

# 5G•6G OpenRIT 6G Invited Speakers



**Thomas Magedanz**, TU Berlin / Fraunhofer FOKUS

*Towards an inclusive global 6G eco system – Enabling Toolkits and Open Testbeds for Everyone, Everywhere*

**Abstract:**

6G is targeting to be THE ultimate network environment fulfilling on the one hand the UN SDGs to a large extent, but also to support any type of future connected application. Thus, 6G network customization to specific requirements will be key to success. Fraunhofer FOKUS and TU Berlin are developing since two decades different wireless networking toolkits to build open testbed infrastructures enabling both academic and industrial proof of concepts around the globe. In this talk we will provide an overview of the TU Berlin Open Source Open6GNet.org initiative for students as well as the Fraunhofer FOKUS Organic 6G Core toolkit for research labs.

**Keywords:** *Open Source, RAN Technologies, Core Networks, Testbed, Eco systems.*

**Serge Fdida**, Sorbonne Universite

*SLICES, an open infrastructure and data-driven scientific instrument to host 6G thought experiments*

**Abstract:**

The scientific community engaged in the research of future generation networks and systems is lacking advanced and sustainable tools to evidence their research, accelerate the discovery process by sharing their data as well as support reproducibility. This first implies that academic research is often lagging behind large industry. Second, it becomes almost impossible to handle the pace of academic scientific production, largely data-driven thanks to the fast application of AI/ML, but that is hard to validate. SLICES is the first initiative structured as a scientific instrument, under the umbrella of the European ESFRI framework, sustainable, aiming to cover the full research large cycle. This talk will introduce the instrument, its community, academy and roadmap. It will emphasize its openness and potential for cooperation.

**Keywords:** *Scientific instrument, open research data, reproducibility, Open Source, RAN Technologies, Core-Edge continuum.*

**Matti Hämäläinen**, University of Oulu, FINLAND

*Being a 5G test network operator, what it requires and what has been learned*

**Abstract:** This talk focuses on the following questions: How on earth can an academic player be a mobile test network operator? How can we serve research and industry in their needs in this field? What is required and how has the University of Oulu managed to do it? The talk will then go through the University of Oulu 5G test network structure, the lessons learned to run a private 5G test network, and the takeaways from our experience. Also, the visions in the path towards 6G test network are discussed.

**Keywords:** *5G/6G, testbed, test network, vertical solutions, distributed computing.*

**Ivan Seskar**, *Rutgers University, USA*

*From 5G Trials to 6G Triumphs: Understanding Testing Complexity Issues*

**Abstract:**

The presentation examines the evolution from 5G to 6G and its inherent challenges. A key focus is on the development and rigorous testing of AI/ML-driven RAN Intelligent Controllers (RICs), which are essential for efficient operations in the multifaceted 5G landscape. The complexity of this task is exemplified through an exploration of 5G RIC testing. This includes ensuring interoperability and adherence to the progressive O-RAN standards, utilizing a combination of simulations and real-world testing environments. A significant challenge in the testing process of these AI/ML components is ensuring repeatability, which is compounded by the requirement for massive amounts of data to effectively train these systems. Furthermore, diverse and complex data are needed to robustly verify the models'

performance across different scenarios and use cases. As the research moves towards 6G, these challenges are expected to escalate, necessitating more sophisticated solutions and testing protocols. This presentation seeks to shed light on the trajectory from 5G to the potential of 6G, highlighting both the hurdles and opportunities that lie ahead in the performance evaluation of next-generation networks.

**Keywords:** *5G, 6G, Open RAN, AI/ML, Wireless Testing and Certification*

**Abhimanyu Gosain**, *Northeastern University, USA.*

*A vision for Future Network System as Open Service Based Platform in FutureG Era*

**Abstract:**

In this talk, we explore future networked systems: systems which would be composed of combinations of multiple subsystems leveraging open interfaces, commoditized hardware for compute and networking, heterogeneous edge radios covering terrestrial and non-terrestrial spectrum bands from many stakeholders; not only from the ICT industry but also across broad fields of industries. This will require a new research platform paradigm to deal with increased management and operational complexity. This platform may be based on an open horizontal and vertical interface concept so that multiple stakeholders from academia to small-to-medium sized enterprises with cutting-edge technologies can directly interface. I will put forth considerations for such a platform twining with the ORAN architecture as an enabler for future networked systems.

**Keywords:** *5G, 6G, Network Orchestration, Open Source, Open RAN, AI/ML.*

**Alfonso Ehijo**, *University of O'Higgins, Chile*

*Opportunities and Challenges for 5G→6G Prototyping & Research Platforms & Toolkits in LatAm.*

**Abstract:**

Facing the challenges and fears of Telecom Operators during the transition from 5G-NR to 6G, we take the opportunity to create a federated ecosystem in Latin America for the prototyping and testing of 6G applications using platforms, toolkits, and portable & interoperable testbeds. This initiative aims to forge a robust collaboration between multiple partners, including Telecom Operators and Vendors, to drive the transition from 5G NSA to 6G. For example, considering Chile as a starting point, there already are more than 20 universities and research centres with 5G(R15) labs that are fine-tuning their strategic and technology roadmaps towards 6G; the aim is to expand this initiative throughout Latin America. This approach solves technical complexities and business challenges and drives innovation and skills development in an environment where AI is key in shaping future telecommunications networks. It emphasizes the creation of essential testbeds for hands-on learning, industry use cases, and rapid technology integration, supporting the development of Intelligent Cities & Industries and the synergy of different cutting-edge enabling technologies, enriched by AI/ML at the edge and intelligent sensors. In addition, we envision the implementation of a 5G/6G LatAm Observatory and the development of use cases based on international experience, including AI-RAN in 6G networks and the implications of AI for Telecom Operators. Finally, we intend to establish this LatAm Observatory as a new collaborative space between industry and academia, including teaching and training, research, and developing new "glocal" study cases, services and applications.

**Keywords:** *Transition from 5G-NR to 6G, portable testbeds, AI in 6G, Federated Testing Platforms.*

**JongWon Kim**, *Gwangju Institute of Science and Technology, South Korea*  
*Live X+AI Services Realization with Digital Twin Cloud Support*

**Abstract:** By aligning with the national AI-support cluster effort and leveraging the latest trends for cloud-native and data-centric edge-to-exascale computing paradigm, a specialized testbed infrastructure is being constructed in Gwangju Metropolitan City, directly next to GIST campus. In order to support this effort, GIST AIGS and SCENT are jointly preparing a futuristic HPC-AI-leveraged digital-twin cloud environment to enable the seamless live interaction of training and inferencing for emerging X+AI services. In this talk, we will explain the status and ongoing plans to facilitate open and federated collaboration with global ICT testbed R&D communities.

**Keywords:** *Cloud-native Computing, HPC-AI, Digital Twin, Testbed, Eco systems*

**Joyce Mwangama**, *University of Cape Town, South Africa*  
*Digital Health in Africa: Research Opportunities and Challenges*

**Abstract:** Africa, with its vast and diverse population, faces a myriad of health challenges. However, the digital revolution offers promising solutions to address some of these challenges. In this talk, we unpack the current state of digital health initiatives in Africa. From mobile health (mHealth) solutions that enhance patient data collection to telemedicine and connected care that bridges the urban-rural divide, African countries are leveraging technology to improve healthcare outcomes. The state-of-the-art as well as some of our results on the development of digital health interventions catered for Africa are also addressed.

**Keywords:** *Digital health, mHealth, Telemedicine, 5G/6G, Interventions*

**Bessie Malila**, *University of Cape Town, South Africa*

*Generating evidence for the efficacy of Telemedicine systems in Africa: Can 5G/6G test bed infrastructures help?*

**Abstract:** Investments in digital models of healthcare can potentially address some of the global health challenges currently being experienced. However, there is still lack of evidence of the efficacy and cost-effectiveness of digital health interventions. Test beds, also known as living labs or real-world test environments present opportunities for generating such evidence through solution testing and validation. In this talk, we discuss the design and development of a 5G digital health test bed infrastructure currently in development at the University of Cape Town. The test bed infrastructure is expected to provide a platform for researchers and innovators for testing their ideas, hence accelerate their adoption into mainstream health systems. The test bed infrastructure allows the development of digital models of care health solutions that take into context the unique healthcare delivery challenges experienced in different regions in Africa.

**Keywords:** *Digital health, Test beds, Real-world test environments, Living Labs, Framework, Health, Evidence*

**Akihiro Nakao**, *Tokyo University, Japan*

*Inclusive Development of Next Generation Cyber Infrastructure as Digital Lifeline*

**Abstract:** We are increasingly depending upon cyber infrastructure for mission critical use cases. The evidence is countless; once a disruption happens in our mobile networks, we suffer from the loss not just of human conversations but of all sorts of socio-economic activities such as banking, trading, payment, education, remote meeting, etc. Thus, information communications have been increasingly utilized as a social infrastructure, namely, "digital lifeline". In an effort for defining, developing and deploying next generation cyber infrastructure, we posit that it is significant to take an inclusive approach for accelerating innovations, that is, bringing all the stakeholders in the eco-system. We devote ourselves to providing flexible customization to the infrastructure so that general people that can clearly define the social problems may be able to develop innovative solutions and to evaluate the social acceptance of such solutions. In this presentation, we introduce our research activities on softwarization, virtualization and modularization of telecommunication infrastructure components through open interfaces and democratizing the development of cyber infrastructure by privatization such as Private5G/Local 5G. In addition, we also show values as digital lifeline that we bring to the society by means of the latest such technologies applied to local government revitalizations.

**Anastasius Gavras**, *Eurescom, Germany*

On the stimulation of an evolution of test and experimentation infrastructures to measure value

**Abstract:** In the realm of testbeds and research infrastructures, the traditional focus has been on functional metrics and performance of new technologies. However, there's an increasing recognition of the importance of aligning technological advancements with societal values and sustainable development goals. This shift emphasizes the need to prioritize environmental, societal, and economic outcomes in technology development. While the significance of values in Information and Communication Technology (ICT) research is acknowledged, a clear framework for values-driven development remains elusive. As a consequence, current testbeds and research infrastructure cannot support the validation and evaluation of delivered key values. Among other objectives the SNS project 6G-SANDBOX makes an attempt to introduce a method to measure value-related impacts based on Key Value Indicators (KVI) in the context of emerging 6G technologies. The KVI framework delineates certain steps, ranging from defining use cases to evaluating value outcomes, thereby offering a structured approach for research and development of 6G technologies. The ultimate aim is to empower RTD projects on future communications systems to address environmental, societal, and economic challenges and estimate value outcomes.