



# THE 28<sup>TH</sup> ASIA-PACIFIC SOFTWARE ENGINEERING CONFERENCE

6th - 9th December 2021 - Virtual  
(originally Taipei, Taiwan)

## APSEC 2021 Program

(Time Zone: UTC+8, Taipei Time)

## 4<sup>th</sup> December 2021 (Sat.)

09:00 - 12:00

*Microsoft Teams Testing*

14:00 - 17:00

*Microsoft Teams Testing*

## Day 1: 6<sup>th</sup> December 2021 (Mon.)

02:30 - 05:30

[QuASoQ 2021](#)  
*9th International Workshop on Quantitative Approaches to Software Quality*

09:00 - 12:00

[SEED 2021](#)  
*4th Software Engineering Education Workshop: Emerging Needs of Software Engineering Education*

10:00 - 14:40

[iMLSE 2021](#)  
*3rd International Workshop on Machine Learning Systems Engineering*  
(Break: 12:00-13:30)

13:30 - 17:30

[NLPaSE 2021](#)  
*2nd Workshop on NLP Advancements for Software Engineering*

14:00 - 19:00

[RESOSY 2021](#)  
*1st International Interdisciplinary Workshop on Requirements Engineering for Sociotechnical Systems*

18:00 - 20:00

***Steering Committee Meeting***

## Day 2: 7<sup>th</sup> December 2021 (Tue.)

09:20 - 09:40	<b>Opening Ceremony</b> Host: Prof. Nien-Lin Hsueh, Feng Chia University, Taiwan		
09:40 - 10:00	<b>Memorial Ceremony for Prof. Aoyama</b> Host: Prof. Katsuhisa Maruyama, Ritsumeikan University, Japan		
10:00 - 11:00	<b>Keynote 1: “Software Engineering for Human-on-the-loop Cyber-Physical Systems”</b> <b>Speaker: Jane Cleland-Huang, University of Notre Dame in Indiana, USA</b> Host: Prof. Chun-Feng Liao, National Chengchi University, Taiwan		
11:00 - 11:10	Break		
11:10 - 12:20	<a href="#"><u>Session 1A: Software Architecture, Modelling and Design</u></a> Chair: Alan Liu, National Chung Cheng University, Taiwan	<a href="#"><u>Session 1B: Human Factors and Social Aspects of Software Engineering</u></a> Chair: Subhajit Datta, Singapore Management University, Singapore	<a href="#"><u>Session 1C: Security, Reliability, and Privacy</u></a> Chair: Yoshiki Higo, Osaka University, Japan
12:40 – 14:00	Break		
14:00 – 15:30	<a href="#"><u>Session 2A: Software Engineering in Practices-1</u></a> Chair: Fang Yu, National Chengchi University, Taiwan	<a href="#"><u>Session 2B: Software Repository Mining and Data Analytics-1</u></a> Chair: Yung-Chun Chang, Taipei Medical University, Taiwan	14:50 - 16:00
			<a href="#"><u>Session 3C: Empirical Software Engineering</u></a> Chair: Jingyue Li, Norwegian University of Science and Technology, Norway
15:30 – 15:50	Break		
15:50 – 17:00	<a href="#"><u>Session 3A: Software Engineering in Practices-2</u></a> Chair: Shahida Sulaiman, Universiti Teknologi Malaysia, Malaysia	<a href="#"><u>Session 3B: AI for Software Engineering</u></a> Chair: Konstantin Kobylkin, Russian Academy of Sciences, Russia	

### Day 3: 8<sup>th</sup> December 2021 (Wed.)

09:50 – 10:00	<p><b>Awards Announcement</b></p> <p>Host: Prof. Shang-Pin Ma, National Taiwan Ocean University, Taiwan</p>	
10:00 – 11:00	<p><b>Keynote 2: “Quantitative Symbolic Analysis for Software Security and Dependability”</b></p> <p><b>Speaker: Tevfik Bultan, University of California, USA</b></p> <p>Host: Prof. Deron Liang, National Central University, Taiwan</p>	
11:00 – 11:10	Break	
11:10 – 12:20	<p><a href="#"><u>Session 4A: Testing, Verification, and Validation-1</u></a></p> <p>Chair: Chien-Hung Liu, National Taipei University of Technology, Taiwan</p>	<p><a href="#"><u>Session 4B: Software Comprehension, Visualization, and Traceability</u></a></p> <p>Chair: Wangshu Liu, Nanjing University, China</p>
12:20 – 13:30	Break	
13:30 – 17:00	<p><a href="#"><u>IWESQ 2021</u></a></p> <p>3rd International Workshop on Experience with SQuaRE series and its Future Direction</p>	
14:00 – 15:30	<p><a href="#"><u>Session 5A: Testing, Verification, and Validation-2</u></a></p> <p>Chair: Jessica Turner, University of Waikato, New Zealand</p>	<p><a href="#"><u>Session 5B: Software Repository Mining and Data Analytics-2</u></a></p> <p>Chair: Yong-Li Hu, Academic Sinica, Taiwan</p>
15:30 – 15:50	Break	
15:50 – 17:20	<p><a href="#"><u>Session 6A: Requirement Engineering and Model-driven Engineering</u></a></p> <p>Chair: Pinjia He, Chinese University of Hong Kong, China</p>	<p><a href="#"><u>Session 6B: Debugging, Defect Prediction and Fault Localization</u></a></p> <p>Chair: Lwin Khin Shar, Singapore Management University, Singapore</p>

## Day 4: 9<sup>th</sup> December 2021 (Thu.)

09:30 - 10:40	<a href="#"><u>Session 7A: Early Research Achievements-1</u></a> Chair: Cuiyun Gao, Harbin Institute of Technology, China	<a href="#"><u>Session 7B: Poster-1</u></a> ( <i>Gather Town</i> ) Chair: Ching-Hu Lu, National Taiwan University of Science and Technology, Taiwan
10:40 - 10:50	<i>Break</i>	
10:50 - 12:10	<a href="#"><u>Session 8A: Early Research Achievements-2</u></a> Chair: Kuo-Hsun Hsu, National Taichung University of Education, Taiwan	
12:10 - 13:00	<i>Break</i>	
13:00 - 15:10	<a href="#"><u>SETaiwan 2021</u></a> 1st Software Engineering in Taiwan Workshop	
14:00 - 15:10	<a href="#"><u>Session 9A: Early Research Achievements-3</u></a> Chair: YungYu Zhuang, National Central University, Taiwan	<a href="#"><u>Session 9B: Poster-2</u></a> ( <i>Gather Town</i> ) Chair: Chiung-Hon Leon Lee, Feng Chia University, Taiwan

## **Session 1A: Software Architecture, Modelling and Design**

*11:10 - 12:20, 7 December 2021*

*Chair: Alan Liu, National Chung Cheng University, Taiwan*

- 58 Akira Mizutani, Masami Noro and Atsushi Sawada. Design of Software Architecture for Neural Network Cooperation: Case of Forgery Detection
- 109 Yong-Jun Shin, Joon-Young Bae and Doo-Hwan Bae. Concepts and Models of Environment of Self-Adaptive Systems: A Systematic Literature Review
- 250 Gregorius Airlangga and Alan Liu. A Novel Architectural Design for Solving Lost-Link Problems in UAV Collaboration

## **Session 1B: Human Factors and Social Aspects of Software Engineering**

*11:10 - 12:20, 7 December 2021*

*Chair: Subhajit Datta, Singapore Management University, Singapore*

- 41 Lingjia Li, Jian Cao and Qin Qi. Monitoring Negative Sentiment-Related Events in Open Source Software Projects
- 73 Xin Huang, He Zhang, Xin Zhou, Dong Shao and Letizia Jaccheri. A Research Landscape of Software Engineering Education
- 258 Ishita Bardhan, Subhajit Datta and Subhashis Majumder. Degree doesn't Matter: Identifying the Drivers of Interaction in Software Development Ecosystems ([India, 8:40-9:50](#))

## **Session 1C: Security, Reliability, and Privacy**

*11:10 - 12:20, 7 December 2021*

*Chair: Yoshiki Higo, Osaka University, Japan*

- 19 Asma Razgallah and Raphaël Khoury. Behavioral classification of Android applications using system calls ([Canada, 23:10-00:20](#))
- 78 Yuxuan Li, Ruitao Feng, Sen Chen, Qianyu Guo, Lingling Fan and Xiaohong Li. IconChecker: Anomaly Detection of Icon-Behaviors for Android Apps
- 266 Guangwei Li, Ting Yuan, Jie Lu, Lian Li, Xiaobin Zhang, Xu Song and Kejun Zhang. Exposing Vulnerable Paths: Enhance Static Analysis with Lightweight Symbolic Execution

## Session 2A: Software Engineering in Practices-1

14:00 - 15:30, 7 December 2021

*Chair: Fang Yu, National Chengchi University, Taiwan*

- 40 Hongbing Wang and Qi Li. Effective Bug Triage Based on a Hybrid Neural Network
- 267 Pouya Ataei and Alan Litchfield. NeoMycelia: A software reference architecture for big data systems ([New Zealand: 19:00-20:30](#))
- 268 Aiswarya Raj Munappy, Jan Bosch, Helena Holmström Olsson and Anders Jansson. On the Impact of ML use cases on Industrial Data Pipelines ([Sweden, 07:00-08:30](#))
- 277 Liming Dong, He Zhang, Lanxin Yang, Zhiluo Weng and Xin Zhou. Survey on Pains and Best Practices of Code Review

## Session 2B: Software Repository Mining and Data Analytics-1

14:00 - 15:30, 7 December 2021

*Chair: Yung-Chun Chang, Taipei Medical University, Taiwan*

- 16 Kejun Li, Taiming Wang and Hui Liu. NameChecker: Detecting Inconsistency between Method Names and Method Bodies
- 30 Yoshiki Higo, Junnosuke Matsumoto and Shinji Kusumoto. Tree-based Mining of Fine-grained Code Changes to Detect Unknown Change Patterns
- 75 Siyuan Liu, Jingxuan Zhang, Jiahui Liang, Junpeng Luo, Yong Xu and Chenxing Sun. CHIS: A Novel Hybrid Granularity Identifier Splitting Approach
- 81 Guang Yang, Yanlin Zhou, Xiang Chen and Chi Yu. Fine-grained Pseudo-code Generation Method via Code Feature Extraction and Transformer

## Session 3A: Software Engineering in Practices-2

15:50 - 17:00, 7 December 2021

Chair: Shahida Sulaiman, Universiti Teknologi Malaysia, Malaysia

- 84 Yuchu Liu, David Issa Mattos, Jan Bosch, Helena Holmström Olsson and Jonn Lantz. Bayesian propensity score matching in automotive embedded software engineering ([Sweden, 08:50-10:00](#))
- 88: Anas Dakkak, Hongyi Zhang, David Issa Mattos, Jan Bosch and Helena Hölmstrom Olsson. Towards Continuous Data Collection from In-service Products: Exploring the Relation Between Data Dimensions and Collection Challenges ([Sweden, 08:50-10:00](#))
- 275 Chi Li, Yuexing Wang, Min Zhou and Ming Gu. Scalable Fault Detection Based on Precise Access Path

## Session 3B: AI for Software Engineering

15:50 - 17:00, 7 December 2021

Chair: Konstantin Kobylkin, Russian Academy of Sciences, Russia

- 53 Zhifang Liao, Wenlong Li, Yan Zhang and Song Yu. Detecting Duplicate Questions in Stack Overflow via Semantic and Relevance Approaches
- 65 Elena N. Akimova, Alexander Yu. Bersenev, Artem A. Deikov, Konstantin S. Kobylkin, Anton V. Konygin, Ilya P. Mezentssev and Vladimir E. Misilov. PyTraceBugs: A Large Python Code Dataset for Supervised Machine Learning in Software Defect Prediction ([Russia, 10:50-12:00](#))
- 116 Kien-Tuan Ngo, Dinh-Truong Do, Thu-Trang Nguyen and Hieu Vo Dinh. Ranking Warnings of Static Analysis Tools Using Representation Learning

## Session 3C: Empirical Software Engineering

14:50 - 16:00, 7 December 2021

Chair: Jingyue Li, Norwegian University of Science and Technology, Norway

- 98 Sindre Beba, Magnus Melseth Karlsen, Jingyue Li and Bing Zhang. Critical Understanding of Security Vulnerability Detection Plugin Evaluation Reports ([Norway, 07:50-09:00](#))
- 103 Benjamin Koh, Mojtaba Shahin, Annette Ong, Soo Ying Yeap, Priyanka Saxena, Manvendra Singh and Chunyang Chen. Pandemic Software Development: The Student Experiences from Developing a COVID-19 Information Dashboard ([Australia, 17:50-19:00](#))
- 254 Nataliya Berbyuk Lindstrom, Dina Koutsikouri, Mirosław Staron, Wilhelm Meding and Ola Söder. Understanding Metrics Team-Stakeholder Communication in Agile Metrics Service Delivery ([Sweden, 07:50-09:00](#))



## **Session 4A: Testing, Verification, and Validation-1**

*11:10 - 12:20, 8 December 2021*

Chair: Chien-Hung Liu, National Taipei University of Technology, Taiwan

- 94 Bo Gao, Siyuan Shen, Ling Shi, Jiaying Li, Jun Sun and Lei Bu. Verification Assisted Gas Reduction for Smart Contracts
- 251 Kiat Kian Anthony Chua, Doo-Hwan Bae and Eunyoung Jee. Metamorphic Testing for Reliability in System of Systems
- 262 Yizheng Chen, Ninad Chaudhari and Mei-Hwa Chen. Context-Aware Regression Test Selection ([USA, 23:10-00:20](#))

## **Session 4B: Software Comprehension, Visualization, and Traceability**

*11:10 - 12:20, 8 December 2021*

Chair: Wangshu Liu Nanjing University, China

- 11 Aiping Zhang, Kui Liu, Liming Fang, Qianjun Liu, Xinyu Yun and Shouling Ji. Learn To Align: A Code Alignment Network For Code Clone Detection
- 83 Yusuke Shinyama, Yoshitaka Arahori and Katsuhiko Gondow. Improving Semantic Consistency of Variable Names with Use-Flow Graph Analysis
- 125 Yusuke Shinyama, Yoshitaka Arahori and Katsuhiko Gondow. How Do Programmers Express High-Level Concepts using Primitive Data Types?

## **Session 5A: Testing, Verification, and Validation-2**

*14:00 - 15:30, 8 December 2021*

Chair: Jessica Turner, University of Waikato, New Zealand

- 66 Weigang He, Xia Mao, Ting Su, Yanhong Huang and Jianqi Shi. Data Flow Testing for PLC Programs via Dynamic Symbolic Execution
- 92 Xiang Du, Liangze Yin, Haining Feng and Wei Dong. Program Verification Enhanced Precise Analysis of Interrupt-Driven Program Vulnerabilities
- 115 Wenjie Li, Yanyan Jiang, Jun Ma and Chang Xu. Automatic Performance Testing for Image Displaying in Android Apps
- 121 Azeem Ahmad, Francisco Gomes de Oliveira Neto, Zhiziang Shi, Kristian Sandahl and Ola Leifler. A Multi-factor Approach for Flaky Test Detection and Automated Root Cause Analysis ([Sweden, 07:00-08:30](#))

## **Session 5B: Software Repository Mining and Data Analytics-2**

*14:00 - 15:30, 8 December 2021*

Chair: Yong-Li Hu, Academic Sinica, Taiwan

- 21 Yu Wang, Huaxiao Liu, Shanquan Gao and Shujia Li. Categorizing npm Packages by Analyzing the Text Information in Software Repositories
- 36 Yang Yu, Minglai Shao, Hongtao Liu, Ying Sun, Wenjun Wang and Bofei Ma. PGraph: A Graph-based Structure for Interactive Event Exploration on Social Media
- 46 Huaxi Jiang, Jie Zhu, Li Yang, Geng Liang and Chun Zuo. DeepRelease: Language-agnostic Release Notes Generation from Pull Requests of Open-source Software
- 71 Jingxuan Zhang, Weiqin Zou and Zhiqiu Huang. An Empirical Study on the Usage and Evolution of Identifier Styles in Practice

## Session 6A: Requirement Engineering and Model-driven Engineering

15:50 - 17:20, 8 December 2021

Chair: Pinjia He, Chinese University of Hong Kong, China

- 12 Mouna Hammoudi, Christoph Mayr-Dorn, Atif Mashkoor and Alexander Egyed. TraceRefiner: An Automated Technique for Refining Coarse-Grained Requirement-to-Class Traces ([Austria, 08:50-10:20](#))
- 56 Jessica Turner, Judy Bowen and Nikki van Zandwijk. Interaction Modelling for IoT ([New Zealand, 20:50-22:20](#))
- 113 Selin Aydin, Andreas Steffens and Horst Lichter. Automated Construction of Continuous Delivery Pipelines from Architecture Models ([Germany, 08:50-10:20](#))
- 260 Stefan Fischer, Lukas Linsbauer and Rudolf Ramler. Comparing Automated Reuse of Scripted Tests and Model-Based Tests for Configurable Software ([Austria, 08:50-10:20](#))

## Session 6B: Debugging, Defect Prediction and Fault Localization

15:50 - 17:20, 8 December 2021

Chair: Lwin Khin Shar, Singapore Management University, Singapore

- 17 Stefan Schulz, Emanuel Herrendorf and Christoph Bockisch. Thread-Sensitive Data Race Detection for Java ([Germany, 08:50-10:20](#))
- 68 Hushuang Zeng, Jingxin Chen, Beijun Shen and Hao Zhong. Mining API Constraints from Library and Client to Detect API Misuses
- 123 Lwin Khin Shar, Nguyen Binh Duong Ta and David Lo. Empirical Evaluation of Minority Oversampling Techniques in the Context of Android Malware Detection
- 244 Wangshu Liu, Yongteng Zhu, Xiang Chen, Qing Gu, Xingya Wang and Shenkai Gu. S2LMMD: Cross-Project Software Defect Prediction via Statement Semantic Learning and Maximum Mean Discrepancy

## **Session 7A: Early Research Achievements-1**

*09:30 - 10:40, 9 December 2021*

Chair: Cuiyun Gao, Harbin Institute of Technology, China

- 289 Chong Wang, Tianyang Liu, Peng Liang, Maya Daneva and Marten Sinderen. The Role of User Reviews in App Updates: A Preliminary Investigation on App Release Notes
- 292 Ryoko Izuta, Shinsuke Matsumoto, Hiroshi Igaki, Sachio Saiki, Naoki Fukuyasu and Shinji Kusumoto. Detecting Functional Differences using Automatic Test Generation for Automated Assessment in Programming Education
- 295 Humphrey O. Obie, Mojtaba Shahin, John Grundy, Burak Turhan, Li Li, Waqar Hussain and Jon Whittle. Does Domain Change the Opinion of Individuals on Human Values? A Preliminary Investigation on eHealth Apps End-users
- 305 Scott Lupton, Hironori Washizaki, Nobukazu Yoshioka and Yoshiaki Fukazawa. Literature Review on Log Anomaly Detection Approaches Utilizing Online Parsing Methodology

## **Session 7B: Poster-1**

*09:30 - 10:40, 9 December 2021*

Chair: Ching-Hu Lu, National Taiwan University of Science and Technology, Taiwan

- 310 Ben Wang, Hanting Chu, Pengcheng Zhang and Hai Dong. Smart Contract Vulnerability Detection Using Code Representation Fusion
- 314 Aki Hongo and Naoya Nitta. Towards a Dynamic Visualization of Complex Reverse-Engineered Object Collaboration
- 318 Irving Rodriguez and Xiaoyin Wang. Topic Trends in Issue Tracking System of ExtendedReality Frameworks ([USA 21:30-22:40](#))
- 319 Shaikh Mostafa and Xiaoyin Wang. An Exploration Study On the Dependency Among Vulnerabilities and Bugs ([USA, 21:30-22:40](#))
- 320 Chu-Ti Lin, Sheng-Hsiang Yuan and Jutarnporn Intasara. A Learning-to-Rank Based Approach for Improving Regression Test Case Prioritization

## Session 8A: Early Research Achievements-2

10:50 - 12:10, 9 December 2021

Chair: Kuo-Hsun Hsu, National Taichung University of Education, Taiwan

- 283 Yoriyuki Yamagata, Fabien Hervé, Yuji Fujiwara and Katsuro Inoue. Finding repeated strings in code repositories and its applications to code-clone detection
- 284 Puneet Bhateja. Probabilistic testing of asynchronously communicating systems ([India, 08:10-09:30](#))
- 286 Hiroto Watanabe, Shinsuke Matsumoto, Yoshiki Higo, Shinji Kusumoto, Toshiyuki Kurabayashi, Hiroyuki Kirinuki and Haruto Tanno. Applying Multi-Objective Genetic Algorithm for Efficient Selection on Program Generation
- 300 Kapil Singi, Kanchanjot Kaur Phokela, Narendranath Sukhavasi and Vikrant Kaulgud. Framework for Recommending Data Residency Compliant Application Architecture ([India, 08:10-09:30](#))
- 303 Akira Fujimoto, Yoshiki Higo and Shinji Kusumoto. Towards Accurate File Tracking Based on AST Differences

## Session 9A: Early Research Achievements-3

14:00 - 15:10, 9 December 2021

Chair: YungYu Zhuang, National Central University, Taiwan

- 282 Cuong Tran Manh, Kien Tran Trung, Tan M. Nguyen, Thu-Trang Nguyen, Son Nguyen and Hieu Vo Dinh. API parameter recommendation based on language model and program analysis
- 285 Rakshit Mittal, Dominique Blouin and Soumyadip Bandyopadhyay. PNPEq: Verification of Scheduled Conditional Behavior in Embedded Software using Petri Nets ([France, 07:00-08:10](#))
- 299 Yuwei Wang, Denis Conan, Sophie Chabridon, Kavoos Bojnourdi and Jingxuan Ma. Runtime models and evolution graphs for the version management of microservice architectures ([France, 07:00-08:10](#))
- 301 Anton V. Uzunov, Matthew Brennan, Mohan Baruwal Chhetri, Bao Vo, Ryszard Kowalczyk and John Wondoh. AWaRE2-MM: A Meta-Model for Goal-Driven, Contract-Mediated, Team-Centric Autonomous Middleware Frameworks for Antifragility ([Australia, 17:00-18:10](#))

## Session 9B: Poster-2

14:00 - 15:10, 9 December 2021

Chair: Chiung-Hon Leon Lee, Feng Chia University, Taiwan

- 312 Yi-Chun Yen, Bing-Yun Wang, Xin-Zhe Zhong, Wei-Yi Chiang, Chin-Yun Hsieh and Yu Chin Cheng. Applying Problem Frames in Behavior-Driven Development for Smart Cone System
- 315 Dongwook Choi, Jinseok Heo and Eunseok Lee. Automated Feedback Generation for Multiple Function Programs
- 316 Norihiro Yoshida, Takahiro Shimizu, Ryota Yamamoto and Hiroaki Takada. Extracting a Micro State Transition Table Using the KLEE Symbolic Execution Engine
- 321 Hasnaa El Jihad, Morayo Adedjouma and Matteo Morelli. Automated Fault Tree generation in Open-PSA from UML Models ([France, 07:00-08:10](#))
- 324 Liqian Chen, Taoqing Chen, Guangsheng Fan and Banghu Yin. Static Analysis of Resource Usage Bounds for Imperative Programs

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