ENCon: ICA3PP Workshop on Emerging Network Technologies in Computing and Networking Convergence

In the digital economy era, emerging technologies like artificial intelligence (AI), big data, the Internet of Things (IoT), and fifth-generation mobile communication technology (5G) are rapidly advancing. This has spurred diverse business scenarios including smart cities, smart transportation, smart education, and smart healthcare, driving unprecedented demand for Computing Power Networks (CPN) that deliver "high-performance computing, ubiquitous connectivity, high reliability, and intelligence".

Computing and Networking Convergence (CNC) focuses on integrating "computing power" and "networking" through unified orchestration, intelligent scheduling, and joint optimization of heterogeneous computing and network resources via global collaborative scheduling mechanisms. By providing foundational support—such as low-latency networks and computing-aware routing protocols—CNC enables efficient computing power scheduling, positioning it as the future of information infrastructure.

While CNC's importance as an emerging network architecture and system is widely recognized, its key technologies remain in the exploratory phase. Critical challenges include: (i) Architecturally, CPN's concrete architectural form remains undefined, and its relationship with existing TCP/IP networks is unclear. We must determine whether CPN represents an upgrade and extension of TCP/IP networks, or an entirely new system built from the ground up. (ii) From a security standpoint, integrating computing power into networks introduces novel security risks. Computing resources distributed across cloud, edge, and end devices expand network boundaries and multiply access points, creating an extended attack surface that increases vulnerability to cyberattacks and other security threats.

The aim of this workshop is to collate original research and review articles discussing the state of the art in the field. We hope that this workshop will provide a forum for researchers and practitioners in all aspects of emerging network technologies in CNC. Topics of interest include, but are not limited to, the following scope:

- Architecture, protocols, and methodologies of CNC
- Innovations in application layer, transport layer and network layer for CNC
- Blockchain-enabled privacy preservation techniques for CNC applications
- Machine learning and Artificial Intelligence algorithms for CNC services
- Orchestration of software-defined networking (SDN) or network virtualization (NV) for CNC applications
- Cloud computing, mobile edge computing and on-device computing technologies for CNC

- Security and privacy in CNC

Chairs:

Dr. Yuanlong Cao
Jiangxi Normal University, China
Email: ylcao@jxnu.edu.cn

Dr. Yirui Jiang
Cranfield University, UK
Email: yirui.jiang@cranfield.ac.uk

Dr. Xun Shao
Toyohashi University of Technology, Japan
Email: x-shao@ieee.org

Dr. Giselle Lugo Miole
United Nation University, Japan
Email: giselle.miole@unu.edu

Dr. Mo Fan
Cambridge University, UK
Email: fm651@cam.ac.uk