

# BCT4MAS - 2019

## Blockchain Technology for Multi-Agent Systems

### 1. Workshop title and acronym

2nd International Workshop on Blockchain Technology for Multi-Agent Systems (BC4MAS)

### 2. Topic Description

Multi-agent systems (MAS) are composed of loosely coupled entities (agents) interconnected and organized in a network. Every agent has the ability to *solve problems* and *attain its goals* by interacting with each other through *collaboration*, *negotiation*, and *competition* patterns. MAS are increasingly dealing with sensitive data. Therefore, enforcing the notion of reputation, ensuring trust and reliability, is essential for modern MAS.

Blockchain (BCT) is a P2P distributed ledger technology providing shared, immutable, transparent, and updatable (append-only) registers of given values characterizing a given network (e.g., all the actions intercurrent among the participants and information about the participants themselves).

However, employing the BCT "as-is" and by itself in dynamic and quickly evolving scenarios can represent an unlucky choice. The reasons span from fundamental properties of BCT, to application/domain specific constraints. Reaching consensus in distributed multi-stakeholder networks with possible unaligned interests can be considerably complex or unsustainable.

Therefore, if properly managed, combining BCT and MAS can represent a win-win solution:

(i) the adoption and adaptation of BCT can help to overcome trust and reliability limitations broadly known in MAS literature, enabling secure, autonomous, flexible and even profitable solutions.

(ii) MAS can contribute with its features to address limitations of BCT.

### 3. Call for papers

Human beings are increasingly connected through uncountable interlinked electronic devices that perform ubiquitous computing. As a consequence, scientific research is pushing towards the design and development of autonomous and collaborative systems and devices that interact and compete with each other, often emulating humankind dynamics.

Multi-Agent Systems (MAS) are widely used for the development of intelligent distributed systems, including cases that deal with highly sensitive data, such as ambient assisted living, healthcare, and energy trading. An agent can be rationalized as an autonomous entity observing its surrounding environment through a perception layer, and possibly interacting with it, as well as with other agents. These intelligent agents are also able to perform distributed reasoning exploiting their knowledge base. It can be extended and updated, thus renewing their plans to achieve the desired goals. In MAS, a solution to given problem to be solved is delivered through autonomous actions and interactions between many agents rather than by any single "smart" agent. Hence, MAS are generally composed of loosely coupled agents interconnected and organized in a network, each of them having the ability to solve problems and attain its goals by interacting with each other through collaboration, negotiation, and competition patterns.

Recently, BCT has been proposed as a peer-to-peer distributed ledger technology that can provide a shared, immutable, and transparent history of all the events intercurrent among all the participants in a given network. Currently, MAS require trusted mediators storing the transactions among the agents. These mediators can be replaced with a distributed ledger technology: BCT properties can ensure that no corruption of topics or moderators would impact on the reliability of the network.

For example, systems handling societal information and dealing with hundreds/thousands of nodes to manage sensitive information can benefit from the combination of MAS and BCT. Such systems need the crucial feature guaranteed by MAS, as much the traceability and immutability ensured by the BCT.

This workshop aims at offering a common ground to researchers from diverse areas to share experiences about possible outcomes of combining MAS and BCT.

In particular, the submitted papers should address how MAS and BCT can be used together in one or more of the following (scientific and applied) topics:

## 4. Topics

Theoretical track:

- Main properties of blockchain technology
- Self-aware and smart contracts
- Reputation management
- Decision-making for policy
- Secure identity assurance
- Security and privacy management
- Trust and data integrity
- Procurement
- Conflict resolution in business collaboration
- Task allocation, coordination, and supervision
- Agreement technologies and artificial institutions
- Big data management in highly distributed environments
- Anonymization of distributed data

Applied track

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- Distributed energy grids
- Collaborative governance
- Distributed Autonomous Organisations (DAO)
- Distributed artificial intelligence
- Swarm robotics
- Coordination models in Internet-of-Things (IoT)
- E-commerce and demand-supply relationships
- Software life-cycle management
- E-government
- Sharing economy

## 4. Important Dates

**Deadline for Submission:** 18 March 2019  
**Notification of Acceptance:** 08 April 2019  
**Camera-ready:** 22 April 2019  
**Workshop day(s):** 26-28 June 2019

## 5. Organizers:

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#### **4.1 List of program committee members, including their affiliations**

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#### **6. Special Issue:**

[https://www.mdpi.com/journal/information/special\\_issues/Blockchain\\_Technologies](https://www.mdpi.com/journal/information/special_issues/Blockchain_Technologies)

#### **7. Contacts:**

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#### **8. BCT4MAS2019 website:**

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