

2024 IEEE/ACM 19th Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS 2024)

**Lisbon, Portugal
15-16 April 2024**



**IEEE Catalog Number: CFP2480C-POD
ISBN: 979-8-3503-6383-8**

**Copyright © 2024, Association for Computing Machinery (ACM)
All Rights Reserved**

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP2480C-POD
ISBN (Print-On-Demand):	979-8-3503-6383-8
ISBN (Online):	979-8-4007-0585-4
ISSN:	2157-2305

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2024 IEEE/ACM 19th Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS) SEAMS 2024

Table of Contents

Message from the SEAMS 2024 Chairs	ix
Organizing Committee	x
Program Committee	xi

Session 1: Intro + Keynote 1

Keynote 1: Advances on Symbolic Machine Learning and Recent Applications to Software Engineering	1
<i>Alessandra Russo (Imperial College London)</i>	

Session 2: Uncertainty

Formal Synthesis of Uncertainty Reduction Controllers	2
<i>Marc Carwehl (Humboldt-Universität zu Berlin, Germany), Calum Imrie (University of York, UK), Thomas Vogel (Humboldt-Universität zu Berlin, Germany), Genaina Rodrigues (University of Brasilia, Brasil), Radu Calinescu (University of York, UK), and Lars Grunske (Humboldt-Universität zu Berlin, Germany)</i>	
Automated Planning for Adaptive Cyber-Physical Systems under Uncertainty in Temporal Availability Constraints	14
<i>Raquel Sánchez-Salas (ITIS Software, Universidad de Málaga), Javier Troya (ITIS Software, Universidad de Málaga), and Javier Cámara (ITIS Software, Universidad de Málaga)</i>	
Handling uncertainty in the specification of autonomous multi-robot systems through mission adaptation	25
<i>Gianluca Filippone (University of L'Aquila), Juan Antonio Piñera García (Gran Sasso Science Institute), Marco Autili (University of L'Aquila), and Patrizio Pelliccione (Gran Sasso Science Institute)</i>	

Uncertainty Flow Diagrams: Towards a Systematic Representation of Uncertainty Propagation and Interaction in Adaptive Systems	37
<i>Javier Cámara (ITIS Software, Universidad de Málaga), Sebastian Hahner (Karlsruhe Institute of Technology), Diego Perez-Palacin (Linnaeus University), Antonio Vallecillo (ITIS Software, Universidad de Málaga), Maribel Acosta (Technical University of Munich), Nelly Bencomo (Durham University), Radu Calinescu (University of York), and Simos Gerasimou (University of York)</i>	

Session 3: Unmanned Aerial Vehicles and LLMs

ADAM: Adaptive Monitoring of Runtime Anomalies in Small Uncrewed Aerial Systems	44
<i>Md Nafee Al Islam (University of Notre Dame, USA), Jane Cleland-Huang (University of Notre Dame, USA), and Michael Vierhauser (University of Innsbruck, Austria)</i>	
Towards Proactive Decentralized Adaptation of Unmanned Aerial Vehicles for Wildfire Tracking	56
<i>Enrique Vilchez (ITIS Software, Universidad de Málaga), Javier Troya (ITIS Software, Universidad de Málaga), and Javier Cámara (ITIS software, Universidad de Málaga)</i>	
Wildfire-UAVSim: An Exemplar for Evaluation of Adaptive Cyber-Physical Systems in Partially-Observable Environments	63
<i>Enrique Vilchez (ITIS Software, Universidad de Málaga), Javier Troya (ITIS Software, Universidad de Málaga), and Javier Cámara (ITIS Software, Universidad de Málaga)</i>	
Aloft: Self-Adaptive Drone Controller Testbed	70
<i>Calum Imrie (University of York), Rhys Howard (University of Oxford), Divya Thuremella (University of Oxford), Nawshin Mannan Proma (University of York), Tejas Pandey (University of York), Paulina Lewinska (University of York), Ricardo Cannizzaro (University of Oxford), Richard Hawkins (University of York), Colin Paterson (University of York), Lars Kunze (University of Oxford), and Victoria Hodge (University of York)</i>	
Exploring the Potential of Large Language Models in Self-adaptive Systems	77
<i>Jialong Li (Waseda University), Mingyue Zhang (Southwest University), Nianyu Li (ZGC National Laboratory), Danny Weyns (KU Leuven), Zhi Jin (Peking University), and Kenji Tei (Tokyo Institute of Technology)</i>	

Session 4: Testing and Community Debate

Automating Pipelines of A/B Tests with Population Split Using Self-Adaptation and Machine Learning	84
<i>Federico Quin (KU Leuven, Belgium) and Danny Weyns (Linnaeus University, Sweden and KU Leuven, Belgium)</i>	

Generating Executable Test Scenarios from Autonomous Vehicle Disengagements using Natural Language Processing	98
<i>Qunying Song (Lund University, Sweden), Rune Anderberg (Lund University, Sweden), Henrik Olsson (Lund University, Sweden), and Per Runeson (Lund University, Sweden)</i>	
Swarm intelligence-based bio-inspired algorithms	105
<i>Darko Bozhinoski (IRIDIA, Université Libre de Bruxelles)</i>	
Bio-inspired computing systems: handle with care, discard if need it	107
<i>Rogério de Lemos (University of Kent)</i>	

Session 5: Awards + Keynote 2

Keynote 2: Towards Always Law-Abiding Self-Driving	109
<i>Sun Jun (Singapore Management University (SMU))</i>	

Session 6: Self-Recovery & Evaluation

Raft Protocol for Fault Tolerance and Self-Recovery in Federated Learning	110
<i>Rustem Dautov (SINTEF Digital) and Erik Johannes Husom (SINTEF Digital)</i>	
Integrating Graceful Degradation and Recovery through Requirement-driven Adaptation	122
<i>Simon Chu (Carnegie Mellon University), Justin Koe (The Cooper Union), David Garlan (Carnegie Mellon University), and Eunsuk Kang (Carnegie Mellon University)</i>	
Learning Recovery Strategies for Dynamic Self-healing in Reactive Systems	133
<i>Mateo Sanabria (Universidad de los Andes), Ivana Dusparic (Trinity College Dublin), and Nicolás Cardozo (Universidad de los Andes)</i>	
SWITCH: An Exemplar for Evaluating Self-Adaptive ML-Enabled Systems	143
<i>Arya Marda (IIIT Hyderabad, India), Shubham Kulkarni (IIIT Hyderabad, India), and Karthik Vaidhyanathan (IIIT Hyderabad, India)</i>	

Session 7: SAS Applications

Patterns of Applied Control for Public Health Measures on Transportation Services under Epidemic	150
<i>Kenneth Johnson (Auckland University of Technology), Samaneh Madanian (Auckland University of Technology), and Catia Trubiani (Gran Sasso Science Institute)</i>	
RAMSES: An Artifact Exemplar for Engineering Self-Adaptive Microservice Applications	161
<i>Vincenzo Riccio (Politecnico di Milano, Italy), Giancarlo Sorrentino (Politecnico di Milano, Italy), Ettore Zamponi (Politecnico di Milano, Italy), Matteo Camilli (Politecnico di Milano, Italy), Raffaella Mirandola (Karlsruhe Institute of Technology, Germany), and Patrizia Scandurra (University of Bergamo, Italy)</i>	

Self-adaptive, Requirements-driven Autoscaling of Microservices	168
<i>João Paulo Karol Santos Nunes (IBM Brazil and University of São Paulo), Shiva Nejati (University of Ottawa), Mehrdad Sabetzadeh (University of Ottawa), and Elisa Yumi Nakagawa (University of São Paulo)</i>	
GreenhouseDT: An Exemplar for Digital Twins	175
<i>Eduard Kamburjan (University of Oslo, Norway), Riccardo Sieve (University of Oslo, Norway), Chinmayi Prabhu Baramashetru (University of Oslo, Norway), Marco Amato (University of Turin, Italy), Gianluca Barmina (University of Turin, Italy), Eduard Occhipinti (University of Turin, Italy), and Einar Broch Johnsen (University of Oslo)</i>	
Latency-aware RDMSim: Enabling the Investigation of Latency in Self-Adaptation for the Case of Remote Data Mirroring	182
<i>Sebastian Götz (Technische Universität Dresden), Nelly Bencomo (Durham University), and Huma Samin (Durham University)</i>	

Session 8: Human Aspects

Explanation-driven Self-adaptation using Model-agnostic Interpretable Machine Learning	189
<i>Francesco Renato Negri (Politecnico di Milano), Niccolò Nicolosi (Politecnico di Milano), Matteo Camilli (Politecnico di Milano), and Raffaella Mirandola (Karlsruhe Institute of Technology)</i>	
Human empowerment in self-adaptive socio-technical systems	200
<i>Nicolas Boltz (Karlsruhe Institute of Technology, Germany), Sinem Getir Yaman (University of York, United Kingdom), Paola Inverardi (Gran Sasso Science Institute, Italy), Rogério de Lemos (University of Kent, United Kingdom), Dimitri Van Landuyt (KU Leuven, Belgium), and Andrea Zisman (The Open University, United Kingdom)</i>	
Towards Understanding Trust in Self-adaptive Systems	207
<i>Dimitri Van Landuyt (KU Leuven, Belgium), Dávid Halász (Masaryk University, Czech Republic), Stef Verreydt (KU Leuven, Belgium), and Danny Weyns (KU Leuven, Belgium/Linnaeus University, Sweden)</i>	
SafeDriveRL: Combining Non-cooperative Game Theory with Reinforcement Learning to Explore and Mitigate Human-based Uncertainty for Autonomous Vehicles	214
<i>Kenneth H. Chan (Michigan State University), Sol Zilberman (Michigan State University), Nick Polanco (Michigan State University), Joshua E. Siegel (Michigan State University), and Betty H.C. Cheng (Michigan State University)</i>	

Author Index	221
---------------------------	------------