

**KM Conference 2022**

**29 June - 2 July 2022**

**University of Maribor, Faculty of Criminal Justice and Security (FVV), Slovenia**

**Themes: Knowledge Management, Cybersecurity, Learning, and Information Technology**

<https://iakm.org/conference/>

**2<sup>nd</sup> Day Opening Keynote Lecture**

**Knowledge and Cybersecurity Implications in a Metaverse**

**Professor Bruce W. Watson**

Chair of AI, Cybersecurity and Cyberwarfare, Stellenbosch University, South Africa

**Keynote Overview:**

Metaverses are comprehensive virtual worlds relying heavily on advances in computing power, social media, and most recently, Blockchain. While *the Metaverse* is a recently announced move by Facebook, the concept is decades old and we can expect numerous other metaverses to be developed (and populated) in the coming years. Aside from the appeal of no-holds-barred virtualization, they provide many profit-driven advantages – most of which arise from cryptocurrencies. Blockchains (as well as NFTs) already impact knowledge management and sharing, cybersecurity and intelligence analysis – where they are the foundation of modern digital proof of (unique or shared) ownership. They rely on various consensus algorithms (commonly known as “mining”) such as proof-of-stake, etc. These concepts are already being built into metaverses to facilitate the (meta)digital economy, but whether such Blockchains must reside *inside the metaverse* or *in the real world* remains an open question, and our research specifically explores the implications of both. In particular, to avoid potential cheating by the metaverse owner (e.g. Facebook, or others), both meta and real Blockchains may be required, along with *bindings* between them. Cross-Blockchain bindings (using smart contracts) are already understood – but the implications of bindings crossing the *metabARRIER* are ill-understood, especially if they subsequently cross back out into “real”. Still deeper complexity arises when knowledge artefacts (e.g. AI’s) cross the metabARRIER, or are partially developed on both sides of the barrier. The discussion will round off consideration of mid-term issues such as: binding between two metaverses, smart contracts across barriers, and Blockchain on post-quantum cryptography.

**About the Keynote Presenter:**

Bruce W. Watson is Research Professor Cybersecurity and Cyberwarfare and the Director of the Centre for Artificial Intelligence Research in the School for Data-Science & Computational Thinking. His first Ph.D is in computing science from Eindhoven University of Technology, after studying discrete mathematics and computer science at the University of Waterloo. He later returned to Eindhoven as chair and head of Software Construction. Watson’s second Ph.D is from the University of Pretoria. Parallel to his academic career, he worked as a compiler specialist at several high tech companies (e.g. Microsoft, Watcom, Visual Edge/IBM), and subsequently as an algorithmicist in cybersecurity and cyberthreat intelligence (e.g. for Cisco, Netronome and Computed Future). He regularly serves as a presenter or consulting scientist for a variety of governments, defense organizations, and companies – focused on deep technologies, tactics, and strategic trends in the intersection of AI, cryptography, intelligence analysis, and Blockchain. He has supervised dozens of graduate students, serves as an IFIP TC2 representative, is a member of ACM and SPIE, and has a diversity of publications and research grants, which include cybersecurity, software correctness and algorithmics, but also AI applied to long-COVID treatment, wine science, and astrophysics/cosmology modeling using quantum computing. Various companies’ software projects have failed spectacularly, making his co-authored book on *Correctness-by-Construction* very topical. In his spare time, Watson collects and enjoys wine, and flies planes.

