

Welcome to FAS*2019



ICAC 2019

16 - 20 June 2019
Umeå, Sweden
The 16th IEEE
International Conference
on Autonomic Computing

The 16th IEEE International Conference on Autonomic Computing (ICAC) is held in Umeå, Sweden on June 16 – 20, 2019, as part of the Foundations and Applications of Self* Systems (FAS* 2019).

ICAC is the leading conference on autonomic computing techniques, foundations, and applications.



SASO 2019

16 - 20 June 2019
Umeå, Sweden
The 13th IEEE
International Conference
on Self-Adaptive and
Self-Organizing Systems

The 13th IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO 2019) is held in Umeå, Sweden on June 16 – 20, 2019, as part of the Foundations and Applications of Self* Systems (FAS* 2019).

The aim of the Self-Adaptive and Self-Organizing Systems conference series (SASO) is to provide a forum for the foundations of a principled approach to engineering systems, networks and services based on self-adaptation and self-organization.

We are glad to welcome you in Umeå and to the FAS*2019 conferences!
We hope you will have a nice stay in our region and you will enjoy the workshops, tutorials and technical sessions of the conferences.

On the following pages, you can find the conference program.
For further information about the conferences and maps to the venues, please visit
<https://icac2019.cs.umu.se/>
<https://saso2019.cs.umu.se/>

Sunday, 16th of June 2019: Workshops & Tutorials					
	(N410)	(N420)	(N430)	(N440)	(N450)
9.00 – 10.30	6th International Workshop of Self-Improving System Integration (SISSY'19)	2nd Workshop on Hot Topics in Cloud Computing Performance (HotCloudPerf-2019)	Tutorial 1: Blockchain Technology – Fundamentals, Applications, and Research Challenges	Tutorial 2: Probabilistic Graphical Models and Their Inference	4th Workshop on Engineering Collective Adaptive Systems (eCAS'19)
10.30 – 11.00	Break (Coffee adjacent to workshops)				
11.00 – 12.30	SISSY'19 continued	HotCloudPerf-2019 continued	Tutorial 1 continued	Tutorial 2 continued	eCAS'19 continued
12.30 – 14.00	Lunch (Restaurant Hjortron)				
14.00 – 15.30	SISSY'19 continued	HotCloudPerf-2019 continued	Tutorial 1 continued	Tutorial 2 continued	
15.30 – 16.00	Break (Coffee adjacent to workshops)				
16.00 – 17.30	SISSY'19 continued	HotCloudPerf-2019 continued	Tutorial 1 continued	Tutorial 2 continued	
20.00	Welcome Reception (P5, Storgatan 46, Umeå City)				

Monday, 17th of June 2019: ICAC & SASO Main Conferences		
	(Aula Nordica)	(Rotundan)
8.45 – 9.00	ICAC and SASO Opening (Aula Nordica)	
9.00 – 10.00	Keynote: Capacity Efficiency in the Cloud (Aula Nordica) Kathryn S McKinley, Senior Staff Researcher, Google Cloud	
10.00 – 10.30	Break (Coffee at Brashörnan)	
10.30 – 12.00	ICAC: Cyber-Physical Systems (chair: Connor Imes, University of Chicago) <ul style="list-style-type: none"> ▪ GreenRoute: A Generalizable Fuel-Saving Vehicular Navigation Service ▪ Autonomic Computing Challenges in Fully Autonomous Precision Agriculture ▪ Self-Improving Autonomic Systems for Antifragile Cyber Defence: Challenges and Opportunities ▪ Workflow Variability for Autonomic IoT Systems 	SASO: Runtime Modelling (chair: Sven Tomforde, Passau University, Germany) <ul style="list-style-type: none"> ▪ Planning as Optimization: Dynamically Discovering Optimal Configurations for Runtime Situations ▪ Runtime K Models to Support Trade-offs for Self-Adaptation using Partially Observable Markov Decision Processes ▪ Generic Adaptive Monitoring based on Executed Architecture Runtime Model Queries and Events – Effective and Effort-Reducing
12.00 – 13.30	ICAC SC meeting (MC323, MIT-huset building)	Lunch (Restaurant Hjortron)
13.30 – 15.30	ICAC: Resource Management and Cloud 1 (chair: Asser Tantawi, IBM Research) <ul style="list-style-type: none"> ▪ CoPPer: Soft Real-time Application Performance Using Hardware Power Capping ▪ Chisel: Reshaping Queries to Trim Latency in Key-Value Stores ▪ Quality-Elasticity: Improved Resource Utilization, Throughput, and Response Times via Adjusting Output Quality to Current Operating Conditions ▪ Online Power Consumption for Functions in Cloud Applications 	SASO: Sensing, Learning, and Adaptation (chair: David W. King, Air Force Institute of Technology, Ohio) <ul style="list-style-type: none"> ▪ Adaptive Fault Detection exploiting Redundancy with Uncertainties in Space and Time ▪ Distributed Self-Monitoring Sensor Networks via Markov Switching Dynamic Linear Models ▪ Autonomous Management of Energy-Harvesting IoT Nodes Using Deep Reinforcement Learning ▪ Constructivist Approach to State Space Adaptation in Reinforcement Learning
15.30 – 17.30	Posters and Demos Session (Brashörnan)	
17.00 – 18.30	ASOS SC meeting (MC323, MIT-huset building)	

Tuesday, 18th of June 2019: ICAC & SASO Main Conferences		
	(Aula Nordica)	(Rotundan)
9.00 – 10.00	Keynote: The Future of Technology Will Not Be Technological... (Aula Nordica) Indranil Gupta, Professor, & Associate-Head, Department of Computer Science, University of Illinois, Urbana-Champaign	
10.00 – 10.30	Break (Coffee at Brashörnan)	
10.30 – 12.00	ICAC: Internet of Things (chair: Betty HC Chang, Michigan State University) <ul style="list-style-type: none"> • EMU-IoT – A Virtual Internet of Things Lab • The Elastic Node: An Experimentation Platform for Hardware Accelerator Research in the Internet of Things • Model Checking a Self-Adaptive Camera Network with Physical Disturbances 	SASO: Cloud-Based Adaptation (chair: Christopher Stewart, Ohio State University) <ul style="list-style-type: none"> • Ops-Scale: Elastic Cloud Operations by Declarative Functional Abstraction and Feedback Control Loop • Maintaining SLOs of Cloud-Native Applications via Self-Adaptive Resource Sharing • Towards Self-Organizing Cloud Polyglot Database Systems
12.00 – 13.30	Lunch (Restaurant Hjortron)	SASO SC meeting (MC323, MIT-huset building)
13.30 – 15.30	ICAC: Deep Learning (chair: Geir Horn, University of Oslo) <ul style="list-style-type: none"> • Adaptively Accelerating Data Analytics Applications with GPUs : A Case Study • Enhancing Learning-Enabled Software Systems to Address Environmental Uncertainty • Speeding up Deep Learning with Transient Servers • Forecasting a Storm: Divining Optimal Configurations using Genetic Algorithms and Supervised Learning 	Doctoral Symposium (chair: Ada Diaconescu, Télécom ParisTech, France) <ul style="list-style-type: none"> • Collaboration as an Emergent Property of Self-Organizing Software Systems • Learning Approach for Smart Self-Adaptive Cyber-Physical Systems • Adaptive Routing for Challenging Networks • Emergent Scheduling of Distributed Execution Frameworks • Machine-Assisted Reformulation for MiniZinc • Towards an Autonomic and Distributed Device Management for the Internet of Things
15.30 – 16.00	Break (Coffee at Brashörnan)	
16.00 – 17.15	Industry Panel: Towards the Era of Autonomous Systems (Aula Nordica) Moderator: Alessandro Papadopoulos, Mälardalen University Panelists: Azimeh Sefidcon (Ericsson), Johan Tordsson (Elastisys/Umeå University), Robert Birke (ABB), Jayaram K. R (IBM T. J. Watson Research Center), Christian Grante (Volvo Group)	
17.15 – 17.45	Open Community Discussion led by Christopher Stewart (Aula Nordica)	
19.00	Conference Dinner and Awards (Restaurant Rex, Rådhusorget, Umeå)	

Wednesday, 19th of June 2019: ICAC & SASO Main Conferences		
	(Aula Nordica)	(Rotundan)
9.00 – 10.00	Keynote: Software Engineering for ML/AI (Aula Nordica) Patrizio Pelliccione, Associate Professor at Chalmers / University of Gothenburg and University of L'Aquila	
10.00 – 10.30	Break (Coffee at Brashörnan)	
10.30 – 12.00	ICAC: Analytical Methods (chair: Nikolas Herbst, University of Wurzburg) <ul style="list-style-type: none"> ▪ Affine Scalarization of Two-Dimensional Utility Using the Pareto Front ▪ Characterizing Disk Health Degradation and Proactively Protecting Against Disk Failures for Reliable Storage Systems ▪ Autonomic Forecasting Method Selection: Examination and Ways Ahead 	SASO: Agents and Coordination (chair: Simon Dobson, University of St. Andrews, UK) <ul style="list-style-type: none"> ▪ Beyond Sync: Distributed Temporal Coordination and Its Implementation in a Multi-Robot System ▪ Social Action in Socially Situated Agents ▪ The Emergence of Division of Labor in Multi-Agent Systems
12.00 – 13.10	Lunch (Restaurant Hjortron)	
13.10 – 13.30		In Memoriam Rolf Würtz by Kirstie L. Bellman and Sven Tomforde
13.30 – 15.00	ICAC: Resource Management and Cloud 2 (chair: Chris Stewart, Ohio State University) <ul style="list-style-type: none"> ▪ Capacity-Driven Scaling Schedules Derivation for Coordinated Elasticity of Containers and Virtual Machines ▪ Autonomic cloud placement of mixed workload: An adaptive bin packing algorithm ▪ Express-Lane Threading to Minimize Tail Latency ▪ Characterizing Service Level Objectives for Cloud Services: Realities and Myths 	SASO: Learning and Coordination (chair: Peter R. Lewis, Aston Univ. UK.) <ul style="list-style-type: none"> ▪ Genet: A Quickly Scalable Fat-Tree Overlay for Personal Volunteer Computing using WebRTC ▪ Distributed Emergent Software: Assembling, Perceiving and Learning Systems at Scale ▪ Multi-Scale Feedbacks for Large-Scale Coordination in Self-* Systems
15.00 – 15.30	Break (Coffee at Brashörnan)	
15.30 – 17.00	Industry Presentation: End-to-End Orchestration Automation in Distributed Cloud: Resource, Service and Multi-stakeholders Aspects (Aula Nordica) Robert Szabo, Master Researcher, Cloud Systems and Platforms, Ericsson Research.	
	Closing (Aula Nordica)	

Thursday, 20th of June 2019: Workshops & Tutorials					
	(N410)	(N420)	(N430)	(N440)	(N450)
9.00 – 10.30	3rd Workshop on Self-Aware Computing (SeAC 2019) & 1st Workshop on Evaluations and Measurements in Self-Aware Computing Systems (EMSAC'19) & 1st International Workshop on Self-Protecting Systems SPS'19)	Tutorial 3: How to Build Emergent Software Systems	Tutorial 4: Best practices for Time Series Forecasting	Tutorial 5: Performance Benchmarking of Infrastructure-as-a-Service (IaaS) Clouds with Cloud WorkBench	
10.30 – 11.00	Break (Coffee adjacent to workshops)				
11.00 – 12.30	SeAC 2019 EMSAC'19 SPS'19 continued	Tutorial 3 continued	Tutorial 4 continued	Tutorial 5 continued	
12.30 – 14.00	Lunch (Restaurant Hjortron)				
14.00 – 15.30	SeAC 2019 EMSAC'19 SPS'19 continued	Tutorial 3 continued	7th International Workshop on Autonomic Management of high performance Grid and Cloud Computing (AMGCC'19)	3rd International Workshop on Self-Organized Construction (SOCO 2019)	Tutorial 6: Resource Constrained Self-Aware Cyber-Physical Systems
15.30 – 16.00	Break (Coffee adjacent to workshops)				
16.00 – 17.30	SeAC 2019 EMSAC'19 SPS'19 continued	Tutorial 3 continued	AMGCC'19 continued	SOCO 2019 continued	Tutorial 6 continued

Keynotes

June 17, 9.00-10.00

Kathryn S McKinley,
Senior Staff Researcher, Google Cloud
Title: Capacity Efficiency in the Cloud



Abstract: The promise of cloud computing is affordable, available, and secure computing resources managed by experts. To achieve this promise, providers face end-to-end challenges, from efficiently running customer virtual machines (VM) on multicore hardware to mapping VM workloads to machines to predicting workloads and growth. Improving VM performance and packing, even by 1%, directly reduce capacity requirements and thus data center costs. This talk overviews analysis and kernel tracing tools that Google uses to optimize performance, understand workloads, limit resource stranding, and dynamically verify mitigations to recent Intel hardware speculation errors. It highlights optimization opportunities, showing many workloads change slowly over time, but unpredictable bursts and new workloads are common.

After technical questions, I will show how myths, such as the sole genius, are counter productive to science and innovation. In contrast, social science shows diverse teams achieve better outcomes in controlled and uncontrolled studies. I will put these results in the context of my personal research experiences. I challenge you to build diverse research teams and mentor the next generation, so that your team will produce more innovative work.

June 19, 9.00-10.00

Patrizio Pelliccione,
Associate Professor at Chalmers |
University of Gothenburg (Sweden) and
University of L'Aquila (Italy)
Title: Software Engineering for ML/AI



Abstract: ML and AI are increasingly dominating the high-tech industry. Organizations and technology companies are leveraging their big data to create new products or improve their processes to reach the next level in their market. However, ML and AI are not a silver bullet and Software 2.0 is not the end of software developers or software engineering. In this talk, I will argument on how software engineering can help ML and AI to become the key technology for (autonomous) systems of the near future. Software engineering best practices and achievements reached in the last decades might help, e.g., (i) democratising the use of ML/AI, (ii) composing, reusing, chaining ML/AI models to solve more complex problems, and (iii) supporting for reasoning about correctness, repeatability, explainability, traceability, fairness, ethics, while building an ML/AI pipeline.

June 18, 9.00-10.00

Indranil Gupta,
Professor, & Associate-Head,
Department of Computer Science,
University of Illinois, Urbana-
Champaign
Title: The Future of Technology Will
Not Be Technological...



Abstract: Distributed Systems designers and builders excel at addressing the goals of scale, reliability, security, and fault-tolerance. These challenges are however only a subset of a much broader set of needs and wants that users have from computer systems. This talk will attempt to show how these broader goals could serve as a source of innovative avenues and exciting new problems for distributed systems research.

Industry speaker

June 19, 15.30-16.15

Robert Szabo,
Master Researcher, Cloud Systems and
Platforms, Ericsson Research, Ericsson
(Hungary)
Title: End-to-End Orchestration
Automation in Distributed Cloud: Resource, Service and
Multi-stakeholders Aspects



Abstract: Edge computing provides compute and storage resources with adequate connectivity (networking) close to the devices generating / terminating traffic. The benefit is the ability to provide new services with strict requirements on, e.g., latency, bandwidth or on local break-out possibilities. Many use-cases for 5G (IoT, connected cars, Industry 4.0, ...) span the device, access-, distributed-, national- or global sites. This requires a solution that can handle any workload, anywhere in the network, with end-to-end orchestration. Distributed cloud goes along with automated deployment of applications at just the right location in the network to optimize resource efficiency and user experience. Distributed clouds, however, may well span across multiple providers, both infrastructure and online service providers, and may include enterprises or end customer resources too. In such scenarios, autonomous systems shall self-organize themselves into situational orchestration structures (hierarchies) to enable end-to-end automation. Last but not least applications are built on top of multiple-layers of services, which may be managed on their own (XaaS paradigm). How distributed resources and managed services from multiple-stakeholders may be brought together for end-to-end service automation is discussed based on results and insights gained from a proof of concept research prototype.

Patrons & Sponsors

Silver level



Bronze level



Other



Conference Venue

The conference is organized in the buildings of Umeå University.

- The ICAC track will be held in Aula Nordica, Universum building.
- The SASO track will be held in Rotundan, Universum building.
- The Posters and Demos Session will be held in Brashörnan, Universum building.
- Coffee breaks on Monday-Wednesday will be served in Brashörnan, Universum building.
- Lunches will be served in Restaurant Hjortron, Universum building.
- Workshops and tutorials will be held in rooms N410, N420, N430, N440, and N450, Naturvetarhuset building.
- ICAC, SASO, and ASOS Steering Committee meetings will be held in MC323, MIT-huset building.

Maps for the conference venue and social events locations:

Please visit the conference web site (> Attending > Conference location).

