

The WEAF Mnecosystem – Perspective Vision of Micro/Nano Technologies and Materials as Pillars of Future 6G, Super-IoT and Tactile Internet

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The paradigms of 6G, Super-IoT (Internet of Things) and Tactile Internet (TI), expected to become reality in about one decade from now, demand for unprecedented leaps at conceptual prior that at technology level. Extensive use of Artificial Intelligence (AI) will broaden services and functionalities, while requiring the 6G network infrastructure itself to develop unparalleled concepts, like self-sustenance and self-evolution. The present work argues that the classical Hardware-Software (HW-SW) design approaches, which were effective for decades are that are still in use today, e.g. in 5G, will not be suitable anymore in realizing the self-evolving network of the future. To this end, this contribution will focus on the HW, suggesting its increase in separation and symmetry with respect to the SW, as critical attributes to be pursued in overcoming the so-called HW-SW divide. In particular, partial reformulation of the concept of HW is proposed, capitalizing on the analogy between HW/SW systems/infrastructures and the four classical elements in nature. The envisioned ecosystem is named the WEAF Mnecosystem, standing for the Water, Earth, Air and Fire Micro/Nanotechnologies Ecosystem, within which devices and solutions based on Micro/Nanosystems, Micro/Nanoelectronics and novel materials are accounted to be pivotal in the transition of 6G and TI from current visions to future reality. After defining the WEAF Mnecosystem at conceptual level, its empty landscape will commence to be populated by reporting several state of the art Micro/Nanotechnologies-based research activities, devices, solutions and methodologies, currently discussed in literature, identified as key enabling technologies of 6G, Super-IoT and TI.

Biography

Jacopo Iannacci is Researcher at Fondazione Bruno Kessler (FBK) in Trento, Italy, where he focuses on modeling, design, optimization, integration, packaging and testing for reliability of MEMS/RF-MEMS devices/networks for sensors/actuators, energy harvesting and telecommunication systems. He received the MSc Degree in Electronic Engineering (2003) and the PhD in Information Technology (2007) from the ARCES Research Center at the University of Bologna, Italy, and worked as Visiting Researcher (2005-2006) at the DIMES Technology Center of the Technical University of Delft, the Netherlands, He authored numerous scientific contributions for international journals, conferences, books and chapters in the field of MEMS/RF-MEMS technology.

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