

## **Invited Talk Abstracts**

### **General Conference Invited Talks**

# **The Evolution of AI: How Medical Applications Have Stimulated and Guided the Field**

**Ted Shortliffe**

Chair Emeritus & Adjunct Professor of Biomedical Informatics  
Vagelos College of Physicians and Surgeons  
Columbia University in the City of New York

Five decades have passed in the evolution of Artificial Intelligence (AI) and its medical applications. Medical AI has evolved substantially while tracking the corresponding changes in computer science, hardware technology, communications, and biomedicine itself. Emerging from medical schools and computer science departments in its early years, the AI in Medicine (AIM) field is now more visible and influential than ever before, paralleling the enthusiasm and accomplishments of AI and data science more generally. This talk will briefly summarize some of AIM history, relating it to the themes in AI itself and providing an update on the status of the field as it enters its second half-century. The inherent complexity of medicine and of clinical care necessitates that AIM research and development address not only decision-making or analytical performance but also issues of usability, workflow, transparency, ethics, safety, and the pursuit of persuasive results from formal clinical trials. These requirements contribute to an ongoing investigative agenda for AIM R&D and are likely to continue to influence the evolution of AI itself.

## **Teaching Robots To “Get It Right”**

**Joydeep Biswas**

Associate Professor, Computer Science Department  
UT Austin

We are interested in building and deploying service mobile robots to assist with arbitrary end-user tasks in everyday environments. In such open-world settings, how can we ensure that robots 1) are robust to environmental changes; 2) navigate the world in ways consistent with social and other unwritten norms; and 3) correctly complete the tasks expected of them? In this talk, I will survey these technical challenges, and present several promising directions to address them. To "get it right", robots will have to reason about unexpected sources of failures in the real world and learn to overcome them; glean appropriate contextual information from perception to understand how to navigate in the world; and reason about what correct task execution actually entails.

## **Challenges and Opportunities of AI/ML and Autonomy for the Navy**

**John Seel**

Head of NSWC Dahlgren Division Warfare Control and Integration Department

Over the last dozen years, advances in machine learning have heralded and accelerated new generations of AI breakthroughs with much of the innovation happening outside DoD and government. Since, the US' ability to compete in the 21st century depends, in part, on US leadership in data, analytics, and AI, DoD's task is to adopt these innovations wherever they can add the most military value and drive their diffusion across the enterprise. This talk will discuss the Navy's approach to AI adoption and its hierarchy of AI needs and will emphasize the aspects of the Navy and its mission that shape the environment for and demands on desired AI solutions.

## **Special Track Invited Talks**

### **Special Track: Neural Networks and Data Mining Special Track**

## **Neural Network Hardware Acceleration**

**David Bisant**

Central Security Service

Deep learning models require hardware acceleration. The current thirst for this acceleration is exceeding current capabilities and reality. At current trends, by 2045, one half of the world's electricity will be consumed by training deep learning models. This talk will cover background and a history of the field, the acceleration which is currently available, and what is expected in the future.