

# **2020 46th Euromicro Conference on Software Engineering and Advanced Applications (SEAA 2020)**

**Kranj, Slovenia  
26 – 28 August 2020**



**IEEE Catalog Number: CFP2092A-POD  
ISBN: 978-1-7281-9533-9**

**Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. 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:	CFP2092A-POD
ISBN (Print-On-Demand):	978-1-7281-9533-9
ISBN (Online):	978-1-7281-9532-2

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# 2020 46th Euromicro Conference on Software Engineering and Advanced Applications (SEAA) **SEAA 2020**

## Table of Contents

Message from the General Chair .xvi.....	
Message from the Program Chairs .xviii.....	
SEAA 2020 Committees .xx.....	
SEAA 2020 Program Committee .xxi.....	
Keynotes .xxx.....	
Additional Reviewers .xxxii.....	
Sponsors and Organizers .xxxiii.....	

## AI4DevOps: AI-Enabled Software Development and Operations

A Lightweight Customized Build Chain Visualization Approach Applied in Industry .1.....	
<i>Claus Klammer (Software Competence Center Hagenberg GmbH) and Johannes Gmeiner (Software Competence Center Hagenberg GmbH)</i>	
Breaking the Vicious Circle: Why AI for Software Analytics and Business Intelligence does not Take off in Practice .5.....	
<i>Iris Figalist (Siemens Corporate Technology), Christoph Elsner (Siemens Corporate Technology), Jan Bosch (Chalmers University of Technology), and Helena Holmström Olsson (Malmö University)</i>	
Modelling Data Pipelines .13.....	
<i>Aiswarya Raj Munappy (Chalmers University of Technology, Sweden), Jan Bosch (Chalmers University of Technology, Sweden), Helena Holmström Olsson (Malmö University, Sweden), and Tian J. Wang (Ericsson, Sweden)</i>	
AI on the Edge: Architectural Alternatives .21.....	
<i>Meenu Mary John (Malmö University, Sweden), Helena Holmström Olsson (Malmö University, Sweden), and Jan Bosch (Chalmers University of Technology, Sweden)</i>	
Software Logs for Machine Learning in a DevOps Environment .29.....	
<i>Nathan Bosch (Ericsson AB, Sweden) and Jan Bosch (Chalmers University of Technology, Sweden)</i>	

# SPPI: Software Process and Product Improvement

An Operational Constraint Language to Evaluate Feature-Dependent Non-functional Requirements .34.....	34
<i>Philipp Haindl (Johannes Kepler University, Linz, Austria), Reinhold Plösch (Johannes Kepler University, Linz, Austria), and Christian Körner (Siemens AG, Munich, Germany)</i>	
PACE: A DSL-Based Approach to Manage Complex Build Pipelines .43.....	43
<i>Nelson Fonseca (Universidade da Beira Interior &amp; OutSystems), João Paulo Fernandes (CISUC - Universidade de Coimbra), Mario Pires (OutSystems), and Simão Melo de Sousa (Nova-Lincs, C4 - Universidade da Beira Interior)</i>	
Comparison of Agile Maturity Models: Reflecting the Real Needs .51.....	51
<i>Doruk Tuncel (Siemens AG, Germany), Reinhold Plösch (Johannes Kepler University Linz, Austria), and Christian Körner (Siemens AG, Germany)</i>	
Investigating Trade-Offs between Portability, Performance and Maintainability in Exascale Systems .59.....	59
<i>Elvira-Maria Arvanitou (University of Macedonia, Greece), Apostolos Ampatzoglou (University of Macedonia, Greece), Nikolaos Nikolaidis (University of Macedonia, Greece), Aggeliki-Agathi Tzintzira (University of Macedonia, Greece), Areti Ampatzoglou (University of Macedonia, Greece), and Alexander Chatzigeorgiou (University of Macedonia, Greece)</i>	
A Data-Driven Approach to Measure the Usability of Web APIs .64.....	64
<i>Rediana Koçi (Polytechnic University of Catalonia, Spain), Xavier Franch (Polytechnic University of Catalonia, Spain), Petar Jovanovic (Polytechnic University of Catalonia, Spain), and Alberto Abelló (Polytechnic University of Catalonia, Spain)</i>	
What do Developers Talk about Open Source Software Licensing? .72.....	72
<i>Georgia M. Kapitsaki (University of Cyprus, Cyprus), Maria Papoutsoglou (Aristotle University of Thessaloniki, Greece), Daniel M. German (University of Victoria, Canada), and Lefteris Angelis (Aristotle University of Thessaloniki, Greece)</i>	
A Comparative Study of Vectorization-Based Static Test Case Prioritization Methods .80.....	80
<i>Hirohisa Aman (Ehime University), Sousuke Amasaki (Okayama Prefectural University), Tomoyuki Yokogawa (Okayama Prefectural University), and Minoru Kawahara (Ehime University)</i>	
SPEM-Based Process Anti-Pattern Models for Detection in Project Data .89.....	89
<i>Lenka Simeckova (University of West Bohemia), Premek Brada (University of West Bohemia), and Petr Picha (University of West Bohemia)</i>	
How Agile Software Development Practitioners Perceive the Need for Documenting Quality Requirements: A Multiple Case Study .93.....	93
<i>Woubshet Behutiye (University of Oulu, Finland), Pilar Rodríguez (Universidad Politécnica de Madrid, Spain), Markku Oivo (University of Oulu, Finland), Sanja Aaramaa (Nokia, Finland), Jari Partanen (Bittium Wireless Ltd., Finland), and Antonin Abherové (Softteam, France)</i>	

Automotive A/B Testing: Challenges and Lessons Learned from Practice .101.....	
	<i>David Issa Mattos (Chalmers University of Technology, Sweden), Jan Bosch (Chalmers University of Technology, Sweden), Helena Holmström Olsson (Malmö University, Sweden), Aita Maryam Korshani (Volvo Cars, Sweden), and Jonn Lantz (Volvo Cars, Sweden)</i>
The Five Purposes of Value Modeling .110.....	
	<i>Helena H. Olsson (Malmö University) and Jan Bosch (Chalmers University of Technology)</i>
Privacy in Software Ecosystems - An Initial Analysis of Data Protection Roles and Challenges .120.....	
	<i>George Valença (Universidade Federal Rural de Pernambuco), Ralf Kneuper (IUBH Internationale Hochschule), and Maria Eduarda Rebelo (Universidade Federal Rural de Pernambuco)</i>
Productivity, Turnover, and Team Stability of Agile Teams in Open-Source Software Projects.124..	
	<i>Ezequiel Scott (University of Tartu, Estonia), Khaled Nimr Charkie (University of Tartu, Estonia), and Dietmar Pfahl (University of Tartu, Estonia)</i>
Towards Lean R&D: An Agile Research and Development Approach for Digital Transformation .132	
	<i>Marcos Kalinowski (Pontifical Catholic University of Rio de Janeiro (PUC-Rio)), Solon Tarso Batista (Pontifical Catholic University of Rio de Janeiro (PUC-Rio)), Helio Lopes (Pontifical Catholic University of Rio de Janeiro (PUC-Rio)), Simone Diniz Junqueira Barbosa (Pontifical Catholic University of Rio de Janeiro (PUC-Rio)), Marcus Poggi (Pontifical Catholic University of Rio de Janeiro (PUC-Rio)), Thuener Silva (Pontifical Catholic University of Rio de Janeiro (PUC-Rio)), Hugo Villamizar (Pontifical Catholic University of Rio de Janeiro (PUC-Rio)), Jacques Chueke (Pontifical Catholic University of Rio de Janeiro (PUC-Rio)), Bianca Teixeira (Pontifical Catholic University of Rio de Janeiro (PUC-Rio)), Juliana Alves Pereira (Pontifical Catholic University of Rio de Janeiro (PUC-Rio)), Bruna Ferreira (Pontifical Catholic University of Rio de Janeiro (PUC-Rio)), Rodrigo Lima (Pontifical Catholic University of Rio de Janeiro (PUC-Rio)), Gabriel da Silva Cardoso (Petrobras), Alex Furtado Teixeira (Petrobras), Jorge Alam Warrak (Petrobras), Marinho Fischer (Petrobras), André Kuramoto (Petrobras), Bruno Itagyba (Petrobras), Cristiane Salgado (Petrobras), Carlos Pelizaro (Petrobras), Deborah Lemes (Petrobras), Marcelo Silva da Costa (Petrobras), Marcus Waltemberg (Petrobras), and Odnei Lopes (Petrobras)</i>
Evaluation of the HAVOSS Software Process Maturity Model .137.....	
	<i>Martin Höst (Lund University) and Martin Hell (Lund University)</i>

## **MDEML: Model-Driven Engineering and Modeling Languages**

Visualizing Multi-dimensional State Spaces Using Selective Abstraction .141.....	
	<i>Christian Burghard (AVL List GmbH, Austria) and Luca Berardinelli (Johannes Kepler University, Linz, Austria)</i>

Positioning-Based Domain-Specific Modelling through Mobile Devices .150.....	
	<i>Alberto Sebastián-Lombraña (Universidad Autónoma de Madrid, Spain), Esther Guerra (Universidad Autónoma de Madrid, Spain), and Juan de Lara (Universidad Autónoma de Madrid, Spain)</i>
Service API Modeling and Comparison: A Technology-Independent Approach .158.....	
	<i>Zdenek Vales (University of West Bohemia, Czech Republic) and Premek Brada (University of West Bohemia, Czech Republic)</i>
A Domain-Specific Language and Interactive User Interface for Model-Driven Engineering of Technology Roadmaps .162.....	
	<i>Alexander Breckel (Ulm University, Germany), Jakob Pietron (Ulm University, Germany), Katharina Juhnke (Ulm University, Germany), and Matthias Tichy (Ulm University, Germany)</i>
Supporting the Understanding and Comparison of Low-Code Development Platforms .171.....	
	<i>Apurovanand Sahay (University of L'Aquila, Italy), Arsene Indamutsa (University of L'Aquila, Italy), Davide Di Ruscio (University of L'Aquila, Italy), and Alfonso Pierantonio (University of L'Aquila, Italy)</i>
Variability Model Transformations: Towards Unifying Variability Modeling .179.....	
	<i>Kevin Feichtinger (Johannes Kepler University Linz, Austria) and Rick Rabiser (Johannes Kepler University Linz, Austria)</i>

## Journal First

Refining Statecharts While Preserving the Structure and Behavior .183.....	
	<i>Eugene Syriani (University of Montreal), Vasco Sousa (University of Montreal), and Levi Lúcio (Airbus Defense and Space GmbH)</i>
Automated Code-Based Test Selection for Software Product Line Regression Testing .184.....	
	<i>Jung Pilsu (KAIST), Kang Sungwon (KAIST), and Lee Jihyun (Jeonbuk National University)</i>
The Effects of Database Complexity on SQL Query Formulation (journal-First) .185.....	
	<i>Toni Taipalus (University of Jyväskylä, Finland)</i>

## DAIDE: Data and AI Driven Engineering

Continuous Experiment Definition Characteristics .186.....	
	<i>Florian Auer (University of Innsbruck), Chhong Shing Lee (University of Innsbruck), and Michael Felderer (University of Innsbruck)</i>
Improving Data Quality for Regression Test Selection by Reducing Annotation Noise .191.....	
	<i>Khaled Walid Al-Sabbagh (University of Gothenburg), Miroslaw Staron (University of Gothenburg), Regina Hebig (University of Gothenburg), and Wilhelm Meding (Ericsson AB)</i>
Eccola - a Method for Implementing Ethically Aligned AI Systems .195.....	
	<i>Ville Vakkuri (University of Jyväskylä, Finland), Kai-Kristian Kemell (University of Jyväskylä, Finland), and Pekka Abrahamsson (University of Jyväskylä, Finland)</i>

Challenges and Opportunities in Open Data Collaboration - A Focus Group Study .205.....	
	<i>Runeson Per (Lund University) and Thomas Olsson (RISE Research Institutes of Sweden, Sweden)</i>

## **CNADO: Cloud Native And DevOps**

From a Monolithic Big Data System to a Microservices Event-Driven Architecture .213.....	
	<i>Rodrigo Laigner (University of Copenhagen), Marcos Kalinowski (PUC-Rio), Pedro Diniz (PUC-Rio), Leonardo Barros (Tecgraf/PUC-Rio), Carlos Cassino (Tecgraf/PUC-Rio), Melissa Lemos (Tecgraf/PUC-Rio), Darlan Arruda (Western University), Sérgio Lifschitz (PUC-Rio), and Yongluan Zhou (University of Copenhagen)</i>
An Empirical Taxonomy of DevOps in Practice .221.....	
	<i>Ruth W. Macarthy (University of Salford, UK) and Julian M. Bass (University of Salford, UK)</i>
Deriving Microservice Code from Underspecified Domain Models Using DevOps-Enabled Modeling Languages and Model Transformations .229.....	
	<i>Florian Rademacher (University of Applied Sciences and Arts Dortmund, Germany), Sabine Sachweh (University of Applied Sciences and Arts Dortmund, Germany), and Albert Zündorf (University of Kassel, Germany)</i>
Gradual Deployment in Practice: Experiences from an Industrial Case Study .237.....	
	<i>Eveliina Pakarinen (Cinia, Ltd., Finland), Tommi Harakkamäki (Cinia, Ltd., Finland), and Tommi Mikkonen (University of Helsinki, Finland)</i>
Cost Efficiency Under Mixed Serverless and Serverful Deployments .242.....	
	<i>Anja Reuter (University of Groningen, The Netherlands), Timon Back (University of Groningen, The Netherlands), and Vasilios Andrikopoulos (University of Groningen, The Netherlands)</i>

## **SM: Software management: Measurement, Peopleware and Innovation**

Big-Data/Analytics Projects Failure: A Literature Review .246.....	
	<i>Gianna Reggio (Dibris - University of Genoa, Italy) and Egidio Astesiano (Dibris - University of Genoa, Italy)</i>
The Character of Software Startup Hubs in an Emerging Ecosystem .256.....	
	<i>Grace Kamulegeya (Makerere University Kampala, Uganda), Raymond Mugwanya (Makerere University Kampala, Uganda), and Regina Hebig (Chalmers J University of Gothenburg Gothenburg, Sweden)</i>
Software Features Prioritization Based on Stakeholders' Satisfaction/Dissatisfaction and Hesitation .265.....	
	<i>Vassilis Gerogiannis (University of Thessaly), Eftychia Tsoni (Hellenic Open University), Christian Born (Heinrich-Heine-University), and Omiros Iatrellis (University of Thessaly)</i>
Lessons Learned on Research Co-Creation: Making Industry-Academia Collaboration Work .272...	
	<i>Dusica Marijan (Simula Research Laboratory) and Arnaud Gotlieb (Simula Research Laboratory)</i>

Researcher Bias in Software Engineering Experiments: A Qualitative Investigation .276.....	
	<i>Simone Romano (University of Bari), Davide Fucci (Blekinge Institute of Technology), Giuseppe Scanniello (University of Basilicata), Maria Teresa Baldassarre (University of Bari), Burak Turhan (Monash University and University of Oulu), and Natalia Juristo (Universidad Politécnica de Madrid)</i>
Product Roadmap Formats for an Uncertain Future: A Grey Literature Review .284.....	
	<i>Jürgen Münch (Reutlingen University), Stefan Trieflinger (Reutlingen University), Emre Bogazköy (Reutlingen University), Patrick Eißler (Reutlingen University), Bastian Roling (Viasstore Software GmbH), and Jan Schneider (Reutlingen University)</i>
Licensing in Artificial Intelligence Competitions and Consortium Project Collaborations .292.....	
	<i>Yuliyán V. Maksimov (Blekinge Institute of Technology, Sweden) and Samuel A. Fricker (FHNW University of Applied Sciences and Arts Northwestern, Switzerland)</i>
Taming and Unveiling Software Reuse Opportunities through White Label Software in Startups.302	
	<i>Franklin Silva (Federal University of Bahia (UFBA)), Renata Souza (Federal University of Bahia (UFBA)), and Ivan Machado (Federal University of Bahia (UFBA))</i>
Which Information Help Agile Teams the Most? An Experience Report on the Problems and Needs .306.....	
	<i>Fabian Kortum (Leibniz University Hannover, Germany), Jil Klünder (Leibniz University Hannover, Germany), Oliver Karras (Leibniz University Hannover, Germany), Wasja Brunotte (Leibniz University Hannover, Germany), and Kurt Schneider (Leibniz University Hannover, Germany)</i>
On the Effects of File-Level Information on Method-Level Bug Localization .314.....	
	<i>Sousuke Amasaki (Okayama Prefectural University), Hirohisa Aman (Ehime University), and Tomoyuki Yokogawa (Okayama Prefectural University)</i>
MVP and Experimentation in Software Startups: A Qualitative Survey .322.....	
	<i>Jorge Melegati (Free University of Bozen-Bolzano), Rafael Chanin (PUCRS), Afonso Sales (PUCRS), Rafael Prikładnicki (PUCRS), and Xiaofeng Wang (Free University of Bozen-Bolzano)</i>
Internal Software Startups – A Multiple Case Study on Practices, Methods, and Success Factors .326.....	
	<i>Kai-Kristian Kemell (University of Jyväskylä), Juhani Risku (University of Jyväskylä), Kari Eline Strandjord (Norwegian University of Science and Technology), Anh Nguyen-Duc (University of Southeast Norway), Xiaofeng Wang (Free University of Bozen-Bolzano), and Pekka Abrahamsson (University of Jyväskylä)</i>
On the Effect of Noise on Software Engineers' Performance: Results from Two Replicated Experiments .334.....	
	<i>Simone Romano (University of Bari), Giuseppe Scanniello (University of Basilicata), Maria Teresa Baldassarre (University of Bari), and Davide Fucci (Blekinge Institute of Technology)</i>



Business Model Canvas Should Pay More Attention to the Software Startup Team .342.....	
	<i>Kai-Kristian Kemell (University of Jyväskylä, Finland), Atte Elonen (University of Jyväskylä, Finland), Mari Suoranta (University of Jyväskylä, Finland), Anh Nguyen-Duc (University of Southeast Norway, Norway), Juan Garbajosa (Universidad Politécnica de Madrid, Spain), Rafael Chanin (PUCRS, Brazil), Jorge Melegati (Free University of Bozen-Bolzano, Italy), Usman Rafiq (Free University of Bozen-Bolzano, Italy), Abdullah Aldaej (University of Maryland Baltimore Country, USA), Nana Assyne (University of Jyväskylä, Finland), Afonso Sales (PUCRS, Brazil), Sami Hyrynsalmi (LUT University, Finland), Juhani Risku (University of Jyväskylä, Finland), Henry Edison (Lero, NUI Galway, Ireland), and Pekka Abrahamsson (University of Jyväskylä, Finland)</i>

## SEaTeD: Software Engineering and Technical Debt

On the Influence of UML Class Diagrams Refactoring on Code Debt: A Family of Replicated Empirical Studies .346.....	
	<i>Sávio Freire (Federal University of Bahia and Federal Institute of Ceará, Brazil), Amanda Passos (Federal Institute of Bahia, Brazil), Manoel Mendonça (Federal University of Bahia, Brazil), Cláudio Sant'Anna (Federal University of Bahia, Brazil), and Rodrigo O. Spínola (Salvador University and State University of Bahia, Brazil)</i>
Common Causes and Effects of Technical Debt in Serbian IT: InsignTD Survey Replication .354.....	
	<i>Robert Ramač (University of Novi Sad, Serbia), Vladimir Mandić (University of Novi Sad, Serbia), Nebojša Taušan (Infora Research Group, Subotica, Serbia), Nicolli Rios (Federal University of Bahia, Salvador, Brazil), Manoel G. de Mendonça Neto (Federal University of Bahia, Salvador, Brazil), Carolyn Seaman (University of Maryland Baltimore County, USA), and Rodrigo Oliveira Spínola (Salvador University and State University of Bahia, Salvador, Brazil)</i>
Continuous Debt Valuation Approach (CoDVA) for Technical Debt Prioritization .362.....	
	<i>Marek Grzegorz Stochel (Motorola Solutions, Poland; AGH University of Science and Technology, Poland), Piotr Cholda (AGH University of Science and Technology, Poland), and Mariusz Wawrowski (Motorola Solutions, Poland)</i>
On Coherence in Technical Debt Research: Awareness of the Risks Stemming from the Metaphorical Origin and Relevant Remediation Strategies .367.....	
	<i>Marek Grzegorz Stochel (Motorola Solutions, Poland; AGH University of Science and Technology, Poland), Piotr Cholda (AGH University of Science and Technology, Poland), and Mariusz Wawrowski (Motorola Solutions, Poland)</i>
Refactoring, Bug Fixing, and New Development Effect on Technical Debt: An Industrial Case Study .376.....	
	<i>Ehsan Zabardast (Blekinge Institute of Technology), Javier Gonzalez Huerta (Blekinge Institute of Technology), and Darja Šmite (Blekinge Institute of Technology)</i>

Prevalence, Contents and Automatic Detection of KL-SATD .385.....	
	<i>Leevi Rantala (University of Oulu, Finland), Mika Mäntylä (University of Oulu, Finland), and David Lo (Singapore Management University, Singapore)</i>
Towards an Approach to Identify Obsolete Features Based on Importance and Technical Debt .389.	
	<i>Andrea Janes (Free University of Bozen-Bolzano) and Valentina Lenarduzzi (LUT University)</i>

## **SMSE: Systematic Literature Reviews and Mapping Studies in Software Engineering**

Focus Areas, Themes, and Objectives of Non-functional Requirements in DevOps: A Systematic Mapping Study .394.....	
	<i>Philipp Haindl (Johannes Kepler University, Linz, Austria) and Reinhold Plösch (Johannes Kepler University, Linz, Austria)</i>
Crowdsourcing in Systematic Reviews: A Systematic Mapping and Survey .404.....	
	<i>Katia Romero Felizardo (Federal University of Technology - Paraná), Érica Ferreira de Souza (Federal University of Technology - Paraná), Rafael Lopes (Federal University of Technology - Paraná), Geovanne J. Moro (Federal University of Technology – Paraná), and Nandamudi L. Vijaykumar (National Institute for Space Research (INPE) and Federal University of São Paulo – (UNIFESP))</i>
Security Compliance in Agile Software Development: A Systematic Mapping Study .413.....	
	<i>Fabiola Moyón (Technical University of Munich (TUM) and Siemens CT, Germany), Pamela Almeida (Universidad San Francisco de Quito (USFQ), Ecuador), Daniel Riofrío (Universidad San Francisco de Quito (USFQ), Ecuador), Daniel Méndez Fernández (Blekinge Institute of Technology and fortiss GmbH, Sweden), and Marcos Kalinowski (Pontifical Catholic University of Rio de Janeiro, Brazil)</i>
A Systematic Mapping Study on the Organisation of Corporate Hackathons .421.....	
	<i>George Valença (Universidade Federal Rural de Pernambuco), Nycolas Lacerda (Universidade Federal Rural de Pernambuco), Cleidson R B. de Souza (Universidade Federal de Pará), and Kiev Gama (Universidade Federal de Pernambuco)</i>
A Taxonomy of Metrics for Software Fault Prediction .429.....	
	<i>Maria Caulo (University of Basilicata) and Giuseppe Scanniello (University of Basilicata)</i>
Open Source Software Evaluation, Selection, and Adoption: A Systematic Literature Review .437...	
	<i>Valentina Lenarduzzi (LUT University), Davide Taibi (Tampere University), Davide Tosi (University of Insubria), Luigi Lavazza (University of Insubria), and Sandro Morasca (University of Insubria)</i>
Trends in Software Engineering Processes using Deep Learning: A Systematic Literature Review .445.....	
	<i>Alvaro Fernández Del Carpio (Universidad La Salle) and Leonardo Bermón Angarita (Universidad Nacional de Colombia)</i>
Architectures of Cloud-Enabled Cyber Physical Systems — A Systematic Mapping Study .455.....	
	<i>Anja Reuter (University of Groningen, The Netherlands) and Vasilios Andrikopoulos (University of Groningen, The Netherlands)</i>

Research Landscape of Patterns and Architectures for IoT Security: A Systematic Review .463.....	
	<i>Tanusan Rajmohan (University of Oslo), Phu Nguyen (SINTEF), and Nicolas Ferry (SINTEF)</i>
Knowledge Management for Promoting Update of Systematic Literature Reviews: An Experience Report .471.....	
	<i>Katia Romero Felizardo (Federal University of Technology – Paraná), Érica Ferreira de Souza (Federal University of Technology – Paraná), Tamiris Malacrida (Federal University of Technology - Paraná), Bianca M. Napoleão (Université du Québec à Chicoutimi), Fabio Petrillo (Université du Québec à Chicoutimi), Sylvain Hallé (Université du Québec à Chicoutimi), Nandamudi L. Vijaykumar (National Institute for Space Research (INPE) and Federal University of São Paulo – (UNIFESP)), and Elisa Y. Nakagawa (University of São Paulo (ICMC/USP))</i>
Software Techniques for Making Cloud Data Centers Energy-Efficient: A Systematic Mapping Study .479.....	
	<i>Fauzia Khan (Foundation University, Islamabad, Pakistan), Hina Anwar (University of Tartu), Dietmar Pfahl (University of Tartu), and Satish Srirama (University of Tartu)</i>

## **STREAM: Software Analytics: Mining Software Open Datasets and Repositories**

Investigating the Relationship between Co-occurring Technical Debt in Python .487.....	
	<i>Jie Tan (University of Groningen), Daniel Feitosa (University of Groningen), and Paris Avgeriou (University of Groningen)</i>
Identification and Remediation of Self-Admitted Technical Debt in Issue Trackers .495.....	
	<i>Yikun Li (University of Groningen), Mohamed Soliman (University of Groningen), and Paris Avgeriou (University of Groningen)</i>
Improving Quality of a Post's Set of Answers in Stack Overflow .504.....	
	<i>Mohammadreza Tavakoli (Sharif University of Technology), Maliheh Izadi (Sharif University of Technology), and Abbas Heydarnoori (Sharif University of Technology)</i>
Using Machine Learning to Identify Code Fragments for Manual Review .513.....	
	<i>Miroslaw Staron (Chalmers, University of Gothenburg), Miroslaw Ochodek (Poznan University of Technology), Wilhelm Meding (Ericsson), and Ola Söder (Axis Communications)</i>
A Preliminary Study of Knowledge Sharing Related to Covid-19 Pandemic in Stack Overflow .517.....	
	<i>Konstantinos Georgiou (Aristotle University of Thessaloniki, Greece), Nikolaos Mittas (International Hellenic University, Greece), Lefteris Angelis (Aristotle University of Thessaloniki, Greece), and Alexander Chatzigeorgiou (University of Macedonia, Greece)</i>

## CPS: Cyber – Physical Systems

- Graph-Theoretic Models of Resource Distribution for Cyber-Physical Systems of Disaster-Affected Regions .521.....  
*Kenneth Johnson (Auckland University of Technology), Samaneh Madanian (Auckland University of Technology), and Roopak Sinha (Auckland University of Technology)*
- Generation of Multi-factory Production Plans: Enabling Collaborative Lot-Size-one Production .529.....  
*Deepak Dhungana (IMC University of Applied Sciences Krems Austria), Alois Haselböck (Siemens AG Austria), and Stefan Wallner (Siemens AG Austria)*
- From AMALTHEA to RCM and Back: A Practical Architectural Mapping Scheme .537.....  
*Alessio Bucaioni (Mälardalen University), Matthias Becker (KTH Royal Institute of Technology), John Lundbäck (Arcticus Systems), and Harald Mackamul (Bosch)*
- Scenario-Based Testing of a Ship Collision Avoidance System .545.....  
*Ivan Porres (Åbo Akademi University), Sepinoud Azimi (Åbo Akademi University), and Johan Lilius (Åbo Akademi University)*
- Model-Driven Engineering of Monitoring Application for Sensors and Actuators Networks .553.....  
*Thibault Béziers la Fosse (IMT Atlantique, ICAM), Zheng Cheng (ICAM), Jérôme Rocheteau (ICAM, LS2N), and Jean-Marie Mottu (LS2N)*

## ES-IoT: Embedded Systems and the Internet of Things

- LEMONS: Leveraging Model-Based Techniques to Enable Non-intrusive Semantic Enrichment in Wireless Sensor Networks .561.....  
*Jan Novacek (FZI Research Center for Information Technology, University of Tübingen), Arthur Kühlwein (Independent), Sebastian Reiter (FZI Research Center for Information Technology), Alexander Viehl (FZI Research Center for Information Technology), Oliver Bringmann (University of Tübingen, FZI Research Center for Information Technology), and Wolfgang Rosenstiel (University of Tübingen, FZI Research Center for Information Technology)*
- An Overview of user Privacy Preferences Modeling and Adoption .569.....  
*Georgia M. Kapitsaki (University of Cyprus, Cyprus), Alexia Dini Kounoudes (University of Cyprus, Cyprus), and Achilleas P. Achilleos (Frederick University, Cyprus)*
- Modelling Security Aspects with ArchiMate: A Systematic Mapping Study .577.....  
*Augustus Ellerm (University of Canterbury, New Zealand) and Miguel Ehécatl Morales Trujillo (University of Canterbury, New Zealand)*
- IVIS: Highly Customizable Framework for Visualization and Processing of IoT Data .585.....  
*Lubomír Bulej (Charles University, Czech Republic), Tomáš Bureš (Charles University, Czech Republic), Petr Hnětynka (Charles University, Czech Republic), Václav Čamra (Charles University, Czech Republic), Petr Siegl (Charles University, Czech Republic), and Michal Töpfer (Charles University, Czech Republic)*

Context-Based Confidentiality Analysis for Industrial IoT .589.....  
    *Nicolas Boltz (Karlsruhe Institute of Technology (KIT), Germany),*  
    *Maximilian Walter (Karlsruhe Institute of Technology (KIT), Germany),*  
    *and Robert Heinrich (Karlsruhe Institute of Technology (KIT), Germany)*

**Author Index 597.**.....