Day 1 (Wednesday, May 17)

8:50- **Registration**

9:20-9:40 **Opening Remarks**

LTC J. D. Johnson, DoD Blast Injury Research Program Coordinating Office, USAMRDC (USA)
Prof. S. Sato, Div. of Bioinformation and Therapeutic Systems, National Defene Medical College Research Institute (Japan)

Session1: Measurements and Prediction of Blast Injury and Exposure
Co-chairs: Dr. R. Gupta & Dr. S. Sato

9:40-10:00 **High-Fidelity Person-Borne Blast Dosimeter fr Peak Pressure and Maximum Impulse Tracking** *(Invited)*
J. Levine, J. P. Dionne, and A. Makris
Med-Eng Holdings ULC (Canada)

10:00-10:20 **Investigation of intracorporeal shock wave propagation using a simplified torso model and a shock wave generator** *(Invited)*
S. Grobert[1], D. Krentel[2], H. Seeber[3], M. Kluge[2], and T. Hauer[1]
[1]Bundeswehr Hospital Berlin (Germany),
[2]German Federal Institute for Materials Research and Testing (BAM) Division 2.1 (Germany),
[3]Helmut Schmidt University (Germany)

10:20-10:35 **Modeling of the shock wave generated by a projectile impact on a body armor with LISW (laser-induced shock wave)**
Y. Yanagihara[1], M. Kawai[1], T. Koiwai[1], R. Nakao[1], S. Kurihara[1], S. Hasegawa[1], K. Morichika[1], S. Kawauchi[2], Y. Tsunoi[2], S. Sato[2], and H. Suzuki[1]
[1]Japan Ground Self Defense Force (Japan),
[2]National Defense Medical College Research Institute (Japan)

10:35-10:45 **Break**

Quantitative assessment of fragment penetration into cardiac and hepatic tissue *(Abstract only)*
H. Tsukada[1], T-T. N. Nguyen[1], N. Baxan[2], I. E. Gibb[1,3], J. Breeze[1,4], and S. D. Masouros[1]
[1]Imperial College London (UK), [2]Imperial College London (UK),
[3]Centre for Defence Radiology c/o Sickbay, HMS Nelson (UK),
[4]Royal Centre for Defence Medicine (UK)

10:45-11:05 **Experimental Validation of Algorithm to Estimate Incident Blast Overpressure from Body-Mounted Blast Sensors in Multiple Scenarios** *(Invited)*
S. Wiri[1], D. Ortley[1] , C. Wagner[1] , J. Longwell[1], S. Wofford[1], and C. Needham[2]
[1]Applied Research Associates (USA), [2]Needham Consulting (USA)

11:05-11:25 **Occluded insertion loss from intracochlear pressure measurements during acoustic shock wave exposure** *(Invited)*
N. T. Greene[1], D. A. Anderson[2], A. D. Brown[3], G. Rule[2], and T. F. Argo IV[2]
[1]University of Colorado School of Medicine (USA), [2]Applied Research Associates, Inc. (USA),
[3]University of Washington (USA)

11:25-12:40 **Lunch**

Session 2: Blast-induced Brain Injury (1)

Co-chairs: Dr. D. Agoston & Dr. I. Nishidate

12:40-13:15 **Tutorial 1**

The roles of REM sleep in cognitive function, brain maintenance, and cerebral blood flow regulation

Y. Hayashi[1,2]
[1]Department of Biological Sciences, Graduate School of Science, University of Tokyo (Japan),
[2]International Institute for Integrative Sleep Medicine (WPI-IIIS), University of Tsukuba (Japan)

13:15-13:35 **Pontine myelin injuries cause sleep impairments in Veterans with repeated chronic blast-mTBI** *(Invited)*

J. S. Meabon[1,2], A. G. Schindler[2,3,] D. R. Murray[1], J. W. Rodriguez[1], T. L. Richards[4], K. D. Meeker[3,5], D. P. Perl[6], D. A. Marshall[7], C. Dirk Keene[7], J. F. Neumaier[2], D. G. Cook[3,8,9], R. G. Thomas[10,11], C. McEvoy[12], A. Crabtree[12], J. R. Powell[13], J. P. Mihalik[13], and E. R. Peskind[1,2]
[1,3]VA Puget Sound Health Care System (USA), [2,4,7,8,9]University of Washington (USA),
[5]Immusoft (USA), [6]Uniformed Services University (USA),
[10,11]University of California San Diego (USA),
[12]United States Army Special Operations Command (USA), [13]University of North Carolina (USA)

13:35-13:50 **Impairment of glymphatic clearance in the rat brain exposed to a laser-induced shock wave**

S. Kawauchi[1], T. Nozawa[1], A. Kohno[1], Y. Muramatsu[1], I. Nishidate[1,2], and S. Sato[2]
[1]National Defense Medical College Research Institute (Japan),
[2]Tokyo University of Agriculture and Technology (Japan)

13:50-14:00 **Break**

14:00-14:20 **Brain Vulnerability Towards Blast Exposure is Intensified by Previous Repeated Sub-Concussive Events** *(Invited)*

P. Arun, J. K. S. Krishnan, M. Govindarajulu, D. M. Wilder, and J. B. Long
Walter Reed Army Institute of Research (USA)

14:20-14:40 **Pre-clinical modeling repeated blast exposure: functional, behavioral, and pathological study** *(Invited)*

V. S. Sajja, J. C. Demar, L. H. Heyburn, R. T. Urioste, A. B. Batuure, D. M. Wilder, Y. Wang, P. Arun, and J. B. Long
Walter Reed Army Institute of Research (USA)

14:40-14:55 **In vivo imaging of cerebrovascular nitric oxide generation in the rat brain exposed to a laser-induced shock wave**

S. Kawauchi[1], M. Inaba[2], Y. Muramatsu[1], A. Kono[1], I. Nishidate[1,2], T. Adachi[3], I. Cernak[1,4], and S. Sato[1]
[1]National Defense Medical College (NDMC) Research Institute (Japan),
[2]Tokyo University of Agriculture and Technology (Japan), [3]NDMC (Japan),
[4]Mercer School of Medicine, Mercer University (USA)

14:55-15:10 **Break**

Session 3: Sensing and Imaging

Co-chairs: Dr. S. Karna & Dr. M. Takeda

15:10-15:30 **Optical Measurement of State Variables Associated With Blast Wave Evolution** *(Invited)*

K. L. McNesby[1], S. Dean[1], D. G. Scott[1], R. A. Benjamin[1], and T. Piehler[1,2]
[1]US Army Research Laboratory (USA),
[2]US Army Medical Research and Development Command (USA)

15:30-15:45	**Real-time non-contact vital signs monitoring from facial video captured by a red-green-blue camera** I. Nishidate[1], N. Nagao[1], H. Suzuki[1], R. Yasui[1], and Y. Kokubo[2] [1]Tokyo University of Agriculture and Technology (Japan), [2]Yamagata University (Japan)
15:45-16:05	**Nanophotonic Probes as Modulators of Calcium Activity in Neural Cells** *(Invited)* K. J. Perry[1,2], W. Losert[2], S. P. Karna[1], and R. K. Gupta[3] [1]DEVCOM Army Research Laboratory (USA), [2]University of Maryland, College Park Institute for Physical Science and Technology (USA), [3]US Army Medical Research and Development Command (USA)
16:05-16:25	**Novel Protein-templated Fluorescent metal Nanocluster Probes to Investigate Blood-Brain-Barrier Permeability Changes in Blast Overpressure Exposures** *(Invited)* V. (R.) Kakulavarapu[1,4], K. J. Perry[2], M. Kattupirambil[1], S. P. Karna[2]. R. K. Gupta[3], V. L. McLean[1], D. M. Wilder[1], J. B Long[1], and V. S. Sajja[1] [1]Walter Reed Army Institute of Research (USA), [2]DEVCOM Army Research Laboratory (USA), [3]US Army MRDC (USA)
16:25	**Wrap up**
17:00-	**Get-Together (Reception)**

Day 2 (Thursday, May 18)

8:30- **Registration**

Session 4: Blast-induced Brain Injury (2)

Co-chairs: Dr. V. Sajja & Dr. A. Tashiro

9:00-9:35 **Tutorial 2**

The role of laser-induced shock wave (LISW) in blast injury research

S. Sato and S. Kawauchi
National Defense Medical College Research Institute (Japan)

9:35-9:50 **Study on immediate death by blast injury using a site-specific injury model with laser-induced shock wave**

K. Yamamura[1], N. Kiriu[2,3], S. Tomura[2], S. Kawauchi[4], K. Murakami[1], S. Sato[4], D. Saitoh[2,3], and H. Yokoe[1]
[1,2]National Defense Medical College (Japan),
[3,4]National Defense Medical College Research Institute (Japan)

9:50-10:05 **Gastrointestinal function and gut microbiota in the mild bTBI animal model**

H. Nishimura[1], A. Mizoguchi[1] , M. Higashiyama[1] ,S. Kawauchi[2] ,S. Sato[2], and R. Hokari[1]
[1]National Defense Medical College (Japan),
[2]National Defense Medical College Research Institute (Japan)

10:05-10:20 **Evans blue and FITC-dextran double labeling reveals precise sequence of vascular leakage and glial responses after exposure to mild-level blast-associated shock waves**

K. Nishii[1], Y. Satoh[1], T. Higashi[1], T. Ishizuka[1], M. Kashitani[2], D. Saitoh[1], and Y. Kobayashi[1]
[1]National Defense Medical College (Japan), [2]National Defense Academy (Japan)

10:20-10:35 **Break**

10:35-11:15 **Keynote 1**

Chair: Dr. R. Gupta

The Department of Defense/Uniformed Services University Brain Tissue Repository: Updates from the Front Lines of Neuropathology in Military Service Members

D. Priemer[1-3] and D. Perl[1,2]
[1,2]Uniformed Services University (USA),
[3]The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc. (USA)

Session 5: Blast TBI and Blunt TBI

Co-chairs: Dr. S. Tomura & Dr. S. Grobert

11:15-11:30 **Delayed neuropathological sequelae of traumatic brain injury and organophosphorus nerve agent poisoning: PET study with ^{18}F-florzolotau** *(Post-deadline paper)*

K. Takahata[1,2,] H. Endo[1], K. Tagai[1], H. Tatebe[1], M. Miyata[1], K. Matsuoka[1], M. Kubota, S. Kurose[1], M. Ichihashi[1], M. Oya[1], H. Matsumoto[1], K. Hirata[1], Y. Yamamoto[1], F. Saito[2], S. Moriguchi[1], K. Kawamura[1], M-R Zhang[3], M. Mimura[2], T. Tokuda[1], and M. Higuchi[1]
[1,4]National Institutes for Quantum Science and Technology (Japan),
[2]Keio University School of Medicine (Japan), [3]Kyoto University (Japan),

11:30-11:45 **Amyloid beta expression after traumatic brain injury**

H. Ohta[1], S. Kawauchi[2], T. Saido[3,] K.F. Tanaka[4], and S. Sato[2]
[1]National Defense Medical College (Japan),
[2]National Defense Medical College Research Institute (Japan),
[3]RIKEN CBS (Japan), [4]Keio University (Japan)

11:45-12:05 **Effect of combat and mission related repetitive blast and blunt force TBI on cerebral autonomic injury and response to integrative medicine therapies** *(Invited)*

T. DeGraba[1,4] , N. Carter[2], E. M. Gregg[3], and S. Raiciulescu[4]
[1]Walter Reed National Military Medical Center (USA), [2]Eisenhower Army Medical Center (USA),
[3]Joint Base San Antonia (USA), [4]Uniformed Service University (USA)

12:05-13:30 **Lunch**

Session 6: Assessments of Human Blast Exposure

Co-chairs: Dr. T. Piehler & Dr. A. Makris

13:30-14:10 **Tutorial 3**

FY18 NDAA Section 734 Blast Overpressure Study
Line of Inquiry 3: Exposure Environment

T. A. Kluchinsky Jr., Dr.PH, MSPH, RES, RS, REHS
Defense Centers for Public Health-Aberdeen (USA)

14:10-14:30 **Blast Injury Prevention Standards Recommendation Process for Auditory Blast Injuries** *(Invited)*

E. B. Brokaw[1], R. W. Byrne[1], R. W. Spencer[1], L. Lalis[1], and R. K. Gupta[2]
[1]The MITRE Corporation (USA),
[2]US Army Medical Research and Development Command (USA)

14:30-14:50 **Observable patterns of temporary threshold shift and binaural hearing deficits across Section 734 Blast Overpressure Studies** *(Invited)*

D. Kulinski[1], W. Carr[2], Q. Hecht[3], M. Roy[4], C. Smalt[5], and D. Brungart[1]
[1]Walter Reed National Military Medical Center (USA),
[2]Walter Reed Army Institute of Research (USA), [3]Defense Health Agency (USA),
[4]Uniformed Services University (USA),
[5]Massachusetts Institute of Technology – Lincoln Laboratories (USA)

14:50-15:05 **Break**

15:05-15:25 **Moving Beyond Peak Pressure Level for Occupational Blast Injury Risk Criteria** *(Invited)*

C. Smalt[1], J. Kemmerer[1], A. Servi[1], D. Kulinksi[2], D. Brungart[2], W. Carr[3], L. Kent[4], A. Anderson[5], and H. Rao[1]
[1]Massachusetts Institute of Technology Lincoln Laboratory (USA),
[2]Walter Reed National Military Medical Center (USA),
[3]Walter Reed Army Institute of Research (USA), [4]1st Special Forces Command (Airborne) (USA),
[5]U.S. Army Special Operations Command (USA)

15:25-15:45 **Assessing Risk of Adverse Health Outcomes due to Blast Overpressure Exposures** *(Invited)*

O. H. Webster
Defense Centers for Public Health-Aberdeen (USA)

15:45-16:05 **Neurobehavioral Symptom Reporting Following Special Operations Forces Training** *(Invited)*

Cory McEvoy[1,2], A. Crabtree[1], J. Case[1], J. Mihalik[3], and J. S. Meabon[4,5]
[1]United States Army Special Operations Command (USA),
[2]University of Colorado School of Medicine (USA),
[3]The University of North Carolina at Chapel Hill (USA),
[4]VA Puget Sound Health Care System (USA), [5]University of Washington (USA)

16:05-16:25	**Status quo: NATO STO Human Factors and Medicine Research Task Group 338: "Development of Military Loading Exposure Guidelines for Prevention of Chronic Traumatic Encephalopathy"** *(Invited)* Team Leaders HFM RTG-338: M. K. Sköld[1], T. Westerhof[2], and P. Beliveau[3] Leader Subgroup Biophysics: S. Grobert[4] [1]Karolinska Institutet (Sweden), [2]Expert Group for Explosions, ballistics and protection (Netherlands), [3]Department of National Defence (Canada), [4]Bundeswehr Hospital Berlin (Germany)
16:25	**Wrap up**
17:00-	**Conference Dinner**

Day 3 (Friday, May 19)

8:30- **Registration**

Session 7: Therapies, Treatments, and Prevention

Co-chairs: Dr. T. DeGraba and Dr. J. Batchelor

9:00-9:35 **Tutorial 4**

New Therapeutic Targets for Post-Traumatic Headache

A. Tashiro[1], D.G. Cook[2,3], E.R. Peskind[4,5] S. Kawauchi[6], S. Sato[6], and Y. Morimoto[1]
[1]National Defense Medical College (Japan), [2]VA Puget Sound Health Care System (USA),
[3,5]University of Washington School of Medicine (USA),
[4]Veterans Affairs Northwest Mental Illness Research, Education and Clinical Center (USA),
[6]National Defense Medical College Research Institute (Japan)

9:35-9:55 **Novel antibacterial approaches for traumatic wound infections caused by blast injury** *(Invited)*

D. V. Zurawski, M. Escatte, T. Wong, T. A. Fitzgerald, G. Castellanos, S. Hur, R. Abu-Taleb, V. Antonic, A. Bobrov, Y. L. Breton, Y. A. Alamneh, M. P. Nikolich, and S. M. Noble
Walter Reed Army Institute of Research (USA)

9:55-10:15 **The Military Operational Medicine Research Program – Neurosensory Injury Prevention and Treatment Overview** *(Invited)*

M. Sun
US Army Medical Research and Development Command (USA)

10:15-10:25 **Break**

10:25-11:05 **Keynote 2**

Chair: Dr. R. Gupta

The Biological Substrates and Differential Diagnosis of Primary Blast-Induced Mild Traumatic Brain Injury (mbTBI) and Post-Traumatic Stress Disorder (PTSD)

D. V. Agoston
Department of Anatomy, Physiology & Genetics, Uniformed Services University (USA)

Session 8: Blast TBI and PTSD

Co-chairs: Dr. T. DeGraba and Dr. J. Batchelor

11:05-11:25 **Retina Gene Expression Changes in Response to Diet and Trauma using Rodent model** *(Invited)*

A. Gautam[1], M. Y. Patel[1,2], R. Yang[1], S. A. M. Miller[1], N. Chakraborty[1], J. DeMar[1], A. Batuure[3], D. Wilder[3], J. Long[3], and R. Hammamieh[1]
[1,3]Walter Reed Army Institute of Research (USA),
[2]Oak Ridge Institute for Science and Education (USA)

11:25-12:40 **Lunch**

12:40-13:20 **Keynote 3**

Chair: Dr. S. Sato

International Technology Cooperation in ATLA, MOD

Kei Ota
Acquisition, Technology & Logistics Agency (ATLA), Ministry of Defense (Japan)

Session 9: Modeling and Simulation of Blast Exposure and Injury

Co-chairs: Dr. D. Agoston and Dr. S. Kawauchi

13:20-13:35 **Global overpressure measurement for blast loading assessment**

T. Mizukaki[1], F. Wang[2], and D. Numata[1]
[1,2]Tokai University (Japan)

13:35-13:55	**Model-based Monitoring of Acute and Repeated Blast Exposure during Military Weapon Training to minimize blast injury** *(Invited)* R. K. Gupta[1], H. T. Garimella[2], Z. J. Chen[2], and A. Przekwas[2] [1]USAMRDC (USA), [2]CFD Research Corporation (USA)
13:55-14:15	**From rats to humans: a biomechanical-based approach to scale blast-induced molecular changes in the brain** *(Invited)* J. E. Rubio[1,2], D. R. Subramaniam[1,2], G. Unnikrishnan[1,2], V. S. S. S. Sajja[3], S. V. Albert[3], F. Rossetti[3], A. Frock[1,2], G. Nguyen[1,2], A. Sundaramurthy[1,2], J. B. Long[3], and J. Reifman[1] [1]United States Army Medical Research and Development Command (USA), [2]The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc. (USA), [3]Walter Reed Army Institute of Research (USA)
14:15-14:30	**Break**
14:30-15:30	**Discussion: Blast Injury Threshold** *Moderator* R. K. Gupta, DoD Blast Injury Research Program Coordinating Office, USAMRDC (USA)
	Session 10: Biomarkers of Blast-induced Brain Injury *Co-chairs: Ms. O. Webster & Dr. N. Kiriu*
15:30-15:50	**State-of-the-Art Review: Mild Traumatic Brain Injury Blood-based Biomarkers in Human Subjects Exposed to Repeated Sub-concussive Blast Overpressure** *(Invited)* S. Sinkar[1,2], N. T. Obey[1], P. Kalakoti[1,2], M. S. Moore[1], J. K. Canner[1], C. S. Ong[1], and E. B. Schneider[1,2] [1]Yale School of Medicine (USA), [2]Johns Hopkins Bloomberg School of Public Health (USA)
15:50-16:10	**The Role of Neurovascular Unit in Mediating the Long-Term Consequences of Primary Explosive Blast Exposure** *(Invited)* D. V. Agoston[1], J. McCullough[1], R. Aniceto[1], I-H. Lin[1], A. Kamnaksh[1], M. Eklund[1], W. M. Graves III[2,4], C. Dunbar[2,4], J. Engall[2,4], E. B. Schneider[3], F. Leonessa[4], and J. L. Duckworth[2,4] [1]Uniformed Services University (USA), [2]Camp Pendleton (USA), [3]Yale School of Medicine (USA), [4]Uniformed Services University (USA)
16:10-16:25	**Open Discussion**
16:25-16:30	**Closing Remarks**