



Mirko ZICHICHI

MSCA ITN Early Stage Researcher in Law Science and Technology Joint Doctorate

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Madrid, Spain i Born in Palermo, Italy, 08/03/1995

Early Stage Researcher in Law, Science and Technology - Rights of the Internet of Everything (LaST-JD-RloE) a Horizon 2020 Research and Innovation programme funded by the Marie Skłodowska-Curie Actions. The overall goal of my research is to investigate methodologies and design systems that direct the control of the flow of personal data to individuals through decentralized systems.

WORK EXPERIENCE

Ongoing Apr 2020	Expert, INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO), Madrid <i>Member, AD-HOC GROUP FOR ISO/IEC 21000-23 SMART CONTRACTS FOR MEDIA</i> <ul style="list-style-type: none"> Standard for the conversion of Intellectual Property Rights contracts into Smart Contracts MPEG-21 IPR Distributed Ledger Technologies Smart Contracts Media Contract Ontology
(est.) Oct 2022 Nov 2019	EU Horizon 2020 MSCA ITN Early Stage Researcher, LAW SCIENCE AND TECHNOLOGY JOINT DOCTORATE, Bologna, Turin, Madrid <i>Universities: UNIVERSITY OF BOLOGNA, UNIVERSITY OF TURIN, UNIVERSIDAD POLITÉCNICA DE MADRID</i> <ul style="list-style-type: none"> Decentralized Systems for the Protection and Portability of Personal Data Member, Ontology Engineering Group (OEG), Universidad Politécnica de Madrid Member, Analysis of Networks and Simulation Research Group (AnaNSi), University of Bologna Member, Legal Blockchain Lab, University of Bologna Personal Data GDPR Distributed Ledger Technologies Smart Contracts Semantic Web Linked Data
Apr 2021 Nov 2020	Student PhD Traineeship, BITNOMOS, Bologna <i>Research and development: INTELLIGIBLE IDENTITY AND CERTIFICATE PRODUCTS</i> <ul style="list-style-type: none"> Development of the Intelligible models for verifying the authenticity of digital certificates and online identity assertions through smart contracts and standards for mark-up of legal documents. Self-Sovereign Identity Ethereum ERC-721 Non Fungible Tokens Smart Contracts Akoma Ntoso
Apr 2019 Feb 2019	Student Traineeship, UNIVERSITY OF BOLOGNA, Bologna <i>Department: DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (DISI)</i> <ul style="list-style-type: none"> Research on Blockchain technologies and Smart Contracts for Intelligent Vehicles Network. Blockchain Ethereum Smart Contracts Solidity Python JavaScript Docker Truffle IOTA
Sep 2017 Dec 2016	Student Traineeship and Thesis, ITALIAN NATIONAL COUNCIL OF RESEARCH CNR, Palermo <i>Institute: ISTITUTO DI CALCOLO E RETI AD ALTE PRESTAZIONI (ICAR)</i> <ul style="list-style-type: none"> 200 hours stage: Development of components in MUSA, a multi-agent system for the self-adaptive composition and orchestration of services in a distributed environment 200 hours thesis work: Research on a new monitor model for Linear Temporal Logic aimed to user-requirements satisfaction Java Eclipse Test Driven Development JaCaMo

EDUCATION

(est.) Mar 2023 Nov 2019	PhD in Law, Science and Technology, UPM-UNIBO-UNITO, <i>Universities: UNIVERSIDAD POLITÉCNICA DE MADRID, UNIVERSITY OF BOLOGNA AND UNIVERSITY OF TURIN</i> <ul style="list-style-type: none"> Departamento de Inteligencia Artificial (DIA), UPM Department of Computer Science and Engineering (DISI), UNIBO Department of Law, UNITO
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Jul 2019 | Master's Degree in Computer Science, UNIVERSITY OF BOLOGNA,
 Sep 2017 | Specialization : INFORMATION SCIENCE FOR MANAGEMENT
 > Grade : 110/110 cum laude
 > Thesis : "A Distributed Ledger based infrastructure for Intelligent Transportation Systems"
 > Thesis supervisor : prof. Stefano Ferretti

Oct 2017 | Bachelor's Degree in Computer Science, UNIVERSITÀ DEGLI STUDI DI PALERMO,
 Sep 2014 | > Grade : 110/110 cum laude
 > Thesis : "Tecniche di Monitoring di Servizi Web per la Soddisfazione Parziale dei Requisiti"
 (Web Services Monitoring Techniques for Partial Satisfaction of Requirements)
 > Thesis supervisor : Ing. Cossentino Massimo

LANGUAGES

Italian Mother tongue
 English C1 | IELTS Academic held on 07/2018 | Overall band : 7 (L : 8; R : 8.5; W : 6; S : 6)
 Spanish B2

SCIENTIFIC ACTIVITIES

Chairmanship | Chair of :
 > Digital Media and Human Well-Being Workshop, Madrid, Spain, November 2021
 > Seminario "Ordine, Caos, Complessità e Sistemica", Palermo, Italy, May 2016

Invited | Lectures :
 > Community Innovation Lecture Series, MOBI - Mobility Open Blockchain Initiative, April 2022
 Technical Program Committee :
 > HICSS 56, 56th Hawaii International Conference on System Sciences, Hawaii, USA, Jan 2023
 > GoodIT 2022, ACM International Conference on Information Technology for Social Good, Limassol, Cyprus, Sep 2022
 > Blockchain 2022, International Congress on Blockchain and Applications, L'Aquila, Italy, Jul 2022
 > Networking 2022, IFIP Networking Conference, Catania, Italy, Jun 2022
 > HICSS 55, 55th Hawaii International Conference on System Sciences, Hawaii, USA, Jan 2022
 > Blockchain 2021, International Congress on Blockchain and Applications, Salamanca, Spain, Oct 2021
 > CryBlock 2020, 3rd Workshop on Cryptocurrencies and Blockchains for Distributed Systems (part of MobiCom 2020), London, United Kingdom, Sep 2020
 > Blockchain 2020, International Congress on Blockchain and Applications, L'Aquila, Italy, Jul 2020

Reviewer | Reviewed submissions for the following journals :
 > Springer Nature : Scientific Reports
 > Elsevier : Journal of Network and Computer Applications, Pervasive and Mobile Computing, Information Processing & Management, Computer Communications, Blockchain : Research and Applications
 > IEEE : Open Journal of the Computer Society, Access
 > Springer : Computing
 > Wiley : Concurrency and Computation : Practice and Experience

Participation | Conferences and Workshops :
 > ACM International Conference on Information Technology for Social Good, Sep 2022, Limassol, Cyprus
 > 31st International Conference on Computer Communications and Networks, Jul 2022, Virtual Event
 > 2022 IEEE International Conference on Blockchain and Cryptocurrency, May 2022, Virtual event
 > 14th International Conference on Agents and Artificial Intelligence, Special Session on Super Distributed and Multi-agent Intelligent Systems, Feb 2022, Virtual Event

- 33rd Benelux Conference on Artificial Intelligence and the 30th Belgian Dutch Conference on Machine Learning, Nov 2021, Esch-sur-Alzette, Luxembourg
- ACM International Conference on Information Technology for Social Good, Jul 2021, Rome, Italy
- International Workshop on Social (Media) Sensing, co-located with 30th IEEE International Conference on Computer Communications and Networks, Jul 2021, Athens, Greece
- 2020 IEEE 19th International Symposium on Network Computing and Applications, Nov 2020, Virtual Event
- 3rd Workshop on Cryptocurrencies and Blockchains for Distributed Systems, co-located with the 26th Annual International Conference on Mobile Computing and Networking (MobiCom 2020), Sep 2020, London, United Kingdom
- 2nd International Workshop on Social (Media) Sensing, co-located with 25th IEEE Symposium on Computers and Communications 2020, Jul 2020, Rennes, France
- 3rd Distributed Ledger Technologies Workshop, co-located with ITASEC 2020, Feb 2020, Ancona, Italy
- 32nd International Conference on Legal Knowledge and Information Systems, Dec 2019, Madrid, Spain



ACADEMIC ACTIVITIES

A.Y. 2021/2022	<p>University of Bologna</p> <ul style="list-style-type: none"> ➤ Tutor (40h), Legal Computer Science IUS/20, Bachelor's Degree in Legal Consultant in Business and Public Administration (Ravenna Campus) ➤ Lecturer (9h), Seminario Blockchain E Smart Contract : Aspetti Giuridici E Tecnologici, Single Cycle Degree in Law ➤ Lecturer (3h), Trattamento dei dati personali e Data Protection Officer, Professional Master's Programme 1st Level ➤ Lecturer (2h), IT Law and Legal Informatics, Professional Master's Programme 1st Level ➤ Thesis supervisor and teaching assistant, Blockchain and Cryptocurrencies, Master Degree in Computer Science and Master Degree in Artificial Intelligence <p>Universidad Politécnica de Madrid</p> <ul style="list-style-type: none"> ➤ Teaching assistant (6h), Social/Legal/Ethical Aspects in Data Science, Master's Degree in Data Science ➤ Teaching assistant (6h), Aspectos Sociales, Éticos y Legales de los Datos y la Inteligencia Artificial, Bachelor's Degree in Artificial Intelligence and Data Science
A.Y. 2020/2021	<p>University of Bologna</p> <ul style="list-style-type: none"> ➤ Lecturer (6h), Seminario Blockchain E Smart Contract : Aspetti Giuridici E Tecnologici, Single Cycle Degree in Law, University of Bologna ➤ Thesis supervisor and teaching assistant, Blockchain and Cryptocurrencies, Master Degree in Computer Science and Master Degree in Artificial Intelligence, University of Bologna
A.Y. 2019/2020	<p>University of Bologna</p> <ul style="list-style-type: none"> ➤ Thesis supervisor and teaching assistant, Peer-to-Peer Systems, Master Degree in Computer Science, University of Bologna



PUBLICATIONS

Journal Articles

- [1] M. Zichichi, S. Ferretti, and G. D'Angelo, "A framework based on distributed ledger technologies for data management and services in intelligent transportation systems," *IEEE Access*, pp. 100384–100402, 2020.
- [2] M. Zichichi, L. Serena, S. Ferretti, and G. D'Angelo, "Complex queries over decentralised systems for geodata retrieval," *IET Networks*, pp. 1–16, 2022.

- [3] **M. Zichichi**, S. Ferretti, G. D'Angelo, and V. Rodríguez-Doncel, "Data governance through a multi-dlt architecture in view of the gdpr," *Cluster Computing*, pp. 1–28, 2022.
- [4] **M. Zichichi**, S. Ferretti, and V. Rodríguez-Doncel, "Decentralized personal data marketplaces : How participation in a dao can support the production of citizen-generated data," *Sensors*, pp. 1–31, 2022.

Book Chapters

- [5] **M. Zichichi**, S. Ferretti, and G. D'Angelo, *Handbook on Blockchain*, ch. Blockchain-based Data Management for Smart Transportation, pp. 1–29. Springer Nature, 2022.

Conference Proceedings

- [6] **M. Zichichi**, M. Contu, S. Ferretti, and G. D'Angelo, "Likestarter : a smart-contract based social DAO for crowdfunding," in *Proc. of the IEEE INFOCOM 2019 - IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS)*, pp. 313–318, IEEE, 2019.
- [7] **M. Zichichi**, V. Rodríguez-Doncel, and S. Ferretti, "The use of decentralized and semantic web technologies for personal data protection and interoperability," in *AI Approaches to the Complexity of Legal Systems XI-XII*, pp. 328–335, Springer International Publishing, 2021. GDPR Compliance - Theories, Techniques, Tools, co-located with the 32nd International Conference on Legal Knowledge and Information Systems (JURIX), December 2019, Madrid Spain.
- [8] **M. Zichichi**, "Location privacy and inference in online social networks," in *Proc. of the Seventh JURIX 2019 Doctoral Consortium, co-located with the 32nd International Conference on Legal Knowledge and Information Systems (JURIX)*, no. 2598 in CEUR Workshop Proceedings, (Aachen), pp. 1–10, 2019.
- [9] **M. Zichichi**, S. Ferretti, and G. D'Angelo, "A distributed ledger based infrastructure for smart transportation system and social good," in *Proc. of the 2020 IEEE 17th Annual Consumer Communications & Networking Conference (CCNC)*, pp. 1–6, IEEE, 2020.
- [10] **M. Zichichi**, M. Contu, S. Ferretti, and V. Rodríguez-Doncel, "Ensuring personal data anonymity in data marketplaces through sensing-as-a-service and distributed ledger," in *Proc. of the 3rd Distributed Ledger Technology Workshop, co-located with ITASEC 2020*, no. 2580 in CEUR Workshop Proceedings, (Aachen), pp. 1–16, 2020.
- [11] **M. Zichichi**, S. Ferretti, and G. D'Angelo, "On the efficiency of decentralized file storage for personal information management systems," in *Proc. of the 25th IEEE Symposium on Computers and Communications (ISCC)*, pp. 1–6, IEEE, 2020.
- [12] **M. Zichichi**, S. Ferretti, and G. D'Angelo, "Are Distributed Ledger Technologies Ready for Intelligent Transportation Systems?," in *Proc. of the 3rd Workshop on Cryptocurrencies and Blockchains for Distributed Systems (CryBlock), co-located with the 26th Annual International Conference on Mobile Computing and Networking (MobiCom)*, pp. 1–6, ACM, 2020.
- [13] B. Distefano, N. Pocher, and **M. Zichichi**, "MOATcoin : Exploring Challenges and Legal Implications of Smart Contracts Through a Gamelike DApp Experiment," in *Proc. of the 3rd Workshop on Cryptocurrencies and Blockchains for Distributed Systems (CryBlock), co-located with the 26th Annual International Conference on Mobile Computing and Networking (MobiCom)*, pp. 1–6, ACM, 2020.
- [14] **M. Zichichi**, S. Ferretti, G. D'Angelo, and V. Rodríguez-Doncel, "Personal data access control through distributed authorization," in *Proc. of the 2020 IEEE 19th International Symposium on Network Computing and Applications (NCA)*, pp. 1–4, IEEE, 2020.
- [15] **M. Zichichi**, S. Ferretti, and G. D'Angelo, "Movo : a dapp for dlt-based smart mobility," in *Proc. of the 30th IEEE International Conference on Computer Communications and Networks (ICCCN)*, pp. 1–6, IEEE, 2021.
- [16] **M. Zichichi**, L. Serena, S. Ferretti, and G. D'Angelo, "Towards decentralized complex queries over distributed ledgers : a data marketplace use-case," in *Proc. of the 30th IEEE International Conference on Computer Communications and Networks (ICCCN)*, pp. 1–6, IEEE, 2021.
- [17] L. Serena, **M. Zichichi**, G. D'Angelo, and S. Ferretti, "Simulation of dissemination strategies on temporal networks," in *Proc. of the 2021 Annual Modeling and Simulation Conference (ANNSIM)*, pp. 1–12, Society for Modeling and Simulation International (SCS), 2021.
- [18] **M. Zichichi**, L. Serena, S. Ferretti, and G. D'Angelo, "Governing decentralized complex queries through a DAO," in *Proc. of the Conference on Information Technology for Social Good (GoodIT)*, pp. 1–6, ACM, 2021.
- [19] L. Serena, **M. Zichichi**, G. D'Angelo, and S. Ferretti, "Simulation of hybrid edge computing architectures," in *Proc. of the 2021 IEEE/ACM 25th International Symposium on Distributed Simulation and Real Time Applications (DS-RT)*, pp. 1–8, IEEE, 2021.

- [20] L. Yu, **M. Zichichi**, R. Markovich, and A. Najjar, "Argumentation in trust services within a blockchain environment," in *Proc. of the 33rd Benelux Conference on Artificial Intelligence (BNAIC) and the 30th Belgian Dutch Conference on Machine Learning (BENELEARN)*, pp. 1–21, 2021.
- [21] L. Yu, **M. Zichichi**, R. Markovich, and A. Najjar, "Enhancing Trust in Trust Services : Towards an Intelligent Human-input-based Blockchain Oracle (IHIBO)," in *Proc. of the 55th Hawaii International Conference on System Sciences (HICSS)*, pp. 1–10, 2022.
- [22] L. Yu, **M. Zichichi**, R. Markovich, and A. Najjar, "Intelligent Human-input-based Blockchain Oracle (IHIBO)," in *Proc. of the 14th International Conference on Agents and Artificial Intelligence (ICAART)*, pp. 1–12, SCITEPRESS, 2022.
- [23] N. Pocher and **M. Zichichi**, "Towards CBDC-based Machine-to-Machine Payments in Consumer IoT," in *Proc. of the 37th ACM/SI-GAPP Symposium on Applied Computing (SAC)*, pp. 1–8, 2022.
- [24] **M. Zichichi**, L. Serena, S. Ferretti, and G. D'Angelo, "Incentivized Data Mules Based on State-Channels," in *Proc. of the 2022 IEEE International Conference on Blockchain and Cryptocurrency (ICBC)*, pp. 1–2, 2022.
- [25] A. Li, L. Serena, **M. Zichichi**, S.-K. Tang, G. D'Angelo, and S. Ferretti, "Modelling of the Internet Computer Protocol Architecture : the Next Generation Blockchain," in *Proc. of the 4th International Congress on Blockchain and Applications (Blockchain 22)*, pp. 1–10, 2022.
- [26] L. Serena, **M. Zichichi**, G. D'Angelo, and S. Ferretti, "On the modeling of p2p systems as temporal networks : a case study with data streaming," in *Proc. of the 2022 Annual Modeling and Simulation Conference (ANNSIM)*, pp. 1–12, Society for Modeling and Simulation International (SCS), 2022.
- [27] **M. Zichichi**, L. Serena, S. Ferretti, and G. D'Angelo, "DLT-based Data Mules for Smart Territories," in *Proc. of the 31st International Conference on Computer Communications and Networks (ICCCN 2022)*, pp. 1–7, 2022.
- [28] G. Bigini, **M. Zichichi**, E. Lattanzi, S. Ferretti, and G. D'Angelo, "Decentralized Health Data Distribution : a DLT-based Architecture for Data Protection," in *Proc. of the 5th IEEE International Conference on Blockchain (IEEE Blockchain 2022)*, pp. 1–7, 2022.
- [29] S. Casale-Brunet, **M. Zichichi**, L. Hutchinson, M. Mattavelli, and S. Ferretti, "The impact of nft profile pictures within social network communities," in *Proc. of the Conference on Information Technology for Social Good (GoodIT)*, pp. 1–11, ACM, 2022.
- [30] L. Serena, A. Li, **M. Zichichi**, G. D'Angelo, S. Ferretti, and S.-K. Tang, "Simulation of the internet computer protocol : the next generation multi-blockchain architecture," in *Proc. of the 2022 IEEE/ACM 26th International Symposium on Distributed Simulation and Real Time Applications (DS-RT 2022)*, pp. 1–8, IEEE, 2022.

PROJECTS

[DESP3D] THE PHD THESIS SOFTWARE REPOSITORY

2022

 github.com/miker83z/lists/phd-thesis

A set of software modules that support the work behind the PhD thesis.

Personal Data Space Decentralized Indexing Distributed Authorization Policy Based Access Control Self-Sovereign Identity

TRUDAMUL SMART CONTRACTS

2021

 github.com/miker83z/TruDaMul

TruDaMul is a decentralized application that combines the use of Distributed Ledger Technologies and Decentralized File Storages, mostly for verifying the correct behavior of all the participants and to incentivize them in Data Mule-based communications.

Data Mule Ethereum Smart Contracts Payment Channels Protocol

REFERENCE SOFTWARE FOR ISO/IEC 21000-23 SMART CONTRACTS FOR MEDIA

2021

 github.com/miker83z/desp3d-policy-dlt-manager

Implementation of the ISO/IEC 21000-23 standard specification. The aim of the Smart Contracts for Media standard is to provide the means (e.g., application programming interfaces) for converting MPEG media contracts, that codify intellectual property (IP) rights, to smart contracts that can be executed on existing DLT environments. It is composed of conversion modules, smart contracts, demo and APIs.

ISO/IEC Ethereum Smart Contracts Non Fungible Tokens MPEG Ontologies

INTELLIGIBLE IDENTITY AND CERTIFICATE

2020-2021

 github.com/miker83z/desp3d-intelligible-packages

Implementation of the Intelligible models for verifying the authenticity of digital certificates and online identity assertions, namely Intelligible Identity and Intelligible Certificate, based on the use of DLTs, smart contracts and standards for mark-up and identification of legal documents.

Self-Sovereign Identity Ethereum ERC-721 Non Fungible Tokens Smart Contracts Akoma Ntoso

UMBRAL-RS

2020

github.com/miker83z/umbral-rs

Implementation of the Umbral threshold proxy re-encryption scheme, built with Rust by taking as reference the Python version (created by the original Umbral authors). Umbral consists of a Proxy Re-Encryption scheme, in which a data holder can delegate decryption rights to a data recipient for any encrypted text. A re-encryption process is performed by several semi-trusted proxies. When a threshold of these proxies participates by performing the re-encryption and creating some shares, the recipient is able to combine these independent re-encryption shares and decrypt the original message using his private key.

Cryptography Proxy Re-Encryption Rust Threshold Scheme

Movo

2019

github.com/miker83z/movoApp

MOVO is a decentralized application (dApp) for smart mobility. The dApp consists of an Android application intended for use inside a vehicle, which helps the user/driver collect contextually generated data (e.g. a driver's stress level, an electric vehicle's battery level), which can then be shared through the use of Distributed Ledger Technology (i.e., IOTA DLT and Ethereum smart contracts) and Decentralized File Storage (i.e., IPFS). The third module consists of an implementation of a communication channel that, via Wi-Fi Direct, allows two devices to exchange data and payment information with respect to DLT (i.e., cryptocurrency and token) assets.

Android IOTA Ethereum Solidity Truffle Ganache Wi-Fi Direct Javascript Node React Native

LIKESTARTER

2018 - 2019

github.com/miker83z/LikeStarterContracts

LikeStarter is a blockchain-based decentralized platform that combines social interactions with crowdfunding mechanisms, allowing any user to raise funds while becoming popular in the social network. Being built over the Ethereum blockchain, it is structured as a Decentralized Autonomous Organization (DAO), that fosters crowdfunding without the intervention of any central authority, and recognizes the active role of donors, enabling them to support artists or projects, while making profits.

Ethereum Solidity Truffle Ganache Web3 API Python Javascript Docker Django Node Express React

In compliance with the GDPR and the Italian Legislative Decree no. 196 dated 30/06/2003, I hereby authorize the receiver of this document to use and process my personal details contained in it

Madrid, September 2022

Mirko Zichichi