Complexity

# Special Issue on
# Collective Decision-Making in Evolutionary State Space

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# CALL FOR PAPERS

Complex and collective systems are surrounding us, and this phenomenon is increasing over time thanks to the advances in new technologies that facilitate the emergence of new interaction and communication possibilities. Collective systems, in which the behavior of the individuals formulates the overall state of the system, are generally analyzed by studying the system transition between its different states, referred to as the system's global states. Such states are, typically, assumed to be known and predefined for most decision-making processes studied in collective systems.

In this special issue, we focus on collective systems where the above assumption does not hold; instead, the state space evolves over time with the system potentially transitioning into completely new states. Such state spaces are, for example, observed in biological speciation dynamics as niche construction and in economy where new market niches, standards, or products appear, or the value of a product increases with the number of users (network effect).

We aim to explore and analyze this kind of dynamics and self-organized decision-making processes in (natural or artificial) collective systems. Self-organized collective decision-making relies on positive and negative feedback; all agents have only access to local information as well as means of local communication. If the number of options from which one can choose from and/or their quality changes over time, then we have an evolutionary state space. This means that the complex system must adopt novel dynamics to i) identify the change of the state space, ii) reevaluate the overall decision, and iii) actually transition to a new space.

The key areas of interest include, but are not limited to, evolutionary state space analysis in the following domains entailing diverse collective decision-making processes, models, and implementations.

Potential topics include but are not limited to the following:

- Computational modelling of decision-making in complex systems with evolutionary state space in biology, economy, sociology, neuroscience, behavioral science, or hybrid society theory
- Novel characterisations and models of decision-making using methods from statistical physics and adaptive network model theory, such as random cluster models, percolation theory, and diffusion-limited aggregation
- Studies on social and network dynamics in evolving collective decisions in the face of changing or incomplete information and synchronous or asynchronous distribution settings
- Evolutionary principles and methodologies for the modeling of collective decision-making and for continuous or expanding state spaces
- Mental model development and multilevel decomposition strategies during group decision making
- State space models for nonstationary statistical properties in nonlinear complex systems

Authors can submit their manuscripts through the Manuscript Tracking System at https://mts.hindawi.com/submit/journals/complexity/cdm/.

Papers are published upon acceptance, regardless of the Special Issue publication date.

**Lead Guest Editor**
Pieter Simoens, Ghent University, Ghent, Belgium
*pieter.simoens@ugent.be*

**Guest Editors**
Heiko Hamann, University of Lübeck, Lübeck, Germany
*hamann@iti.uni-luebeck.de*

Jean Botev, University of Luxemburg, Luxembourg City, Luxembourg
*jean.botev@uni.lu*

Yara Khaluf, Ghent University, Ghent, Belgium
*yara.khaluf@ugent.be*

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