EDCC 2016
12th European Dependable Computing Conference
Gothenburg, September 5-9, 2016

SERENE WORKSHOP
8th International Workshop on Software Engineering for Resilient Systems
September 5-6

CARS WORKSHOP
4th International Workshop on Critical Automotive Applications: Robustness & Safety
September 6
Monday September 5
SERENE Workshop
08:00 - 09:00 Registration
09:00 - 09:15 Opening
09:15 - 10:30 Invited talk
Traffic safety – a boundary condition for autonomous driving
Dr. Anna Nilsson-Ehle, SAFER – Vehicle and Traffic Safety Centre at Chalmers University of Technology, Sweden
10:30 - 11:00 Coffee
11:00 - 12:30 Session 1: Mission-critical systems
A Framework for Assessing Safety Argumentation Condence
Rui Wang, Jérémie Guiochet and Gilles Motet, LAAS-CNRS, Universite de Toulouse, CNRS, INSA, UPS, Toulouse, France
Configurable Fault Trees
Christine Jakobs, Peter Tröger and Matthias Werner, Operating Systems Group, TU Chemnitz, Germany
12:30 - 14:00 Lunch
14:00 - 15:00 Session 2: Verification
Verifying Multi-core Schedulability with Data Decision Diagrams
Dimitri Racordon and Didier Buchs, Centre Universitaire d’Informatique, University of Geneva, Switzerland
Formal verification of the on-the-fly vehicle platooning protocol
Piergiuseppe Mallozzi, Massimo Sciancalepore and Patrizio Pelliccione, Chalmers University of Technology and University of
15:00 - 15:30 Coffee
15:30 - 17:00 Panel Do the autonomous systems jeopardize the safety?
Prof. Devdatt Dubhashi, Chalmers University of Technology, Sweden
Prof. Estevam R. Hruschka Jr., Carnegie Mellon University, USA, and Federal University of Sao Carlos (UFSCar), Brazil
Dr. Anna Nilsson-Ehle, Director of SAFER – Vehicle and Traffic Safety Centre at Chalmers University of Technology, Sweden
Prof. Hans Hansson, Mälardalen University, Sweden
17:45 - 18:45 Visit to ReVeRe, Chalmers Vehicle Research lab
19:00 - 20:00 Reception, L’s Resto, Lindholmen

Tuesday September 6
SERENE Workshop
08:30 - 09:15 Registration
09:15 - 10:30 Invited talk
Challenges in functional safety for future cooperative and autonomous systems
Prof. Hans Hansson, Mälardalen University, Sweden
10:30 - 11:00 Coffee
11:00 - 12:30 Session 3: Engineering resilient systems
WRAD : Tool Support for Workflow Resiliency Analysis and Design
John Mace, Charles Morisset and Aad Van Moorsel, School of Computing Science, Newcastle University, Newcastle upon Tyne, UK
Designing a Resilient Deployment and Reconguration Infrastructure for
Remotely Managed Cyber-Physical Systems
Subhav Pradhan, Abhishek Dubey and Aniruddha Gokhale, Department of Electrical Engineering and Computer Science, Vanderbilt University, Nashville, TN, USA
cloud-ATAM: Method for Analysing Resilient Attributes of Cloud-Based Architectures
David Ebo Adjepon-Yamoah, Centre for Software Reliability, School of Computing Science, Newcastle University, UK
12:30 - 14:00 Lunch
14:00 - 15:00 Session 4: Testing
Automated Test Case Generation for the CTRL Programming Language Using Pex: Lessons Learned
Stefan Klikovits, Université de Genève, Centre Universitaire d’Informatique, Carouge, Switzerland and CERN, European Organization for Nuclear Research, Geneva, Switzerland and David PY Lawrence, Université de Genève, Centre Universitaire d’Informatique, Carouge, Switzerland, Manuel Gonzalez-Berges, CERN, European Organization for Nuclear Research, Geneva, Switzerland, Didier Buchs, Université de Genève, Centre Universitaire d’Informatique, Carouge, Switzerland
A/B Testing in E-commerce Sales Processes
Konstantinos Koukouvis, Roberto Alcañiz Cumero and Patrizio Pelliccione, Chalmers University of Technology and University of
Gothenburg, Sweden
15:00 - 15:30 Closing
Monday, September 5, 2016.

Seminar
Dependable Computing in Practice. Success Stories and Future Challenges.
13.00 - 14.30 Session 1: Space and Automotive Systems
Computers in Space, Today and Tomorrow
Torbjörn Hult, RUAG Space AB.

On the Design of Safety-Critical Automotive Systems
Per Johannessen, AB Volvo

From Autonomous Space Launchers to Self-driving Cars
Rolf Johansson, SP, Technical Research Institute of Sweden

14.30 – 15.00 Coffee

15.00 - 16.00 Session 2: Dependable Avionics
The Gripen Fly-By-Wire system – Architectural Principles and Dependability Testing
Lars Holmlund, Saab AB, Linköping

Challenges in designing dependable avionics
Kristina Forsberg, Saab AB, Jönköping

16:00 – 16.15 Short Break

16.15 - 17.15 Session 3: Testing and Benchmarking
Why Dependability Benchmarks Do Not Work for Dependable Systems and What Can Be Done About It
Henrique Madeira, University of Coimbra, Portugal

Software Dependability through Automated Testing
Robert Feldt, Blekinge Institute of Technology, Sweden

17:45 - 18:45 Visit to ReVeRe, Chalmers Vehicle Research lab
19:00 - 20:00 Reception, L’s Resto, Lindholmen

CAN WE TRUST COMPUTERS TO CONTROL CRITICAL SYSTEMS?

In this seminar, speakers from industry and academia will share their experiences and discuss challenges in designing computer systems for critical applications, such as autonomous road vehicles, airplanes and space missions.

The seminar is dedicated to professor emeritus Jan Torin, who celebrated his 80th birthday in June this year. Jan was a professor of computer engineering at Chalmers from 1984 to 2001, where he founded the dependable computing research lab.

He successfully supervised 20 doctoral students, four of whom are speakers at this seminar. Prior to joining Chalmers, he work at Saab Space (now Ruag Space) where he led the development of on-board computers for the Ariane launchers and several satellites.
Tuesday, September 6, 2016
CARS Workshop
08:00 - 09:00 Registration
08:45 - 09:00 Welcome address
09:00 - 09:45 Invited talk
Challenges in Architecture for Self-driving Cars
Mathias Westlund Systems and functions architect, Autonomous drive, Volvo Car Group.
09:45 - 10:35 Session 1 – Autonomous Vehicles
Session Chair: Rolf Johansson, SP Technical Research Institute of Sweden, Boras, Sweden
Autonomous vehicles Disarming the Trolley Problem – Why Self-driving Cars do not Need to Choose Whom to Kill
Rolf Johansson (SP) and Jonas Nilsson (Volvo Cars), Sweden
Risk reduction of experimental autonomous vehicles: The Safety-Bag approach
Brini Manel, Cruibille Paul and Lussier Benjamin (Université de Technologie de Compiègne), France
Q&A – discussion - 10min
10:35 - 11:00 Break
11:00 - 12:30 Session 2 – Architecting Automotive Systems
Session Chair: Jean-Charles Fabre, LAAS-CNRS / INPT, Toulouse, France
Service-based Modeling of Cyber-Physical Automotive Systems: A Classification of Services
Patrik Feth and Rasmus Adler (Fraunhofer IESE), Germany
Multiplexing Adaptive with Classic AUTOSAR? Adaptive Software Control to Increase Resource Utilization in Mixed-Critical Systems
Angeliki Kritikakou (IRISA), Claire Pagetti (ONERA), Christine Rochange (IRIT), Michael Lauer and Matthieu Roy (LAAS-CNRS), France
Domain-Specific Languages for the Definition of Automotive System Requirements
Florian Bock (Computer Science 7, FAU Erlangen), Sebastian Siegl (Audi AG) and Reinhard German (Computer Science 7, FAU Erlangen), Germany
Virtual Integration on the Basis of a Structured System Modelling Approach
Hennik Kaiser, Henrik Lonn and Peter Thorngren (Volvo Group), Sweden
Q&A – discussion - 10min
12:30 - 14:00 Lunch
14:00 - 15:30 Session 3 – Safety Analysis and Robustness
Session Chair: Philippe Quéré, TCR, Renault SA, Paris, France
Automotive Software Architecture Views and Why we need a new one - Safety view
Mirosław Staron (University of Gothenburg), Sweden
Toward an MDD-based Analysis of Stateful and Variant-rich Automotive Functions
Michael Käßmeyer, Rüdiger Berndt (Audi AG), Peter Bazan and Reinhard German (Friedrich-AlexanderUniversität, Erlangen- Nürnberg), Germany
Towards certification of software-intensive mixed-critical systems in automotive industry
Peter Reichenpfader, Florian Pölzbauer and Mario Driussi (Kompetenzzentrum - Das virtuelle Fahrzeug, Forschungsgesellschaft mbH), Austria
Automated Freedom from Interference Analysis for Automotive Software
Florian Leitner-Fischer(ZF TRW Automotive GmbH), Stefan Leue and Sirui Liu (University of Konstanz), Germany
Q&A – discussion - 10min
15:30 - 16:00 Break
16:00 - 17:30 Session 4 – Development Process and Techniques
Session Chair: Mario Trapp, Fraunhofer IESE, Kaiserslautern, Germany
Development process and techniques Towards Shaping ISO 26262-compliant Resources for OSLC-based Safety Case Creation
Barbara Gallina, Julieth Patricia Castellanos Ardila (Mälardalen University) and Mattias Nyberg (Scania CV), Sweden
Towards Flexible and Dependable E/E-Architectures for Future Vehicles
Gereon Weiss, Philipp Schleiss and Christian Drabek (Fraunhofer ESK), Germany
Provisioning of Deterministic and Non-Deterministic Services for Vehicles: The Rubus Approach
Harold Lawson (Lawson Konsult AB), Saad Mubeen, Alessio Bucaioni, Jukka Mäki-Turja (Mälardalen University), John Lundbäck, Mattias Gålnder, Kurt-Lennart Lundbäck (Arcticus Systems), and Mikael Sjödin (Mälardalen University), Sweden
Academic-industrial Collaboration in the Vehicle Software Domain: Experiences and End-user Perspective
Saad Mubeen, Jukka Mäki-Turja (Mälardalen University), John Lundbäck, Mattias Gålnder, Kurt-Lennart Lundbäck (Arcticus Systems), Mikael Sjödin (Mälardalen University) and Harold Lawson (Lawson Konsult), Sweden
Q&A – discussion - 10min
18:00 - 19:00 Visit to ReVeRe, Chalmers Vehicle Research lab
EDCC Wednesday, September 7, 2016

08:00 - 09:00 Registration
09:00 - 09:15 Welcome Address
Johan Karlsson (General Chair), and Marco Vieira (Program Chair)
09:15 - 10:30 Keynote
Speed, Data and Ecosystems: The Future of Software Engineering
Jan Bosch, Chalmers University of Technology

Abstract: The future of software engineering is centered around three main developments: Speed, Data and Ecosystems. The focus on speed is concerned with the constantly increasing rate of deploying new software in the field. This continuous integration and deployment is no longer only the purview of internet companies but is also increasingly deployed in embedded systems. Second, data is concerned with the vast amounts of information collected from systems deployed in the field and the behavior of the users of these systems. The software-intensive systems industry needs to significantly improve its ability to exploit the value present in that data. Finally, ecosystems are concerned with the transition in many companies from doing everything in-house to strategic use of innovation partners and commodity providing partners. The keynote addresses these three main developments, provides numerous examples from the Nordic and international industry and predicts the next steps that industry and academia need to engage in to remain competitive.

10:30 - 11:00 Coffee
11:00 - 12:30 Best Paper Session
Session Chair: Marco Vieira
Finding Resilience-Friendly Compiler Optimizations using Meta-Heuristic Search Techniques
Nithya N., Karthik Pattabiraman and Matei Ripeanu (University of British Columbia (UBC), Canada)

Diversity, Safety and Security in Embedded Systems: modeling adversary effort and supply chain risks
Ilir Gashi, Andrey Povyakalo and Lorenzo Strigini (City University London, U.K.)

A System-level Architecture for Fine-grained Privacy Control in Location-based Services
Arielle Moro and Benoît Garbinato (University of Lausanne, Switzerland)

12:30 - 14:00 Lunch
14:00 - 15:30 Software Security
Session Chair: Elena Troubitsyna
Software Metrics and Security Vulnerabilities: Dataset and Exploratory Study
Henrique Alves, Baldoino Fonseca and Nuno Antunes (1 Federal University of Alagoas, Brazil; 2 University of Coimbra, Portugal)

Coverage Metrics and Detection of Injection Vulnerabilities: An Experimental Study
Ana Paula Sayuri Matsunaga, Nuno Antunes and Regina Moraes (1 Federal University of Ceará, Brazil; 2 University of Coimbra, Portugal; 3 University of Campinas, Brazil)

Inferring a Distributed Application Behavior Model for Anomaly Based Intrusion Detection
Eric Totel, Mouna Hkimi, Michel Hurfin, Mourad Leslous and Yvan Labiche (1 CentraleSupelec, France; 2 INRIA, France; 3 Carleton University, Canada)

15:30 - 16:00 Coffee
16:00 - 17:00 Fault Tolerance
Session Chair: Paolo Lollini
CrossCheck: a Holistic Approach for Tolerating Crash-Faults and Arbitrary State Corruptions
Arthur Martens, Christoph Borchert, Manuel Nieke, Olaf Spinczyk and Rüdiger Kapitza (1 TU Braunschweig, Germany; 2 TU Dortmund, Germany)

SAREK: Optimistic Parallel Ordering in Byzantine Fault Tolerance
Bijun Li, Wenbo Xu, Muhammad Zeeshan Abid, Tobias Distler and Rüdiger Kapitza (1 TU Braunschweig, Germany; 2 KTH Stockholm, Sweden; 3 Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany)

17:00 - 18:00 Student Forum
Session Chair: Hans Peter Schwegel
Adaptive Data Collection Mechanisms for Smart Monitoring of Distribution Grids
Mohammed S. Kemal and Rasmus L. Olsen (Aalborg University, Denmark)

Delay Evaluation of OpenFlow Network Based on Queueing Model
Zhixiao Shang and Katinka Wolter (Freie Universität Berlin, Germany)

Improving FPGA resilience through Partial Dynamic Reconfiguration
José Luis Nunes (University of Coimbra, Portugal)

18:30 - 20:00 Welcome Reception, Restaurant Bistrot, Jupiter Building
**Thursday, September 8, 2016**

**EDCC Conference**

08:00 - 08:30 Registration

08:30 - 10:30 Hardware Dependability

Session Chair: Johan Karlsson

*On the Effects of Cumulative SEUs in FPGA-based Systems*

Jose Luis Nunes¹, Joao Carlos Cunha¹ and Mario Zenha-Rela² (¹ Polytechnic Institute of Coimbra, Portugal; ² University of Coimbra, Portugal)

*3D-DPS: An Efficient 3D-CAC to Reliable Data Transfer in 3D ICs*

Zahra Shirmohammadi, Nezam Rohbani and Seyed Ghassem Miremadi (Sharif University of Technology, Iran)

*Ultrafast Error Correction Codes for Double Error Detection/Correction*

Luis J. Saiz-Adalid, Pedro Gil, Juan Carlos Ruiz, Joaquin Gracia, Daniel Gil and Juan C. Baraza (Universitat Politècnica de València, Spain)

*Investigating the Effects of Process Variations and System Workloads on Reliability of STT-RAM Caches*

Elham Cheshmikhani, Amir Mahdi Hosseini Monazzah, Hamed Farbeh and Seyed-Ghasem Miremadi (Sharif University of Technology, Iran)

10:30 - 11:00 Coffee

11:00 - 12:30 Testing

Session Chair: Nuno Antunes

*Practical Emulation of Software Defects in Source Code*

Gonçalo Pereira, Raul Barbosa and Henrique Madeira (University of Coimbra, Portugal)

*Prediction of the Testing Effort for the Safety Certification of Open-Source Software: A Case Study on a Real-Time Operating System*

Domenico Cotroneo¹, Domenico Di Leo², Roberto Natella¹ and Roberto Pietrantuono¹ (¹ Università degli Studi di Napoli Federico II, Italy; ² Critiware, Italy)

*Virtual Worlds for Testing Robot Navigation: a Study on the Difficulty Level*

Thierry Sotiropoulos, Jérémie Guiochet, Félix Ingrand and Hélène Waeselynck (LAAS-CNRS, France)

12:30 - 14:00 Lunch

14:00 - 15:00 Data Storage

Session Chair: Karthik Pattabiraman

*Experimental Assessment of NoSQL Databases Dependability*

Luis Ventura and Nuno Antunes (University of Coimbra, Portugal)

*Design and Implementation of a Consistent Data Store for a Distributed SDN Control Plane*

Fabio Botelho¹, Tulio A. Ribeiro¹, Paulo Ferreira¹, Fernando M. V. Ramos² and Alysson Bessani² (¹ LaSIGE, Portugal; ² Universidade de Lisboa, Portugal)

15:00 - 16:00 Fast Abstracts

Session Chair: Gilles Tredan

*A Combined Dependability and Security Approach for COTS Software in Space Systems*

David Escorial Rico, Mark Hann

*Efficient non-anonymous composition operator for modeling complex dependable systems*

Silvano Chiaradonna, Felicita Di Giandomenico and Giulio Masetti

*Estimating Maximum Error Impact in Dynamic Data-driven Applications for Resource-aware Adaption of Software-based Fault-Tolerance*

Björn Böninghoff, Horst Schirmeier

*Towards Dependable Change Management and Traceability for Global Software Development*

David Ebo Adjepon-Yamoah

*DETOx: Towards Optimal Software-based Soft-Error Detector Configurations*

Michael Lenz and Horst Schirmeier

*MISO: an intermediate language to express parallel and dependable programs*

Alcides Fonseca, Raul Barbosa

17:00 - Excursion and banquet

The banquet will be held at Nya Älvsborgs Fortress, located on a small island in the mouth of the Göta Älv river.
### Friday, September 9, 2016

**EDCC Conference**

**08:30 - 09:00 Registration**

**09:00 - 10:30 Short papers**

**Session Chair: Regina Moraes**

#### Assuring Dependable Cloud-Based System Engineering: A Cloud Accountability Method

David Ebo Adjepon-Yamoah \(^1\) and Zhenyu Wen \(^2\) (\(^1\) Newcastle University, U.K.; \(^2\) University of Edinburgh, U.K.)

#### Expert-Guided Automatic Diagnosis of Performance Problems in Enterprise Applications

Christoph Heger \(^1\), André van Hoorn \(^2\), Dušan Okanović \(^1\), Stefan Siegl \(^1\) and Alexander Wert \(^1\) (\(^1\) NovaTec Consulting GmbH, Germany; \(^2\) University of Stuttgart, Germany)

#### Towards a Common Safety Ontology for Automobiles and Railway Vehicles

Bernhard Hulin \(^1\), Hermann Kaindl \(^2\), Thomas Rathfux \(^2\), Roman Popp \(^2\), Edin Arnautovic \(^2\) and Roland Beckert \(^2\) (\(^1\) Berner & Mattner Systemtechnik GmbH, Germany; \(^2\) TU Wien, Austria)

#### Multidimensional Log Analysis

Marcin Kubacki and Janusz Sosnowski (Warsaw University of Technology, Poland)

**10:30 - 11:00 Coffee**

**11:00 - 12:30 Deployment and Evolution**

**Session Chair: Lorenzo Strigni**

#### Combining SAN and P-Graphs for the Analysis and Optimization of Industrial Processes

Riccardo Bernini \(^1\), Andrea Bondavalli \(^2\), Paolo Lollini \(^2\) and Leonardo Montecchi \(^2\) (\(^1\) Blue Reply s.r.l., Italy; \(^2\) University of Firenze, Italy)

#### Dwarf: Shortening Downtime of Reboot-based Kernel Updates

Ken Terada and Hiroshi Yamada (TUAT, Japan)

#### Adaptive Deployment Infrastructure for Android Applications

Junior Cupe Casquina, Jane D. A. Sandim Eleuterio and Cecilia M.F. Rubira (University of Campinas, Brazil)

**12:30 - 14:00 Lunch**

**14:00 - 15:30 Fault Prediction and Tolerance**

**Session Chair: Karama Kanoun**

#### An RSU Replication Scheme for Dependable Wireless Vehicular Networks

João Almeida, Joaquim Ferreira and Arnaldo Oliveira (Instituto de Telecomunicações, Portugal)

#### Transitioning Fault Prediction Models to a New Environment

Jesper Derehag \(^1\), Elaine Weyuker \(^2\), Thomas Ostrand \(^2\) and Daniel Sundmark \(^2\) (\(^1\) Ericsson AB, Sweden; \(^2\) Mälardalen University, Sweden)

#### A Performance Comparison of Algorithms for Byzantine Agreement in Distributed Systems

Shreya Agrawal and Khuzaima Daudjee (University of Waterloo, Canada)

**Wrap-up 15:30 - 16:00**
Practical information

CONFERENCE VENUE

- Lindholmen Conference Centre hosts different tracks of the EDCC conference and is located at Lindholmspiren 5.
- The main track of the EDCC conference will be held in rooms Pascal (Wednesday and Friday) and Lindholmen conference hall (Thursday).
- The Dependable Computing in Practice seminar will be held in the Demo Studio (second floor).
- The SERENE workshop will be held in room Kelvin.
- The CARS workshop will be held in room Pascal.
- Lunches are served in L’s Resto, in the same building as the conference rooms.
 Practical information

SOCIAL EVENTS

Monday

• Reception for SERENE workshop and Dependable Computing in Practice seminar will be held between 19:00-20:00 at L’s Resto, located at Lindholmen Conference Centre.
• Visit to ReVeRe (Chalmers Research Vehicle Resource) lab. ReVeRe is located at Valdemar Noréns gata 12, which is a 9-minute walk from Lindholmen Conference Centre.

Wednesday

• Welcome Reception will be held at Restaurant Bistrot, located in the ground floor of the Jupiter building, a 1 minute walk from the conference centre.
Practical information

SOCIAL EVENTS

Thursday

- Excursion & Banquet at Nya Älvsborgs Fortress, located on a small island in the mouth of the Göta Älv river. A small cruise ship will take the participants to/from the island. The pick up point is 2 minutes walk from Lindholmen Conference Centre.

CONFERENCE PROCEEDINGS

- The conference proceedings are available at:  
  http://conferences.computer.org/edcc/2016
  (The site is only live during the conference).
- You can access the proceedings using the following credentials:
  
  Username: edcc16
  Password: conf16

INTERNET ACCESS

Internet access at Lindholmen Conference Center

- **Network:** CHSRA B-C
- **Password:** ChalmersKonferens
PUBLIC TRANSPORTATION

Public transportation in Gothenburg is generally frequent and reliable. Most stops have a screen with realtime arrival times. The transportation is handled by Västtrafik and covers all busses, trams, and ferries within the municipality and beyond.

Pay the fares

http://www.vasttrafik.se/#!/en/tickets-and-prices/

There is an app for iPhone and Android, called Västtrafik ToGo, which you can connect to your bank card and use to pay single fares.

Tickets valid for a certain period of time can be purchased at Västtrafik shops, or any point of sale marked with the Västtrafik logo.
- 24 hours for 85 SEK
- 72 hours for 170 SEK

Boarding/Activating your ticket

If you have a 24- or 72-hour card, all you need to do to activate it is place it in front of the card reader on board. The machine will give a single short beep and the screen will indicate how long the card/trip is valid. You may change vehicles as often as you like within that time-frame (and zone), just place your card in front of the card reader on the next tram/bus as well. If you have a ToGo-ticket in your phone, you show it on demand to the driver or ticket inspector.

Styr&Ställ, Rental bike system

- Styr & stall is an easy use bike rental compa- with 50 stations through- the city. One of them is Stenpiren, where you can ac- the ferry to Lindholmen.
- Buy a 3-day pass for only SEK, pay by credit card your pick-up station.

http://en.goteborgbikes.se/Subscription/3-day-Pass/