1145-AB-1401 **Mary Lynn Reed***, National Security Agency, 9800 Savage Rd, Suite 6844, Ft. Meade, MD 20755. *The Mathematics of Data Science with Applications to National Security.*

The National Security Agency (NSA) faces a wide variety of complex problems under both its signals intelligence and cybersecurity missions. Many of these problems involve analyzing data and applying rigorous mathematical thinking. In this talk we'll highlight some of the unique aspects of data science problems at NSA and the role that advanced mathematical thinking plays in their solutions. We'll feature NSA's two-pronged approach to advancing the state-of-the-art in data science: (1) building the science and advancing the mathematical underpinnings of machine learning, graph algorithms, and other statistical methods, while (2) engaging across disciplines with computer scientists, engineers, and domain experts to solve mission-critical problems and drive research forward. Time permitting, highlighted topics may include: detecting and predicting extremely rare phenomena, the analysis of puzzles and mysteries, advances in recommender-system theory, understanding models for high-consequence decision-making, graph algorithms for community detection, and adversarial machine learning. (Received September 21, 2018)