

IEEE Transactions on SMC-A

CFP: Special Issue on Systems and Synthetic Biology

It is well-known that the twenty-first century of life science has been forecasted various times as the century of Systems Biology, i.e. the science that aims to provide new insights into the study of living organisms through the adoption and development of mathematical methodologies and tools typical of the theory of dynamical systems. And indeed, starting with this millennium, there has been a huge and constantly increasing interest for the area of Systems Biology that has led the creation worldwide of numerous dedicated meetings (such as invited sessions, workshops, conferences), journals, technical committees, and research centers.

Technically speaking, it can be said that Systems Biology focuses on the systematic study of complex interactions in biological systems by integrating various fields such as mathematics, chemistry, informatics, and engineering. It is recognized that the regulation mechanism that allows living organisms to achieve their complex functions cannot be fully understood by merely analyzing individual components, such as genes and metabolites, and hence biologists face the challenge of studying a complex system or network with mutually interacting components, in particular at molecular level. Since these interactions have dynamical nature, it is natural to introduce the study on living organisms from the system viewpoint.

The studies that have been conducted in last years on Systems Biology have opened the doors to the new field of Synthetic Biology, i.e. the science that aims to investigate the possibility of designing biological systems and networks, in the attempt of emulating, controlling and improving biological processes. Synthetic Biology is expected to constitute a primary research and application area for forward engineering in near future, in particular system engineering, whose methodologies for investigating dynamical systems may tremendously help to devise effective strategies.

The aim of this Special Issue is to collect the latest advances in the area of Systems and Synthetic Biology that either the discovery of new system-like interactions in living organisms, or the development of ad-hoc methodologies for studying biological systems, has made possible to achieve. It is strongly believed that a large number of researchers will benefit of such a Special Issue, including those working in the area of systems, as the papers here collected will provide new potential applications for their techniques, and those working in the area of biology that are new to system approaches as the methodologies here described will provide new potential solutions for their problems.

The topics of this Special Issue are (but not limited to):

- Biomolecular networks identification;
- Feedback mechanisms in living organisms;
- Robustness analysis in biomolecular networks;

- Stability of equilibria in biological systems;
- Modeling biomolecular systems;
- Reverse engineering biomolecular networks;
- Qualitative analysis and quantitative simulation for biological systems;
- Design of biological components and synthetic biological systems;
- Re-design of natural biological systems with specific functions;
- Systems biology of complex diseases.

Timeline

- November 1 2010, site open to submissions
- December 1 2010, 1st submission deadline
- April 1 2011, Notification of 1st review
- June 1 2011, 2nd submission
- September 1 2011, Final notification
- October 1 2011, Final revision due
- Target publication date: July 2012

Submission instructions

All manuscripts should follow the general guidelines for authors of IEEE SMC-A. Manuscripts should not have been published or be under consideration at other journals. Please submit your paper electronically through the website of IEEE SMC-A. Please note in your cover letter that the paper is for the special issue on Systems and Synthetic Biology.

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