

## Preface

Information Technology and Implementation (IT&I-2022) provides a leading international forum that brings together researchers and practitioners in the field of computer science with the purpose of exploring the fundamental roles, interactions as well as practical impacts of information technology in modern world. The purpose of the event is presentation and discussion of the latest scientific results in the field of computer science, information technology, research and development of methodologies, techniques and tools for digital transformations of society on this basis. The collection includes papers peer-reviewed, selected by the program committee and presented at the workshops of the 9th International Research Conference Information Technology and Implementation (IT&I-2022, November 30 - December 2, 2022, Kyiv, Ukraine). The conference was held as a video conference using the Zoom platform by topics:

- Mathematical Foundations of Information Technology & Artificial Intelligence
- E-commerce, E-learning, Network and Internet Technologies & Cyberspace Protection

Anatoly Anisimov,

Vitaliy Snytyuk

IT&I-2022 Conference Editors

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**Vitaliy Tsyganok**, Professor, Institute for Information Recording of the National Academy of Sciences of Ukraine

**Vladimir Vovk**, Professor, Royal Holloway, University of London, United Kingdom

### **The Conference is Organized by**

- Taras Shevchenko National University of Kyiv (Faculty of Information Technology, Faculty of Computer Science and Cybernetics)
- National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute»
- Viktor Glushkov Institute of Cybernetics of the National Academy of Sciences of Ukraine
- Institute of Information Technology and Learning Tools of the National Academy of Educational Sciences of Ukraine
- Institute for Information Recording of the National Academy of Sciences of Ukraine
- Institute of Software Systems of the National Academy of Sciences of Ukraine
- The Council of Young Scientists of the Faculty of Computer Science and Cybernetics and the Faculty of Information Technology of Taras Shevchenko National University of Kyiv