athlete: What is Possible?**
John M. Tokish, MD
Mayo Clinic
- 8:30 am - 8:40 am **Special Forces Operator with Anterior Shoulder Instability: What Do We Need to Successfully RTD**
Brett D. Owens, MD
Brown Alpert School of Medicine
- 8:40 am - 8:50 am **Critical Issues in the Foot/Ankle for the Tactical Athlete**
Annunziato Amendola, MD
Duke University
- 8:50 am - 9:00 am **25-Year-Old 11-Bravo with Low Back Pain; What's Missing to Return to Rucking**
Brett Freedman, MD
Mayo Clinic
- 9:00 am - 9:10 am **Femoral Acetabular Impingement: Barriers to Return to Sport & Duty**
Asheesh Bedi, MD
University of Michigan
- 9:10 am - 9:20 am **Questions and Answers**
- 9:20 am - 9:45 am **BREAK** (Grand Ballroom B)

RESEARCH HIGHLIGHTS

- 9:45 am - 9:50 am **Estimating the Likelihood of Prolonged Opioid Use After Anterior Cruciate Ligament Reconstruction**
LT Ashley Anderson, MD
Walter Reed National Military Medical Center
- 9:50 am - 9:55 am **A Novel Fiber-Reinforced Total Meniscus Replacement Device Restores Load Distribution in Human Cadaveric Knees**
Charles J. Gatt Jr., MD

Extremity War Injuries XIV

Emerging Combat and Readiness Research

Grand Ballroom A unless otherwise indicated

January 23, 2019

- 9:55 am - 10:00 am **Clinical Evaluation of the Revolutionizing Prosthetics Modular Prosthetic Limb (MPL) System for Upper Extremity Amputees: Phases I and II**
 Emilia-Marie Jaskot, BS
 Henry M. Jackson Foundation for the Advancement of Military Medicine
- 10:00 am - 10:05 am **Sustained Local Delivery of Nerve Growth Factor Improves Fracture Healing by Accelerating Endochondral Ossification**
 Chelsea S. Bahney, PhD
 Steadman Philippon Research Institute
- 10:05 am - 10:10 am **Questions and Answers**
- 10:10 am - 10:30 am **BREAK** (Grand Ballroom B)

- 9:55 am - 10:00 am **Mid to Long-Term Follow-Up of MRI Proven Acetabular Labral Pathology in Previously Asymptomatic Patients**
 Lt Col Matthew R. Schmitz, MD
 San Antonio Military Medical Center
- 10:00 am - 10:05 am **Timing of Surgery and Staged Procedures Show No Difference in Return to Duty Rates for US Military Service Members with Multi-ligament Knee Injury**
 LT John Richards, MD
 Walter Reed National Military Medical Center
- 10:05 am - 10:10 am **Questions and Answers**
- 10:10 am - 10:30 am **BREAK** (Grand Ballroom B)

Track A: Trauma Management Grand Ballroom A

Moderators: David C. Ring, MD and Gerard Slobogean, MD

Pain Management

- 10:30 am - 10:40 am **Current Evidence for Reducing Opioid Use in Orthopaedics**
 Thomas F. Higgins, MD
 University of Utah
- 10:40 am - 10:50 am **Pain Management and Opioid Use in the DoD**
 MAJ Michael Patzkowski, MD
 San Antonio Medical Center
- 10:50 am - 11:00 am **Strategies to Identify and Prevent Poor Outcomes in Orthopaedic Trauma**
 Steve Wegner, PhD
 Johns Hopkins University
- 11:00 am - 11:10 am **Cognitive and Emotional Aspects of Trauma Rehabilitation**
 David C. Ring, MD
 University of Texas at Austin
- 11:10 am - 11:20 am **Questions and Answers**

Track B: Readiness and Return to Duty Grand Ballroom C

Moderators: Kurt Spindler, MD and CDR Lance E. LeClere, MD

Accelerating RTD

- 10:30 am - 10:40 am **STaR Trial and Lessons Learned in Multi-Ligamentous Knee Injuries**
 James J. Irrgang, PhD
 University of Pittsburgh
- 10:40 am - 10:50 am **Deployed Medic s/p IED Blast with TBI: Implications for Future MSK Injury**
 Steven Svoboda, MD
 Medstar Sports Medicine
- 10:50 am - 11:00 am **ACL Reconstruction and Return to Sport: Where Are We in 2019?**
 Volker Mushal, MD
 University of Pittsburgh
- 11:00 am - 11:10 am **Predicting RTD: How Outcomes are Changing the Military Paradigm of Care**
 Dan Rhon, PhD
 Uniformed Services University of the Health Sciences
- 11:10 am - 11:20 am **Questions and Answers**

Extremity War Injuries XIV

Emerging Combat and Readiness Research

Grand Ballroom A unless otherwise indicated

January 23, 2019

11:20 am - 11:50 am **Lunch/Industry Update**
 *CME Credit Not Available
Stryker (Grand Ballroom A)
 Indications & Design Principles for
 Reverse Shoulder Arthroplasty
 Stephen Dunstan

11:50 am - 12:20 pm **Dessert in the Exhibit Hall**
 (Grand Ballroom B)

General Session V: Outcomes

Moderators: RADM Bruce Gillingham, MD and David C. Ring, MD

12:20 pm - 12:30 pm **The Future of Outcomes and Implications in the DoD**
 Kurt Spindler, MD
 The Cleveland Clinic

12:30 pm - 12:40 pm **Patient Centered Outcomes Research for the Wounded Warrior**
 Gerard Slobogean, MD
 University of Maryland School of
 Medicine R Adams Cowley Shock
 Trauma Center

12:40 pm - 12:50 pm **MOTION- Addressing Readiness through Outcomes**
 LTC Jonathan F. Dickens, MD
 Walter Reed National Military Medicine

12:50 pm - 1:00 pm **The Resiliency Factor**
 BG (Ret) Rhonda Cornum, MD
 The Cornum Group

1:00 pm - 1:10 pm **Patient Reported Outcomes in a Large Civilian Medical System**
 MaCalus V. Hogan, MD, MBA
 University of Pittsburgh

1:10 pm - 1:25 pm **Questions and Answers**

General Session VI: Rehabilitation and RTD

Moderators: Gerard Slobogean, MD and MAJ Jeanne C. Patzkowski, MD

1:25 pm - 1:35 pm **Blood Flow Restrictive Therapy: Where Are We in 2019?**
 Johnny Owens
 Owens Recovery Science

1:35 pm - 1:45 pm **Patient Centered Rehabilitation and Barriers to Optimal Outcomes: The Military Experience**
 Joseph R. Hsu, MD
 Carolinas Medical Center

1:45 pm - 1:55 pm **Gaps in Post-traumatic Rehabilitation in the Military**
 Jason M. Wilken, PhD, PT
 University of Iowa

1:55 pm - 2:10 pm **Questions and Answers**

2:10 pm - 2:30 pm **BREAK** (Grand Ballroom B)

BREAKOUT SESSIONS

2:30 pm - 3:30 pm **Breakout Group 5: Amputation, Nerve Injury, and Replantation Portrait Room**
 Moderators: CDR Scott M. Tintle, MD and Jaimie T. Shores MD, FACS

Breakout Group 6: Leveraging Big Data and Outcomes Freer Room
 Moderators: Kurt Spindler, MD / Brett Freedman, MD / Timothy C. Mauntel, ATC, PhD

Breakout Group 7: Barriers for Immediate Return to Duty After Joint/Soft Tissue Injury and Extremity Trauma Hillwood Room
 Moderators: Joseph R. Hsu, MD / Johnny Owens, MD / CDR Lance E. LeClere, MD

3:30 pm - 3:45 pm **Breakout Group Reports**

3:45 pm - 4:00 pm **Questions and Answers**

4:00 pm - 4:15 pm **Next Steps**

4:15 pm **ADJOURN**

Extremity War Injuries XIV

Emerging Combat and Readiness Research

Poster Presentations

Grand Ballroom Foyer

READINESS

Poster 1: Blood Flow Restriction for Strengthening of the Rotator Cuff and Injury Prevention

Bradley Lambert, PhD, Houston Methodist Hospital

Poster 2: Return to Sport Testing at 6 Months After Arthroscopic Shoulder Stabilization Demonstrates Residual Functional Deficits

Kevin Wilson, MD, University of Pittsburgh Medical Center

Poster 3: A Comprehensive Assessment of the Effect of Tibial Slope on Cruciate Ligament Reconstruction Grafts: Tibial Slope Matters

LCDR Andrew S. Bernhardson, MD, The Steadman Clinic

Poster 4: Posterior Tibial Slope and Risk of Posterior Cruciate Ligament Injury

LCDR Andrew S. Bernhardson, MD, The Steadman Clinic

Poster 5: Orthopaedic Surgeon Decision-Making Processes for Post-Surgical Opioid Prescribing

LT Jason Kopp, MD, Walter Reed National Military Medical Center

Poster 6: Rates and Risk Factors for Prolonged Opioid Use Following Multiligament Knee Surgery

Volker Musahl, MD, University of Pittsburgh Medical Center

TRAUMA

Poster 7: Characterization of Blast Injuries Sustained at a Civilian Level-1 Trauma Center

O3 Carl Anthony Nunziato Jr., MD, University of Texas at Austin

Poster 8: A Novel BMP-2 Delivery Device Induces Superior Bone Formation Compared to InFuse® In A Rat Critical Defect Model

Yi D. Arnold, PhD, Theradaptive

Poster 9: Biocompatible Ex Vivo-Induced Designer Fracture Hematoma for the Healing of Segmental Bone Defects

Vaida Glatt, PhD, University of Texas Health Science Center San Antonio

Poster 10: Comparison of 3 Devices to Measure Compartment Syndrome

Edward Harvey, MD, MSc, McGill University

Poster 11: Evaluation of a Low Cost "Tool-less" External Fixator for Far Forward DCO: Ease of Application

Robert M. Harris, MD, Hughston Clinic

Poster 12: Novel Biomarker for Fracture Healing: Circulating Collagen X Degradation Product Correlates with Mouse and Human Fracture Healing Progression

Chelsea S. Bahney, PhD, Steadman Philippon Research Institute

Poster 13: Osseointegrated Implants for Transtibial Amputees: A Prospective Proof-Of-Concept Study

Munjed Al Muderis, FRACS, FRCS (Ortho), MBChB, The Osseointegration Group of Australia

Poster 14: Outcomes After Heel Pad Degloving Injuries

Michael J. Bosse, MD, Carolinas Medical Center