



ALERT
AWARENESS AND LOCALIZATION
OF EXPLOSIVES-RELATED THREATS

Awareness and Localization of Explosives-Related Threats (ALERT)

*ALERT is supported by the Department of Homeland Security (DHS)
Science and Technology (S&T) Directorate through the
Office of University Programs (OUP)*

**Advanced Development for Security Applications (ADSA) Workshop 22:
Reducing Operator Cognitive Load in Aviation Security
Virtual Workshop**

Session 2

November 24, 2020, 11 AM - 1 PM ET

SPEAKER BIOGRAPHIES



Daniela Buser

University of Applied Sciences and Arts Northwestern Switzerland

I am a Research Scientist and PhD student at the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) and at the Center for Adaptive Security Research and Applications (CASRA). My main research focus is on complex socio-technical systems in the field of airport security. Projects I am currently working on concern *Remote Cabin Baggage Screening* and *Human Factors at Security Checkpoints*. The objective of those projects are identifying factors relevant to security personnel's commitment, resources and strains as well as performance in different work environments in order to increase the efficiency and effectiveness of security checkpoints. I studied psychology and biology at the University of

Zurich and hold an MSc in Cognitive Psychology and Cognitive Neuroscience.



Carl R. Crawford

Csuptwo

Carl Crawford is president of Csuptwo, LLC, a technology development and consulting company in the fields of medical imaging and explosive detection for Homeland Security. He has been a technical innovator in the fields of computerized imaging for more than thirty years. His technology has resulted in 90 U.S. Patents. Dr. Crawford was the Technical Vice President of Corporate Imaging Systems at Analogic Corporation, Peabody, Massachusetts, where he led the application of signal and image processing techniques for medical and security scanners. He developed the reconstruction and explosive detection algorithms for a computerized tomographic (CT) scanner deployed in airports worldwide. He was also

employed at General Electric Medical Systems, Milwaukee, Wisconsin, where he invented the enabling technologies for helical scanning for medical CT scanners and physiological motion compensation for projection-based imaging systems. At Elscint, Haifa, Israel, he developed technology for cardiac CT scanners. He also has developed technology for magnetic resonance imaging (MRI), single photon emission tomography (SPECT), positron emission tomography (PET), ultrasound imaging, dual energy imaging and automated threat detection algorithms. He has a PHD in electrical engineering from Purdue University. He is a Fellow of the IEEE and a Fellow of the American Association of Physicists in Medicine (AAPM).



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John M. Fortune

DHS Science and Technology (S&T) Directorate, Department of Homeland Security

Dr. John M. Fortune is the Screening at Speed Program Manager in the DHS Science and Technology (S&T) Directorate. The Screening at Speed Program is pursuing transformative R&D activities that support a future vision for increasing aviation security effectiveness and improving the passenger experience. He also leads the Screening Program Management Team in S&T's Office of Mission Capability and Support. Previously, Dr. Fortune was a Branch Chief in S&T's Resilient Systems Division, where he focused on enhancing resilience of the Nation's most critical infrastructure sectors, such as energy, transportation, water, and communications. He managed the Resilient Tunnel Project, which developed inflatable plugs

to protect subway tunnels from flooding. He also oversaw several projects to assess vulnerability and design countermeasures for critical transportation infrastructure, including development of a blast protection strategy that was purchased and installed by a major U.S. mass transit agency. In his earlier work at S&T, Dr. Fortune served in the Emerging Threats Portfolio, where he oversaw a nationwide assessment of underwater subway tunnels, a high priority effort requested by the TSA Administrator, and he worked closely with the intelligence community to understand potentially disruptive threats to the Nation's security. Dr. Fortune came to DHS in 2005 as a Science and Technology Policy Fellow with the American Association for the Advancement of Science. Prior to joining DHS, Dr. Fortune was a researcher at the National Institute of Environmental Health Sciences. He holds a Ph.D. in biochemistry from Vanderbilt University and a B.S. in chemistry from Duke University.



David Huegli

University of Applied Sciences and Arts Northwestern Switzerland

I work as a research scientist at the University of Applied Sciences and Arts Northwestern Switzerland and the Center for Adaptive Security Research and Applications (CASRA). My research focuses on human-automation interaction at airport security checkpoints, especially how airport security operators deal with new technologies (automation and 3D imaging). I have an MSc degree in psychology and am currently pursuing a PhD at the Technical University of Berlin.



Kristopher Korbek

Transportation Security Administration

Dr. Korbek is an Engineering Psychologist with a B.A. in Psychology from Fairfield University, M.A. and Ph.D. in Industrial/Organizational Psychology from the University of Connecticut. Before joining TSA, Dr. Korbek was a Human Factors Analyst at Evolving Technologies, Inc. where he conducted predictive modeling and job task optimization research. Dr. Korbek was then a Senior Research Psychologist/Principal Associate at Dunlap and Associates, Inc., where he conducted behavioral transportation safety research for NHTSA.



Bonnie Kudrick

HumanLink

Bonnie Kudrick is the managing principal consultant at HumanLink, LLC, and a global expert in the field of Human Factors and Aviation Security. A former founder and Manager of the Transportation Security Administration's (TSA) Human Performance Branch in Arlington, Virginia, Bonnie has nearly 20 years of professional experience working at Lucent Technologies, Lockheed Martin, L-3 Technologies, and other leading consulting firms, before joining TSA.

Bonnie's expert knowledge of airport operations stands out among her many abilities. Her experience includes developing user requirements for security systems, training assessments, designing user interfaces, workstation design, and cognitive analyses. Bonnie's speaking and panel discussions at conferences around the globe are highly praised for their specialized content, information considered to be the leading authority in the field. Her articles have appeared in Federal Aviation Administration (FAA) publications and peer-reviewed journals, in the U.S. and in Europe.

Bonnie working with her international contacts, has resulted in HumanLink, LLC's having exclusive rights to XRT4, the premiere 2D and 3D training software for aviation screeners

Under Bonnie's leadership, Human Link's mission is to optimize human capabilities to improve performance within complex sociotechnical systems. Human Link's goal is to improve operational efficiency by thoroughly examining how Human Systems Integration (HSI) can be incorporated in all facets of the airport environment. With field operations that involve evaluating operator performance, passenger experience, Graphical User Interface (GUI) analysis, workstation design recommendations and implementation, training, and testing, Bonnie works in close coordination with senior leadership, airport and regional directors, and Transportation Security Officers, both in the U.S. and in the international aviation community.



Harry E. Martz

Lawrence Livermore National Laboratory

Harry Martz is the Director for Non-destructive Characterization Institute and a distinguished member of the technical staff at Lawrence Livermore National Laboratory. He is also Principal Investigator (PI) on Department of Homeland Security, Science and Technology, Homemade Explosives Identification, Detection and Mitigation (*HEIDM*) program. Harry joined the Laboratory to develop the area of X-ray imaging and proton energy loss computed tomography for the non-destructive inspection of materials, components, and assemblies. He received his M.S. and Ph.D. in Nuclear Physics/Inorganic Chemistry from Florida State University, and his B.S. in Chemistry from Siena College. Harry has applied CT to inspect one-millimeter sized laser targets, automobile and aircraft components, reactor-fuel tubes, new production reactor target particles, high explosives, explosive shape charges, dinosaur eggs, concrete and for non-destructive radioactive assay of waste drum contents. Recent R&D efforts include CT imaging for conventional and homemade explosives detection in luggage and radiographic imaging of cargo to detect special nuclear materials and radiological dispersal devices.



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Matthew Merzbacher

Alameda County Community Food Bank

Dr. Merzbacher recently retired from his position as Director of Certification and Qualification at Smiths Detection. There, and before that at Morpho Detection, Matthew was responsible for detection testing across products for explosives, chemical, and radiation detection. He also served as co-chair of the ANSI standards group on image quality for CT-based explosives detection systems and chaired the NEMA DICOS Threat Detection Working Group. Matthew joined InVision Technologies in 2003 as a Research Scientist in the Machine Vision group before taking over as manager of that group. Dr. Merzbacher has a Ph.D. in Computer Science from UCLA, specializing in data mining. He has several patents on image processing for explosives detection. He spends his time in the more rewarding pursuits of hiking and volunteering at the local food bank.



Jeffrey P. Middleton

Transportation Security Administration

Jeff Middleton was born in La Jolla, California. He enlisted in the Marine Corps in 1992 and served as a TOW Crewman with 1st Battalion, 3rd Marine Regiment, Marine Corps Base Hawaii from 1992-1996.

In 1996, Corporal Middleton lateral-moved into Public Affairs and was assigned to MCAS Cherry Point as a Combat Correspondent from 1996 to 1998. As a Sergeant, he was transferred to Recruiting Station Baltimore where he served as the Marketing/Public Affairs Representative from 1998 to 2001. He was promoted to Staff Sergeant in 2000 and was transferred to Recruiting Station New Orleans as the Marketing/Public Affairs Representative where he served from 2001 to 2004. In 2004, Staff Sergeant Middleton was transferred back to MCB Hawaii where he served as the Public Affairs Media Representative from 2004 to 2005. After completing an undergraduate degree in Business Management, he was selected for commissioning through the Enlisted Commissioning Program in 2005.

Upon completion of Officer Candidate School and The Basic School, 2ndLt Middleton obtained the MOS of Financial Management. 2ndLt Middleton completed the Financial Management Officer's Course in 2006 and was assigned to the Comptroller Office, 3rd Marine Division, Okinawa, Japan where he served from 2006-2009. In 2009, Captain Middleton reported to the Naval Postgraduate School and earned a Master of Business Administration with a focus on Finance. Upon completion of his graduate degree, Captain Middleton reported to Programs & Resources, Headquarters Marine Corps, to serve as a financial management analyst. Upon completion of his tour at Headquarters Marine Corps, Captain Middleton retired from the Marine Corps in 2014.

In 2014, Jeff Middleton accepted a position at Programs & Resources, Headquarters Marine Corps, as a senior program analyst in the Program Development Branch. He managed the Installations, Manpower, Headquarters, Operating Forces, and Training portfolios. In 2016, Jeff Middleton accepted a position at Office of Finance and Administration, Transportation Security Administration, and served as the Branch Chief of the Planning and Program Analysis Branch. In 2018, he was selected as the Program and Budget Branch Chief responsible for Programming, Budgeting, and Fiscal Integration across financial systems.

Jeff Middleton is married to the former Carolina Alvarez, and has four children: Jacob, age 29; Nicole, age 25; Johnathan, age 19; and Isabella, age 17. In his spare time, he plays soccer and does woodworking.



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Steven Mitroff

George Washington University | Kedlin Screening International

Dr. Mitroff is a Professor in the Department of Psychological and Brain Sciences at The George Washington University and is the Chief Science Officer of Kedlin Screening International. He received a BA in Cognitive Science from UC Berkeley, and a Master's degree and PhD in Cognitive Psychology from Harvard. He completed 3 years of research focused on adult visual cognition and infant cognitive development at Yale prior to spending 10 years as faculty at Duke University. He joined The George Washington University in 2015. Dr. Mitroff has received research funding from the National Institute of Health, the National Science Foundation, the Department of Homeland Security, the Transportation Security Administration, the Institute for Homeland Security Solutions, the Army Research Office, the Army Research Labs, DARPA, and Nike, Inc.

Dr. Mitroff's research examines the nature of visual cognition—examining mechanisms of visual memory, perception, and attention. He has a current primary focus on individual differences to reveal how it is that some people can outperform others, how can we quickly identify the best performers, and how can we then train those individuals to make them even better. Dr. Mitroff's lab explores the topic of visual search—how target items are found among distractors—and works with a variety of groups to inform both academic theory and real-world questions. For example, he examines visual search performance with expert populations (e.g., TSA officers, radiologists) and with big data obtained from a smartphone app. More information about his research and his academic publications can be found at <http://www.mitrofflab.org>. More information about Kedlin Screening International can be found at <https://www.kedlinscreening.com>.



Laura Parker

Department of Homeland Security

Laura Parker is the Senior Advisor for Sensors in the Science and Technology Directorate at the Department of Homeland Security. She is also the Program Manager for the ALERT Center of Excellence, a DHS-sponsored consortium of universities led by Northeastern University to perform research that address explosive threats. Laura, most recently, was the Program Manager for the Next Generation Explosives Trace Detection Program focused on developing advanced explosives trace detectors for use at checkpoints and other DHS operational environments. Laura has worked on a variety of research projects focused on explosives screening technologies to include algorithm and hardware development and interfacing with DHS components such as Transportation Security Administration, Customs and Border Protection, US Secret Service, the US Coast Guard and other government agencies. Previously, Laura worked as a contractor providing technical and programmatic support of chemical and biological defense and explosives programs for several Department of Defense (DoD) offices. She also performed research in several US Navy laboratories in the field of energetic materials. She obtained her Ph.D. in chemistry from the Pennsylvania State University.



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Michael B. Silevitch

Northeastern University

Michael B. Silevitch is currently the Robert D. Black Professor of Engineering at Northeastern University in Boston, an elected life fellow of the IEEE, the Director of the Homeland Security Center of Excellence for Awareness and Localization of Explosives Related Threats (ALERT), and the Director of the Bernard M. Gordon Center for Subsurface Sensing and Imaging Systems (Gordon-CenSSIS), a graduated National Science Foundation Engineering Research Center (ERC). His training has encompassed both physics and electrical engineering disciplines. An author/co-author of over 65 journal papers, his research interests include laboratory and space plasma dynamics, nonlinear statistical mechanics, and K-12 science and mathematics curriculum implementation. Prof. Silevitch is also the creator of the Gordon Engineering Leadership (GEL) Program at Northeastern University, a graduate curriculum offered through the College of Engineering, with the mission of creating an elite cadre of engineering leaders. He and the current GEL Director, Simon Pitts, were awarded the 2015 Bernard M. Gordon Prize for Engineering Education by the National Academy of Engineering (NAE).



Jeremy Wolfe

Harvard Medical School

Jeremy Wolfe is Professor of Ophthalmology and Professor of Radiology at Harvard Medical School. He is Director of the Visual Attention Lab at Brigham and Women's Hospital. Wolfe received an AB in Psychology in 1977 from Princeton and his PhD in Psychology in 1981 from MIT under the supervision of Richard Held. His research focuses on visual search and visual attention with a particular interest in socially important search tasks in areas such as medical image perception (e.g. cancer screening), security (e.g. baggage screening), and intelligence. Wolfe's Guided Search model is one of the leading theoretical approaches to the study of visual search. He has published over 200 peer-reviewed articles (>34000 citations, h-index=84 in Google Scholar). His lab has been funded since 1982 by NIH (NEI, NIMH, NCI), NSF, AFOSR (Air Force), ONR (Navy), ARO (Army), Homeland Security, and the Nat. Geospatial Agency as well as by IBM, Google, Toshiba, Hewlett-Packard, & GE. Wolfe taught Intro. Psychology and other courses for 25 years, mostly at MIT. Leadership: Past President or Chair: Federation of Associations in Behavioral and Brain Sciences (FABBS), Psychonomic Soc, APA Division 3, Eastern Psychological Assoc, NAS Panel on Soldier Systems. Boards: Vision Sciences Society, APA Div 1, 6. Founding Editor-in-Chief of Cognitive Research: Principles and Implications (CRPI). Past-Editor of Attention, Perception, and Psychophysics. Wolfe also serves on the Oversight Committee of the North American Board of the Union for Reform Judaism. He was elected to American Academy of Arts and Sciences in 2019.