

6G, METAVERSE, AND GENERATIVE AI: FROM CONVERGENCE TO EMERGENCE

SEMINAR

ABSTRACT

6G networks will bring forth a variety of novel enabling technologies such as integrated sensing and communications for perceptive mobile networks, quantum-enabled wireless networks, blockchainized mobile networks, and AI-native networks with intelligence-endogeneous capabilities. The push from more advanced technological tools becoming available as well as the pull from society's needs imply that there must be several 6G paradigm shifts, e.g., transition from 2D to global 3D connectivity, services beyond communication, and a *cyber-physical continuum* between the connected physical world of senses, actions, and experiences and its programmable digital representations. Importantly, NSF's view on Next G research is that Next G includes but is not limited to the specific key performance indicator requirements and topics of interest addressed by the different 6G standards development organizations. In fact, according to the Next G Alliance roadmap, there is a unique opportunity to address the interdependencies between technological and human evolution, given that there is a symbiotic relationship between technology and a population's societal and economic needs. As technology shapes human behavior and lifestyles, those needs shape technological evolution.



Prof. Martin Maier
Full Professor
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This talk focuses on the fusion of digital and real worlds. We introduce the concept of the so-called *Multiverse* as an interesting attempt to help realize the fusion of digital and real worlds. The Multiverse offers eight different types of reality, including but not limited to virtual and augmented reality. A term closely related to the Multiverse is the recently emerging Metaverse. The Metaverse might be viewed as the next step after the Internet, similar to how the mobile Internet expanded and enhanced the early Internet in the 1990s and 2000s. The various adventures that this place has to offer will surround us both socially and visually. The Metaverse will put the user first, allowing every member of our species to delve into new realms of possibilities. A modern, digital renaissance is taking place on the grandest stage we have ever seen, involving billions of connected brains. In the coming decades, a new era of virtual life will bring in our next big milestone as a networked species.

Some argue that we are in the middle of making a historic pivot from adapting nature to our species to adapting our species back to nature. This pivot requires a wholesale rethinking of our worldview, shifting to a new scientific paradigm that views nature as a life source rather than resource and perceives the Earth as a complex self-organizing and self-evolving system. While we know less about the ocean floor than we know about the surface of the moon, we know even less about the complex life that busies itself under our feet in the soil and cannot be seen with the naked eye. A handful of forest soil contains more life forms than there are people on the planet. The talk will end by providing an outlook on the convergence of digital evolution with biology, as illustrated for the use case of Metaverse's virtual society. We outline our ideas of the virtual society's symbiosis of Inter(net) and (human) being in the future Metaverse, giving rise to the powerful concept of *Interbeing*. We show that that generative AI is instrumental in creating life-like digital organisms that produce clever solutions that AI researchers did not consider, had thought impossible, or even outwitting us humans.

Registration



Date: 12 Oct 2023 (Thu)
Time: 16:00 - 17:30
Venue: G4702, Green Zone, 4/F
Yeung Kin Man Academic Building
City University of Hong Kong

ABOUT THE SPEAKER

Martin Maier is a full professor with the Institut National de la Recherche Scientifique (INRS), Montréal, Canada. He was educated at the Technical University of Berlin, Germany, and received MSc and PhD degrees both with distinctions (summa cum laude) in 1998 and 2003, respectively. He was a recipient of the two-year Deutsche Telekom doctoral scholarship from 1999 through 2001. He was a visiting researcher at the University of Southern California (USC), Los Angeles, CA, in 1998 and Arizona State University (ASU), Tempe, AZ, in 2001. In 2003, he was a postdoc fellow at the Massachusetts Institute of Technology (MIT), Cambridge, MA. Before joining INRS, Dr. Maier was a research associate at CTTC, Barcelona, Spain, 2003 through 2005. He was a visiting professor at Stanford University, Stanford, CA, 2006 through 2007. He was a co-recipient of the 2009 IEEE Communications Society Best Tutorial Paper Award. Further, he was a Marie Curie IIF Fellow of the European Commission from 2014 through 2015. In 2017, he received the Friedrich Wilhelm Bessel Research Award from the Alexander von Humboldt (AvH) Foundation in recognition of his accomplishments in research on FiWi-enhanced mobile networks. In 2017, he was named one of the three most promising scientists in the category "Contribution to a better society" of the Marie Skłodowska-Curie Actions (MSCA) 2017 Prize Award of the European Commission. In 2019/2020, he held a UC3M-Banco de Santander Excellence Chair at Universidad Carlos III de Madrid (UC3M), Madrid, Spain.

Among numerous other publications, Martin Maier is co-author of the book "Toward 6G: A New Era of Convergence" (Wiley-IEEE Press, January 2021) and author of the recently published sequel "6G and Onward to Next G: The Road to the Multiverse" (Wiley-IEEE Press, February 2023). The first book elaborates on the importance of **convergence** of upcoming technological trends and key enabling technologies (e.g., AI, robots, XR, and blockchain) that lie at the heart of 6G and the possible end of the smartphone era. The book ends with an outlook on how future profound technologies will weave themselves into the fabric of everyday life until they are indistinguishable from it and the boundary between virtual and physical worlds is to become increasingly imperceptible. Conversely, the second book explores the **emergence** of a new regime that connects all humans and machines into a global matrix, which some call the global mind or world brain, leveraging on the collective intelligence of all humans combined with the collective behavior of all machines, plus the intelligence of nature, plus whatever behavior emerges from this whole. It focuses not only on the technologies but also points to the expected human transformation in the 6G era through unifying experiences across the physical, digital, and biological worlds delivered by non-traditional converged service platforms, where developers do not hesitate to use technologies from as many disciplines as possible to pave the way for the coming Metaverse as the precursor of the future Multiverse.

Books authored/co-authored by Prof. Martin Maier :

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*Toward 6G –
A New Era of Convergence*



*6G and Onward to Next G –
The Road to the Multiverse*