ISSRE 2020 Program

Monday, Oct 12th

13:00-13:15	13:15-14:15	14:15-14:30	14:30-15:30	14:15-14:30	15:45-16:45
Workshops		Break	Workshops	Break	Workshops
Doctoral Symposium - Session 1			Doctoral Symposium - Session 2		Doctoral Symposium - Session 3
NFS Introduction	NFS1: Academia, Industry, and Society		NFS2: Building and Sustaining Your Academic Career		NFS3: Bootstrapping an Academic Career

Tuesday, Oct 13th

13:00-13:45	13:45-14:15	14:15-14:30	14:30-15:00	15:00-15:30	14:15-14:30	15:45-16:15	16:15-16:45
Welcome and Keynote 1	*Best Research Paper Nominees*	Break	R1: Anomaly Detection	R2: Vulnerability and Failure Analysis	Break	R3: Failure Prediction, Detection, and Prevention	R4: Reliability Analysis and Assurance
			FPA1: The emergence of machine learning in software reliability	FPA2: The future of automated software reliability engineering		I1: Modeling dependable systems	I2: Data-driven improvement of software practices
			T1: Continuous Dependability Assessment and Improvement in DevOps			T1: Continuous Dependability Assessment and Improvement in DevOps	

Wednesday, Oct 14th

13:00-13:45	13:45-14:15	14:15-14:30	14:30-15:00	15:00-15:30	14:15-14:30	15:45-16:15	16:15-16:45
Keynote 2	*Best Industry Paper Nominees*	Break	R5: Faults and Failures Analysis	R6: Dependability Assessment	Break	FPA3: New approaches for system assurance	J1C2
			I3: Safety critical systems	I4: Assured hardware and embedded systems			
			T2: Approaches and Techniques for Postprocessing of Static Analysis Alarms			T2: Approaches and Techniques for Postprocessing of Static Analysis Alarms	

Thursday, Oct 15th

13:00-13:15	13:15-13:45	13:45-14:15	14:15-14:30	14:30-15:00	15:00-15:30	14:15-14:30	15:45-16:15	16:15-16:45	16:45-17:00
Annoucements	R7: Android Security and Reliability	R8: Testing	Break	R9: Fault Prediction and Detection	R10: Quality Assessment and Assurance	Break	R11: Failure/Fault Detection and Reproduction	R12: Fault Injection	*Closing Session*
	I5: Defects and vulnerabilities	I6: Cloud and networking		T3: Robustness Testing of Complex Software Systems to Improve Operational Reliability			T3: Robustness Testing of Complex Software Systems to Improve Operational Reliability		
	T4: The Analysis of Typed Functional Languages			T4: The Analysis of Typed Functional Languages			T4: The Analysis of Typed Functional Languages		

Contents

Keynotes

Westley Weimer

University of Michigan

Title

What Medical Imaging Can Tell Us About Code Review, Data Structures, Code Writing and the Brain (Tue Oct 13, 13:00-13:45 UTC, Session Chair: Henrique Madeira)

Abstract

Within the last few years, medical imaging techniques that measure patterns of neural activity have been used to help us understand what goes on in our brains when we carry out software engineering activities. This talk provides a gentle overview of recent research in that area. We consider questions such as: "Does the brain treat reading code like reading prose?" "Are there neurological differences in how men and women carry out code review?" "Does the brain treat data structures like real objects in space?" and "Are there neurological differences between writing a method and writing an English paragraph?" We present recent work providing potential answers to such questions as well as a more speculative discussion of the implications for topics such as tool design, workforce retraining, and pedagogy. This talk assumes no previous background in medical imaging techniques or terminology. In-line references will be provided, but the presentation will focus on accessible high-level take-aways and interesting ideas.

Short Biography

Westley Weimer is a professor of Computer Science at the University of Michigan. His research focuses both on improving software quality through static and dynamic methods and also on the use of medical imaging techniques to provide better rigorous, grounded

understandings of how humans engineer software. While perhaps best known for advances in automated program repair, his work in general has been cited over 14,000 times and has received four "Ten Year Most Influential" paper awards. He has also received the CRA-E Undergraduate Research Faculty Mentoring Award and three of the papers summarized in this talk feature undergraduate researcher authors.

Paulo Marques

Feedzai Inc.

Title

Machine Learning Business Critical Systems: Paving the way into the future
(Wed Oct 14, 13:00-13:45 UTC, Session Chair: Marco Vieira)

Abstract

“You test what you fly, you fly what you test.” There’s probably no better-known moto in the safety and business critical systems’ design community than this small phrase. It emphasizes not only testability but the importance of determinism and immutability after systems are constructed. Unfortunately, it’s becoming obsolete or, at least, largely inadequate as the world progresses. Machine Learning (ML) has taken the world by storm. This includes not only applications but also both business critical and safety critical systems. Today, all real-time and non- real-time financial transactions are evaluated using machine learning models; lane-assist and self-driving car technology are mostly based on ML; medical decisions and even prison-parole judgments are being backed by modern machine learning. As machine learning systems are mostly based on stochastic processes, this raises significant challenges

in terms of determinism, repeatability, transparency, and overall safety. But the world doesn't stop nor waits. In this talk we will discuss the challenges and lessons learned of building large scale machine-learning system for real-time risk management and fraud prevention. Today, at Feedzai, we process over $5 billion dollars' worth of transactions per day, every single day, in real-time. If you have made a transaction in the last day, being a card payment, an online payment, or even a mobile payment, it's very likely that our ML systems evaluated it and deemed it worth of being honored or blocked it. Building these systems is extremely challenging and we will examine what lessons can be generalized. In this talk we will cover not only the engineering aspects and its implications, but also the impact of having ML-based systems making autonomous decisions that impact human lives and outcomes, and what type of properties we would like such systems to exhibit.

Short Biography

Paulo is the Chief Technology Officer and co-founder of Feedzai, a leading data science and machine learning company managing risk and fraud prevention for worldwide financial institutions. Before founding Feedzai, Paulo was co-Director of the Carnegie Mellon University|Portugal Professional Master in Software Engineering program and had a dual appointment at Carnegie Mellon University and the University of Coimbra. Over the years, he led a large number of projects for the European Space Agency, Microsoft Research, Siemens among other companies. The projects ranged the design and implementation of safety and business critical systems, programming languages and runtime environments, virtualization, and software design. Paulo holds a PhD in Distributed Systems from the University of Coimbra, has authored over 40 peer-reviewed publications and a book. He's currently Scientific Director of the CMU|Portugal program, member of the Forbes Technology Council, and an early-stage technology investor and advisor.

Research Papers

Best Research Paper Nominees (Tue Oct 13, 13:45-14:15 UTC, Session Chairs: Nuno Antunes and Zheng Zheng)

Fault Triggers in the TensorFlow Framework: An Experience Report (Practical Experience Report)
Xiaoting Du (Beihang University), Guanping Xiao (Nanjing University of Aeronautics and Astronautics) and Yulei Sui (University of Technology Sydney)

On failures of RGB cameras and their effects in autonomous driving applications (Research Paper)
Francesco Secci (University of Florence) and Andrea Ceccarelli (University of Florence)

AV-FUZZER: Finding safety violations in autonomous driving systems (Research Paper)
Guanpeng Li (University of Illinois at Urbana-Champaign), Yiran Li (University of Illinois at Urbana-Champaign), Saurabh Jha (University of Illinois at Urbana-Champaign), Timothy Tsai (NVIDIA), Michael Sullivan (NVIDIA), Siva Kumar Sastry Hari (NVIDIA), Zbigniew Kalbarczyk (University of Illinois at Urbana-Champaign) and Ravishankar Iyer (University of Illinois at Urbana-Champaign)

Research Session 1: Anomaly Detection (Tue Oct 13, 14:30-15:00 UTC, Session Chair: Roberto Natella)

LogTransfer: Cross-System Log Anomaly Detection for Software Systems with Transfer Learning (Research Paper)
Rui Chen (Nankai University), Shenglin Zhang (Nankai University), Dongwen Li (Nankai University), Yuzhe Zhang (Nankai University), Fangrui Guo (Nankai University), Weibin Meng (Tsinghua University), Dan Pei (Tsinghua University), Yuzhi Zhang (Nankai University), Xu Chen (Nankai University) and Yuqing Liu (Nankai University)

Unsupervised Detection of Microservice Trace Anomalies through Service-Level Deep Bayesian Networks (Research Paper)
Ping Liu (Tsinghua University), Haowen Xu (Tsinghua University), Qianyu Ouyang (Tsinghua University), Rui Jiao (Tsinghua University), Zhekang Chen (BizSeer), Shenglin Zhang (Nankai University), Jiahai Yang (Tsinghua University), Linlin Mo (WeBank), Jice Zeng (WeBank), Wenman Xue (WeBank) and Dan Pei (Tsinghua University)

How Far Have We Come in Detecting Anomalies in Distributed Systems? An Empirical Study with a Statement-level Fault Injection Method (Research Paper)

Yong Yang (Peking University), Yifan Wu (Peking University), Karthik Pattabiraman (University of British Columbia (UBC)), Long Wang (IBM T. J. Watson Research Center) and Ying Li (Peking University)

Research Session 2: Vulnerability and Failure Analysis (Tue Oct 13, 15:00-15:30 UTC, Session Chair: Jin Liu)

Understanding Merge Conflicts and Resolutions in Git Rebases (Research Paper)
Tao Ji (National University of Defense Technology), Liqian Chen (National University of Defense Technology), Xin Yi (National University of Defense Technology) and Xiaoguang Mao (National University of Defense Technology)

AFLTurbo: Speed up Path Discovery for Greybox Fuzzing (Research Paper)
Lei Sun (Ocean University of China), Xumei Li (Ocean University of China), Haipeng Qu (Ocean University of China) and Xiaoshuai Zhang (Queen Mary University of London)

SwissLog: Robust and Unified Deep Learning Based Log Anomaly Detection for Diverse Faults (Research Paper)
Xiaoyun Li (Sun Yat-sen University), Pengfei Chen (Sun Yat-sen University), Linxiao Jing (Sun Yat-sen University), Zilong He (Sun Yat-sen University) and Guangba Yu (Sun Yat-sen University)

Research Session 3: Failure Prediction, Detection, and Prevention (Tue Oct 13, 15:45-16:15 UTC, Session Chair: Fabrizio Pastore)

QoS-aware Metamorphic Testing: An Elevation Case Study (Practical Experience Report)
Jon Ayerdi (Mondragon Unibertsitatea), Sergio Segura (Universidad de Sevilla), Aitor Arrieta (Mondragon Unibertsitatea), Goiuria Sagardui (Mondragon Unibertsitatea) and Maite Arratibel (Orona)

Fault Injection to Generate Failure Data for Failure Prediction: A Case Study (Research Paper)
João Campos (University of Coimbra) and Ernesto Costa (University of Coimbra)

Modelling Machine Learning Components for Mapping and Scheduling of AUTOSAR Runnables (Research Paper)
Milan Copic (RWTH Aachen University), Rainer Leupers (RWTH Aachen University) and Gerd Ascheid (RWTH Aachen University)

Research Session 4: Reliability Analysis and Assurance (Tue Oct 13, 16:15-16:45 UTC, Session Chair: Leonardo Montecchi)

Connecting Software Reliability Growth Models to Software Defect Tracking (Research Paper)
Maskura Nafreen (UMass Dartmouth), Melanie Luperon (UMass Dartmouth), Lance Fiondella (UMass Dartmouth), Vidhyashree Nagaraju (UMass Dartmouth), Ying Shi (NASA Goddard Space Flight Center) and Thierry Wandji (Naval Air Systems Command)

Probabilistic Symbolic Analysis of Neural Networks (Research Paper)
Hayes Converse (University of Texas, Austin), Antonio Filieri (Imperial College London), Divya Gopinath (KBR Inc., NASA Ames), Corina Pasareanu (NASA Ames, Carnegie Mellon University and KBR Inc.)

Designing Neural Networks Using Logical Specs (Research Paper)
Shikhar Singh (University of Texas at Austin), Marko Vasic (University of Texas at Austin) and Sarfraz Khurshid (University of Texas at Austin)

Research Session 5: Faults and Failures Analysis (Wed Oct 14, 14:30-15:00 UTC, Session Chair: Karthik Pattabiraman)

An Exploratory Study of Bugs in Extended Reality Applications on the Web (Research Paper)
Shuqing Li (Southern University of Science and Technology), Yechang Wu (Southern University of Science and Technology), Yi Liu (Southern University of Science and Technology), Dinghua Wang (University of Technology Sydney), Ming Wen (Huazhong University of Science and Technology), Yida Tao (Shenzhen University), Yulei Sui (University of Technology Sydney) and Yepang Liu (Southern University of Science and Technology)

Deep Learning Based Valid Bug Reports Determination and Explanation (Research Paper)
Jianjun He (Chongqing University), Ling Xu (Chongqing University), Yuanrui Fan (Zhejiang University), Zhou Xu (Chongqing University), Meng Yan (Chongqing University) and Yan Lei (Chongqing University)

HINDbr: Heterogeneous Information Network Based Duplicate Bug Report Prediction (Research Paper)
Guanping Xiao (Nanjing University of Aeronautics and Astronautics), Xiaoting Du (Beihang University), Yulei Sui (University of Technology Sydney) and Tao Yue (Nanjing University of Aeronautics and Astronautics)

Research Session 6: Dependability Assessment (Wed Oct 14, 15:00-15:30 UTC, Session Chair: Helene Waeselynck)

A Reactive Batching Strategy of Apache Kafka for Reliable Stream Processing in Real-time (Research Paper)
Han Wu (Freie Universität Berlin), Zhihao Shang (Zhengzhou University), Guang Peng (Freie Universität Berlin) and Katinka Wolter (Freie Universität Berlin)

Dependability Evaluation of Middleware Technology for Large-scale Distributed Caching (Practical Experience Report)
Domenico Cotroneo (University of Naples Federico II), Roberto Natella (University of Naples Federico II) and Stefano Rosiello (University of Naples Federico II)

Identifying and Prioritizing Chaos Experiments by Using Established Risk Analysis Techniques (Practical Experience Report)
Dominik Kesim (University of Stuttgart), André van Hoorn (University of Stuttgart), Sebastian Frank (University of Stuttgart) and Matthias Häussler (Novatec Consulting GmbH)

Research Session 7: Android Security and Reliability (Thu Oct 15, 13:15-13:45 UTC, Session Chair: Jianwen Xiang)

Correlating UI Contexts with Sensitive API Calls: Dynamic Semantic Extraction and Analysis (Research Paper)
Jie Liu (University of New South Wale), Dongjie He (University of New South Wale), Diyu Wu (University of New South Wale) and Jingling Xue (University of New South Wale)

An Empirical Evaluation of GDPR Compliance Violations in Android mHealth Apps (Research Paper)
Ming Fan (Xi'an Jiaotong University), Le Yu (The HongKong Polytechnic University), Sen Chen (Nanyang Technological University, Tianjin University), Hao Zhou (The HongKong Polytechnic University), Xiapu Luo (The HongKong Polytechnic University), Shuyue Li (Xi'an Jiaotong University), Yang Liu (Nanyang Technological University), Jun Liu (Xi'an Jiaotong University) and Ting Liu (Xi'an Jiaotong University)

Exposing Android Event-Based Races by Selective Branch Instrumentation (Research Paper)
Diyu Wu (University of New South Wales), Dongjie He (University of New South Wales), Shiping Chen (CSIRO Data61) and Jingling Xue (University of New South Wales)

Research Session 8: Testing (Thu Oct 15, 13:45-14:15 UTC, Session Chair: Yulei Sui)

FSCS-SIMD: An efficient implementation of Fixed-Size-Candidate-Set adaptive random testing using SIMD instructions (Research Paper)
Muhammad Ashfaq (Jiangsu University), Rubing Huang (Jiangsu University) and Michael Omari (Jiangsu University)

Cost-Effective Testing of a Deep Learning Model through Input Reduction (Research Paper)
Jianyi Zhou (Peking University), Feng Li (Peking University), Jinhao Dong (Peking University), Hongyu Zhang (University of Newcastle) and Dan Hao (Peking University)

Investigating the Configurations of an Industrial Path Planner in Terms of Collision Avoidance (Practical Experience Report)
Xiao-Yi Zhang (National Institute of Informatics), Paolo Arcaini (National Institute of Informatics), Fuyuki Ishikawa (National Institute of Informatics) and Kun Liu (Peking University)

Research Session 9: Fault Prediction and Detection (Thu Oct 15, 14:30-15:00 UTC, Session Chair: Katerina Goseva-Popstojanova)

Detecting Implementation Bugs in Graph Convolutional Network based Node Classifiers (Research Paper)
Yiwei Wang (National University of Singapore), Wei Wang (National University of Singapore), Yujun Cai (Nanyang Technological University), Bryan Hooi (National University of Singapore) and Beng Chin Ooi (National University of Singapore)

Cross-Project Aging-Related Bug Prediction Based on Joint Distribution Adaptation and Improved Subclass Discriminant Analysis (Research Paper)
Bin Xu (Wuhan University of Technology), Dongdong Zhao (Wuhan University of Technology), Kai Jia (Wuhan University of Technology), Junwei Zhou (Wuhan University of Technology), Jing Tian (Wuhan University of Technology) and Jianwen Xiang (Wuhan University of Technology)

Locating the Clues of Declining Success Rate of Service Calls (Research Paper)
Guoping Rong (Nanjing University), Hao Wang (Nanjing University), Yong You (Meituan-Dianping Group), He Zhang (Nanjing University), Jialin Sun (Meituan-Dianping Group), Dong Shao (Nanjing University) and Yangchen Xu (Nanjing University)

Research Session 10: Quality Assessment and Assurance (Thu Oct 15, 15:00-15:30 UTC, Session Chair: Barbara Gallina)

An Empirical Study of Thresholds for Code Measures (Research Paper)
Luigi Lavazza (Università degli Studi dell'Insubria) and Sandro Morasca (Università degli Studi dell'Insubria)

On-board Diagnosis: A First Step from Detection to Prevention of Intrusions on Avionics Applications (Practical Experience Report)
Aliénor Damien (Thales AVS & LAAS-CNRS), Pierre-François Gimenez (LAAS-CNRS), Nathalie Feyt (Thales AVS), Vincent Nicomette (LAAS-CNRS, Université de Toulouse, INSA Toulouse), Mohamed Kaaniche (LAAS-CNRS), Eric Alata (LAAS-CNRS, Université de Toulouse, INSA Toulouse),

Evaluation of RESTful frameworks under soft errors (Practical Experience Report)
Frederico Cerveira (Universidade de Coimbra), Rui Oliveira (University of Lisbon), Raul Barbosa (Universidade de Coimbra) and Henrique Madeira (University of Coimbra)

Research Session 11: Failure/Fault Detection and Reproduction (Thu Oct 15, 15:45-16:15 UTC, Session Chair: Ganesh Pai)

SACC - A property driven approach to expose undesired behaviors among system's components (Research Paper)
Kaushik Madala (University of North Texas), Ke Ye Hang (University of North Texas), Hyunsook Do (University of North Texas) and Bastian Tenbergen (State University of New York at Oswego)

Fault Localization for Declarative Models in Alloy (Research Paper)
Kaiyuan Wang (Google Inc), Allison Sullivan (University of Texas at Arlington), Darko Marinov (University of Illinois at Urbana-Champaign) and Sarfraz Khurshid (University of Texas at Austin)

Understanding Reproducibility and Characteristics of Flaky Tests Through Test Reruns in Java Projects (Research Paper)
Wing Lam (University of Illinois at Urbana-Champaign), Stefan Winter (TU Darmstadt), Angello Astorga (University of Illinois at Urbana-Champaign), Victoria Stodden (University of Illinois at Urbana-Champaign) and Darko Marinov (University of Illinois at Urbana-Champaign)

Research Session 12: Fault Injection (Thu Oct 15, 16:15-16:45 UTC, Session Chair: Nuno Laranjeiro)

Model-Driven Fault Injection in Java Source Code (Research Paper)
Elder de Oliveira Rodrigues Jr. (University of Campinas), Leonardo Montecchi (University of Campinas) and Andrea Ceccarelli (University of Florence)

TensorFI: A Flexible Fault Injection Framework for TensorFlow Applications (Tools and Artifact)
Zitao Chen (The University of British Columbia), Niranjhana Narayanan (The University of British Columbia), Bo Fang (The University of British Columbia), Guanpeng Li (University of Illinois at Urbana-Champaign), Karthik Pattabiraman (The University of British Columbia) and Nathan DeBardeleben (Los Alamos National Laboratory)

Journal-First

Wednesday, October 14th, 16:15 - 16:45 UTC, J1C2: Journal-first Paper Presentations, Session Chair: Peter Popov

ISSRE continues to enrich the program of the conference, we are enriching the program with journal-first presentations. Journal-first papers report completely new contributions that have not been previously presented at any other conference or journal, and that do not extend any previous paper. The journal-first papers were selected among the ones recently published in the journal (2019 and mid-2020) and that intersect with the topics of interest of the ISSRE conference.

An Empirical Study of Regression Bug Chains in Linux *Guanping Xiao (Nanjing University of Aeronautics and Astronautics, China), Zheng Zheng (Beihang University, China), Bo Jiang (Beihang University, China), Yulei Sui (University of Technology Sydney, Australia)*

Dependability Assessment of the Android OS Through Fault Injection *Domenico Cotroneo (Università degli Studi di Napoli Federico II, Italy), Antonio Ken Iannillo (SnT, University of Luxembourg, Luxembourg), Roberto Natella (Università degli Studi di Napoli Federico II, Italy), Stefano Rosiello (Università degli Studi di Napoli Federico II, Italy)*

Optimal Test Activity Allocation for Covariate Software Reliability and Security Models *Vidhyashree Nagaraju (University of Tulsa, OK, USA), Chathuri Jayasinghe (University of Sri Jayewardenepura), Lance Fiondella (University of Massachusetts Dartmouth, MA, USA)*

Industry Papers

Best industry paper nominees (Wed Oct 14, 13:45-14:15 UTC, Session Chairs: Antonio Pecchia, Valerio Formicola, and Nuno Silva)

K-Detector: Identifying Duplicate Crash Failures in Large-Scale Software Delivery.
Hao Yang, Yang Xu, Yong Li and Hyun-Deok Choi

BP-IDS: Using business process specification to leverage intrusion detection in critical infrastructures.
João Lima, Filipe Apolinário, Nelson Escravana and Carlos Ribeiro

ADF2T: an Active Disk Failure Forecasting and Tolerance Software.
Hongzhang Yang, Yahui Yang, Zhengguang Chen, Zongzhao Li, and Yaofeng Tu

Modeling dependable systems (Tue Oct 13, 15:45-16:15 UTC, Session Chair: Valerio Formicola)

When Failure is (Not) an Option: Reliability Models for Microservices Architectures.
Lalita J. Jagadeesan and Veena B. Mendiratta

CRESCO Framework and Checker: Automatic Generation of Reflective UML State Machine's C++ Code and Checker.
Miren Illarramendi, Leire Etxeberria, Goiuria Sagardui and Felix Larrinaga

Applying Modular Decomposition in Simulink.
Monika Jaskolka, Stephen Scott, Vera Pantelic, Alan Wassyng and Mark Lawford

Data-driven improvement of software practices (Tue Oct 13, 16:15-16:45 UTC, Session Chair: Valerio Formicola)

Multi-label Classification of Commit Messages using Transfer Learning.
Muhammad Usman Sarwar, Sarim Zafar, Mohamed Wiem Mkaouer, Gursimran Singh Walia and Muhammad Zubair Malik

Using Semantic Analysis and Graph Mining Approaches to Support Software Fault Fixation.
Maninder Singh and Gursimran Singh Walia

A Human Error Based Approach to Understanding Programmer-Induced Software Vulnerabilities.
Vaibhav Anu, Kazi Zakia Sultana and Bharath Kumar Samanthula

Safety critical systems (Wed Oct 14, 14:30-15:00 UTC, Session Chair: Antonio Pecchia)

Independent Verification and Validation for the Space Industry: Guide Evolution Experience.
Nuno Silva, Xavier Ferreira, Jesper Troelsen, Tomasz Kacmajor and Andrei-Mihai Buzgan

A Process to Support Safety Analysis for a System-of-Systems.
Stephan Baumgart, Joakim Fröberg and Sasikumar Punnekkat

Time-Series-Based Clustering for Failure Analysis in Hardware-in-the-Loop Setups: An Automotive Case Study.
Claudius V. Jordan, Florian Hauer, Philipp Foth and Alexander Pretschner

Assured hardware and embedded systems (Wed Oct 14, 15:00-15:30 UTC, Session Chair: Antonio Pecchia)

Instrumenting Compiler Pipeline to Synthesise Traceable Runtime Memory Layouts for Mixed-critical Applications.
Nermin Kajtazovič, Peter Hödl, and Georg Macher

Static and Verifiable Memory Partitioning for Safety-Critical Systems.
Jean Guyomarc'h and Jean-Baptiste Hervé

Systematic Software Testing of Critical Embedded Digital Devices in Nuclear Power Applications.
Athira Varma Jayakumar, Smitha Gautham, Richard Kuhn, Brandon Simons, Aidan Collins, Thomas Dirsch, Raghu Kacker and Carl Elks

Defects and vulnerabilities (Thu Oct 15, 13:15-13:45 UTC, Session Chair: Nuno Silva)

RSX: Reproduction Scenario Extraction Technique for Business Application Workloads in DBMS.
Seunghwan Baek, Jisoo Song and Changyun Seo

ConstBin: A Tool for Automatic Fixing of Unreproducible Builds.
Hongjun He, Jicheng Cao, Lesheng Du, Hao Li, Shilong Wang and Shengyu Cheng

An improved fuzzing approach based on adaptive random testing
Jinfu Chen, Jingyi Chen, Dong Guo, and Dave Towey

Cloud and networking (Thu Oct 15, 13:45-14:15 UTC, Session Chair: Nuno Silva)

Challenges Faced with Application Performance Monitoring (APM) when Migrating to the Cloud.
Vidroha Debroy, Alireza Mansoori, James Haleblian and Mark Wilkens

Migrating Large Deep Learning Models to Serverless Architecture.
Dheeraj Chahal, Ravi Ojha, Manju Ramesh and Rekha Singhal

eAPT: enhancing APT with a mirror site resolver
Gilhee Lee, Taegeun Moon, Min Jang and Hyoungshick Kim

Doctoral Symposium

The Doctoral Symposium will provide advice and guidance to doctoral students, in a friendly and international atmosphere. The first two sessions are open to any students attending ISSRE 2020. All may benefit from the keynotes, and take the opportunity to freely interact with the keynote speakers and a panel of experts. The students may seek advice on various aspects of completing a PhD and ask the questions they never dared to ask. The last session is for the DS authors only, who submitted a paper describing their dissertation research. They will receive personalized feedback from the DS panel of experts.

Session 1 (Mon Oct 12, 13:00-14:15 UTC)

Introduction by Chairs
Carol Smidts, The Ohio State University, USA
Hélène Waeselynck, LAAS-CNRS, France

Keynote: PhD, the University and Everything
Holger Schlingloff, Fraunhofer Institute for Open Communication Systems (FOKUS), Germany

Abstract: *Have you ever wondered about the ultimate questions – what is the meaning of a PhD, why are we here at the university, and when will everything be completed? In this talk, I will reflect on some of the common problems of thesis writing. From a non-representative survey, I will describe different viewpoints onto the process, namely from the student, supervisor, and reviewer perspective. I will highlight some of the Do's and Don'ts in dealing with administration and support, and present my personal recipe for writing a computer science thesis. Finally, I will give some recommendations on "life after PhD"*

Free interaction with the Keynote Speaker and Panel of Experts

Session 2 (Mon Oct 12, 14:30-15:30 UTC)

Keynote: How to Get Your Paper Rejected
Jeff Offutt, George Mason University, USA

Abstract: *My papers have been rejected nearly a thousand times (including by ISSRE 2020). In fact, being rejected is one of my best skills! I am confident that I lead the field of software testing in the number of rejections. In this talk, I try to pass on my knowledge and skills to a*

younger generation, so that you, too, can aspire to accumulate large piles of rejection messages.

Free interaction with the Keynote Speaker and Panel of Experts

Session 3 (Mon Oct 12, 15:45-16:45 UTC)

Techniques and Tools for Advanced Software Vulnerability Detection
Jose D'Abruzzo Pereira

Reliability Evaluation of ML systems, the oracle problem
Antonio Guerriero

Improving the Security of Microservice Systems by Detecting and Tolerating Intrusions
Jose Flora

Towards safety monitoring of ML-based perception tasks of autonomous systems
Raul Sena Ferreira

A fault localization and debugging support framework driven by bug tracking data
Thomas Hirsch

Engineering Resilience: Predicting The Change Impact on Performance and Availability of Reconfigurable Systems
Alireza Hakamian

Panel of experts

Nuno Antunes, University of Coimbra, Portugal
Domenico Cotroneo, Federico II University of Naples, Italy
Karama Kanoun, LAAS-CNRS, France
Nuno Laranjeiro, University of Coimbra, Portugal
Marco Vieira, University of Coimbra, Portugal
Mladen Vouk, North Carolina State University, USA

New Faculty Symposium

Introduction (Mon Oct 12, 13:00-13:15 UTC)

Roberto Natella (Federico II Univ.), Karthik Pattabiraman (Univ. British Columbia)

Session 1: Academia, Industry, and Society (Mon Oct 12, 13:15-14:15 UTC)

Jakub Boratyński (EU Commission)

"Key Societal Challenges and Priorities on Cybersecurity in EU"

Laurie Williams (North Carolina State Univ.)

"Defining Your Research North Star: Productively Conducting Research with Impact to Industry and Society"

Session 2: Building and Sustaining Your Academic Career (Mon Oct 12, 14:30-15:30 UTC)

Michael Lyu (CUHK)

"Your Academic Journey: Dungeon or Ivory Tower?"

Lionel Briand (U. of Ottawa and U. of Luxembourg)

"Not losing Sight of the Essential: Enjoying your Career in Research"

Session 3: Bootstrapping an Academic Career (Mon Oct 12, 15:45-16:45 UTC)

Cristina Nita-Rotaru (Northeastern University)

"From Student to PI: Becoming an Independent Researcher"

Vijay Chidambaram (The University of Texas at Austin)

"How to setup and run a systems research lab"

Fast Panel and Abstracts

Session 1: The emergence of machine learning in software reliability engineering (Tue Oct 13, 14:30-15:00 UTC)

Invited Experts
Ana Estela Antunes da Silva (UNICAMP - BR)
Nuno Lourenço (UC - PT)

Using Metamorphic Testing to Evaluate DNN Coverage Criteria
Jinyi Zhou, Kun Qiu, Zheng Zheng, Tsong Yueh Chen and Pak-Lok Poon

SIDE: Security-aware Integrated Development Environment
Naghmeh Ivaki and Nuno Antunes

Applying Machine Learning with Chaos Engineering
Juan Hernández-Serrato, Alejandro Velasco, Yury Niño and Mario Linares-Vásquez

Multi-Language Web Vulnerability Detection
Alexandra Figueiredo, Tatjana Lide and Miguel Correia

Session 2: The future of automated software reliability engineering (Tue Oct 13, 15:00-15:30 UTC)

Invited Experts
Shinji Inoue (Kansai University - JP)
Damiano Torre (University of Luxembourg - LU)

Modelling CI/CD Pipeline Through Agent-Based Simulation
Qianying Liao

Automated Tool for Revising Masking MC/DC Test Suite
Zhenxiang Chen, Hironori Washizaki and Yoshiaki Fukazawa

Test-First for Abstracted Behavior of Software Using Extended Finite State Machine
Tomohiko Takagi and Koichiro Sakata

Model-based Quantitative Fault Tree Analysis based on FIDES Reliability Prediction
Nataliya Yakymets and Adedjouma Morayo

Session 3: New approaches for system assurance (Wed Oct 14, 15:45-16:15 UTC)

Invited Experts
Raul Barbosa (UC - PT)
Tania Basso (UNICAMP - BR)

Unit Lemmas for Detecting Requirement and Specification Flaws
Ashlie B. Hocking, Jonathan C. Rowanhill and Ben L. Di Vito

TDABD: Test-Driven-Assurance-Based Development
Jonathan Rowanhill, Benjamin Hocking and William Hawkins

Should we "safely" handle the uncertainties at runtime? - A rather seldom asked question
Nishanth Laxman and Peter Liggesmeyer

Similarity Calculation of Executable Using Intel Pin Instrumentation Framework
Madhuparna Bhowmik, Madhumitha Nara and Biju R. Mohan

Tutorials

Continuous Dependability Assessment and Improvement in DevOps (Tue Oct 13, 14:30-15:30; 15:45-16:45 UTC)
Alberto Avritzer, Barbara Russo

Approaches and Techniques for Postprocessing of Static Analysis Alarms (Wed Oct 14, 14:30-15:30; 15:45-16:45 UTC)
Tukaram Muske

Robustness Testing of Complex Software Systems to Improve Operational Reliability (Thu Oct 15, 14:30-15:30; 15:45-16:45 UTC)
Vincent Sinclair, Abhaya Asthana

The Analysis of Typed Functional Languages (Thu Oct 15, 13:15-14:15; 14:30-15:30; 15:45-16:45 UTC)
Jurriaan Hage

GAUSS 2020 Workshop

Opening (Mon Oct 12, 13:00-13:10 UTC)

Keynote 1 (Mon Oct 12, 13:10-13:45 UTC, Session Chair: Francesco Poggi)

Testing and Debugging Autonomous Driving: Experiences with Path Planner and Future Challenges
Fuyuki Ishikawa

Session 1: Architecture (Mon Oct 12, 13:45-14:15 UTC, Session Chair: Daniela Briola)

Domain Metric Driven Decomposition of Data-Intensive Applications
Matteo Camilli, Carmine Colarusso, Barbara Russo, and Eugenio Zimeo

Towards the synthesis of context-aware choreographies
Gianluca Filippone, Marco Autili, and Massimo Tivoli

Keynote 2 (Mon Oct 12, 14:30-15:05 UTC, Session Chair: Francesco Gallo)

Stopping the Barbarians at the Gate: Protecting IoT Devices from Security Attacks
Karthik Pattabiraman

Session 2: Validation (Mon Oct 12, 15:05-15:30 UTC, Session Chair: Pietro Braione)

Towards Anomaly Detectors that Learn Continuously
Andrea Stocco and Paolo Tonella

Standing on the Shoulders of Software Product Line Research for Testing Systems of Systems
Antonia Bertolino, Francesca Lonetti, and Vânia de Oliveira Neves

Session 3: Management and Evolution (Mon Oct 12, 15:45-16:30 UTC, Session Chair: Giovanni Quattrocchi)

Declarative Dashboard Generation
Alessandro Tundo, Leonardo Mariani, Marco Mobilio, Oliviero Riganelli, and Chiara Castelnovo

Towards Declarative Decentralised Application Management in the Fog
Antonio Brogi, Stefano Forti, Carlos Guerrero, and Isaac Lera

A Reconfiguration Approach for Open Adaptive Systems-of-Systems
Björn Wudka, Carsten Thomas, Lennart Siefke, and Volker Sommer

Closing (Mon Oct 12, 16:30-16:45 UTC)

RSDA 2020 Workshop

Session 1: Security and Privacy (Mon Oct 12, 13:00-14:15 UTC, Session Chair: Raffaele Della Corte)

Vulnerability Analysis as Trustworthiness Evidence in Security Benchmarking: A Case Study on Xen
Charles Gonçalve and Nuno Antunes

Evaluating the Accuracy of Password Strength Meters using Off-The-Shelf Guessing Attacks
David Pereira, Joao F. Ferreira and Alexandra Mendes

EARNEST: A challenge-based intrusion prevention system for CAN messages
Gianpiero Costantino, Ilaria Matteucci and Domenico Morales

Session 2: Deep Learning and Dependability Evaluation (Mon Oct 12, 14:30-15:30 UTC, Session Chair: Marta Catillo)

Considering Reliability of Deep Learning Function to Boost Data Suitability and Anomaly Detection
Lydia Gauerhof, Yuki Hagiwara, Christoph Schorn and Mario Trapp

Evaluating Deep Learning Classification Reliability in Android Malware Family Detection
Francesco Mercaldo, Fabio Martinelli, Giacomo Iadarola and Antonella Santone

A flexible simulation-based framework for model-based/data-driven dependability evaluation
Carlo Abate, Lelio Campanile and Stefano Marrone

Session 3: Keynote and Closing (Mon Oct 12, 15:45-16:45 UTC, Session Chair: Raffaele Della Corte)

Keynote Talk: Dependability Meets Data Analytics
Saurabh Bagchi

Closing Remarks
Raffaele Della Corte, Christopher Gutierrez, Jin Hong and Marta Catillo

SHIFT 2020 and IWSF 2020 Workshops

Session 0 (Mon Oct 12, 12:55-13:00 UTC)

Quick welcome!

Session 1 (Mon Oct 12, 13:00-13:30 UTC)

Invited Keynote: Fuzzing C++ class interfaces for generating and running tests with libFuzzer
Assoc. Prof. Dr. Zoltán Porkoláb, Eötvös Loránd University (ELTE), Budapest, Hungary & Ericsson Hungary Ltd.

Session 2 (Mon Oct 12, 13:30-14:00 UTC)

Root cause prediction based on bug reports
Thomas Hirsch and Birgit Hofer

Break (Mon Oct 12, 14:00-14:15 UTC)

Welcome, and Introduction to SHIFT and IWSF Workshop
Chairs and all workshop participators

Session 3 (Mon Oct 12, 14:15-14:45 UTC)

Multi-Level Execution Trace Based Lock Contention Analysis
Majid Rezazadeh, Naser Ezzati Jivan, Evan Galea, and Michel Dagenais

Session 4 (Mon Oct 12, 14:45-15:15 UTC)

Troubleshooting in systems and in distributed systems: Tools and challenges
Dr. Simone Ferlin, Ericsson

Break (Mon Oct 12, 15:15-15:30 UTC)

Session 5 (Mon Oct 12, 15:30-16:00 UTC)

AHPCap: A Framework for Automated Hardware Profiling and Capture of Mobile Application States
Rodger Byrd and Kristen Walcott

Session 6 (Mon Oct 12, 16:00-16:45 UTC)

Invited Keynote: Finding Bugs, Fixing Bugs, Preventing Bugs — Exploiting Automated Tests to Increase Reliability
Prof. Serge Demeyer, University of Antwerpen

Closing Discussion – All participators in workshop

WoSAR 2020 Workshop

Opening - WoSAR 2020 Organizing Committee (Mon Oct 12, 13:00-13:15 UTC)

Domenico Cotroneo - GC, Alberto Avritzer and Xiaoyuan Xie -PC

Session 1: Software Aging Fault-Models (Mon Oct 12, 13:15-14:00 UTC, Session Chair: Domenico Cotroneo)

Keynote Talk: Facing the complexity of detecting software aging effects
Rivalino Matias

Session 2: Fundamentals, Methods, Applications and Future Research - Extended Abstracts of selected chapters of the Handbook of Software Aging and Rejuvenation (Mon Oct 12, 14:00-15:00 UTC, Session Chair: Alberto Avritzer)

Keynote Talk: Fundamentals: Chapter 1: Software Aging and Rejuvenation: A Genesis
Kishor Trivedi

Fundamentals: Chapter 3: Software Rejuvenation: Key Concepts and Granularity
Vasilis Koutras and Agapios Platis

Data-Driven Approach: Chapter 4: Measurements-based aging analysis
Roberto Pietrantuono, Javier Alonso, and Kalyan Vaidyanathan

Model-Driven Approach: Chapter 5: Markov chains and Petri nets for software rejuvenation systems
Fumio Machida and Paulo R. M. Maciel

Applications: Chapter 8: Software Aging Monitoring and Rejuvenation for the Assessment of High-Availability Systems
Alberto Avritzer, Michael Grottke, and Daniel Sadoc Menasché

Applications: Chapter 11: Experimental Tools for Software Aging Analysis
Roberto Natella and Artur Andrzejak

Session 3: Aging and Rejuvenation Research Papers Q/A (Mon Oct 12, 15:00-15:30 UTC, Session Chair: Daniel Sadoc Menasche)

Detecting Struct Member-Related Memory Leaks Using Error Code Analysis in Linux Kernel
Keita Suzuki, Takafumi Kubota, and Kenji Kono

How robust is the optimal software rejuvenation timing?
Junjun Zheng, Hiroyuki Okamura, and Tadashi Dohi

Software Aging in Image Classification Systems on Cloud and Edge
Ermeson Andrade, Fumio Machida, Roberto Pietrantuono and Domenico Cotroneo

Session 4: Closing (Mon Oct 12, 15:30-16:00 UTC)

Wrap (feedback, discuss plans for next year)

Online WoSAR Social Banquet - All Invited

WoSoCer 2020 Workshop

Opening (Mon Oct 12, 13:00-13:10 UTC)

Session 1: Keynote (Mon Oct 12, 13:10-13:55 UTC, Session Chair: Luigi De Simone)

Keynote Talk: How do Ordinary Coding Errors Contribute to Security Vulnerabilities?
D. Richard Kuhn, National Institute of Standards & Technology, Computer Security Division, Gaithersburg, Maryland, US

Session 2: Reconfigurable Systems (Mon Oct 12, 13:55-14:15 UTC, Session Chair: Johnny Marques)

Resilience, Survivability, and Elasticity: A Taxonomy for Change Impact Quantification of Reconfigurable Systems
Alireza Hakamian, Floriment Klinaku, André van Hoorn, and Steffen Becker

Session 3: Machine Learning and Certification Evidence (Mon Oct 12, 14:30-15:30 UTC, Session Chair: Fuqun Huang)

Ensuring Dataset Quality for Machine Learning Certification
Eric Jenn, Sylvaine Picard, Camille Chapdelaine, Baptiste Lefèvre, Thomas Soumarmon, Cyril Cappi, and Laurent Gardes

New Wine in an Old Bottle: N-Version Programming for Machine Learning Components
Arpan Gujarati, Sathish Gopalakrishnan, and Karthik Pattabiraman

Towards Automated Evidence Generation for Rapid and Continuous Software Certification
Joanna Cecilia Da Silva Santos, Ali Shokri, and Mehdi Mirakhorli

Session 4: Test and Safety Cases (Mon Oct 12, 15:45-16:45 UTC, Session Chair: Andrea Ceccarelli)

Checkable Safety Cases: Enabling Automated Consistency Checks between Safety Work Products
Carmen Carlan, Daniel Petrișor, Barbara Gallina, and Hannes Schoenhaar

Safety-Critical Software - Quantification of Test Results
Johan Sundell, Kristina Lundqvist, and Håkan Forsberg

Generating test cases to evaluate and improve processes of safety-critical systems development
Lilian Barros, Celso Hirata, Johnny Marques, and Ana Maria Ambrosio