



**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 23:  
Autonomous Security Systems**

Session 2

May 11, 2021, 11:00 AM – 1:30 PM ET

## SPEAKER BIOGRAPHIES



**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).



**Richard Dempers**

*Heathrow Airport*

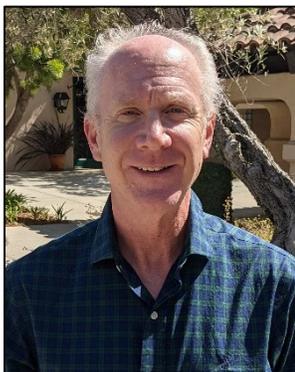
Richard Dempers is a Managing Consultant at Rheinberry carrying out the role of Lead Designer for Security Portfolio projects at Heathrow Airport. Over the last 7-8 years Richard has delivered projects across Hold Baggage, Cabin Baggage and Passenger Security for Heathrow. In his current role of Lead Designer he is providing technical assurance and governance for the replacement of the assets on all of Heathrow's 150+ security lanes. Richard has taken a leading role in the production of the Open Architecture for Airport Security Systems document and is a member of all three workstreams for ACI EUROPE's Open Architecture Working Group. Additionally, Richard has presented on this subject to organisations including ICAO, IATA, ECAC and the IET. Richard's experience in IT spans 20 years and he has worked in a variety of industries including aviation, telecommunications, pharmaceuticals, engineering and utilities. Richard graduated from Imperial College, London in 1993 with a BEng in Materials Science and Engineering before returning to Imperial to complete a MSc in Advanced Mechanical Engineering and a PhD in Mechanical Engineering during which time he was co-funded by the Ministry of Defence, Department for Trade & Industry and European Gas Turbines to analyse and model the mechanical properties of gamma-Titanium Aluminide under multi-axial creep conditions.



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**Eric Duff**

### *Capture*

Eric Duff was Chief Scientist for the development of a limited-angle tomography system and algorithms for industrial X-ray inspection of printed circuit boards at IRT Corporation, and performed CAT scan image reconstruction and optimization, using both full and sparse datasets at InVision Technologies. In another role at InVision Technologies, Mr. Duff was the Director of Business Development, surveying all emerging security technologies. Mr. Duff previously founded two novel technology companies – Advanced Neurometrics (New technology for medical EEG acquisition) and GroundMetrics (Geological EM tomography with applications including natural resource extraction).



**Tyler Karns**

### *Battelle Memorial Institute*

Tyler Karns began working at Battelle in the Summer of 2020 as a Junior Technician, and is continuing his work for Battelle while completing his final year of a BS in Computer Science at University of Nevada, Las Vegas. He is also very active in his school's community, taking leadership roles such as President and Vice President in two different clubs and a member of 2 others. Tyler has developed a strong background in Machine Learning through his projects at Battelle as well as his experience at school. His primary focus has been working with the TSL on applying new testing methodologies to Deep Learning (DL) algorithms used by Advanced Imaging Technology (AIT) systems. These testing methodologies are used to better understand the behavior of DL systems and make AIT systems more accurate in edge-case scenarios.



**Eugene Kramer**

### *Heathrow Airport*

Eugene is the 'Head of Cybersecurity for Passenger, AVSEC and Borders' - Security Strategy and Cyber Defence at Heathrow Airport. He is responsible for Identity, Biometrics, Automation and Security Transformation programmes including driving forward the concept of Open Architecture globally working closely with airports, airlines, industry bodies and regulators. Previously, he was the Principle Architect at Heathrow Airport responsible for the Identity, Automation and Biometrics programmes and successful rollout of large-scale projects across Security, Engineering and Commercial domains. He has experience working in diverse organisations in Fortune500 companies, consultancies, media and venture capital backed start-ups.



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**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 Collage. 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.



**Matthew Merzbacher**

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.



**Amir Neeman**

*Amir Neeman Consulting, LLC*

For over 30 years, Mr. Neeman has been involved in aviation security, homeland protection, and specifically security technologies. His diverse background as an airport operator (with 4 years as Head of Transportation Security Officer (TSO) unit at Ben Gurion International Airport), a government regulator (with 8 years as head of Transportation Security Equipment (TSE) Evaluation and Implementation Branch with the Israeli Security Agency), an equipment manufacturer (with 4 years of Explosive Detection Systems (EDS) Product Management group Leader and Founding VP Product Management at Qylur Intelligent Systems) and a strategic adviser to TSA for over a decade (as Head of Security Practice at LeighFisher and at ANC LLC) enabled him to acquire a holistic approach that is critically required to develop and implement successful and sustainable security solutions. Expert in systems analysis and TSE design, development use and implementation, TSE test & evaluation, business analysis and change management for large and complex project teams. A globally recognized expert in complex security operational issues. Amir holds an MBA (major in technology management) from the Technion Institute of Technology, Israel and is a former Israeli Defense Forces Explosive Ordinance Specialist.



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**Kate Saenko**

*Boston University*

Kate is an Associate Professor of Computer Science at Boston University and a consulting professor for the MIT-IBM Watson AI Lab. She leads the Computer Vision and Learning Group at BU, is the founder and co-director of the Artificial Intelligence Research (AIR) initiative, and member of the Image and Video Computing research group. Kate received a PhD from MIT and did her postdoctoral training at UC Berkeley and Harvard. Her research interests are in the broad area of Artificial Intelligence with a focus on dataset bias, adaptive machine learning, learning for image and language understanding, and deep learning.



**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).



**Christopher D. Smith**

*Department of Homeland Security*

Christopher Smith received his Ph.D. in Aerospace Engineering from Rutgers University in 1990. In his 14 year career with the Federal Aviation Administration (FAA), Dr. Smith performed and managed a range of research and development projects related to the airworthiness of fixed-wing aircraft and rotorcraft. His first assignments with the FAA were in the area of fatigue and fracture analysis, after which he was appointed manager of the FAA's Inspection Systems Research Project. Following the 1997 report of the White House Commission on Aviation Safety and Security, Dr. Smith was appointed manager of the newly formed Aging Systems Research Program. In 1999 the Aging Structures and Aging Systems Research Programs were combined into a single Aging Aircraft Program under Dr. Smith's direction. Dr. Smith managed the FAA's Airworthiness Assurance Research Branch from 2002 through February 2005. In July 2005, Dr. Smith joined the Transportation Security Laboratory (TSL) as the Conveyance Protection Product Lead, where he oversaw research, development, test and evaluation projects on passenger aircraft vulnerability to explosives and mitigation approaches. Dr. Smith became the TSL's Chief Engineer in 2010, responsible for all developmental test and evaluation at the TSL and satellite supporting locations. In 2014, Dr. Smith served as the acting Division Director of the HSARPA Explosives Division, where he facilitated relationship building with S&T customers and supported several of the Undersecretary's cross-cutting initiatives. Upon his return to the TSL in 2016, Dr. Smith resumed his role as Chief Engineer along with oversight on Laboratory Operations,



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including management of the TSL's explosives inventory, quality control procedures, safety procedures, and the technical knowledgebase. Dr. Smith became the Director of the TSL in November 2016. Dr. Smith is a 2004 graduate of the Federal Executive Institute's Leadership for a Democratic Society Program, and a 2010 graduate of the Harvard Kennedy School's Senior Executive Fellows Program. Dr. Smith is a DHS Acquisition Professional with a Level III Certificate in Test and Evaluation Management.



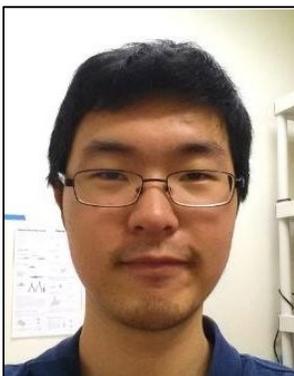
**Michael Tan**

*Scarabee*

As founder and President of the Scarabee Aviation Group (SAG), Michael Tan established a successful business offering world-renowned airport solutions that stretch from Europe to Asia and the Middle East. With over twenty-five years of experience and an extensive track record, Michael is requested by governments, airports and airlines to enhance terminal operations and airline and airport business.

Michael graduated from the University of Delft with a Master's degree in Mechanical Engineering. From a young age onwards he was driven by the entrepreneur gene to discover opportunities and build a business. His company incorporated advanced IT- & control systems and large-scale emulation systems in baggage handling systems. They deliver reputed self-service baggage drop off solutions that are attractive and intuitive to use. Working closely with Schiphol Airport they transformed the way passengers are screened. In 2014 a groundbreaking security checkpoint solution was introduced. Providing security as a service by combining smart technology, signature-design aesthetics and the human factor.

Making a difference in airport and passenger experience, Michael is committed to exceed his customers' needs, deliver tangible results and increase performance. His ambition is opening up new approaches that enable expedited decision-making in creating an inventive and inspirational airport space where long-held visions evolve and ambitions become reality.



**Yilin Yang**

*Rutgers University*

Yilin Yang is a graduate student at Rutgers University in the Department of Electrical and Computer Engineering. He is a researcher at the Wireless Information Network Laboratory (WINLAB) under the mentorship of Dr. Yingying Chen. Prior to this, he was an undergraduate researcher at the Collaborative Robotics and Intelligent Systems (CRoIS) lab at The College of New Jersey (TCNJ) under the mentorship of Dr. Seung-yun Kim. His research interests include robotics, wireless sensor networks, mobile devices, and computer vision.