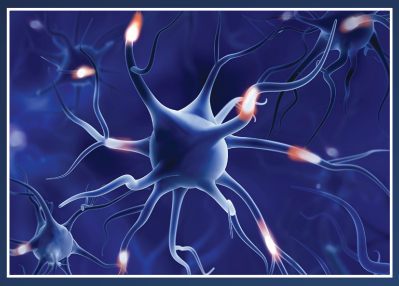
Uniformed Services University

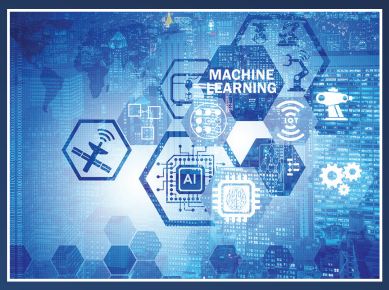
Center for the Study of Traumatic Stress

# PROGRAM

# Big Data & Machine Learning in Military Mental Health

## November 29–30, 2018
## Embassy of Canada to the United States
## Washington, D.C.

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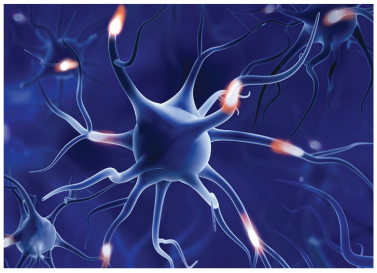
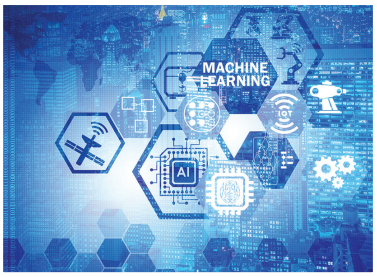
# PROGRAM

## NORTH ATLANTIC TREATY ORGANIZATION HUMAN FACTORS AND MEDICINE (HFM)

# Leveraging Technology in Military Mental Health
# Big Data & Machine Learning
# Meeting #4

## November 29–30, 2018
## Embassy of Canada to the United States
## Washington, D.C.






NATO Research Task Group (RTG) Mission: Identify technological advances that can have a direct impact on assessment, treatment, education, training, and identification of risk to enhance force readiness through optimized performance, risk mitigation, return to duty, and more efficient health care utilization.

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# Center for the Study of Traumatic Stress (CSTS)

The Center for the Study of Traumatic Stress (CSTS) is one of the nation's oldest and most highly regarded, academic–based organizations dedicated to advancing trauma–informed knowledge, leadership and methodologies. The Center's work addresses a wide scope of trauma exposure from the consequences of combat, operations other than war, terrorism, natural and human made disasters, and public health threats. CSTS is a part of our nation's federal medical school, Uniformed Services University (USU), and its Department of Psychiatry. These affiliations represent the Center's history, mission and future directions as a major contributor to our country's understanding of the impact of trauma and the advancement of trauma–informed care.

A unique aspect and contribution of the Center is the bridging of military and disaster psychiatry and the integration of disaster mental health and public health. In applying the principles and practices for dealing with individuals and groups exposed to extreme environments (in the military), the Center has generated and disseminated its subject matter expertise to inform disaster preparedness, response and recovery principles and practices across a wide range of traumatic events and populations.

Today and into the future, the Center is uniquely positioned to respond to DoD mission relevant activities and issues, as well as to educate regional and national stakeholders in government, industry, healthcare, public health, and academia on mitigating the effects of disaster and trauma in the civilian community to foster human continuity and community and national resilience.

### The Center:

- Develops and carries out research programs to extend our knowledge of the medical and psychiatric consequences of war, deployment, trauma, disaster and terrorism, including weapons of mass destruction.
- Educates and trains health care providers, leaders, individuals and public and private agencies on how to prevent, mitigate and respond to the negative consequences of war, deployment, traumatic events, disasters, and terrorism.
- Consults with private and government agencies on medical care of trauma victims, their families and communities, and their recovery following traumatic events, disasters and terrorism.
- Maintains an archive on medical literature related to the health consequences of traumatic events, disasters and terrorism of individuals, families, organizations, and communities.
- Provides opportunities for post–doctoral training of medical scientists to respond to and research the health consequences of trauma, disaster, and terrorism.

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# Embassy of Canada to the United States of America

The embassy building is at 501 Pennsylvania Avenue, Northwest, Washington, D.C. between the Capitol and the White House, just north of the National Gallery of Art. In addition to its diplomatic role, the Embassy handles consular services and assists with international business development for the surrounding states of Virginia, West Virginia, and Maryland.

The Embassy was officially opened by Prime Minister Brian Mulroney on May 3, 1989. The building houses approximately 265 Canadian diplomatic and locally engaged staff. The Embassy houses representatives from two provinces (Ontario and Alberta) and 13 Canadian federal government agencies including Foreign Affairs, International Trade and Development Canada, Industry Canada, Transport Canada, Public Works and Government Services Canada, the Department of National Defence, the Permanent Mission of Canada to the Organization of American States, the Royal Canadian Mounted Police, amongst others.

Canada has the embassy closest to the Capitol and is the only country to have its embassy along the Presidential inaugural route between the Capitol and the White House. The Washington, D.C. bureau of the Fox News Channel is a short distance away—its studio is positioned such that the Canadian flag of the embassy is usually visible out the window during broadcasts.

The Embassy of Canada hosts numerous events throughout the year for visiting ministers as well as for a wide range of diplomatic, military, and public functions.

# NATO Science and Technology Organization (STO)

The North Atlantic Treaty Organization, also called the North Atlantic Alliance, is an intergovernmental military alliance between 29 North American and European countries. The organization implements the North Atlantic Treaty that was signed on 4 April 1949.

NATO was launched as part of a broader effort to serve three purposes: deterring Soviet expansionism, forbidding the revival of nationalist militarism in Europe through a strong North American presence on the continent, and encouraging European political integration.

NATO's essential purpose is to safeguard the freedom and security of its members through political and military means.

## About STO (Science and Technology) in NATO

In NATO, S&T is defined as the selective and rigorous generation and application of state-of-the-art, validated knowledge for defence and security purposes. S&T activities embrace scientific research, technology development, transition, application and field-testing, experimentation and a range of related scientific activities that include systems engineering, operational research and analysis, synthesis, integration and validation of knowledge derived through the scientific method.

The STO is a NATO subsidiary body having the same legal status as NATO itself, and created within the framework of the North Atlantic Treaty signed in Washington, D.C. in 1949. It has been established with a view to meeting to the best advantage the collective needs of NATO, NATO Nations and partner Nations in the fields of Science and Technology. The STO is operated under the authority of the North Atlantic Council which has delegated the operations of the STO to a Board of Directors (the Science & Technology Board — STB) comprising the NATO Nations S&T managers. The STB is chaired by the NATO Chief Scientist who is a high level recognized S&T leader of a NATO Nation, being permanently assigned to the NATO Headquarters in Brussels and also serving as the Senior Scientific Advisor to the NATO leadership.

The STO is composed of the STB, the Chief Scientist, and the three executive bodies: The Office of the Chief Scientist (NATO HQ, Brussels), The Collaboration Support Office (Paris, France), and The Centre for Maritime Research and Experimentation (La Spezia, Italy). The CSO supports a range of activities primarily divided among a number of technical panels. These technical panels (and one group) include Applied Vehicle Technology (AVT), Human Factors in Medicine (HFM), Information Systems Technology (IST), Systems Analysis and Studies (SAS), Systems Concepts and Integration (SCI), Sensors and Electronics Technology (SET), and the NATO Modelling and Simulation Group (NMSG).

The mission of the HFM Technical Panel, under which RTG 279 falls, is to provide the science and technology base for optimizing health, human protection, well-being and performance of the human in operational environments with consideration of affordability. This involved understanding and ensuring the physical, physiological, psychological and cognitive compatibility among military personnel, technological systems, missions, and environments. This is accomplished by exchange of information, collaborative experiments and shared field trials. HFM RTG 279 is a 3 year effort with the objective of identifying and validating technologies that will advance mental health within military populations, thus reducing the burden.

# Leveraging Technology in Military Mental Health

## Background and Justification for this RTG

Leveraging technology represents the greatest opportunity for advancing mental health in over a century. Across the NATO Alliance all partners are contending with a significant mental health burden and leveraging technology will be part of a concentrated effort to mitigate its impact. Advances in fields such as data analytics, robotics, imaging and biomarkers, simulation, machine learning and genomics have been leveraged in various medical specialties, most notably in oncology, cardiology, radiology, and surgery. Mental health is lagging behind in the application of these advances. Leveraged technologies will augment or replace conventional approaches across all domains of military mental health (assessment, treatment, education, training, and identification of risk). Taking advantage of these technologies will contribute to greater force readiness and enhance assessment and treatment of the ill and injured.

Current military mental health approaches reflect mental health in the broader community. However, given their unique populations and mandate, militaries are perfectly poised to leverage technology. Unlike civilian communities, militaries have a mission–oriented responsibility to optimize a broad range of aspects of a service member's life, including health, employment, housing and family/community. It is the unique role of the militaries that makes it possible to effectively invest in leveraged technology.

The Exploratory Team (ET–137) concluded that the myriad of technologies and potential mental health applications are too expansive to be covered in a single RTG. As such the recommendation is to focus an RTG on technologies for military relevant mental health problems such as PTSD, Depression, Substance Use Disorders and Suicidality.

The relevance of this proposed RTG is the collective sharing of efforts in the domain of implementing new technologies in mental health. The impact will be a decreased mental health burden on our militaries through the adaptation of these emerging technologies. This could lead to the standardization of various technologies within NATO.

This RTG will address priorities in other NATO S&T areas including Big Data & Long Data Processing and Analysis, and Sensor Integration & Networks. This RTG will also coordinate with relevant on–going activities: ET–135 Precision/Personalized Mental Health and Performance, and HFM–RTG–260 Wearable Sensors. In addition, this RTG will also address the 2016 NATO S&T Priority 'Advances Human Performance and Health' in the following areas: Human Resiliency, Medical Solutions for Health Optimization and Enhanced Cognitive Performance.

The outcome of this RTG will be identification of technological advances that can have a direct impact on assessment, treatment, education, training, and identification of risk. This will enhance force readiness through optimized performance, risk mitigation, return to duty, and more efficient health care utilization.

## Objective:

The main objective is to identify and validate technologies that will advance mental health within military populations thus reducing the burden.

## Topics to be Covered

1. Big Data/Machine Learning
2. Neuroimaging/Biomarkers
3. Mobile and Online Interventions
4. Genomics
5. Simulation and 'Serious Gaming'
6. Neurostimulation

The proposed RTG will review existing technologies with regards to their applicability and suitability in the military mental health setting. The list below outlines some of these technologies, but others could be studied as the field continues to evolve. Each technology will be reviewed with respect to prevention, diagnosis, treatment and prediction of military mental health disorders.

- **Big Data/Machine Learning:** Most militaries have incredible amounts of data in Electronic Health Record (EHR) systems, as well as personnel and other administrative data. These approaches will provide a depth of analysis that has not been possible before. This allows for risk stratification, algorithm creation, treatment predictions, and training need identification, all of which may inform policy. Augmentation of datasets with alternative data streams from sources such as wearable devices and social media can further enhance opportunities to leverage this technology.
- **Neuroimaging/Biomarkers:** Increased exploration of biomarkers (e.g. hormones, cytokines) and neuroimaging techniques (e.g. magnetoencephalography (MEG)) has greatly enhanced the understanding of the biological underpinnings of mental health disorders. Computational analyses of these objective markers allows for discovery of biosignatures that can inform clinical care of military relevant mental health problems.
- **Mobile and Online Interventions:** Several new applications have emerged that allow online assessment as well as treatment (e.g. web–based CBT, telemental health). There are no geographic or temporal limitations to these approaches which is crucial for militaries that deploy troops throughout the world. These approaches are provider multipliers in a setting where personnel resources are limited.
- **Genomics:** Genomic analyses have facilitated better understanding of the molecular biology of PTSD, Depression, Substance Use Disorders and Suicidality. This understanding may result in more refined approaches. Most notably pharmacogenomics has evolved to the point where medication management can be fairly specifically directed based on discrete testing.
- **Simulation and 'Serious Gaming':** Militaries are already familiar with Simulation and Serious Gaming. New approaches can extend this technology, create more immersive environments and incorporate live (e.g. wearables, neuro/biofeedback) interactive modes of training. Serious Gaming tailored to military contexts can enhance resilience, and simulation can augment treatment response (e.g. Virtual Reality for PTSD).
- **Neurostimulation:** Biological therapies beyond medication have existed for many years. This field is rapidly advancing despite a controversial history. Effective treatments such as repetitive Transcranial Magnetic Stimulation (rTMS), Deep Brain Stimulation (DBS), Vagal Nerve Stimulation (VNS), transcranial Direct Current Stimulation (tDCS), and Electroconvulsive Therapy (ECT) stimulate regions of the brain in order to alleviate suffering. These approaches can be individualized to target affected regions of the brain and are generally very well tolerated in military relevant mental health disorders.

# Summary of Meetings to Date

### Research Task Group Planning (Meeting #1)

NATO Science and Technology Office
Neuilly-sur-seine, Paris, FR
19–21 April 2017

The initial meeting of the HFM 279 RTG panel members took place at the NATO STO Collaboration Support Office in Paris, FR and focused on organization and scheduling. Panel members reviewed the foundational documents supporting NATO's decision to stand up the RTG. Panel members sketched out an initial schedule of meetings for the topics to be covered. Tasks were assigned and interim updates and planning meetings were scheduled. A discussion around the possibility of producing a journal special issue from this RTG was undertaken and panel members volunteered to explore this further.

### Biomarkers and Neuroimaging (Meeting #2)

Royal Canadian Military Institute
Toronto, CA
2–4 October, 2017

The Biomarkers and Neuroimaging Meeting took place at the Royal Canadian Military Institute located in Toronto, CA. The first full day of meetings, Oct 3rd, was dedicated to the topic of biomarkers for military relevant mental health. Discussion topics included the utility of various sources of biomarkers and the potential application of biomarkers for diagnosis, treatment prediction and monitoring, and prevention efforts. The second full day of meetings, Oct 4th, was dedicated to the topic of neuroimaging including fMRI, MEG, PET and others. The meeting concluded with initial planning for Meeting #3.

### Serious Gaming and Simulation (Meeting #3)

Marine Etablissement Amsterdam
Amsterdam, NLD
20 – 22 Feb 2018

The Serious Gaming and Simulation Meeting took place at the Marine Etablissement in Amsterdam, NLD. During the course of this meeting, panel members were given a wide range of presentations on gamification of mental health interventions, virtual reality, full body haptic suits for military training, sensory reality pods, computer aided therapy, and other topics. Panel members were also treated to a tour of outstanding research facilities in the Netherlands. The meeting concluded with initial planning for Meeting #4.

# Panel Members

## Col Rakesh Jetly (CAN)
## Panel Chair

Colonel Rakesh Jetly enrolled under the Medical Officer Training Plan in 1989 and graduated in 1991 from the University of Toronto with a Doctorate in Medicine (MD). Upon graduation, he was posted to Canadian Forces (CF) Base Borden as a General Duty Medical Officer and Flight Surgeon.

In 1993, Col Jetly deployed as the senior medical officer to the United Nations mission in the Golan Heights (UNDOF) and in 1994, he deployed to Rwanda as part of the CF humanitarian mission

In 1996, he was accepted into the University of Toronto Postgraduate Training Program in Psychiatry and was promoted to the rank of major in 1997. Upon graduation in 2000, he was certified as a Fellow in the Royal College of Physicians and Surgeons of Canada (psychiatry) and posted to CF Health Services Centre (Atlantic). During his tenure in Halifax from 2000-2008, he filled various roles including clinical director of mental health services and regional director of the Operational Trauma and Stress Support Centre (OTSSC).

In 2006 and 2007, Col Jetly was deployed on two separate missions to Afghanistan as the head of the mental health detachment of the Canadian-led Role Three Multinational Medical Unit. He was promoted to Lieutenant-Colonel in 2007 and posted to Ottawa in 2008 as the mental health advisor to the Deputy Surgeon General.

Col Jetly was promoted to his current rank in 2011 and appointed senior psychiatrist and mental health clinical advisor to the CF Surgeon General. He was additionally appointed in 2015 "The Canadian Forces Brigadier Jonathan C. Meakins, CBE, RCAMC Chair in Military Mental Health".

Col Jetly was appointed to the Order of Military Merit as an Officer in 2009. He is also an associate professor of psychiatry at Dalhousie University (Halifax); Queen's University (Kingston), and the University of Ottawa. He has published numerous articles in professional journals and presents nationally and internationally on such topics as post-traumatic stress disorder and operational psychiatry.

Col Jetly and his wife Julie reside in Ottawa with their three children: Sarah, Serena and Deven.

# Panel Members, Continued

## Col Eric Vermetten (NLD)
## Panel Co-Chair

Prof dr Vermetten, M.D., Ph.D. (1961), is Strategic Advisor of Research at the Military Mental Health Service with the Dutch Ministry of Defense, Arq Psychotrauma Research Group and at UMC Utrecht. He holds an endowed chair in Psychiatry at the Department of Psychiatry at Leiden UMC. He also has an Adjunct Professorship at the Department of Psychiatry of NYU School of Medicine. He is trained in the Netherlands as well as in the USA (Stanford, Yale and Emory) in psychiatry and neuroscience. He has clinical as well as a research positions with a focus on medical/biological as well as psychiatric aspects of complex psychotrauma in military as well as civilian populations. He has published over 200 papers, over 30 book chapters and edited several books on this topic. His research is in the field of stress, trauma, complex PTSD and neuroscience. He is interested in the history of war and has special focus on combining biological-based interventions in psychotraumatology with novel technology and novel drug developments. He is PI of a new research initiative on a roadmap for medication-assisted psychotherapy in The Netherlands and Europe, including use of a variety of psychedelics. Prof Vermetten is an ad hoc reviewer for numerous journals and granting agencies. He has lectured on the topic of PTSD, resilience, military and veterans issues as well as novel approaches to therapy across the globe.

## LTC Gary H. Wynn (USA)
## Local Panel Host

Dr. Wynn is Associate Professor of Psychiatry and Neuroscience and Assistant Chair of the Department of Psychiatry at the Uniformed Services University of the Health Sciences. He is a Scientist at the Center for the Study of Traumatic Stress. He is also a Distinguished Fellow of the American Psychiatric Association and on the editorial boards of the Journal of Neuroscience Research. Dr. Wynn received his education at the United States Military Academy at West Point and Uniformed Services University of the Health Sciences. He completed a dual residency in psychiatry and internal medicine at the Walter Reed Army Medical Center in Washington, D.C. During his military career Dr. Wynn served as a Division Psychiatrist (2nd Infantry Division, Korea), Assistant Chief of Inpatient Services (Walter Reed), and as a Research Psychiatrist (Walter Reed Army Institute of Research) prior to transitioning to the Uniformed Services University of the Health Sciences.

Dr. Wynn has served as a frequent member of DoD level committees and working groups on the topics of PTSD and suicide. He currently serves as the Chair for the DoD's Joint Program Committee working group on Diagnosis and Treatment of PTSD. Dr. Wynn has served as a member of VA Merit Review Boards, National Institute of Mental Health (NIMH) Data Safety and Monitoring Board, and as US Representative to NATO Human Factors in Medicine panels. He is a member of the Order of Military Medical Merit and recipient of the AMEDD "A" Proficiency Designator, the Rundell Award, the Artiss Award, and three Meritorious Service Medals. Dr. Wynn is a Past President of the Society of Uniformed Services Psychiatrists. In addition, Dr. Wynn has over 70 publications, including being co-author and editor on three books.

## Panel Members, Continued

### Rosemarie Huver Ph.D. (NLD)
### Panel Member

Dr. Rosemarie Huver is a Senior Business Developer at TNO (Netherlands Organization for Applied Scientific Research). Rosemarie is a psychologist with a PhD in Health Sciences. She works at TNO Defense Safety and Security, as a partner in innovation for the Netherlands MoD. She organizes TNO's business team Human Performance and Health, focusing on the initiation and development of research programs and projects.

What causes some individuals or teams to keep up performance while others don't? How can we support professionals operating in challenging conditions? And how can we protect high-risk professionals from developing negative mental health consequences? These are some of the questions business team Human Performance and Health tries to answer, focusing on Military and Police Forces. Pursuing 'Fit for action, fit for function, fit for life', business team Human Performance and Health aims at improving the performance and health (in physical, mental, social and cognitive fields) of those working in complex, demanding environments.

Rosemarie's research interests focus on measuring and enhancing psychological resilience, wearable technology, people analytics, recruitment and selection of personnel, increasing employability, human and organizational adaptivity, and behavioral influence. She is passionate about discovering innovative waysfor leveraging technology for military mental health.

### Shawn G. Rhind, Ph.D. (CAN)
### Panel Member

Dr. Shawn Rhind earned his doctorate in Immunobiology from the University of Toronto. He completed an NSERC Postdoctoral Fellowship with the Defence & Civil Institute of Environmental Medicine (DCIEM) and US Army Research Institute of Environmental Medicine (USARIEM), examining biomolecular interactions between neuro-endocrine-immune systems under severe physiological stress and environmental extremes and their impact on health and performance. Today, Dr. Rhind is a senior Defense Scientist in the Military Operational Health Group at Defence Research and Development Canada (DRDC) Toronto and an Associate Professor at the University of Toronto, where he leads an integrative — molecular to systemic — translational research team. His research spans basic laboratory science to human clinical trials, and is currently focused on elucidating the biological basis and therapeutic countermeasures for combat-related psychological and physical trauma, including post-traumatic stress disorder (PTSD) and battlefield care after traumatic shock and brain injury.

# Speakers

## Robert J. Ursano, M.D. (USA)

Dr. Ursano is Professor of Psychiatry and Neuroscience at the Uniformed Services University School of Medicine and founding Director of the Center for the Study of Traumatic Stress. He is Editor of Psychiatry, the distinguished journal of interpersonal and biological processes, founded by Harry Stack Sullivan. Dr. Ursano completed twenty years of service in USAF medical corps. He is a Distinguished Life Fellow of the American Psychiatric Association. He has received the Department of Defense Humanitarian Service Award, the Lifetime Achievement Award of the International Traumatic Stress Society and the William C. Menninger Memorial Award of the American College of Physicians. He is senior editor of the Textbook of Disaster Psychiatry. Dr Ursano was the first Chairman of the APA's Committee on Psychiatric Dimensions of Disaster. His work has greatly aided the integration of psychiatry and public health in times of disaster and terrorism.

## Ronald C. Kessler, Ph.D. (USA)

Ronald C. Kessler is the McNeil Family Professor of Health Care Policy at Harvard Medical School (HMS). His research deals broadly with the social determinants of mental illness from an epidemiological perspective. He is the author of over 700 publications and the recipient of many awards for his research, including Senior Scientist and MERIT awards from NIMH. He has been rated as the most widely cited researcher in the world in psychiatry for the past two decades. He is a member of both the Institute of Medicine and National Academy of Sciences. Kessler is the Principal Investigator of the US National Comorbidity Survey, the first nationally representative survey of the prevalence and correlates of mental disorders in the U.S., and Co-Director of the World Health Organization's World Mental Health Survey Initiative, a series of comparative community epidemiological surveys of the prevalence and correlates of mental disorders in 30 countries around the world. He is involved in evaluating a number of innovative programs for the prevention and treatment of mental illness in high-risk segments of the population. He is also the HMS PI of the STARRS-LS program of research on risk and protective factors for suicide among Army personnel and of the AURORA study of adverse neuropsychiatric reactions to traumatic life events among patients presenting to emergency departments in the wake of such events. Kessler earned his Ph.D. in sociology from New York University, completed a postdoctoral fellowship in psychiatric epidemiology at the University of Wisconsin, and was on the faculty at the University of Michigan before taking his current position in 1995 at HMS.

# Speakers, Continued

## CAPT Joshua Morganstein (USA)

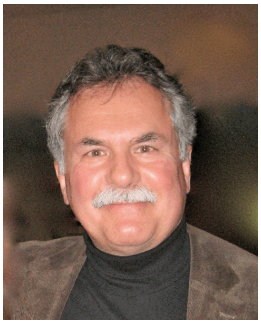
Dr. Joshua C. Morganstein currently serves as an Associate Professor and Assistant Chair in the Department of Psychiatry and Assistant Director at the Center for the Study of Traumatic Stress. He is a Fellow and Chair of the Committee on the Psychiatric Dimensions of Disaster within the American Psychiatric Association. Dr. Morganstein completed undergraduate training at the University of Maryland at College Park, medical school at the Uniformed Services University, and combined Psychiatry and Family Medicine residency training in the National Capital Consortium. Dr. Morganstein's operational experiences include remote overseas community mental health care for the Pacific Air Force in Japan and deployment to Afghanistan as the lead Psychiatrist in support of the Global War on Terrorism. He served as Chief of Addictions Services for the Air Force's only dual-diagnosis treatment program and was selected to serve as the Behavioral Health Advisor to the Commander, Joint Task Force National Capital Region-Medical. Following a sixteen year career as an Air Force officer, Dr. Morganstein transferred to the Commissioned Corps of the United States Public Health Service in 2013 to pursue his professional interests in public health and disaster mental health.

Dr. Morganstein provides disaster mental health education, consultation and training as a speaker and consultant to federal agencies and national organizations. He has authored and co-authored a range of scholarly works on the mental health effects of various disaster events including natural disasters, mass violence, terrorism, pandemics, climate change, and nuclear exposure. Dr. Morganstein served in the development of disaster mental health training curriculum and global disaster management doctrine. He is Assistant Editor for the second edition of the Textbook of Disaster Psychiatry. Dr. Morganstein is currently collaborating with the National Institutes of Justice and UCLA on a study of community resilience in the aftermath of mass shootings and working with the U.S. Air Force to identify and manage the effects of recurrent and persistent traumatic stress exposure on personnel involved in drone aircraft operations.

## Robert Bossarte, Ph.D. (USA)

Dr. Bossarte is Director of West Virginia University's Injury Control Research Center and Associate Professor in the Department of Behavioral Medicine and Psychiatry. Dr. Bossarte completed his Ph.D. in Sociology at the University of Notre Dame and postdoctoral training in epidemiology as an Officer in CDC's Epidemic Intelligence Service program, where he worked on violence and suicide prevention in the National Center for Injury Prevention and Control. Dr. Bossarte's work focuses on developing new models for identifying risk for suicide and linkages between advanced analytics and suicide prevention programs.

## Gary Hasey, M.D. (CAN)

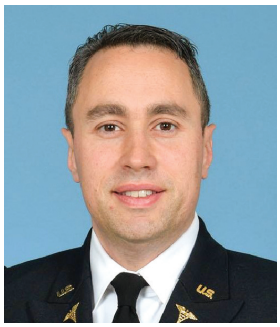


Dr Hasey is an Associate Professor at McMaster University (Hamilton, Ontario) in the Departments of Psychiatry and Behavioural Neurosciences, Electrical and Computer Engineering and Biomedical Engineering. He established Canada's first therapeutic repetitive transcranial magnetic stimulation clinic in 1997. In partnership with St Joseph's Hospital and McMaster University, he and his engineering colleagues founded Digital Medical Technologies Inc (DME). DME's machine learning algorithms use electrical brain activity (EEG) and

## Speakers, Continued

clinical data to autonomously diagnose various mental illnesses, predict the effectiveness of various pharmacological and non-pharmacological psychiatric treatments and estimate suicide risk.

### LTC Vincent Capaldi (USA)



LTC Vincent F. Capaldi, II, MC, USA, is the Chief of the Department of Behavioral Biology, Center for Military Psychiatry and Neuroscience Research, at the Walter Reed Army Institute of Research in Silver Spring, MD. He currently serves as an associate professor in the departments of Internal Medicine and Psychiatry at the Uniformed Services University of the Health Sciences in Bethesda, MD. He is also the program director of the National Capital Consortium combined Internal Medicine and Psychiatry residency training program and chair of the Biomedical Ethics Committee at Walter Reed National Military Medical Center

LTC Capaldi completed dual residency training in Internal Medicine and Psychiatry and fellowship in Sleep Medicine at Walter Reed National Military Medical Center. LTC Capaldi holds board certifications from the American Board of Psychiatry and Neurology and the American Board of Internal Medicine to practice General Psychiatry, Internal Medicine, and Sleep Medicine. In 2013, LTC Capaldi was elected as a Fellow of the American Psychiatric Association and the American College of Physicians and currently serves at the president of the Society of Uniformed Services Psychiatrists.

In January, 2013, LTC Capaldi was appointed as officer in charge (OIC) of the Restoration Program at Bagram Air Field, Afghanistan. As OIC, LTC Capaldi was responsible for the comprehensive behavioral health restoration program, all clinical operations, and prevention activities for over 45,000 NATO troops stationed across Afghanistan.

LTC Capaldi has published over 30 peer reviewed scientific articles and book chapters on various topics such as sleep disorders, traumatic brain injury, and post stroke depression that have appeared in several medical journals. He serves as the Psychiatry & Clinical Psychology Disorders Capabilities Manager and Steering Committee Chair for Physiological Health and Performance in the Military Operational Research Program.

### David Forbes, Ph.D. (AUS)

David Forbes is the Director of Phoenix Australia — Centre for Posttraumatic Mental Health and Professor in the Department of Psychiatry, University of Melbourne. He has over twenty-five years experience in the assessment and treatment of mental health problems in trauma survivors, with a speciality in military and veteran mental health. He led the development of the inaugural 2007 Australian Guidelines for the Treatment of Posttraumatic Stress Disorder (PTSD) and the revision published in 2013 approved by the National Health and Medical Research Council and endorsed by colleges of psychiatrists, psychologists and general practitioners. Professor Forbes is also Vice Chair of International Society for Traumatic Stress Studies Committee for the new PTSD Guidelines and the lead editor for the forthcoming third edition of the ISTSS Effective Treatments for PTSD book.

He has published 150 scientific papers in the international literature and sits on many Commonwealth government policy and scientific advisory panels and academic journal editorial boards

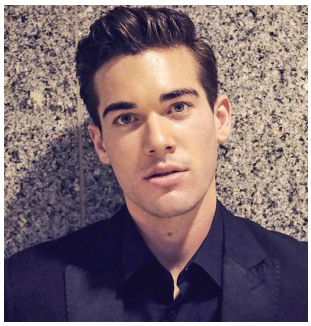
He has a strong track record in the conduct of research in the assessment and treatment of PTSD and the provision of policy and service development advice to government and agencies responsible for the care of veteran and military personnel and trauma survivors across the community.

Professor Forbes has also a strong track record

## Speakers, Continued

in the provision of training in evidence-based treatments for PTSD and related disorders. This has also included the development of mobile app and online resources for practitioners and trauma survivors.

### Andrew Nicholson, Ph.D. (CAN)



Dr. Andrew Nicholson (Western University) is a post-doctoral fellow working with Drs. Rakesh Jetly, Ruth Lanius, and Margaret McKinnon. Nicholson's research background has expanded to include a multitude of fMRI imaging studies in the field of PTSD, as well as EEG and PET modalities. The key strength Nicholson brings to the Canadian research group is his expertise in a plethora of technical fMRI imaging methods, including real-time fMRI neurofeedback, generalized psychophysiological interaction analyses, resting-state effective connectivity analyses, and most recently, the application of fMRI machine learning algorithms to predict PTSD symptoms.

### Edmund Howe, M.D. (USA)

Dr. Edmund Howe received his undergraduate degree at Yale and his M.D. at Columbia. He completed an internship at Harlem Hospital and his residency in Psychiatry at Walter Reed Army Medical Center. He attended Rutgers University Law School and then received his law degree at Catholic University. Dr. Howe joined the USU faculty in 1977 and is a Professor in the Department of Psychiatry, Associate Professor in the Department of Medicine, Director of Programs in Medical Ethics, and Senior Scientist, Center for the Study of Traumatic Stress. His research has focused on medical ethics with an emphasis on ethics in military medicine and clinical care at the end of life.

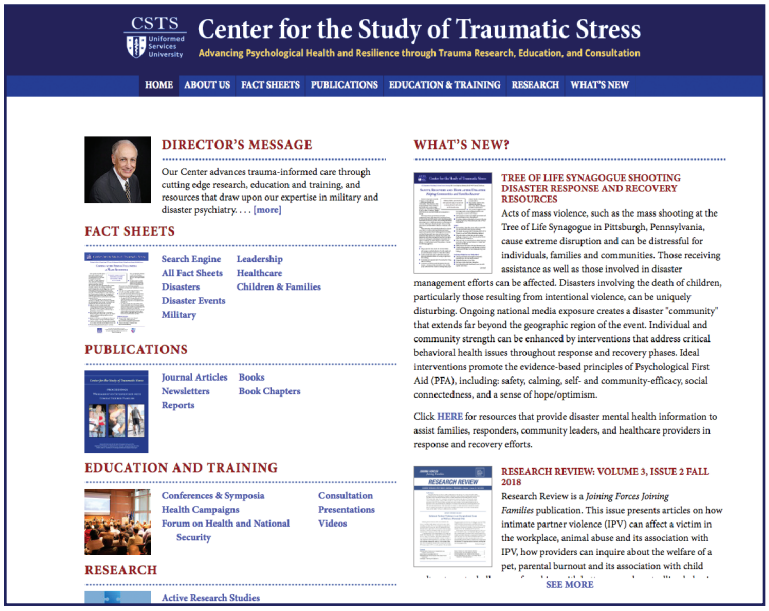
Dr. Howe's professional contributions stem primarily from his interests in ethics. He is the Founding Editor-in-Chief of The Journal of Clinical Ethics and has served as a member of the Walter Reed Army Medical Center, National Naval Medical Center, and Malcolm Grow U.S. Air Force Medical Center Ethics Committees, as well as the Ethics Committees at Montgomery Hospice, the Visiting Nurse Association, Springfield Psychiatric Hospital, the V.A. Hospital of Washington, D.C., and the National Institutes of Health. He is Chair of the human use Institutional Review Board at USU, and the Ethics Subcommittee of the Society of Medical Consultants to the Armed Forces.

Dr. Howe is past Chair of International Health Law Committee of the International Law Section of the American Board Association, a past appointee to the Governor's Commission of Health Care Policy and Financing for the State of Maryland, and present Liaison Member of the International Section of the American Bar Association and the Commission on Mental and Physical Disability Law. He is or has been a consultant at NIH, OTA, HHS, FDA, the Institute of Medicine, the US Public Health Service, the National Science Foundation and NASA. He is a member of the CIA IRB and has been a member of the American Red Cross IRB and several other IRB's. He is on the Editorial Board and/or a reviewer for numerous publications, including NEJM and JAMA. He is currently President of the Academy of Medicine in Washington, D.C.

## Notes

## Notes

## Notes

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