

IEEE AESS Summer School “Frontier Technologies for Space 2.0 Communications” (6th Edition)

University of Rome “Tor Vergata” (Italy), 14-18 September 2026

Invited lectures

Invited lecture #1: Securing Space 2.0: Building Cyber Resilience for Connected and Intelligent Space Systems

Speaker: Kendra Cook, SAIC, Reston, VA

Space systems are undergoing a fundamental transformation. Once composed of largely isolated spacecraft and ground systems, future missions will increasingly operate as highly connected, software-defined, and increasingly intelligent enterprises spanning Earth orbit, the lunar environment, and beyond. As these architectures evolve, so too must the discipline of space system security.

This lecture begins with foundational concepts in space system security, including the unique characteristics of the space threat landscape and the technical, operational, and environmental challenges that distinguish space system security from traditional terrestrial cybersecurity. Building upon these fundamentals, the lecture examines the principles of cyber resilience, trustworthiness, and secure-by-design engineering, and explores how emerging Space 2.0 architectures such as interconnected systems, software-defined functionality, autonomous operations, and AI-enabled mission capabilities are reshaping traditional approaches to mission assurance, safety, security, and operational resilience.

The lecture concludes with a case study drawn from emerging lunar and cis-lunar communications architectures, exploring how human operators and intelligent systems can coexist to support secure and resilient mission operations. Concepts such as human-automation coexistence, explainable AI, Zero Trust principles, and cyber-resilient autonomy will be discussed, providing attendees with practical insights into securing the next generation of Space 2.0 architectures.

About the speaker:



Kendra Cook is a Space System Security Subject Matter Expert at SAIC, where she supports NASA in advancing the future space system security. She brings over two decades of experience in aerospace engineering, cybersecurity, and mission operations. Before her current role, she spent nine years at NASA's Jet Propulsion Laboratory (JPL), serving in multiple engineering positions, most recently as a System Security Engineer with the Mission Protection Office and as the Lead Systems Engineer on the

Europa Clipper mission operations team. Her career also includes 15 years supporting various satellite development and emerging technology programs across government and industry, and seven years of distinguished service as an Officer in the United States Air Force.

Kendra holds a B.S. in Aerospace Engineering from Boston University and dual M.S. degrees in Astronautical Engineering and Computer Engineering from the Air Force Institute of Technology. She is a certified Project Management Professional (PMP), Certified U.S. Export Compliance Officer (CUSECO), and Certified Ethical Hacker (CEH), reflecting her multidisciplinary expertise at the intersection of engineering, cybersecurity, and policy.

Invited lecture #2: Moonlight LCNS (Lunar Communications and Navigation Services) – End-to-End Navigation Architecture and Main Performance Overview

Speaker: Cosimo Stallo (ESA, UK)

In recent years, lunar exploration has regained momentum, driven by technological advancements and international collaborations. Governments and private companies aim to establish a sustainable presence, harness lunar resources, and prepare for future Mars missions. NASA's Artemis program, alongside China's and other nations' efforts, marks a new era of space exploration.

The European Space Agency has launched its program called Moonlight Lunar Communications and Navigation Services (LCNS), an initiative to create a constellation of one communication satellite and four navigation ones orbiting the Moon, providing communications and navigation services over the lunar South Pole.

The program aims to support both institutional and commercial missions, enabling precise autonomous landings, surface mobility, and high-speed, low-latency data transfer between Earth and the Moon. This infrastructure will be essential not only for humanity's return to the Moon but also for establishing a stable and long-term presence.

This presentation will focus on the E2E Moonlight system architecture with emphasis on navigation chain and describing its design, expected performances and how it will support future landing and surface missions.

About the speaker:



Cosimo Stallo received the Ph.D. degree (cum laude) in microelectronics and telecommunications from the Electronic Department of Engineering, Faculty of the University of Rome “Tor Vergata,” Roma, Italy, in 2010. From 2013 to 2014, he was a tutor for the course on communication systems at the University of Trento, Italy. Since 2012, he has been a Senior Researcher with RadioLabs Consortium, Rome, where he has been/is involved in the technical committees of different GNSS projects in the railway sector, such as ESA IAP 3InSat (Train Integrated Safety Satellite System), ESA IAP Space-Based Services for Railway Signalling, H2020 GSA ERSAT-EAV, and H2020 GSA Railway High Integrity Navigation Overlay System. Since 2011, he has been a professor for the course on satellite navigation at the Master of Science on “advanced satellite communication and navigation systems” at the University of Rome Tor Vergata. He is currently the Project Manager of ESA GSTP Element 2-Competitiveness Digital Beamforming for Rail. He is co-author of about 75 papers in international journals/transactions and proceedings of international conferences. Stallo has been the Chair of the Space Systems Technical Panel of the IEEE AESS since February 2010.

Invited lecture #3: Communications and Networking in LEO Mega-Constellations

Speaker: Gunes Karabulut Kurt, Polytechnique Montreal, Montreal (CAN)

The emerging low Earth orbit (LEO) mega-constellation networks, planned to comprise thousands of satellites, have the potential to connect globally and bridge the long-standing digital divide. This talk will focus on the communications and networking aspects of these mega-constellations and their integration with the terrestrial networks. The associated communication and networking problems will be investigated, along with potential techniques and components, such as distributed massive MIMO, very low Earth orbit (VLEO) systems, and high-altitude platform station (HAPS) systems. The talk will conclude with an overview of the open issues and future research directions.

About the speaker:



Gunes Karabulut Kurt received the B.S. degree (Hons.) in electronics and electrical engineering from Bogazici University, Istanbul, Turkiye, in 2000, and the M.A.Sc. and Ph.D. degrees in electrical engineering from the University of Ottawa, ON, Canada, in 2002 and 2006, respectively. She is currently a Canada Research Chair (Tier 1) in new frontiers in space communications and a Professor with the Polytechnique Montreal, Montreal, QC, Canada. She is also the Director of the Poly-Grames Research Center and the Co-Founder and Director of education

and training of ASTROLITH, Transdisciplinary Research Unit of Space Resource and Infrastructure Engineering, Polytechnique Montreal. She is also an Adjunct Research Professor with Carleton University, Canada. She worked in different technology companies in Canada and Turkiye between 2005 and 2010. From 2010 to 2021, she was a Professor at Istanbul Technical University. She is also a Marie Curie Fellow and has received the Turkish Academy of Sciences Outstanding Young Scientist (TUBA-GEBIP) Award in 2019.