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TaIX



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ADDITIONAL
INFORMATION



**THE NEXT
BIG THING
AT I/ITSEC**

ACCELERATING THE ADOPTION OF EMERGING TECHNOLOGIES

2 DECEMBER – 6 DECEMBER 2024 | ORLANDO, FLORIDA
WWW.IITSEC.ORG

NDIA

LARGE LANGUAGE MODELS (LLMs)

SPEAKERS



DR. STENSURD



DR. VOLKOVA



DR. REBENSKY



MR. NAVEAU



MR. DE FIGUEIREDO

The Great Hallucination

The year is 2025. Catching the wave of excitement over its possibilities, many government organizations began rolling out generative AI capabilities for a range of applications, and many of those capabilities are now in place. However, something horrible happened. One of the systems has 'hallucinated', producing catastrophically incorrect content that has led to a spectacular failure. It makes national news, and a congressional investigation follows. In the fallout, the DoD adopts a policy banning the use of GenAI, and ongoing AI programs are paused indefinitely. Luckily it is still 2024, and this is a future we can avoid. How?

Speaker: Brian Stensrud, Ph.D., Technical Fellow, Artificial Intelligence, CAE USA

Augmenting Humans with Compound AI: Future of Military Training and Wargames

This TalX unveils a groundbreaking vision of compound AI that seamlessly blends human intuition with AI, transforming military training and wargaming. We'll explore how cutting-edge AI models, rigorously evaluated for transparency and robustness, work in concert to create immersive, adaptive experiences tailored to everyone. Witness the power of AI-generated scenarios that push the boundaries of strategic thinking. Discover how human-AI

synergy could redefine operational readiness. Join us on a journey to the frontiers of technology, where the fusion of human creativity and AI capabilities promises to unlock unprecedented levels of performance and decision making across military operations.

Speakers: Svitlana Volkova, Ph.D., Chief of Artificial Intelligence, Aptima, Inc. & Summer Rebensky, Ph.D., Research Scientist, Aptima, Inc.

LLM Co-pilots for Domain Specific Modeling Languages

The DoD's digital transformation is advancing with domain specific modeling languages (DSMLs) for precise design specifications, which are better suited than general purpose modeling languages, like SysML, when implementing complex designs. Tangram Flex has successfully used Retrieval-Augmented Generation (RAG) with LLMs to generate DSML code quickly and accurately. Experiments showed significant time savings when using LLMs, reducing development from months to weeks. Additional benefits include easier verification and a reduced learning curve for new users. LLMs thus enhance rapid, confident development of DSMLs, easing adoption for systems and software engineers.

Speaker: Matt Naveau, Chief Technology Officer, Tangram Flex, Inc.

Session Chair: Gastao De Figueiredo





TUESDAY, 3 DECEMBER • 1600-1730 • DESTINATION LOUNGE

HUMAN & MACHINE TEAMING

SPEAKERS



MR. ARNOTT



DR. JAVORSEK



DR. ROWE



DR. PALMER



DR. BRAWNER

From Simulation to Autonomy: Evolving Needs for Humans and Machines

This TalX will discuss the evolving requirements, challenges and opportunities as simulation is now used to enable humans to prepare for missions alongside autonomous systems, as well as train the autonomous systems to get them ready for the future fight. Considering the different abilities of humans and machines to go beyond visual and leverage additional signals and spectral bands, or the speed with which each participant can go through a simulation or training plan and how to harmonize these discrete requirements come to the forefront, as will the need to consider new testing and validation.

Speaker: Shane Arnott, SVP Engineering, Anduril Industries

Optimizing for Human Performance in Human Machine Teams

The future of competition and conflict will be defined by the effective employment of human machine teams. To date, the focus has been on developing exquisite AI-driven solutions, like AI pilots for collaborative combat aircraft, to work alongside human pilots. This TalX will explore these advancements, while discussing how the I/ITSEC community can optimize for human performance in those human-machine teams through new and novel training methodologies.

Speaker: Dan Javorsek, Ph.D., Chief Technology Officer, EpiSci

Bridging the Gap: Overcoming Barriers in the DoD's Adoption of Novel Immersive Reality Technology Solutions

The Department of Defense (DoD) has been slow to adopt and integrate cutting-edge immersive reality technology particularly in the critical area of human-machine integration (HMI). Specifically in regard to technologies that enhance human machine teaming and augmented and virtual reality. Rapid advancements and adoption in this technology area will have a multitude of benefits for our service members. This session will explore the barriers for adoption, focusing on the lack of formalized requirements and funding, and ultimately support from the government for these transformative technologies. We highlight the approach that Office of the Assistant Secretary for Defense for Critical Technologies is taking for technology adoption, addressing the dynamic demands of modern warfare, and identify the most significant gaps that must be addressed to spur immediate investment and development in HMI.

Speakers: Leah Rowe, Ph.D., Principal, Booz Allen Hamilton; Christopher Palmer, Ph.D., Principal Director for Human Machine Interfaces (HMI) in the Critical Technologies Office, Office of the Under Secretary of Defense for Research and Engineering

Session Chair: Keith Brawner, Ph.D., Program Manager of the USC Institute for Creative Technologies UARC, Senior Engineer, Artificial Intelligence Area, Soldier Effective Directorate, U.S. Army DEVCOM SC

NOVEL APPLICATIONS OF DATA

SPEAKERS



MR. WALTER



MR. MORRISON



MS. DRETZKA



MR. GOTTLIEB



DR. STENSURD

Synthetic Training Data for Autonomous System Training Generated with AI from Real-world Sensor Data

Several machine learning and generative AI technologies are employed in the approach discussed in this TaIX to produce high-quality synthetic sensor data for autonomous system training. Real sensor data as initial input ensures focus on target areas and generative AI creates synthetic variation. A novel machine-learning approach extracts relevant custom features from the sensor data sets. These features are used as input to reconstruct realistic 3D training environments. Aspects too detailed to be captured by the sensor data, environmental conditions and dynamic scenarios, are augmented generatively. The workflow allows permutations of any parameter, ensuring high-quality synthetic sensor training data. To make truly autonomous systems as robust as possible, it needs as much training and training data as possible which can only be achieved via synthetic training data. The introduced approach ensures targeted synthetic sensor training generation, aligned with current, realistic, localized, training scenarios to avoid misstraining.

Speaker: Hannes Walter, VP Product Management - 3D Simulation Environments, Blackshark.ai

The Evolution of Autonomous Tactical AI - Learning the Lessons from Ukraine

The Ukrainian conflict has seen trench warfare coupled with new technology including drones and modern sensors. Militaries are updating their doctrine to exploit and defend against these new technologies. Simulation and AI will enable new tactics to be tested in a safe, virtual environment before expensive acquisitions and field deployments. While semi-autonomous AI has been used

for decades, recent advancements will deliver intelligent and autonomous computer-generated forces with utility from training to operations. This TaIX looks at the biggest advancements and predicts when these force-multiplying technologies will make a meaningful difference to the warfighter. Attendees will leave educated on how current / near-future advances in AI will actually impact training and operations, focusing on entity-level AI and COA analysis.

Speaker: Peter Morrison, Chief Product Officer, Bohemia Interactive Simulations

The Data Mesh and Zero Trust

This TaIX will explore the co-dependency between the Data Mesh and Zero Trust and their intersection with MS&T. We will discuss the strategic need, emphasizing the rapid change in technology. For example, the fear that quantum computing, with a horizon of about 3-4 years hence, is the first technology able to break traditional encryption methods. Other examples are the ability for LLMs and other bots to perform rapid, nearly undiscernible security attack and the increased need for scalable, real-time security measures that are flexible and trustworthy as the data mesh adoption enables collaboration while needing to protect their Intellectual Property.

Speakers: Erica Dretzka, Director, Future Analytics Architecture, OSD Chief Digital and AI Office; Jordan Gottlieb, Senior Advisor, Systems Engineer Technical Advisor, DoD CIO, Zero Trust Portfolio Management Office (PfMO)

Session Chair: Brian Stensrud, Ph.D., Technical Fellow, Artificial Intelligence, CAE USA



CATALYSTS TO ADOPTION

SPEAKERS



CAPT HILL, USN (RET.)



MR. SWEATT



MR. MORALES



MR. NEWTON



DR. McARDLE

Why Can't We Innovate?

This discussion will focus around barriers to adopting innovative technologies and what the MS&T community might do to mitigate those barriers. This TalX center around three main barriers to innovation, regardless of specific technology, and what we can do about it.

Speaker: CAPT Tim Hill, USN (Ret.), Director of Central FL Operations, Intuitive Research and Technology Corp

Accelerating Software Accreditation in the Department of Defense

Software accreditation -- obtaining an Authority to Operate (ATO) -- and deployment can be a thorny challenge for new and small businesses when attempting to work with the Department of Defense (DoD). This TalX will discuss new pathways to onboard, secure, and run commercial SaaS applications on DoD networks at a fraction of the cost and time through new DevSecOps platforms that provide an alternative to the traditional ATO process, allowing software to be delivered at the speed of relevance.

Speaker: Tyler Sweatt, Chief Revenue Officer, Second Front Systems

Modeling and Simulation in Software Defined Conflict

The defense technology innovation system is changing with new venture-capital backed entrants developing new novel digital technologies, modeling and simulation capabilities, and training tools for the government. This TalX will explore the impact venture capital can have on defense acquisitions and modernization. It will address how venture capital firms try to identify talented new startups and the types of attributes they look for when making funding decisions.

Speaker: Chris Morales, Partner, Defense Technology, Point72 Ventures

Accelerating Adoption via an AI Framework

The commercial world is quickly adopting AI in their workflows. These enhancements make users more efficient, organized, and more timely and consistent on meeting tasks. This TalX will present design patterns for adopting AI that match existing workflows for accelerating the realization of AI in government organizations.

Speaker: Charles Newton, Director, AI Platform, Soar Technology, LLC

Session Chair: Jennifer McArdle, Ph.D., Adj. Senior Fellow, Center for a New American Security

WEDNESDAY • 4 DECEMBER 2024 • 1745 – 1900

NEXT BIG THING SOCIAL

MEET THE SPEAKERS AND LIKE-MINDED INNOVATORS
FOR HORS D'OEUVRES AND BEVERAGES

OPEN TO ALL WHO ATTENDED A NEXT BIG THING SESSION

THE FUTURE OF XR-BASED, AI-DRIVEN SIMULATION TECHNOLOGIES: WHAT EFFECTIVE HUMAN FOCUSED SYSTEMS WILL LOOK LIKE BEYOND THE NEXT 5 YEARS

SPEAKERS



MR. KENNEDY



MS. HULME



DR. BOWMAN



DR. DENNISON



DR. WINER

Massive Scale, Unprecedented Complexity: The Challenges & Advantages of AI-Enabled Modelling & Simulation Tech

Traditional modeling of civilians walking down a road, ignoring traffic, gunshots, and explosions is worthless, even at scale. Training our warfighters for today must include more than “Move, Shoot, Communicate.” Warfighters need simulations that model human behavior and reactions with accuracy, and this accuracy relies on delivering immense scale. Simulations capable of complex, reactive behaviors of 5M+ civilians in a city are necessary to prepare our warfighters for the challenges they face today, and in the future. While AI is capable of producing assets on a massive scale, incorporating these assets into XR simulations introduces a new set of challenges. Designers and engineers of these simulation systems need to be able to engage and influence “populations” of AI-generated entities into a virtual training environment, which requires interoperability with other complex M&S technologies. This TalX will explore how to incorporate human needs, goals, fears, and sentiment into simulation technologies and provide an example delivered to the UK MoD and Western Allied Nations.

Speakers: Jason Kennedy, CEO & Co-Founder, Skyrail; Naomi Hulme, Managing Director & Co-Founder, Skyrail

Extended Reality (XR) and Human Computer Interaction (HCI) – What’s Coming Beyond the Next 5 Years

Extended Reality (XR) and Human Computer Interaction (HCI) have been covered quite a bit in NBT events the last few years. This panel will focus on what is coming beyond the typical five (5) year technology horizon. XR and HCI are often discussed as mature areas of research and implementation, while in reality they are in their infancy. This group of experts from industry, academic, and government will discuss the next major advancements coming, the technological challenges that exist, and the barriers to adoption that must be addressed to move these fields into the next decade and more.

Speakers: Doug Bowman, Ph.D., Professor of Computer Science and Director of the Center for Human-Computer Interaction, Virginia Tech; Mark Dennison, Ph.D., Information Dynamics Team Lead, Battlefield Information Systems Branch, U.S. DEVCOM Army Research Laboratory West

Session Chair: Eliot Winer, Ph.D., Professor of Mechanical Engineering and Director, VRAC Research Center, Iowa State University



BIOMETRICS/GOVERNMENT INNOVATION LABS

SPEAKERS



MR. GUNZELMANN



MR. VELAZQUEZ



MR. CANNIZZARO



DR. BAIR



MS. HOLBERT

Leveraging Labs for Accelerated Adoption

We will hear from Government representatives from several labs describing how they create an environment for technology experimentation, maturation, and transition that helps speed the delivery of new capabilities to the force by providing an operationally relevant infrastructure that is connected to the broader operational training and test infrastructure (OTTI). A central motivation is to provide an environment that enables early contact with operators to explore human performance, integration, and machine teaming issues in a high-fidelity, operationally-relevant environment. The long-term objective is to provide an enterprise capability to rapidly integrate new technologies, capabilities, and concepts to facilitate adoption for operations.

- The Modeling and Simulation Integration Lab (MSIL) is an emerging initiative originating with the Department of the Air Force's (DAF) Chief Modeling and Simulation Officer (CMSO) to create a modeling and simulation (M&S) environment to accelerate technology transition into operations by bridging between science and technology (S&T) organizations and program offices (i.e., the Valley of Death). To facilitate achieving this objective, the MSIL has acquired a Joint Simulation Environment (JSE) "in a box" (JIAB) that will allow for experimentation and integration activities at the Air Force Research Laboratory (AFRL) that address near-term program gaps, risks, and research needs while evolving to explore longer-term mission impacts of new technologies and warfighting concepts. This includes human performance and human systems integration issues. Moreover, industry partnerships are a critical component of the overall business model, to ensure that we are bringing the best capabilities to the DAF to support and advance mission effectiveness.
- Learn how to leverage the Federal Labs such as the Marine Corps Warfighting Laboratory on Quantico Marine Corps Base and the Science and Technology Reinvention Laboratory (STRL) in Camp Pendleton, CA by using the Technology Transfer (T2) authorities to establish agreements with industry and academia to work collaboratively in the labs.
- The Synthetic Training Environment (STE) Technology Integration Facility (TIF) is a multi-use space for collaborative partnerships using the STE suite of systems and for prototyping future capabilities. The TIF is staffed with experts in Modeling, Simulation, and Training that can facilitate industry engagements such as technology demonstrations and collaborative development projects, as well as assist in the use of the STE Product Development Kit (PDK) to rapidly integrate third party capabilities into the STE enterprise.

Speakers: Glenn Gunzelmann, Principal Research Psychologist, 711th Human Performance Wing, Air Force Research Laboratory; Luis Velazquez, Chief Technology Officer (CTO), for Marine Corps

Systems Command; Mike Cannizzaro, Senior Engineer / Science & Technology Advisor, Army Futures Command, Synthetic Training Environment Cross Functional Team

Catch the Brain Wave and Make Metrics Matter

The intersection of computer science and the enigmas of brain performance represents an exhilarating fusion of technology and biology. This convergence is giving rise to a new generation of intelligent systems utilizing biometrics to establish a 'Brain Score' that leverages machine learning to track progress, offer data-driven insights, and foresee performance declines within a higher fidelity picture. The reach can expand to the field with asynchronous monitoring and intervention delivery tailored to WarFighter's schedule. It is crucial to address the current barriers to adoption and strategize how to capitalize on this meaningful crossover for performance optimization and neurocognition.

Speaker: Amy Bair, Ph.D., Special Operations Cognitive Enhancement Practitioner, KBR

Session Chair: Maureen Holbert, Senior Associate, Booz Allen Hamilton





A NEXT BIG THING TECHNOLOGY SHOWCASE

THURSDAY, 5 DECEMBER • 1300 – 1430

The recent proliferation of AI has created new possibilities for training data analysis, assessment, and and adaptive learning. To drive collaboration and information sharing, a new Exploratory Team managed by NATO's Human Factors & Medicine (HFM) and Modeling & Simulation Group (MSG) panels has been established (HFM-MSG-ET-218 "AI Applied to Military Training and Education"). In collaboration with the Central Florida Tech Grove, the Exploratory Team is hosting this special event, which provides a smaller, more intimate demonstration setting showcasing cutting-edge technologies that leverage AI techniques applied specifically to military-centric use cases. The event will start with short introductions on the fourteen (14) innovative technologies in play, followed by hands-on engagement with demonstrations.

MODERATORS:

Benjamin Goldberg, Ph.D., U.S. Army DEVCOM SC STTC; Erin Baker, Ph.D., Central Florida Tech Grove

TECHNOLOGY THEMES SHOWCASED

Generative AI
Natural Language Processing/
Understanding
Human Machine Interaction
Computer Vision
Predictive Analytics
Multi-Modal Models
Conversational Agents
After Action Review
Realistic Entity Behavior
Personalized Learning
Biometrics
Machine & Deep Learning
Scenario Generation
Large Language Models

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