



WHAT'S NEXT?? UMASS ZOOM SUMMIT: ARTIFICIAL INTELLIGENCE, ROBOTICS AND DATA SCIENCE

The [University of Massachusetts](#) is pleased to extend an [invitation](#) to a “zoom summit” in Artificial Intelligence, Robotics and Data Science on **February 8, 2021 from 3:30-5:00 pm**. We will introduce industry leaders, their colleagues in business strategy and government relations, to some of the most important breakthroughs of recent years in **five key fields within Artificial Intelligence, Robotics and Data Science**.

In the final hour, we invite you to discuss **grand challenges** that will shape these fields over the next decade. Accomplished scientists from across the five campuses of the University of Massachusetts will be on hand to discuss the most pressing translational questions in the post-COVID period.

Major research breakthroughs (30 minutes):

Robotics

- Robot testing center with significant DoD, Federal, MA industrial support and collaboration. CCDC-SC, US Army exoskeleton, NASA Valkrie humanoid robot
- Robot manipulation
- Autonomous vehicles (underwater and driving)

Artificial Intelligence

- Large, acclaimed AI graduate research program (UMA). #7 national ranking in AI in [csrankings.org](#), #11 in US News and World Reports, 11 current or former faculty AAAI Fellows, 61 currently active federal AI research grants
- Reinforcement learning: Pluribus strategic multiplayer game system using RL
- Pioneered Internet Search using probabilistic methods, event detection, distributed search; 1000+ papers, 400 graduate and undergraduate students, 75 PhD's.

Underwater sensing, UAVs

- Underwater systems: \$8.8M from ONR in 2020 fundamental research in next-generation systems for underwater sensing, communication, UAVs driven by AI, robotics

Data Science

- Pioneered development of conditional random fields for probabilistic prediction with high-dimensional features. Widely used in NLP, computer vision, bioinformatics.
- \$15M Mass Mutual grant for research and education along with other MA partners. \$5.5M CZI partnership to create an intelligent/navigable map of scientific knowledge in biomedicine
- MLSC Bits to Bytes Grant \$750k for GPU equipment for breast cancer research in collaboration with local startup DeepHealth

Computer Science Education

- Tripling of on-campus computer science over the last 10 years. Among most popular campus undergraduate majors, among largest graduate programs
- Statewide, national leadership in computer science undergraduate and K-12 education, with emphasis on access and equity
- Data Science: first public data sciences undergraduate and graduate programs in Massachusetts. Undergraduate concentration in DS

Grand Challenges (60 minutes):

Our most accomplished researchers will be on hand for a back-and-forth discussion of these five pressing problems. We will foreground where we're going in these domains, but are curious to learn, is this where you are headed? Are there other directions to consider?

Breakout group 1: Trustworthy AI systems

- EQUATE explores the topics of Equity, Accountability, Transparency, Explainability within software systems and programming languages, machine learning, and vision, theory, and data management systems
 - Developed "Labeled Faces in the Wild (LFW)" one of the most influential face datasets in the world.
 - LFW used to address issues of face-recognition technology, including algorithmic bias and other risks.
- evaluating people's trust of robots and AI

Breakout group 2: Future of work at the human-technology frontier

- Humans and AI working together; using computing to enhance human cognitive capabilities. Includes:
 - AI/machine learning in financial (e.g., fraud detection) and other (e.g., life insurance) predictive systems
 - Digital health (data science, ML, imaging, sensing) and changing face of healthcare
 - AI enabled scientific discovery: scientists using knowledge-guided machine learning in their science domain
 - Humans and robots working together across domains, including healthcare and manufacturing
 - Cybersecurity: multi-time-scale defenses, time-critical decisions: automated and with humans-in-the-loop.

Breakout group 3: Robotics and autonomous systems

- Exoskeletons: training, testing, and development of predictive controllers; enhancing bomb suits with exoskeletons; unmanned ground vehicles (UGVs) and unmanned aerial systems (UASs)
- The undersea domain remains challenging - research using autonomous underwater vehicles has ramped up significantly over the past two decades, but significant problems remain. Communication, sensing, sensor fusion, multi-vehicle coordination and cooperation, complex interactions between AV and other entities in the environment, communication, localization and autonomy are critical challenges.
- Autonomous vehicles in complex environments

Breakout group 4: Data Science

- Smart communities example: Resilience analytics for civil infrastructure in the face of extreme climate events: integrating machine learning and data fusion techniques with physics-based modeling to inform the creation of infrastructure that can withstand extreme weather
- Privacy: Learning from data without disclosing sensitive facts.
- Predictive analytics

Register here: <https://www.eventbrite.com/e/artificial-intelligence-robotics-data-science-registration-131948977945>