2020 Annual Nuclear Security Summit at Georgetown: Use of Emerging Technologies for Disaster Management- Cases of Nuclear Disaster and the COVID-19 Pandemic

In Conjunction with the Bionuclear & Emerging Technologies Working Groups

Date: November 16-18, 2020

Place: Georgetown Medical Center / Virtual Zoom

Sponsors:

- Biomedical Science Policy and Advocacy, Georgetown University Medical Center (GUMC)
- Defense Threat Reduction Agency (DTRA)

Rationale:

The COVID-19 pandemic abruptly brought our attention to the daunting challenges of disaster management on both national and global scales. Although some of those challenges were unique to the particular demands imposed by the emergence of a novel infectious disease, others can be more broadly applied to almost any disaster scenario. The convergence of policy and governance, societal needs and demands, economic impacts, biomedical infrastructure, scientific endeavor, and technological discovery dictates courses of action to mitigate the impacts of disaster and to plot a course for recovery. The 2020 Nuclear Security Summit will provide a venue for examining the elements of disaster management and identifying successes as well as areas for continuing development.

Key Session Themes:

Day one sessions are jointly hosted by the Bionuclear and Emerging Technologies Working Group and Emerging Technologies Working Group. Morning sessions will emphasize nuclear disasters and will include an overview of proposed solutions for environmental as well as human monitoring. Afternoon sessions will focus on emerging technologies that may be brought to bear for addressing the most pressing issues during and in the aftermath of nuclear and other disasters. The day will culminate in an open discussion forum.

Days two and three will include both presentations and breakout sessions during which participants are encouraged to identify gaps in knowledge and capability in addition to new technologies that could lead to more effective disaster management. Day two sessions will include those highlighting dissemination of information through various media and official channels, the impacts of policy and decision-making frameworks, available technologies for containment and control through recovery, modeling and forecasting, and unanticipated higher-order effects. Day three will hone in on the COVID-19 pandemic as a "case study" to gauge our ability to respond to disasters of international magnitude. The Summit will conclude with discussions on research and development efforts of importance for developing effective

prevention and recovery strategies. The overarching goal is lay the foundation for the development of practices and safeguards to enhance preparedness for and promote resiliency to future disasters.

Day 1: Monday, November 16 Nuclear Disasters & Emerging Technologies // Bionuclear (BNWG) and Emerging Technologies (ETWG) Working Group Meeting		
8:30 - 9:00a	Opening Remarks: Welcome to the 2020 Nuclear Security Summit at Georgetown	Richard Calderone, Director, MS Program Biomedical Science Policy and Advocacy & Chair of Microbiology and Immunology Georgetown University, School of Medicine
9:00 - 10:40a	**BNWG: DTRA Basic Research Project Reviews (Chair: Heather Meeks, DTRA)**	
9:00 - 9:20a	Melanized Fungi as Discriminators for Nuclear Fallout Radionuclides	Ekaterina Dadachova, University of Saskatchewan
9:20 - 9:40a	The Impact of Desiccation and Freezing on Gamma Radiation Survival in Microorganisms	Michael Daly, Uniformed Services University of the Health Sciences
9:40 - 10:00a	Characterizing Transcriptome Signatures Across Microbes That are Specific to Low Dose Radiation Stress Responses	Lydia Contreras, University of Texas, Austin
10:00 - 10:20a	Global Mass Spectrometry-Based Analysis of Covalent Modifications in Proteomes after Radiation	Michael Sussman, University of Wisconsin, Madison
10:20 - 10:40a	Development of Brassica as a Low Dose Radiation Biosensor	Patrick Concannon, University of Florida
10:40 - 11:00a	**MORNING BREAK**	
11:00 - 12:40p	**BNWG, cont'd (Chair: Tomoko Steen, GUMC)**	
11:00 - 11:20a	Xe Sensing via Insights from Noble-Gas Protein Interactions	Sarah Goda, University of Pittsburgh SAG196@pitt.edu gyurie@uw.edu Jennifer.Poole@flir.com
11:20 - 11:40p	Discovery and Manipulation of Biomolecular-Noble Gas Interactions	Michael Fitzgerald, Duke University Michael.c.fitzgerald@duke.edu

11:40 - 12:00p	Exploring the Effect of Noble Gases on Enzyme Activity and Bacterial Growth	Anne Ruffing, Sandia National Laboratory
12:00 - 12:20p	Development and Implementation of Neutron Activation Analysis for Rapid Determination of Xenon Content in Biological Samples	Glenn Fugate, Oak Ridge National Laboratory
12:20 - 12:40p	Mediated Electrochemical Probing: A New Approach to Reveal Global Redox Signatures of Exposure and State	Gregory Payne, University of Maryland
12:40 -1:00p	**BIONUCLEAR SOCIETY PRESENTATIONS: Q&A**	
1:00 – 2:00p	**LUNCH BREAK**	
2:00 – 4:00p	**ETWG: Emerging Technologies for Disaster Management (Chair: Astrid Lewis, US Department of State)**	
2:00 – 2:30	Open Source Nuclear Detection System (OSNDS)	James Stroup, Air Force Technical Applications Center
2:30 - 3:00p	Molecular Cryptography	Sterling Sawaya, Geneinfosec
3:00 - 3:30p	The Dynamics of Online Attention and Hazard Message Amplification in Agency/Public Communications	Carter Butts, University of California, Irvine
3:30 – 4:00p	Effective Message Design for Disasters and Crises Using the Risk Communication on Social Media Model	Jeannette Sutton, University of Albany, SUNY
4:00 - 4:10p	**BREAK**	
4:10 – 5:00p	**CLOSED SESSION: NEXT STEPS FOR BIONUCLEAR AND EMERGING TECHNOLOGIES WORKING GROUPS (Public participants use this as break)**	
5:00 - 6:30p	**Lightning Talks by Young Investigators (Chair: David Harrison, Potomac Institute)**	
5:00 – 5:20p	Training Future Generations to Prepare for Pandemics	David Harrison, Potomac Institute
5:10 - 5:20p	Health Literacy Considerations During COVID-19, Part I	Sannidhi Shashikiran Georgetown University
5:20 – 5:30p	Health Literacy Considerations During COVID-19, Part II	Janessa Mendoza, Georgetown University

5:30 - 5:40p	An EMS Response to COVID-19: Lessons Learned in Disaster Preparedness	Joshua Rabotnick, Georgetown University
5:40 - 5:50p	U.S. Biolaboratories in Ukraine: Managing Outbreaks Abroad	Abigail Staggemeier, Georgetown University
5:50 – 6:00p	Minorities and COVID-19	Jennifer Argueta-Contreras, Georgetown University
6:00 - 6:10p	COVID-19 Management: A Case of South Korea	Emerald O'Brien, George Washington University
6:10 - 6:30p	**LIGHTNING TALK: Q&A**	
6:30p	**ADJOURN**	

Day 2: Tuesday, November 17 General Disaster Management		
9:30 - 11:00a	**Information Dissemination, Economic and Societal Impacts during Disaster Scenarios (Chair: Tomoko Steen, GUMC)**	
9:30 – 10:00a	Remarks on the Disaster Management Conference and Introduction of the Keynote Speaker	Tomoko Steen Georgetown University
10:00 -10:30a	**Keynote Address: Health Emergency and Disaster Risk Management: Five Years into Implementation of the Sendai Framework**	**Virginia Murray, Public Health England**
10:30 – 11:00a	**Q&A**	
11:00 – 1:00 p	**LUNCH BREAK**	
1:00 - 2:00p	**Technologies for Disasters (Chair: James Alleman, University of Notre Dame)**	
1:00 - 1:20p	Risk Reduction	Daniela Stricklin, U.S. Food & Drug Administration
1:20 - 1:40p	Epigenetics of Radiation Exposure	Janet Baulch, University of California, Irvine
1:40 – 2:00p	**PANEL DISCUSSION**	

2:00 – 2:10p	**BREAK**	
2:10 - 4:00p	**Modeling and Forecasting (Chair: Jean-Pierre Auffret, George Mason University)**	
2:10 - 2:30p	The Rapid Acquisition of Data: Thoughts on Responding to Disasters with Significant Technical Unknowns and Issues	Dewey Murdick, Center for Security and Emerging Technology
2:30 - 2:50p	Consequence Modeling	John Weidner, University of Cincinnati
2:50 - 3:10p	Understanding and Measuring Climate Risk to Enable Action: The Climate and Ocean Risk Vulnerability Index	Jack Stuart, Stimson Center
3:10 – 3:30p	When are Machine Learning Models Effective in Governance?	Alex Engler, Georgetown University
3:30 - 4:00p	**PANEL DISCUSSION**	
4:00 - 4:10p	**AFTERNOON BREAK**	
4:10 – 6:20p	**Second- and Third-Order Effects (Chair: Astrid Lewis, US Department of State)**	
4:10 - 4:30p	Leveraging Emerging Technologies During A World-Wide Crisis	Steven King, University of North Carolina, Chapel Hill
4:30 - 4:50p	Disaster Impacts on Mental Health and Socio-economic Wellbeing	Melissa Finucane, RAND Cooperation
4:50 – 5:10p	An Introduction of a Breathing Intervention to Support the Mental Health of the Survivors of the Great East Japan Earthquake	Lena Akai, Showa University
5:10 – 5:30p	Disaster Health Data at the Tohoku Medical Megabank	Mami Ishikuro, Tohoku University
5:30 – 6:00p	**PANEL DISCUSSION**	
6:00p	**ADJOURN**	

Day 3: Wednesday, November 18 COVID-19: A Case Study		
9:20 - 10:30a	**Keynote Panel: Information Dissemination and Impacts of COVID-19 Policy and Decision-Making Frameworks during the Pandemic (Chair: Tomoko Steen, GUMC)**	
9:20 - 9:40a	The Role of Public Health Organizations, Government, and Media: A One Health Approach to COVID-19	Bernadette Dunham, George Washington University U.S. Food & Drug Administration
9:40 - 10:00a	Bioethics Before and After the Pandemic	Jonathan Moreno, University of Pennsylvania
10:00 - 10:30a	**PANEL DISCUSSION**	
10:30 - 10:50a	**MORNING BREAK**	
10:50 - 12:30p	**Biomedical Technologies (Chair: Kavita Berger, National Academy of Sciences)**	
10:50 - 11:10a	Rapid, Reagentless, Deep UV Spectroscopic Analysis of SARS-CoV-2 in Clinical Samples using VERITAS	Rohit Bhartia, Photon Systems
11:10 - 11:30a	Ellipsometry Applications for High-Throughput Molecular Diagnostics	Gregory Tobin, Rapid Molecular Diagnostics, Inc.
11:30 - 11:50a	Epidemiology, Transmission, and Control of COVID-19: Lessons Learned from Shenzhen, China	Qifang Bi, Johns Hopkins University
11:50 - 12:10p	Funding Vaccine Research	Joseph Simmonds-Issler, Coalition for Epidemic Preparedness Innovations
12:10 – 12:30p	**PANEL DISCUSSION**	
12:30-1:50	**LUNCH BREAK**	
1:50– 4:00p	**Modeling and Forecasting (Chair: Heather Meeks, DTRA)**	
1:50 -- 2:10p	How Complex Systems Fail: Lessons in Modeling to Protect Infrastructure Even Amid Disaster	Reginald Brothers, Georgetown University

2:10 – 2:30p	Modeling COVID-19 in Illinois: Insights and Challenges	Phil Arevalo, University of Chicago
2:30 – 2:50p	Practical Considerations for Estimating or Interpreting the Effective Reproductive Number, Rt	Katie Gostic, University of Chicago
2:50 - 3:10p	Modeling Host Responses to Infection	Josep Bassaganya-Riera, Biotherapeutics, Inc.
3:10 - 3:30p	COVID-SEE: Enabling Scientific Evidence Exploration through Semantics in a Time of Crisis	Karin Verspoor, University of Melbourne
3:30 – 4:00p	**PANEL DISCUSSION**	
4:00 - 4:20p	**AFTERNOON BREAK**	
4:20 - 6:10p	**Second- and Third-Order Effects (Chair: Qingfang Wang, University of California- Riverside)**	
4:20 – 4:40p	How do Small Businesses Cope with the Impacts of COVID-19?	Qingfang Wang, University of California- Riverside
4:40 – 5:00p	Teaching Disasters: Ethical and Economic Issues of Fukushima and COVID-19	Jessica McManus Warnell & Anna Geltzer, University of Notre Dame
5:00 - 5:20p	Supply Chain Resilience Against Disasters: Implications for the COVID-19 Crisis	Yuzuka Kashiwagi, Waseda University
5:20 – 5:50p	**PANEL DISCUSSION**	
5:50 – 6:00p	**CONCLUDING REMARKS**	
6:00p	**ADJOURN**	