Introduction

The aim of the SASO conference series is to provide a forum for presenting the latest results about self-adaptive and self-organizing systems, networks and services. To this end, the meeting aims to attract participants with different backgrounds, to foster cross-pollination between research fields, to expose and discuss innovative theories, frameworks, methodologies, tools, and applications, and to identify new challenges. The complexity of current and emerging computing systems has led the software engineering, distributed systems and management communities to look for inspiration in diverse fields (e.g., complex systems, control theory, artificial intelligence, sociology, biology, etc.) to find new ways of designing and managing networks, systems and services. In this endeavor, self-organization and self-adaptation have emerged as two promising interrelated facets of a paradigm shift.

Self-adaptive systems work in a top down manner. They evaluate their own global behavior and change it when the evaluation indicates that they are not accomplishing what they were intended to do, or when better function or performance is possible. A challenge is often to identify how to change specific behaviors to achieve the desired improvement. Self-organizing systems work bottom up. They are composed of a large number of components that interact locally according to typically simple rules. The global behavior of the system emerges from these local interactions. Here, a challenge is often to predict and control the resulting global behavior.

Topics of Interest

The SASO conference is interested in both theoretical and practical aspects of systems exhibiting self-* characteristics. A particular focus is the modeling of natural, man-made and social systems that exhibit self-adaptation and self-organization characteristics as well as the constructive use of the underlying basic principles in technical systems. The sixth edition of SASO particularly encourages submissions from the following, non-exclusive list of topic areas:

- **Principles, Theory, and Architectures for SASO systems**

  - Theory and Practice of SASO Systems
  - Formalisms and languages for SASO systems
  - Anticipative adaptive systems
  - Cognitive science roots of Self-* principles
  - Theories of non-linear dynamics for engineering/understanding self-* systems.

- **Building trustworthy SASO Systems**

  - Trust models for SASO systems
  - Trust models for cooperation
  - Models for learning trust and the evolution of trust
  - Decentralized trust models
  - Theoretical trust models

- **Self-* behavior in communication networks**

  - Adaptive protocols for future Internet applications
  - Self-organizing network structures for Peer-to-Peer systems, vehicular and sensor networks
  - Self-organized shaping of communication structures (which is more general)

- Self-organizing control structures for network federation
- Self-organized routing, search, lookup and resource allocation in distributed systems
- Consensus, aggregation and synchronization protocols
- Run-time optimization and adaptation of communication structures
- Self-configuring and self-synchronizing network protocols

- **Design & Engineering of SASO Systems /SASO principles in design automation**

- SASO Methodologies for automating of design systems
- Methodological frameworks for the engineering of SASO systems
- Novel, non-conventional programming paradigms for the design of SASO systems

- **(Self-)Control, (Self-)Observation, (Self-)Monitoring of engineered SASO systems**

- Methods to quantify and control self-organization and self-adaptation phenomena in engineered systems
- Control-theoretic approaches to self-* phenomena
- Decentralized control mechanisms for massively distributed systems
- Self-monitoring, self-adaptation and distributed control techniques in cloud computing, Peer-to-Peer systems and large-scale data centers
- Techniques for decentralized (self-)evaluation of Self-* Systems

- **Robustness, Resilience, fault-tolerance in/with Self-* systems**

- Analysis and optimization of robustness and resilience of technical infrastructures, smart grids and public utilities
- Modeling and prevention of cascading failures and systemic risks in cyber-physical systems and large-scale public infrastructures
- Models, algorithms, theories, measures, tools for robustness, resilience and fault-tolerance in/with self-* systems

- **Complex collective phenomena in social and socio-technical systems**

- Models for wisdom of crowd effects and application to crowd sourcing scenarios
- Modeling and prediction of herding phenomena
- Models for group and hierarchy formation
- Models of collective problem solving
- Social models for distributed decision-making and opinion dynamics
- Modeling and control of distributed collaborative tasks like software development
- Analysis, Understanding, Prediction of collective behavior in (online) social networks and applications in future Internet scenarios
- Use of socio-economic principles and game-theoretic approaches in the design of sustainable information systems
- Humans-Systems coupling and self-* principles in social computing and socio-technical systems

- **Self-organization and self-adaptation in biological/natural systems**

- Simple models for collective phenomena like collective motion, swarm intelligence and synchronization phenomena
- Technical applications of simple models for morphogenesis and pattern formation
- Bio-inspired computing technologies

- Evolutionary programming
- Computational models inspired by neuroscience and neural network models

- **Applications of spatial and physics-inspired self-organization**

  - Applications of reaction-diffusion models for the formation of spatial patterns
  - Application of spatial self-organization schemes to many-core processors, sensor networks and ubiquitous computing scenarios
  - Models for structure-formation in non-equilibrium particle system

- **SASO principles in Cyber-security**

  - Use of machine learning and statistical inference techniques in the design of (self-*) security systems
  - Learning models for (self-*) security systems like firewalls, malware and spam recognition and intrusion detection
  - Reflective and self-adaptive mechanisms in operating systems, managed runtime environments and complex software architectures

- **SASO principles in Robotic systems**

  - Robotic systems making use of self-assembly and self-adaptation principles
  - Learning and environmental modeling in robotic systems
  - SASO principles in image recognition techniques
  - Applications for neural networks and artificial intelligence

- **SASO principles for Ambient Systems and Context-awareness**

  - Cyber-physical systems design with self-* principles
  - Open, interoperable, adaptive systems relevant for ambient systems, characterized by under-specification, dynamic, several designers, without global control and knowledge
  - Distributed management, adaptation and monitoring mechanisms in energy networks, smart grids, transportation and traffic as well as large-scale communication infrastructures
  - Concepts, models, architectures, etc. for awareness (context-awareness, social-awareness…) in self-* systems

- **Real-world experience with engineered systems exhibiting self-* properties**

  - Predictability, controllability and risks in systems with self-* properties
  - Experiences with fail-safety and efficiency of SASO systems as opposed to traditionally built systems
  - Examples for detrimental effects of self-organization phenomena in practical systems
  - Experiments of complex problem-solving with self-* principle such as constraint-satisfaction problem, multi-disciplinary, multi-criteria, multi-objective optimization
  - Prevention of unwanted self-organization effects

All contributions must present novel theoretical or experimental results, or practical approaches and experiences in building or deploying real-world systems, applications. Contributions that contrast "conventional" engineering principles with novel approaches making use of SASO principles are especially welcome. SASO also encourage the submission of papers on emerging topics. These submissions should be clearly marked as such (indicating "Emerging Topic:" in the title) and should provide a well-rounded survey of novel questions, methods and, abstractions that are relevant for the design of SASO systems along

with a clear indication of the possible impact on the SASO community. In this category we particularly encourage submissions that present innovative applications of methodological frameworks being used in other fields of science that study SASO related phenomena, thus highlighting connections and potential for collaboration between different scientific communities.

Submissions Instructions

All submissions should be 10 pages and formatted according to the IEEE Computer Society Press proceedings style guide and submitted electronically in PDF format. Please register as authors and submit your papers using the SASO 2012 conference management system. The proceedings will be published by IEEE Computer Society Press, and made available as a part of the IEEE digital library. Note that a separate call for poster submissions has also been issued.

Review Criteria

Papers should present novel ideas in the topic domains listed above, clearly motivated by problems from current practice or applied research. We expect claims of contribution to be clearly stated and substantiated by formal analysis, experimental evaluations or comparative studies. Appropriate references must be made to related work. Since SASO is a cross-disciplinary conference, a particular criterion that will be strictly enforced by the program committee is that all papers must be understandable by researchers that are not members of the particular, highly-specialize scientific community. Emphasis should rather be placed on cross-cutting aspects that are relevant to a wider audience of researchers and engineers dealing with SASO systems. Furthermore, submissions making use of principles inspired by phenomena occurring in fields like biology, physics, sociology, economics, etc. are required to provide all relevant references for relevant work in the respective field. Papers demonstrating SASO principles in practical applications are expected to provide an indication of the real world relevance of the problem that is solved, including some form of evaluation of performance, usability, or superiority to alternative state-of-the-art approaches. If the application is still early work in progress, then the authors are expected to provide strong arguments as to why the proposed approach will work in the chosen domain.

The program committee strongly suggests to also review the list of common reasons for SASO submissions being rejected, which is available online. It is also highly recommended to see whether your work relates to the following interdisciplinary approaches to the study of SASO-related phenomena.

Important Dates

Abstract submission	April 23rd, 2012
Full paper submission	April 30rd, 2012
Notification of acceptance	June 20th, 2012
Camera-ready version of accepted papers	July 18th, 2012
Early registration	August 20th, 2012

All deadlines are at 11:59 PM West Samoa Time (GMT-11).

PC Chairs

- Anwitaman Datta, Nanyang Technological University, Singapore
- Marie-Pierre Gleizes, IRIT- University of Toulouse, France

- Ingo Scholtes, ETH Zurich, Switzerland