**Open invited track for IFAC World Congress 2023, Yokohama, Japan**
**on**

# Learning for multi-robot and networked systems

**Invited track submission code**: `5fic1`

**Organizers**:

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## Abstract

Multi-robot systems involve two or more autonomous robots that are working together to achieve one or more well-defined objectives. Individual robots may be rather simple and by themselves unable to achieve the desired goals. However, the real power – and at the same time also the major challenge – lies in the cooperation and coordination of the individual robots so as to jointly achieve the specified objectives. Multi-robot interaction is moreover subject to challenges stemming from the networked and communication structure of the system. Although multi-robot systems have attracted significant attention worldwide, research in this area is still in its infancy. This open invited track aims at bringing together contributions covering the broad area of computational-intelligence, machine-learning, networked-control and AI-based methods for multi-agent decision-making in multi-robot systems as well as for coordination in networked systems in general. In addition to papers proposing new fundamental results, we also explicitly solicit papers that show the potential of multi-robot interaction and coordination in networked systems in experimental set-ups and real-life applications. Authoritative survey papers are also welcome.

## Choice of an IFAC technical committee for evaluation

TC 3.2, Computational intelligence in control
Keyword: Machine learning in modelling, prediction, control and automation

## Details and topics

This open invited session aims to:
- bring together novel results in computational-intelligence, machine-learning, networked-control and AI-based methods for multi-agent decision-making for multi-robot systems as well as for coordination in networked systems in general,
- address emerging challenges in decision-making for multi-robot systems and coordination in networked systems, including dealing with highly uncertain or

time-varying environments, restricted computational and communication resources, non-conventional environments (e.g. underwater multi-robot systems), etc.
- present emerging relevant applications.


We encourage the submission of research on *multi-robot and networked systems* related, but not limited to:
- computational intelligence for multi-agent systems
- robust decision-making methods for multi-robot systems
- hybrid computational intelligence techniques
- reinforcement learning
- transfer learning
- learning for prediction and control
- distributed and federated learning
- adaptive dynamic programming for multi-agent systems
- networked systems and cooperative control
- game theory for multi-robot interaction
- neuro-fuzzy and deep learning approaches
- applications and demonstrations

For additional information and updates, see the website of the open track at https://seaclear-project.eu/103-ifac-world-congress-2023-proposal.