

COMPSAC 2021

Intelligent and Resilient Computing for a Collaborative World

45th Anniversary - Conference Program

All-Virtual through *Underline.io*

July 12-16, 2021

All times listed in Pacific Standard Time.

Please use <https://www.thetimezoneconverter.com> to find your local area time.

IEEE

Monday July 12, 2021

ADMNET: The 9th IEEE International Workshop on Architecture, Design, Deployment & Management of Networks & Applications

WS1

Monday July 12, 8:00 – 9:30

172. Analysis of Route Announcements of Unassigned IP Addresses

Kentaro Goto, Akira Shibuya, Masayuki Okada and Masato Uchida

316. Analysis of Inter-regional Relationship among Regional Tier-1 ASes in the Internet

Takuya Urimoto, Daisuke Kotani and Yasuo Okabe

317. Same World Broadcasting: An Internet Broadcasting System for Real-Time Distributed Video Compositions

Koki Makida, Tomoya Kawakami, Satoru Matsumoto, Tomoki Yoshihisa, Yuuichi Teranishi and Shinji Shimojo

346. The Latency Characteristics of GTP-U and SRv6 Stateless Translation on VPP Software Router

Chunghan Lee, Naoyuki Mori, Yasuhiro Ohara, Tetsuya Murakami, Shogo Asaba and Satoru Matsushima

ADMNET: The 9th IEEE International Workshop on Architecture, Design, Deployment & Management of Networks & Applications

WS2

Monday July 12, 8:00 – 9:30

398. A Quantitative Causal Analysis for Network Log Data

Richard Jarry, Satoru Kobayashi and Kensuke Fukuda

399. Towards Extracting Semantics of Network Config Blocks

Kazuki Otomo, Satoru Kobayashi, Kensuke Fukuda, Osamu Akashi, Kimihiro Mizutani and Hiroshi Esaki

474. An Evaluation of Stochastic Quantitative Resilience Index Based on SLAs of Communication Lines

Hiroki Kashiwazaki, Hiroki Takakura and Shinji Shimojo

AIML: The 4th IEEE International Workshop on Advances in Artificial Intelligence & Machine Learning: Applications, Challenges & Concerns

WS3

Monday July 12, 8:00 – 9:30

120. Advancing Design and Runtime Management of AI Applications with ProjectName

Hamta Sedghani, Danilo Ardagna, Matteo Matteucci, Giulio Angelo Fontana, Giacomo Verticale, Fabrizio Amarilli, Rosa Badia, Daniele Lezzi, Ignacio Blanquer, Andre Martin Martin and Konrad Wawruch

260. A Reinforcement Learning Based Approach for Adaptive User Interfaces

Lamia Zouhaier, Yousra Bendaly Hlaoui and Leila Ben Ayed

262. STARS: Spatial Temporal Graph Convolution Network for Action Recognition System on FPGAs

Songwen Pei, Xianrong Wang, Wei Qin and Sheng Liang

278. Automatic Identification of Vulnerable Code: Investigations with an AST-Based Neural Network

Imen Fradj, Yousra Bendaly Hlaoui and Leila Ben Ayed

AIML: The 4th IEEE International Workshop on Advances in Artificial Intelligence & Machine Learning: Applications, Challenges & Concerns

WS4

Monday July 12, 8:00 – 9:30

301. A Reactive System for Specifying and Running Flexible Cloud Service Business Processes based on Machine Learning

Imen Fradj, Yousra Bendaly Hlaoui and Leila Ben Ayed

339. Recognizing the Type of Mask or Respirator Worn Through a CNN Trained with a Novel Database

Antonio Marceddu and Bartolomeo Montrucchio

349. Characteristics of High-Frequency Trading and Its Forecasts

Shigeki Kohda and Kenichi Yoshida

366. A Method for the Detection and Reconstruction of Foliar Damage Caused by Predatory Insects

Gabriel Vieira, Naiane Sousa, Bruno Rocha, Afonso Fonseca and Fabrizzio Soares

AIML: The 4th IEEE International Workshop on Advances in Artificial Intelligence & Machine Learning: Applications, Challenges & Concerns

WS5

Monday July 12, 8:00 – 9:30

422. Metamorphic Testing of Fake News Detection Software

Yingrui Ma, Dave Towey, T.Y. Chen and Zhi Quan Zhou

445. On the Use of Causal Models to Build Better Datasets

Fabio Garcea, Lia Morra and Fabrizio Lamberti

447. A Machine Learning Based Decision Support System Design for Restraining Orders in Turkey

Hüseyin Umutcan Ay, Alime Aysu Öner, Nihan Yıldırım and Tolga Kaya

AIML: The 4th IEEE International Workshop on Advances in Artificial Intelligence & Machine Learning: Applications, Challenges & Concerns

WS6

Monday July 12, 10:00-11:30

463. Effects of Resampling Image Methods in Sugar Cane Classification and the Potential Use of Vegetation Indices Related to Chlorophyll

Priscila Kai, Bruna Oliveira and Ronaldo Costa

470. Multi-class Cardiovascular Disease Detection and Classification from 12-Lead ECG Signals Using an Inception Residual Network

Jian Ni, Shengjie Zhai, Yingtao Jiang, Yihan Chen, Sijia Li, Amei Amei, Dieu-My Tran, Yu Kuang and Lijie Zhai

478. Learning Motion Planning Functions using a Linear Transition in the C-space: Networks and Kernels

Victor Parque

**AIOT: The 2nd IEEE International Workshop on Advanced IoT Computing
WS7**

Monday July 12, 10:00-11:30

155. Solutions to Ventilate Learning Spaces: A Review of Current CO2 Sensors for IoT Systems
Alejandro Leo-Ramírez, Bernardo Tabuenca, Vicente García-Alcántara, Edmundo Tovar, Wolfgang Greller and Carlos Gilarranz-Casado

338. Anomaly Detection in Air Conditioners Using IoT Technologies
Toshiaki Hirata, Kenichi Yoshida, Kunihiro Koido and Sumiei Takahashi

362. An Enhanced Routing Method for Overlay Networks Based on Multiple Different Time Intervals

Tatsuya Kubo and Tomoya Kawakami

**BDCAA: The 3rd IEEE International Workshop on Big Data Computation, Analysis & Applications
WS8**

Monday July 12, 10:00-11:30

110. Learning to Rank Relevant Documents for Information Retrieval in Bioengineering Text Corpora

Kwok Sun Cheng and Myoungkyu Song

181. "Frontline Mediators": An Ethnographic Study of Online Welfare Applications at the Public Library

Dustin Ohara

428. Toward a Novel Measurement Framework for Big Data (MEGA)

Dave Bhardwaj and Olga Ormandjieva

454. FILCIO: Application Agnostic I/O Aggregation to Scale Scientific Workflows

Quentin Jensen, Filip Jagodzinski and Tanzima Islam

**CCR: The 2nd IEEE International Workshop on Emerging Topics in Cognitive Computing & Robotics
WS9**

Monday July 12, 10:00-11:30

291. Field Study on Usability and Security Perceptions Surrounding Social Robots
Subhash Rajapaksha, Shivam Thakrar, Matt Kinzler, Haochen Sun, Justin Smith and Debbie Perouli

352. Bidirectional Edge-Enhanced Graph Convolutional Networks for Aspect-based Sentiment Classification

Jinyang Du, Yin Zhang, Binglei Yue, Huimin Lu and Min Chen

355. A Robotic Vision Model via Xception and Light Gradient Boosting Machine

Fang Hu, Mingfang Huang, Jia Liu, Xingyu Yan and Xiufeng Cheng

359. Shared-latent Variable Network Alignment

Degen Zhang, Xin Li and Linjing Lai

CCR: The 2nd IEEE International Workshop on Emerging Topics in Cognitive Computing & Robotics

WS10

Monday July 12, 10:00-11:30

363. Multi-relational EHR Representation Learning with Infusing Information of Diagnosis and Medication

Yu Shi, Yuhang Guo, Hao Wu, Jingxiu Li and Xin Li

368. IIS: Intelligent Identification Scheme of Massive IoT Devices

Jie Liu, Yi Sun, Fengkai Xu, Keping Yu, Ali Kashif Bashir and Zhaoli Liu

369. Online Vehicles Selection for Task Replication via Bandit Learning

Yongfeng Qian, Zhoutong Zuo and Yixue Hao

CDS: The 9th IEEE International Workshop on Consumer Devices & Systems

WS11

Monday July 12, 12:00 – 1:30

348. Development of Observation Device with Multi Sensor Platform for Underwater Aquaculture Cages

Kazuki Fukae, Tetsuo Imai and Toru Kobayashi

439. QoS Network Control for Elderly Support Services

Daisuke Kotani, Taku Tanaka and Yasuo Okabe

**DADA: The 3rd IEEE International Workshop on Deep Analysis of Data-Driven Applications
WS12**

Monday July 12, 12:00 – 1:30

63. A Data-based Guiding Framework for Digital Transformation

Zakaria Maamar, Saoussen Cheikhrouhou and Said Elnaffar

95. Analyzing Bug Reports by Topic Mining in Software Evolution

Uy Nguyen, Kowk Sun Cheng, Samuel Cho and Myoungkyu Song

98. Adaptation Space Reduction using an Explainable Framework

Alhassan Boner Diallo, Hiroyuki Nakagawa and Tatsuhiro Tsuchiya

109. Determinants of Consumer Purchasing Factors through LDA Modeling Using YouTube Data

Hyun Park and Yanggon Kim

**DADA: The 3rd IEEE International Workshop on Deep Analysis of Data-Driven Applications
WS13**

Monday July 12, 12:00 – 1:30

162. Vision-based Hand Gesture Recognition for Human-Computer Interaction using MobileNetV2

Hermann Baumgartl, Daniel Sauter, Christian Schenk, Cem Atik and Ricardo Buettner

226. A Comprehensive Qualitative and Quantitative Review of Current Research in GANs

Jiachen Ma, Piyush Saxena and Sheikh Ahamed

245. Abnormal Gait Recognition based on Integrated Gait Features in Machine Learning

Wonjin Kim and Yanggon Kim

307. A Data Analytic Solution for Measuring the Impact of COVID-19 on IT-Related Job

Opportunities

Yubo Chen, Carson Leung and Siyuan Shang

**DADA: The 3rd IEEE International Workshop on Deep Analysis of Data-Driven Applications
WS14**

Monday July 12, 12:00 – 1:30

449. Attack Prediction using Hidden Markov Model

Shuvalaxmi Dass, Prerit Datta and Akbar Siami Namin

452. Toward Explainable Users: Using NLP to Enable AI to Understand Users' Perceptions of Cyber Attacks

Faranak Abri, Luis Felipe Gutiérrez, Chaitra T. Kulkarni, Akbar Siami Namin and Keith S. Jones

457. COVID-19 SIHR Modeling and Dynamic Analysis
Zhenhe Pan, Taige Wang, Boxuan Lv and Yuanlin Zhang

**DBDM: The 6th IEEE International Workshop on Distributed Big Data Management
WS15**

Monday July 12, 12:00 – 1:30

157. HyRa: An Effective Hybrid Ranking Model
Sameh Neji, Tarek Chenaina, Abdullah Shoeb and Leila Ben Ayed Jemni

461. Distributed Big Data Management
Carson Leung and Alfredo Cuzzocrea

**DDS-BDAF: The 1st IEEE International Workshop on Dynamic Data Science & Big Data
Analytics in Finance**

WS16

Monday July 12, 2:00-3:00

329. Dempster-Shafer Theory for Stock Selection
Nima Salehy and Giray Okten

351. Time Series Clustering for Robust Mean-Variance Portfolio Selection: Comparison of Several
Dissimilarity Measures

La Gubu, Dedi Rosadi and Abdurakhman

356. Supervised Temporal Autoencoder for Stock Return Time-series Forecasting
Steven Y. K. Wong, Jennifer S. K. Chan, Lamiae Azizi and Richard Y. D. Xu

**DDS-BDAF: The 1st IEEE International Workshop on Dynamic Data Science & Big Data
Analytics in Finance**

WS17

Monday July 12, 2:00-3:00

358. Novel Data-Driven Resilient Portfolio Risk Measures Using Sign and Volatility Correlations
Aerambamoorthy Thavaneswaran, You Liang, Na Yu, Alexander Paseka and Rупpa Thulasiram

372. Dynamic Portfolio Optimization Using Novel Intelligent Probabilistic Forecasts of Risk
Measures

Dynamic Portfolio Optimization Using Novel Intelligent Probabilistic Forecasts of Risk Measures

375. Multimodal Machine Learning for Credit Modeling

Cuong Nguyen, Sanjiv Das, John He, Shenghua Yue, Vinay Hanumaiah, Xavier Ragot and Li Zhang

DDS-BDAF: The 1st IEEE International Workshop on Dynamic Data Science & Big Data Analytics in Finance

WS18

Monday July 12, 2:00-3:00

376. A Novel Algorithmic Multiple Trading Strategy Using Data-Driven Random Weights Innovation Volatility

Md. Erfanul Hoque, Aerambamoorthy Thavaneswaran, Alexander Paseka and Thulasiram Ruppa K.

384. Forecasting Economic Time Series with Long Memory: A Comparative Study using GARMA and LSTM

Hao Wu and Shelton Peiris

412. A Novel Algorithmic Trading Strategy using Hidden Markov Model for Kalman Filtering Innovations

Ethan Johnson-Skinner, You Liang, Na Yu and Alin Morariu

DewCom: The 6th IEEE International Workshop on Dew Computing

WS19

Monday July 12, 2:00-3:00

341. Motrol 2.0: A Dew-oriented Hardware/Software Platform for Batch-benchmarking Smartphones
Cristian Mateos, Matias Hirsch, Juan Toloza and Alejandro Zunino

345. Thine - Approach for a Fault Tolerant Distributed Packet Manager based on Hypercore Protocol
Jannik Blähser, Tim Göller and Matthias Böhmer

378. A Vision of Dew-IoT Ecosystem: Requirements, Architecture and Challenges

Partha Pratim Ray and Karolj Skala

DewCom: The 6th IEEE International Workshop on Dew Computing

WS20

Monday July 12, 2:00-3:00

380. Dew Computing in Industrial Automation: Applying Machine Learning for Process Control
Mladen Sverko, Nikola Tankovic and Darko Etinger

382. What Makes Dew Computing More than Edge Computing for Internet of Things

Marjan Gusev

435. DewOsmosis: A Dew-induced Osmotic Computing Framework in Internet of Music Things
Samarjit Roy, Suman Kalyan Maiti and Debashis De

**DewCom: The 6th IEEE International Workshop on Dew Computing
WS21**

Monday July 12, 3:00 – 4:00

436. An API for Dew Computing Services
Yingwei Wang

443. A Dew Computing Architecture for Smart Parking System with Cloud Image Recognition Service
Yuan-Chih Yu

444. DewGame: Cooperative Game based D2D Communication Enabled Dew Computing in 5G Wireless Network
Subha Ghosh and Debashis De

**DewCom: The 6th IEEE International Workshop on Dew Computing
WS22**

Monday July 12, 3:00 – 4:00

446. Implementation of Dewblock Clients on a Mobile Platform
Minhajur Rahman and Yingwei Wang

450. Serverless and Deviceless Dew Computing: Founding an Infrastructureless Computing
Marjan Gusev

451. Dew Intelligence: Federated learning perspective
Emanuel Guberović, Tomislav Lipić and Igor Čavrak

**DFM: The 8th IEEE International Workshop on Data Flow Models & Extreme-Scale Computing
WS23**

Monday July 12, 3:00 – 4:00

460. An Object-Oriented Interface to The Sparse Polyhedral Library
Tobi Popoola, Ravi Shankar, Anna Rift, Shivani Singh, Eddie Davis, Michelle Strout and Catherine OlschanoWS2ky

**ESAS: The 16th IEEE International Workshop on E-Health Systems & Web Technologies
WS24**

Monday July 12, 3:00 – 4:00

333. Gaming Elements, Applications, and Challenges of Gamification in Healthcare
Fatemah Al Yaqoub and Turki Alanzi

337. Few Shot Learning of COVID-19 Classification Based on Sequential and Pretrained Models: A Thick Data Approach
Darien Sawyer, Jinan Fiaidhi and Sabah Mohammed

392. ProvVacT: A Provenance Based mHealth Application for Tracking Vaccine History
Dilek Yilmazer Demirel and Ozgu Can

**ESAS: The 16th IEEE International Workshop on E-Health Systems & Web Technologies
WS25**

Monday July 12, 3:00 – 4:00

396. A Review of Data Sources for the Study of Ageing
Mary Carlota Bernal, Antoni Martínez-Ballesté and Agusti Solanas

432. Holistic Approach to Intrinsic Capacity Assessment: An Engineering Perspective
Montse Garcia-Famoso, M. Angels Moncusi and Agusti Solanas

437. TIKD: A Trusted Integrated Knowledge Dataspace for Sensitive Healthcare Data Sharing
Julio Hernandez, Lucy McKenna and Rob Brennan

**ICT4SmartGrid: The 2nd IEEE International Workshop on Rising ICT Solutions for Smart
Grids as Multi-energy Systems**

WS 26

Monday July 12, 4:00 – 5:00

137. Deep Learning Applied to Detection of Automatic Reclosers in Power Grid
Francisco Marques, Alano Pinto, Arthur Bastos, Ana Goncalves, Gilherbson Pereira and Flavio Reis

324. Forecasting the Grid Power Demand of Charging Stations from EV Drivers' Attitude
Alberto Bocca, Alberto Macii and Enrico Macii

374. Design of District-level Photovoltaic Installations for Optimal Power Production and Economic Benefit

Matteo Orlando, Edoardo Patti, Sara Vinco, Massimo Poncino, Lorenzo Bottaccioli and Enrico Macii

IEESD: The 11th IEEE International Workshop on Industrial Experience in Embedded Systems Design

WS 27

Monday July 12, 4:00 – 5:00

208. Forecasting Application Cache Behavior using Regression Models

Jakob Danielsson, Janne Suuronen, Marcus Jägemar, Tiberiu Seceleanu, Moris Behnam and Mikael Sjödin

480. Control as a Service

Tiberiu Seceleanu, Ning Xiong and Cristina Seceleanu

MediComp: The 8th IEEE International Workshop on Medical Computing

WS28

Monday July 12, 4:00 – 5:00

46. Motor Imagery: A Review of Existing Techniques, Potentials and Challenges

Olawunmi George and Sheikh Ahamed

214. Integration of m-Health into Primary Health Care for Child Cancer Patients – An Approach to Reduce Health Inequities in Bangladesh

Syed Azizur Rahman, Sheikh Iqbal Ahamed, Nabeel Al-Yateem, Amina Al Marzooqi, Muhammad Arsyad Subu and Swetha Variyath

247. Usability in m-health Applications for Application in Healthcare Environments

Enoch Menezes de Oliveira Júnior and Daniel Scherer

252. IoT-Health Platform to Monitor and Improve Quality of Life in Smart Environments (Student Research Symposium paper)

Pedro Oliveira, Rossana M. C. Andrade and Pedro A. Santos Neto

MediComp: The 8th IEEE International Workshop on Medical Computing

WS29

Monday July 12, 4:00 – 5:00

340. Facial Image Classification for Obstructive Sleep Apnea Pre-Screening

Weihao Lin, Qinyan Zhang, Jijiang Yang, Fang Fang, Qing Wang, Qi Chen and Yi Lei

354. Breast Mass Detection and Classification Using Deep Convolutional Neural Networks for Radiologist Diagnosis Assistance

Tariq Mahmood, Professor Jianqiang Li, Professor Yan Pei, Dr. Faheem Akhtar, Yanhe Jia and Zahid Hussain Khand

377. Joint Extraction of Events in Chinese Electronic Medical Records

Jingnan Wang, Jianqiang Li, Zhichao Zhu, Qing Zhao, Yang Yu, Liyin Yang and Chun Xu

**MediComp: The 8th IEEE International Workshop on Medical Computing
WS30**

Monday July 12, 4:00 – 5:00

379. Medical Named Entity Recognition of Chinese EMRs based on Stacked BILSTM

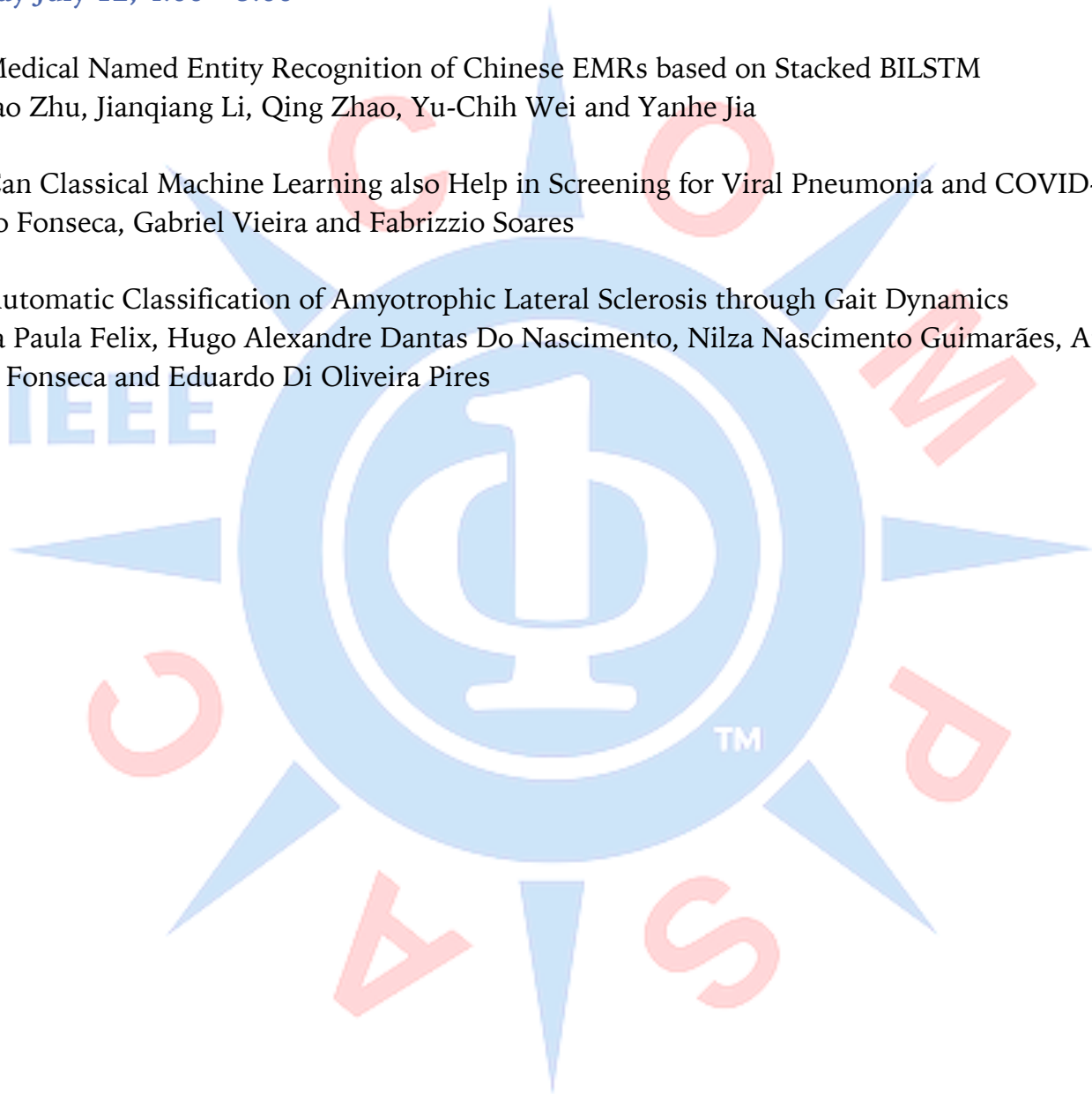
Zhichao Zhu, Jianqiang Li, Qing Zhao, Yu-Chih Wei and Yanhe Jia

420. Can Classical Machine Learning also Help in Screening for Viral Pneumonia and COVID-19?

Afonso Fonseca, Gabriel Vieira and Fabrizzio Soares

453. Automatic Classification of Amyotrophic Lateral Sclerosis through Gait Dynamics

Juliana Paula Felix, Hugo Alexandre Dantas Do Nascimento, Nilza Nascimento Guimarães, Afonso Ueslei Fonseca and Eduardo Di Oliveira Pires



Tuesday July 13

Keynote: IEEE in an Internet Dominated World

Susan K. (Kathy) Land, 2021 IEEE President & CEO

Tuesday July 13, 8:00 – 9:30

As we work together to support the mission and vision of the IEEE, we must remain steadfast in our support for the use of a standardized and peer-reviewed approach in support of scientific research. This will remain is a critical tool for successfully navigating our complex world. Without it, we would be forced to rely solely on intuition, other people's authority, and blind luck.

In her talk, IEEE President Land will discuss cancel culture, social media, its possible impact on the science and technology community and the role IEEE and our members must play.

Plenary Panel: COMPSAC 2021 IEEE Computer Society President's Panel

Tuesday July 13, 10:00 – 11:30

Steve Diamond – 2003 President
Leila De Floriani – 2020 President
Jean-Luc Gaudiot – 2017 President
Hironori Kasahara – 2018 President
Cecilia Metra – 2019 President
Forrest Shull – 2021 President

The IEEE Computer Society depends for its success on a rich volunteer/staff partnership. Our panel of current, past, and emeritus CS Presidents will describe how and why they became involved with the CS, their experience as CS volunteers, and how that contributed to their career and the profession.

Plenary Panel: Career Pointers from Computer Society Leadership

Tuesday July 13, 12:00 – 1:30

Roger Fuji – 2016 President
Dejan Milojicic – 2014 President
Tom Conte – 2015 President
Jean-Luc Gaudiot – 2017 President
Hironori Kasahara – 2018 President

Roger Fuji will moderate a panel of past IEEE Computer Society Presidents who will talk about the important lessons learned in their careers that will aid students and young professionals in advancing their careers.

ASYS Symposium: Autonomous Systems

SYM1

Tuesday July 13, 2:00 – 3:00

36. Implementing Inductive Logic into Embedded Industrial Control System with Polynomial Ring on F2

Luo Mincong and Yu Shan

87. Comparison of Three Metaheuristic Algorithms for Optimization of Cyber Physical Systems

Fu-Shiung Hsieh

122. Domain-Agnostic Context-Aware Framework for Natural Language Interface in a Task-Based Environment

Sarthak Tiwari and Ajay Bansal

CAP Symposium: Computer Architectures & Platforms

SYM2

Tuesday July 13, 2:00 – 3:00

136. The HDFS Replica Placement Policies: a comparative experimental investigation

Rhauani Weber Aita Fazul and Patrícia Pitthan Barcelos

191. Synthesis of Heterogeneous Dataflow Models from Synchronous Specifications

Omair Rafique, Yu Bai, Klaus Schneider and Guangxi Yan

242. LLM-shark -- A Tool for Automatic Resource-boundness Analysis and Cache Partitioning Setup

Jakob Danielsson, Tiberiu Seceleanu, Marcus Jägemar, Moris Behnam and Mikael Sjödin

249. Resource Sharing and Security Implications on Machine Learning Inference Accelerators

Plínio Silveira, Cesar Augusto De Rose, Francisco Avelino Zorzo, Miguel Gomes Xavier, Dejan Milojcic, Sai Rahul Chalamalasetti and Sergey Serebryakov

33. HybridSkipList: A Case Study of Designing Distributed Data Structure with Hybrid RDMA

Teng Ma, Ning Liu and Dongbiao He

CELT Symposium: Computing Education & Learning Technologies

SYM3

Tuesday July 13, 2:00 – 3:00

82. CLACER: A Deep Learning-based Compilation Error Classification Method for Novice Students' Programs

Zheng Li, Fuxiang Sun, Haifeng Wang, Yifan Ding, Xiang Chen and Yong Liu

200. Mathematics in Higher Education: A Transition from Blended to Online Learning in Pandemic Times

Federica Galluzzi, Marina Marchisio, Fabio Roman and Matteo Sacchet

263. Using Cognitive Interest Graphs and Knowledge-activated Attention for Learning Resource Recommendation

Zeyu He, Jianzong Kuang, Wang Li and Yonghong Yan

119. Automatic Slides Generation in the Absence of Training Data

Luca Cagliero and Moreno La Quatra

DSAT Symposium: Data Sciences, Analytics & Technologies

SYM4

Tuesday July 13, 2:00 – 3:00

3. Using GAS for Speedy Generation of Hybrid Multi-Cloud Auto Generated AI Services

Gregor von Laszewski, Anthony Orłowski, Richard Otten, Reilly Markowitz, Sunny Gandhi, Adam Chai, Caleb Wilson, Geoffrey Fox and Wo Chang

12. A Machine Learning Approach for Gas Price Prediction in Ethereum Blockchain

Rawya Mars, Amal Abid, Saoussen Cheikhrouhou and Slim Kallel

69. Intelligent Probabilistic Forecasts of Day-Ahead Electricity Prices in a Highly Volatile Power Market

Behrouz Banitalebi, Srimantoorao Appadoo, Yuvraj Gajpal and Aerambamoorthy Thavaneswaran

78. Learning to Match Workers and Tasks via a Multi-View Graph Attention Network

Nan Cui, Chunqi Chen, Beijun Shen and Yuting Chen

DSAT Symposium: Data Sciences, Analytics & Technologies

SYM5

Tuesday July 13, 2:00 – 3:00

190. A Fast Training Method using Bounded Continual Learning in Image Classification

Seunghui Jang and Yanggon Kim

259. CGAN-IRB: A Novel Data Augmentation Method for Apple Leaf Diseases.

Xinbin Yuan, Cong Yu, Bin Liu, Henan Sun and Xianyu Zhu

268. An Empirical Evaluation of Algorithms for Data Labeling

Teodor Fredriksson, David Issa Mattos, Jan Bosch and Helena Holmström Olsson

274. Enhancing LSTM Prediction of Vehicle Traffic Flow Data via Outlier Correlations
Wesley Fitters, Alfredo Cuzzocrea and Marwan Hassani

CELT Symposium: Computing Education & Learning Technologies

SYM6

Tuesday July 13, 3:00 – 4:00

128. What should I learn next? Ranking Educational Resources

Victor Connes, Colin De La Higuera and Hoel Le Capitaine

131. From Teaching Books to Educational Videos and Vice Versa: A Cross-media Content Retrieval Experience

Luca Cagliero, Lorenzo Canale and Laura Farinetti

135. Playful Learning: An Alternate Reality Game to Learn SQL at University

Laura Farinetti, Mara Lupano and Domenico Morreale

ASYS Symposium: Autonomous Systems

SYM7

Tuesday July 13, 3:00 – 4:00

154. Robot Motion Planning: Can GPUs be a Game Changer?

Enrico Saccon, Paolo Bevilacqua, Daniele Fontanelli, Marco Frego, Luigi Palopoli and Roberto Passerone

167. YOLOv4-object: An Efficient Model and Method for Object Discovery

Mang Ning, Yao Lu, Wenyan Hou and Mihail Matskin

296. Streaming Data Priority Scheduling Framework for Autonomous Driving by Edge

Lingbing Yao, Hang Zhao, Jie Tang, Shaoshan Liu and Jean-Luc Gaudiot

CELT Symposium: Computing Education & Learning Technologies

SYM8

Tuesday July 13, 3:00 – 4:00

199. Enhancing Student Learning Through an Open Educational Resource Competition

Henry C. B. Chan, Isabel M. Kemp, Winnie C. L. Leung, Edmundo Tovar and Sorel Reisman

218. An Immersive Virtual Reality Platform for Training CBRN Operators

Fabrizio Lamberti, Federico De Lorenzis, Filippo Gabriele Praticò and Massimo Migliorini

271. Study and Proposal for Visual Programming Platform - Design for Educational Robotics for Children Aged 8 to 14 Years

Daniel Scherer and Fábio Guimarães

DSAT Symposium: Data Sciences, Analytics & Technologies

SYM9

Tuesday July 13, 3:00 – 4:00

84. A Novel Dynamic Demand Forecasting Model for Resilient Supply Chains using Machine Learning

Md. Erfanul Hoque, Aerambamoorthy Thavaneswaran, Srimantoorao S. Appadoo, Ruppa K. Thulasiram and Behrouz Banitalebi

90. ROCT: Radius-based Class Overlap Cleaning Technique to Alleviate the Class Overlap Problem in Software Defect Prediction

Shuo Feng, Jacky Keung, Jie Liu, Yan Xiao, Xiao Yu and Miao Zhang

118. Personalized and Dynamic top-k Recommendation System using Context Aware Deep Reinforcement Learning

Anubha Kabra and Anu Agarwal

160. Defect Detection of Metal Nuts Applying Convolutional Neural Networks

Daniel Sauter, Anna Schmitz, Fulya Dikici, Hermann Baumgartl and Ricardo Buettner

DSAT Symposium: Data Sciences, Analytics & Technologies

SYM10

Tuesday July 13, 3:00 – 4:00

315. FaasRS: Remote Sensing Image Processing System on Serverless Platform

Guang Yang, Jie Liu, Muzi Qu, Shuai Wang, Dan Ye and Hua Zhong

59. Quantifying Event Impact on the Bitcoin Blockchain

Anthony Luo and Dianxiang Xu

66. Improved Causal Models of Alzheimer's Disease

Hengyi Hu and Larry Kerschberg

70. Hierarchical Clustering Based on Local Cores and Sharing Concept

Jinxin Shi, Qingsheng Zhu and Junnan Li

DSAT Symposium: Data Sciences, Analytics & Technologies

SYM11

Tuesday July 13, 4:00 – 5:00

88. CASR: A Collaborative Attention Model for Session-based Recommendation

Peiyao Han, Nan Wang, Kun Li, Xiaokun Li and Yong Liu

132. Assessing Palliative Care Needs Using Machine Learning Approaches

Yun Shi, Zhiyao Wu, Shaolun Zhang, Hong Xiao and Yijun Zhao

158. Visual Defect Detection of Metal Screws using a Deep Convolutional Neural Network

Visual Defect Detection of Metal Screws using a Deep Convolutional Neural Network

DSAT Symposium: Data Sciences, Analytics & Technologies

SYM12

Tuesday July 13, 4:00 – 5:00

227. Transaction Anomaly Detection based on Graph Networks

Lian Yu, Ning Zhang, Zhiya Cheng and Chang Xu

232. Consumer Fraud Detection via P-feature Conversion

Shanyan Lai, Junfan Wu, Zhiwei Ma, Chunyang Ye and Hui Zhou

234. Lightnings Over Rose Bouquets: An Analysis of the Topology of the Bitcoin Lightning Network

Andrea Lisi, Damiano Di Francesco Maesa, Paolo Mori and Laura Ricci

277. Bayesian Based Predictive Analytics for Transportation Analytic Application via Machine Learning

Marshall Jackson, Carson Leung, Diarra Mbacke and Alfredo Cuzzocrea

EATA Symposium: Emerging Advances in Technologies & Applications

SYM13

Tuesday July 13, 4:00 – 5:00

10. A Survey on Blockchain Data Analysis

Wenhan Hou, Bo Cui and Ru Li

41. A Novel Software Defect Prediction Method Based on Hierarchical Neural Network

Huiqun Yu, Xingjie Sun, Ziyi Zhou and Guisheng Fan

123. Diversifying Relevant Search Results from Social Media using Community Contributed Images

Vaibhav Kalakota and Ajay Bansal

EATA Symposium: Emerging Advances in Technologies & Applications

SYM14

Tuesday July 13, 4:00 – 5:00

250. In-air Signature Authentication Using Smartwatch Motion Sensors

Gen Li, Lingfeng Zhang and Hiroyuki Sato

240. Effectiveness of a Data-based Influence Maximization Algorithm Using Information Diffusion Cascades

Takuya Nagase and Sho Tsugawa

275. Estimating the Incidence of Adverse Weather Effects on Road Traffic Safety Using Time Series Embeddings

Jacopo Fior and Luca Cagliero

DSAT Symposium: Data Sciences, Analytics & Technologies

SYM15

Tuesday July 13, 4:00 – 5:00

163. One Source to Detect them All: Gender, Age, and Emotion Detection from Voice

Syed Rohit Zaman, Dipan Sadekeen, Aqib Alfaz and Rifat Shahriyar

185. SALAD: Self-Adaptive Lightweight Anomaly Detection for Real-time Recurrent Time Series

Ming-Chang Lee, Jia-Chun Lin and Ernst Gunnar Gran

289. TimeRadar: Visualizing the Dynamics of Multivariate Communities via Timeline Representations

V.T. Ngan Nguyen, Jon Hass and Tommy Dang

Wednesday July 14

Keynote: Safety and Resiliency Challenges for Highly Autonomous Intelligent Systems
Cecilia Metra, University of Bologna, Italy – 2019 IEEE Computer Society President
Wednesday July 14, 8:00 – 9:30

Intelligent systems, capable of taking autonomous decisions based on AI algorithms, are becoming more and more widespread in several application fields (autonomous robots, autonomous vehicles, smart factories, smart agriculture, etc.). This thanks to their possible adoption to replace and/or collaborate with humans in harsh environments (hospitals, mines, space, etc.) and/or in difficult jobs (goods delivery, surveillance, etc.). Moreover, autonomous robots (e.g., service robots) and vehicles (e.g., drones) are today's receiving an increasing interest, due to their possible pivotal role in facing the current pandemic emergency and its aftermath. They are complex systems, requiring intelligence at the edge (for low-latency data acquisition and processing), in the network, and up to the cloud and related services. Since such autonomous intelligent systems are in a closed collaboration with human beings and/or the health of human beings may depend on their operation, the need to guarantee their functional safety and resiliency with respect to hazardous conditions emerges. Enabling to increase the autonomy level of such intelligent systems, thus moving towards a smarter world, mandates to satisfy stronger requirements in terms of their functional safety and resiliency. Safety and resiliency challenges to enable highly autonomous intelligent systems will be discussed.

Plenary Panel: Deriving Past, Present, and Future Tech to More Intelligent and Resilient Digital Realities for a Collaborative World
Wednesday July 14, 10:00 – 11:30

Kathy Grise, Senior Program Director – IEEE Future Directions
Tom Coughlin, President, Coughlin Associates
Nicholas Napp, Founder, CEO Xmark Labs
Louis Nisiotis, University of Central Lancashire, Cyprus Campus
Jewika Ranaweera, Oracle
May Wang, Georgia Institute of Technology

There is the philosophical question of “does history repeat itself”. One learns from the past to affect the present, which builds our future. Advances in technology are built upon previous innovations. New technologies are derived from existing technologies. The IEEE leverages past and current technologies to advance work on new and emerging technologies through serving as a catalyst for developing new innovations, products and services.

IEEE Future Directions serves as an incubator for these new initiatives. One of its focus areas, Digital Reality serves to explore and enable the coming Intelligent and Resilient Digital Realities

through collaboration among technologists, engineers, regulators, practitioners, and ethicists around the world. The Digital Transformation is fueled by advances in technology, such as Artificial Intelligence (AI), Machine Learning (ML), and applications using the copious amounts of continuously generated data. By leveraging these technologies and others developed such as Augmented Reality (AR), Virtual Reality (VR), and Digital Twins, the line between the physical world and the digital world will be increasingly less distinct. Applications are already quickly emerging across the broad fields of gaming, entertainment, medicine, automotive, education, manufacturing, enabling the sharing of services, and more.

Emphasis will be upon presenting practical applications and its implementations of interest to attendees. Subject matter expert speakers will comment on current and past implementations. Of course, the speakers will look ahead to the future.

Plenary Panel: Future of the Workforce
Wednesday July 14, 12:00 – 1:30

Dejan Milojicic, Hewlett Packard Labs
Nita Patel, Harris Technologies
Tom Coughlin, Coughlin Associates

The Future of Workforce panel will discuss issues and technologies that impact the future of the workforce at the corporate and regional scale as well as addressing effects on individuals in the workforce. The focus will be on economic, technological, ecological, and societal matters. The panel will address categories such as personal technologies, automation, technology infrastructure, and security. Outcomes from 10 globally held workshops engaging high profile individuals from industry, government and academia will be presented, predicting the direction of how the workforce will evolve due to pandemics and beyond. Based on their work, panelists will make recommendations to industry, legislators, and professional organizations regarding what to consider when planning for the future of their workforces.

HCSC Symposium: Human Computing & Social Computing
SYM16
Wednesday July 14, 2:00 – 3:00

51. Improving Human-Centric Software Defect Evaluation, Reporting, and Fixing
Anuradha Madugalla, John Grundy, Kenny Huynh, Juvent Benarivo, Chew Da Xuan, Giridhar Gopal Sharma and Jeffrey Kang

169. PeakVis: a Visual Analysis Tool for Social Network Data and Video Broadcasts
Pedro Henrique Morais Sanvido, Gabriela Birnfeld Kurtz, Carlos Roberto Gaspar Teixeira, Pedro Prokath Wagner, Lorenzo Leuck, Milene Silveira, Isabel Harb Manssour and Roberto Tietzmann

183. College Life is Hard! - Shedding Light on Stress Prediction for Autistic College Students using Data-Driven Analysis

Tanzima Islam, Phillip Wu Liang, Forest Sweeney, Cody Pragner, Jayaraman Thiagarajan, Moushumi Sharmin and Shameem Ahmed

ITiP Symposium: IT in Practice

SYM17

Wednesday July 14, 2:00 – 3:00

13. Challenges in Geographically Distributed Information System Development: A Case Study
Jali Asp, Toni Taipalus and Ville Seppänen

47. Real-time End-to-End Federated Learning: An Automotive Case Study
Hongyi Zhang, Jan Bosch and Helena Holmström Olsson

180. Data Integrity Security Spots Detected by Object Reference
Rajasree Punneeth Radhakrishnan, Michael Shin and Pushkar Ogale

193. Behind The Mask: Masquerading The Reason for Prediction
Tomohiro Koide and Masato Uchida

NCIW Symposium: Networks, Communications, Internet & Web Technologies

SYM18

Wednesday July 14, 2:00 – 3:00

37. Towards Unified Programming for the Data Plane of Software Defined Network
Zijun Hang, Yongjie Wang and Shuguang Huang

79. Resource Discovery for Edge Computing over Named Data Networking
Daishi Kondo, Thomas Ansquer, Yosuke Tanigawa and Hideki Tode

103. A Multipath Routing Approach for Tile-based Virtual Reality Video Streaming Based on SDN
Fanyuan Zou, Yumei Wang and Yu Liu

224. A Data Scheduling Method for Video-on-Demand Systems on Radio Broadcasting Environments

Satoru Matsumoto, Tomoki Yoshihisa and Shinji Shimojo

27. Bringing Opportunistic Networking to Smartphones: A Pragmatic Approach
Frédéric Guidec, Yves Mahéo, Pascale Launay, Lionel Touseau and Camille Noûs

SCH Symposium: Smart & Connected Health

SYM19

Wednesday July 14, 2:00 – 3:00

134. An Investigation on Non-Invasive Brain-Computer Interfaces: Emotiv EPOC+ Neuroheadset and Its Effectiveness

Jobair Hossain, Maria Valero and Hossain Shahriar

161. Pain Level Assessment for Infants Using Facial Expression Scores

Hermann Baumgartl, Dennis Flathau, Samuel Bayerlein, Daniel Sauter, Ingo J. Timm and Ricardo Buettner

179. Diagnostic Imaging Support System for Rheumatoid Arthritis Using Ultrasound Images

Kenichi Arai, Chisato Miura, Shinya Kawajiri, Tetsuo Imai and Toru Kobayashi

203. Does Our Collective Stringency Control the Virus? Investigating Lockdown Effectiveness on Community Mobility Data

Kangcheng Li, Jiangtao Wang, Zhicen Liu, Yunqi Zhang and Zihao Xie

SEPT Symposium: Security, Privacy & Trust in Computing

SYM20

Wednesday July 14, 2:00 – 3:00

52. The Impact Analysis of Multiple Miners and Propagation Delay on Selfish Mining

Qing Xia, Wensheng Dou, Tong Xi, Jing Zeng, Fengjun Zhang, Jun Wei and Geng Liang

80. Detecting Event-synced Navigation Attacks across User-generated Content Platforms

Hiroki Nakano, Daiki Chiba, Takashi Koide and Mitsuaki Akiyama

107. Integrating Heterogeneous Security Knowledge Sources for Comprehensive Security Analysis

Guodi Wang, Runzi Zhang, Tong Li and Zhen Yang

195. DDAF: Deceptive Data Acquisition Framework against Stealthy Attacks in Cyber-Physical Systems

Md Hasan Shahriar, Mohammad Ashiqur Rahman, Nur Intiazul Haque and Badrul Chowdhury

HCSC Symposium: Human Computing & Social Computing

SYM21

Wednesday July 14, 3:00 – 4:00

196. Visualization as a Tool to Understand the Experience of College Students with Autism
Sean McCulloch, Joe Gildner, Bradley Hoefel, Gabrielle Cervantes, Shameem Ahmed and Moushumi Sharmin

282. Detecting Offensive Content on Social Media During Anti-Lockdown Protests in Michigan
Hieu Nguyen, Jihye Moon, Bradshaw Pines and Swapna Gokhale

ITiP Symposium: IT in Practice

SYM22

Wednesday July 14, 3:00 – 4:00

194. SINETStream: Enabling Research IoT Applications with Portability, Security and Performance Requirements

Atsuko Takefusa, Jingtao Sun, Ikki Fujiwara, Hiroshi Yoshida, Kento Aida and Calton Pu

290. Social-based City Reconstruction Planning in Case of Natural Disasters: A Deep Learning Approach

Ghulam Mudassir and Antinisca Di Marco

309. Ensemble-based Efficient Anomaly Detection for Smart Building Control Systems

Nur Imtiazul Haque, Mohammad Ashiqur Rahman and Hossain Shahriar

50. A Human-centric Approach to Building a Smarter and Better Parking Application

Chenlin Li, Yuting Yu, Jeremy Leckning, Weicheng Xing, Chun Long Fong, John Grundy, Devi Karolita, Jennifer McIntosh and Humphrey Obie

SCH Symposium: Smart & Connected Health

SYM23

Wednesday July 14, 3:00 – 4:00

319. Auto-Grading OCT Images Diagnostic Tool for Retinal Diseases

Shiyu Tian, Nihel Charfi, Jannatul F Tumpa, Nivedh Mudiam, Velinka Medic, Judy E Kim and Sheikh I Ahamed

321. Improving Clinical Predictions of Severe Sepsis using a Variational Long Short-term Memory Autoencoder

Victor Nguyen, Lisa Meyer-Baese, J. Parker Evans and May Wang

323. Data-Driven Generation of Medical-Research Hypotheses in Cancer Patients

William Chu

304. Towards a Template Matching Approach for Human Fall Detection
Snigdha Chaudhari and Razib Iqbal

SCH Symposium: Smart & Connected Health

SYM24

Wednesday July 14, 3:00 – 4:00

239. A Multi-case Perspective Analytical Framework for Discovering Human Daily Behavior from Sensors using Process Mining

Frans Prathama, Bernardo Nugroho Yahya and Seok-Lyong Lee

269. Pain Action Unit Detection in Critically Ill Patients

Subhash Nerella, Julie Cupka, Matthew Ruppert, Patrick Tighe, Azra Bihorac and Parisa Rashidi

272. A Markovian Probabilistic Model for Risk Analysis and Forecasting in Big Healthcare Data Settings

Antonio Coronato and Alfredo Cuzzocrea

174. Prediction of COVID-19 from Chest X-ray Images Using Multiresolution Texture Classification with Robust Local Features

Zakariya Oraibi and Safaa Albasri

SEPT Symposium: Security, Privacy & Trust in Computing

SYM25

Wednesday July 14, 3:00 – 4:00

261. An Empirical Study of Vulnerabilities in Robotics

Kaitlyn Cottrell, Dibyendu Brinto Bose, Hossain Shahriar and Akond Rahman

318. LANTENNA: Exfiltrating Data from Air-Gapped Networks via Ethernet Cables Emission

Mordechai Guri

74. D-SAVI: A Dynamic and Lightweight Framework for Source Address Security Enhancement in SDN-based Datacenters

Qizhao Zhou, Junqing Yu and Dong Li

MOWU Symposium: Mobile, Wearable & Ubiquitous Computing

SYM26

Wednesday July 14, 4:00 – 5:00

48. An Adaptively Parameterized Algorithm Estimating Respiratory Rate from a Passive Wearable RFID Smart Garment

Robert Ross, William Mongan, Patrick O'Neill, Ilhaan Rasheed, Adam Fontecchio, Geneviève Dion and Kapil Dandekar

104. A Bowel Sound Detection Method Based on a Novel Non-speech Body Sound Sensing Device

Yuzhe Qiao, Liang Wang and Xianping Tao

284. A Transfer Learning Approach to Surface Detection for Accessible Routing for Wheelchair Users

Valeria Mokrenko, Haoxiang Yu, Vaskar Raychoudhury, Janick Edinger, Roger O. Smith and Md Osman Gani

ITiP Symposium: IT in Practice

SYM27

Wednesday July 14, 4:00 – 5:00

76. Towards an Indoor Navigation System Using Monocular Visual SLAM

Akshat Bajpai and Sepehr Amir-Mohammadian

91. EasyCloud: Multi-clouds Made Easy

Cosimo Anglano, Massimo Canonico and Marco Guazzone

138. Augmented Reality for Training and Maintenance of Reclosers: A Case Study of a Wearable Application

Arthur Bastos, Samira Ribeiro, Alano Pinto, Francisco Marques, Leonardo Ferreira and Flavio Reis

236. Combining Mobile Crowdsensing and Wearable Devices for Managing Alarming Situations

Viktoriya Kutsarova and Mihhail Matskin

MOWU Symposium: Mobile, Wearable & Ubiquitous Computing

SYM28

Wednesday July 14, 4:00 – 5:00

298. Predicting Next Call Duration: A Future Direction to Promote Mental Health in the Age of Lockdown

Sudip Vhaduri, Sayanton V Dibbo, Chih-You Chen and Christian Poellabauer

SCH Symposium: Smart & Connected Health

SYM29

Wednesday July 14, 4:00 – 5:00

283. Data Analysis Methods for Health Monitoring Sensors: A survey
Shahriar Sobhan, Saiful Islam, Maria Valero, Hossain Shahriar and Sheikh Ahamed

285. Unmasking the Mask Debate on Social Media
Luca Cerbin, Jason DeJesus, Julia Warnken and Swapna Gokhale

295. Gestation: A Microservice architecture for a prenatal care application
José George Dias de Souza

299. Towards Developing an EMR in Mental Health Care for Children's Mental Health Development among the Underserved Communities in USA
Kazi Zawad Arefin, Kazi Shafiul Alam, Masud Rabbani, Peter Dobbs, Leah Jepson, Amy Leventhal, Amy Van Hecke and Sheikh Iqbal Ahamed

**SEPT Symposium: Security, Privacy & Trust in Computing
SYM30**

Wednesday July 14, 4:00 – 5:00

121. A Systematic Mapping Study on Approaches for AI-Supported Security Risk Assessment
Gencer Erdogan, Enrique Garcia-Ceja, Åsmund Hugo, Phu Nguyen and Sagar Sen

209. Towards Provenance-based Trust-aware Model for Socio-Technically Connected Self-Adaptive System
Hyo-Cheol Lee and Seok-Won Lee

258. Impact of Resource Constrained Networks on the Performance of NIST Round-3 PQC Candidates
Dale Auten and Thoshitha Gamage

Thursday July 15

Keynote: Envisioning the Future of Software Engineering

Forrest Shull, Carnegie Mellon, Software Engineering Institute, 2021 IEEE Computer Society President

Thursday July 15, 8:00 – 9:30

The world's dependence on software became very visible earlier this year when millions suddenly joined the ranks of remote workers as companies closed their doors in reaction to Covid 19. Software gained the spotlight as many scrambled to determine what could and could not be done virtually, yet our reliance on software has been deeply rooted—and growing at an increasingly rapid rate—for many years. Today, software is clearly ubiquitous—improving our lives every day, driving efficiency and productivity, increasing competitiveness and innovation, providing new jobs and upward mobility for millions of people, and is vital to implementing aspects of national security.

Although software has been compared to electricity in terms of our dependence, it's a more difficult commodity to understand. It's extremely flexible, endlessly varied, never completely done, and it controls diverse and intertwined functions in ways that few fully understand. And, as computing and software technologies advance, our dependence on the critical nature of software also increases for individuals, organizations, markets, and governments.

While much of the focus in the software engineering and research communities has continued to revolve around specific topics or innovations, there's also value in looking further ahead. Recently, we conducted a larger initiative to look at the wider discipline of software engineering and envision the future we can create – and what we need to do to prepare for that future. While we know software can deliver more and more capabilities, we need to step back and ask: can it do so safely? Are the software-reliant systems we're creating evolvable? Reliable? Timely? Secure? Meanwhile, new system types and software innovations, such as those driven by artificial intelligence, are adding new dimensions of both opportunity and risk as we begin to entrust software with life and death decisions.

As the United States' Federally Funded Research and Development Center focused on improving the practice of software engineering, the Carnegie Mellon University Software Engineering Institute is working to develop a broad, impact-oriented national agenda for software engineering research and development. Developing this agenda has been a community effort with participation from a broad coalition of thought leaders in industry, academia, and government.

In this talk, I will share some of our current results in terms of future challenges in engineering software-reliant systems, and key components of a research roadmap that will drive advances in foundational software engineering principles across system types such as intelligent, autonomous, safety-critical, and data-intensive systems. With our collaborators, we have also been working to

articulate grand challenge problems that can be used to focus research efforts and provide confidence that progress is being made to meet important future needs. Our aim is for this work to aid the development of an ecosystem for software engineering that engages academic, government, and commercial communities to work together on solving future problems and developing critical abilities.

Plenary Panel: Publications of the Future

Thursday July 15, 10:00 – 11:30

Irena Bojanova, NIST

Dejan Milojicic, Hewlett Packard Labs

George O. Strawn, NSF

Tiziana Margaria, University of Limerick

San Murugesan, BRITE Professional Services

Charalampos (Babis) Z. Patrikakis, University of West Attica

Will publications of the future be personalized, bias-free, AI-driven information mashups? Will you be able to get the information you need, when you need it, where you need it and explainable? Will there be an Amazon for science articles — you buy the article, not a whole journal, and for \$2-3, not for \$20-30. Should joining a scientific society be decoupled from receiving their journal(s)? The ~\$100 per year you pay supports your society, maybe it needn't buy articles you don't read. Finally, will there be new suitable applications that would allow you to read scientific papers on popular devices as Kindle? Let's discuss. Let's imagine.

SETA Symposium: Software Engineering Technologies & Applications

SYM31

Thursday July 15, 2:00 – 3:00

6. Recommending Bug-fixing Comments from Issue Tracking Discussions in Support of Bug Repair
Rrezarta Krasniqi

71. Automatic Learning Path Recommendation for Open Source Projects Using Deep Learning on Knowledge Graphs

Hang Yin, Zhiyu Sun and Yanchun Sun

77. Predicting Entity Relations across Different Security Databases by Using Graph Attention Network

Liu Yuan, Yude Bai, Zhenchang Xing, Sen Chen, Xiaohong Li and Zhidong Deng

86. Graphical Modeling VS. Textual Modeling: An Experimental Comparison Based on iStar Models
Wenxing Liu, Yunduo Wang, Qixiang Zhou and Tong Li

SETA Symposium: Software Engineering Technologies & Applications

SYM32

Thursday July 15, 2:00 – 3:00

93. A Support Tool for the L+1-layer Divide & Conquer Approach to Leads-to Model Checking
Yati Phyo, Canh Do Minh and Kazuhiro Ogata

115. Exploiting Multi-aspect Interactions for God Class Detection with Dataset Fine-tuning
Shaojun Ren, Chongyang Shi and Shuxin Zhao

127. Uncertainty Modeling and Quantitative Evaluation of Cyber-physical Systems
Chenchen Yang and Jing Liu

SETA Symposium: Software Engineering Technologies & Applications

SYM33

Thursday July 15, 2:00 – 3:00

210. Trace-based Intelligent Fault Diagnosis for Microservices with Deep Learning
Hao Chen, Kegang Wei, An Li, Tao Wang and Wenbo Zhang

231. API Change Impact Analysis for Android Apps
Tarek Mahmud, Mujahid Khan, Jihan Rouijel, Meiru Che and Guowei Yang

237. A Self-enhanced Automatic Traceability Link Recovery via Structure Knowledge Mining for Small-scale Labeled Data

Lei Chen, Dandan Wang, Lin Shi and Qing Wang

230. A Large-Scale Empirical Study of COVID-19 Themed GitHub Repositories

Liu Wang, Ruiqing Li, Jiaxin Zhu, Guangdong Bai and Haoyu Wang

Student Research Symposium

SYM34

Thursday July 15, 2:00 – 3:00

293. Parallel Deep Neural Networks for Musical Genre Classification: A Case Study
Hui Yuan, Wenjia Zheng, Yun Song and Yijun Zhao

430. How Do Avatar Appearances Affect Communication from Others?

Yasuaki Kobayashi, Tomoya Kawakami, Satoru Matsumoto, Tomoki Yoshihisa, Yuuichi Teranishi and Shinji Shimojo

SIOT Symposium: Smart IoT Systems & Applications

SYM35

Thursday July 15, 2:00 – 3:00

38. Consistent Substitution of Object in Rule-based IoT Applications

Gwen Salaün

217. Securing Smart Homes via Software-Defined Networking and Low-Cost Traffic Classification

Holden Gordon, Christopher Batula, Bhagyashri Tushir, Behnam Dezfouli and Yuhong Liu

201. MI-FIWARE: A web component development method for FIWARE using microservices

Juan Alberto Llopis Expósito, Manel Mena Vicente, Javier Criado Rodríguez and Luis Fernando Iribarne Martínez

SETA Symposium: Software Engineering Technologies & Applications

SYM36

Thursday July 15, 3:00 – 4:00

140. Identification of Informative Communications in Social Networks during Crisis: Case of COVID-19

Zhuoli Xie, Ajay Jayanth, Kapil Yadav, Guanghui Ye and Lingzi Hong

141. Perceived Benefits of Continuous Deployment in Software-Intensive Embedded Systems

Anas Dakkak, David Issa Mattos and Jan Bosch

142. Local and Global Feature Based Explainable Feature Envy Detection

Xin Yin, Chongyang Shi and Shuxin Zhao

168. Graph Representation for Data Flow Coverage

Mario Concilio Neto, Roberto Paulo Andrioli de Araujo, Marcos Lordello Chaim and Jeff Offutt

SETA Symposium: Software Engineering Technologies & Applications

SYM37

Thursday July 15, 3:00 – 4:00

65. MKEA-TCP: A Mutant Kill-based Local Search Augmented Evolutionary Algorithm Approach for Test Case Prioritization

Ekincan Ufuktepe, Deniz Kavzak Ufuktepe and Korhan Karabulut

85. A Variability-Enabling and Model-Driven Approach to Adaptive Microservice-based Systems

Chang-ai Sun, Jing Wang, Zhenxian Liu and Yanbo Han

130. Second-Order Mutation Testing Cost Reduction Based on Mutant Clustering using SOM Neural Network Model

Jing Liu and Li Song

139. Weighted Reward for Reinforcement Learning based Test Case Prioritization in Continuous Integration Testing

Guowei Li, Yang Yang, Zhaolin Wu, Tiange Cao, Yong Liu and Zheng Li

SETA Symposium: Software Engineering Technologies & Applications

SYM38

Thursday July 15, 3:00 – 4:00

149. DockerGen: A Knowledge Graph based Approach for Software Containerization

Jiahong Zhou, Hongjie Ye, Wei Chen, Jiaxin Zhu, Guoquan Wu and Wei Jun

150. An Architecture for Enabling A/B Experiments in Automotive Embedded Software

Yuchu Liu, Jan Bosch, Helena Holmström Olsson and Jonn Lantz

156. Multi-Fault Localization Based on Fault-Relevant Statistics

Sihan Xu, Ya Gao, Xiangrui Cai and Zhiyu Wang

SETA Symposium: Software Engineering Technologies & Applications

SYM39

Thursday July 15, 3:00 – 4:00

330. Scrum, Sampling, and the 90 Percent Syndrome

Robert Ward and Carl Chang

178. Code Change Sniffer: Predicting Future Code Changes with Markov Chain

Ekincan Ufuktepe and Tugkan Tuglular

222. Key Aspects Augmentation of Vulnerability Description based on Multiple Security Databases

Hao Guo, Zhenchang Xing, Sen Chen, Xiaohong Li, Yude Bai and Hu Zhang

314. Towards a Modelling Workbench with flexible Interaction Models for Model Editors operating through Voice and Gestures

João F. Carvalho and Vasco Amaral

Eta Kappa Nu Panel

Friday July 16, 8:00 – 9:30

https://www.youtube.com/watch?v=MtHRZOMv_Sg

The labor market has changed in the last few years. During this session, differences between the IT industry of 20 years ago and today will be discussed. Professional speakers from different parts of the world will give a broad and international overview of the topic. Furthermore there will be speakers of different ages in order to compare the various points of view of different generations of professionals. The event will be hosted by the Mu Nu Chapter of IEEE HKN in collaboration with the Mu Tau, Nu Alpha, and Nu Beta Chapter.

Fast Abstract 1

Friday July 16, 10:00 – 11:30

14. Examining the Perception of Drilling Depth Using Auditory Cues

Guoxuan Ning, Bill Kapralos, Alvaro Uribe Quevedo, Kc Collins, Kamen Kanev and Adam Dubrowski

106. An Innovative Virtual Learning Environment to Enhance Age-Friendly Cultural Competencies

Pamela Mutombo, Andrei Torres, Bill Kapralos, Brenda Gamble, Celeste Adams, Lynda Lawson, Adam Dubrowski and Celina Da Silva

166. Person-centered Virtual Serious Games: Mental Health Education

Celina da Silva, Andrei Torres, Bill Kapralos, Eva Peisachovich, Adam Dubrowski, Veronica Baltazar, Bilal Qureshi and Nelson Caraballo

219. Edge Computing Smart Healthcare Cooperative Architecture for COVID-19 Medical Facilities

Mateus Silva, Ricardo Rabelo, Vicente Amorim and Thiago D'Angelo

100. Research on Periodic Precaching Optimization Strategy Based on Access Mode

Ye Liang, Li Weijie and Zhu Wenhao

211. Artificial Intelligence-based School Decision Support System to Enhance Care Provided for Children at Schools in the United Arab Emirates

Nabeel Al-Yateem, Amina Al Marzooqi, Jacqueline Maria Dias, Syed Azizur Rahman, Muhammad Arsyad Subu, Iqbal Shaikh Ahamed and Mohammad Alshabi

465. VisLan: A Tool for Visualizing Landmark files in Source Code

Sandeep Reddivari

Fast Abstract 2

Friday July 16, 12:00 – 1:30

212. Relationship between Internet Gaming Addiction and Body Mass Index Status among Indonesian Junior High School Students

Muhammad Arsyad Subu, Nabeel Al-Yateem, Imam Waluyo, Rinto Agustino, Jacqueline Dias, Syed Azizur Rahman, Amina Al Marzooqi and Iqbal Shaikh Ahamed

213. Social Media Use and Physical Activity among Junior High School Students in Indonesia

Muhammad Arsyad Subu, Nabeel Al-Yateem, Imam Waluyo, Djadjang Aditaruna, Syed Azizur Rahman, Amina Al Marzooqi, Jacqueline Dias and Iqbal Shaikh Ahamed

202. Lightweight Privacy-Preserving Similar Documents Retrieval over Encrypted Data

Zaid Ameen Abduljabbar, Ayad Ibrahim, Mustafa A. Al Sibahee, Songfeng Lu and Samir M. Umran

291. Field Study on Usability and Security Perceptions Surrounding Social Robots

Subhash Rajapaksha, Shivam Thakrar, Matt Kinzler, Haochen Sun, Justin Smith and Debbie Perouli

32. DEVM: Differential Testing of Ethereum Virtual Machine

Meng Ren, Ying Fu, Fuchen Ma, Heyuan Shi, Xiao Dai and Yingli Zheng

204. OpEx Driven Software Architecture

Sébastien Andreo, Ambra Calà and Jan Bosch

373. A Classification of Web Service Credibility Measures

Jaciel Reyes, Atef Shalan, Hossain Shahriar, Muhammad Rahman and Sarika Jain

Fast Abstract 3

Friday July 16, 2:00 – 3:00

238. Deep Feature Learning to Quantitative Prediction of Software Defects

Lei Qiao, Guangjie Li, Daohua Yu and Hui Liu

303. A Formal Verification approach for Ptolemy SR Model

Yaqin Zhao, Wang Rui, Hui Kong, Lu Zhihao, Yong Guan and Xiaoyu Song

464. Predicting Number of Bugs before Launch: An Investigation based on Machine Learning

Sandeep Reddivari, Shyam Rajendren

235. Automated Educational Program Mapping on Learning Standards in Computer Science

Koki Miura, Daisuke Saito, Hironori Washizaki, Yoshiaki Fukazawa

393. Preliminary Literature Review of Machine Learning System Development Practices
Yasuhiro Watanabe, Hironori Washizaki, Kazunori Sakamoto, Daisuke Saito, Kiyoshi Honda,
Naohiko Tsuda, Yoshiaki Fukazawa and Nobukazu Yoshioka

459. T-ReQs: A Tool for Tracking Similarity in Software ReQirements
Sandeep Reddivari

**MediComp: The 8th IEEE International Workshop on Medical Computing
WS31**

Friday July 16, 10:00 – 11:30

456. Discriminative Pattern Mining for Runtime Security Enforcement of Cyber-Physical Point-of-Care Medical Technology
Fred Love, Jennifer Leopold, Bruce McMillin and Fei Su

468. Reviewing Polypharmacy in Elderly Individuals of Rural Regions
Sayeda Farzana Aktar, Feroz Jahangir Rana, Sheikh Iqbal Ahamed, Siam Rezwana, Iysa Iqbal, Lopa Kabir and Rezwana Islam

477. MLNER: Exploiting Multi-source Lexicon Information Fusion for Named Entity Recognition in Chinese Medical Text
Yinlong Xiao, Qing Zhao, Jianqiang Li, Jieqing Chen and Zhenning Cheng

**NETSAP: The 11th IEEE International Workshop on Network Technologies for Security,
Administration & Protection
WS32**

Friday July 16, 10:00 – 11:30

395. Updating the Taxonomy of Intrusion Detection Systems
Abhishek Phadke and Stanislav Ustymenko

400. Potential Security Risks of Internationalized Domain Name Processing for Hyperlink
Taiga Shirakura, Hirokazu Hasegawa, Yamaguchi Yukiko and Hajime Shimada

438. Identification of TLS Communications Using Randomness Testing
Atsushi Kanda and Masaki Hashimoto

458. Security Metric for Networks with Intrusion Detection Systems having Time Latency using Attack Graphs
Shuvo Bardhan and Abdella Battou

OER: The 5th IEEE International Workshop on Open Education Resources for Computer Science & Information Technology

WS33

Friday July 16, 10:00 – 11:30

241. Teaching Entrepreneurship Using C3 Model-Map

Henry C. B. Chan

270. Use of Augmented and Virtual Reality as a Tool to Support the Teaching of Spatial Geometry

Thiciany Matsudo Iwano, Dayvson Duarte Pereira and Daniel Scherer

389. Remote Software Development: A Student-staff Collaboration to Build a Showcase Platform for Non-traditional Digital Artefacts

Dave Towey, Joseph Manuel Thenara, Gabrielle Saputra Hadian, Aurelie U-King Im, Patricia Wong, Kevin Ferdinand, Ivan Christian Halim and Li-Kai Wu

OER: The 5th IEEE International Workshop on Open Education Resources for Computer Science & Information Technology

WS34

Friday July 16, 10:00 – 11:30

418. From No- to Low-Code: Transcribathons as Practice-Based Learning for Historians and Computer Scientists

Ciara Breathnach, Rachel Murphy and Tiziana Margaria

427. Creating a Virtual Reality OER Application to Teach Web Accessibility

Chengke Tang, Amarpreet Gill, Matthew Pike and Dave Towey

QUORS: The 15th IEEE International Workshop on Quality Oriented Reuse of Software

WS35

Friday July 16, 10:00 – 11:30

73. A Keyword Query Approach Based on Community Structure of RDF Entity Graph

Hanning Zhang, Bo Dong, Haiyu Wu, Boqin Feng and Bifan Wei

114. ApproxiFuzzer: Fuzzing towards Deep Code Snippets in Java Programs

Xintian Yu, Enze Ma, Pengbo Nie, Beijun Shen, Yuting Chen and Ziyi Lin

287. Classifying Memory Bugs Using Bugs Framework Approach

Irena Bojanova and Carlos Eduardo Cardoso Galhardo

**QUORS: The 15th IEEE International Workshop on Quality Oriented Reuse of Software
WS36**

Friday July 16, 12:00 – 1:30

365. Optimised Fusion Model for Meeting Sulphur Abatement Standards in Shipping Industry
Yuting Hu, Shikun Zhou, David Sanders and Weicong Zhang

388. An Optimal Composite Service Selection Model based on Edge-Cloud Collaboration
Yan Wang, Na Zhou, Haixia Lang and Yuying Li

220. Design and Implementation of a Voice Interactive Tool to Facilitate Web Collaboration
Qiang Li, Wenxia Qiao, Haiyang Tian, Zhi Li and Mingjuan Ma

327. Accelerating Transmission of Streaming Files Based on AL-FEC Protection Blocks
Shih-Ying Chang, Hsin-Ta Chiao, Ruey-Kai Sheu, Lun-Chi Chen and Welly Chen

**SCA: The 4th IEEE International Workshop on Smart Computing & Applications
WS37**

Friday July 16, 12:00 – 1:30

220. Design and Implementation of a Voice Interactive Tool to Facilitate Web Collaboration
Qiang Li, Wenxia Qiao, Haiyang Tian, Zhi Li and Mingjuan Ma

327. Accelerating Transmission of Streaming Files Based on AL-FEC Protection Blocks
Shih-Ying Chang, Hsin-Ta Chiao, Ruey-Kai Sheu, Lun-Chi Chen and Welly Chen

**SDIM: The 4th IEEE International Workshop on Secure Digital Identity Management
WS38**

Friday July 16, 12:00 – 1:30

111. FireBugs: Finding and Repairing Cryptography API Misuses in Mobile Applications
Larry Singleton, Rui Zhao, Harvey Siy and Myoungkyu Song

311. Mutual Secrecy of Attributes and Authorization Policies in Identity Federation
Satsuki Nishioka and Yasuo Okabe

350. Addressing Audit and Accountability Issues in Self-Sovereign Identity Blockchain Systems
Using Archival Science Principles
Victoria Lemieux, Artemij Voskobochnikov and Meng Kang

415. Decentralizing Identity Management and Vehicle Rights Delegation through Self-Sovereign Identities and Blockchain

Sofia Terzi, Konstantinos Votis, Dimitrios Tzovaras, Charalampos Savvaïdis and Athanasios Sersemis

SE4ICPS: The 1st IEEE International Workshop on Software Engineering for Industrial Cyber-Physical Systems

WS39

Friday July 16, 12:00 – 1:30

391. Learning Models of Cyber-Physical Systems using Automata Learning

Lutz Schammer, Swantje Plambeck, Fin Hendrik Bahnsen and Görschwin Fey

409. Distributed Smart Measurement Architecture for Industrial Automation

Paolo Azzoni, Gianfranco Caminale, Marco Carratù, Salvatore Dello Iacono, Giuseppe Fenza, Nicola Gallo, Consolatina Liguori, Elisa Londero, Antonio Pietrosanto and Nicolo Rebella

417. YOLO-based Panoptic Segmentation Network

Manuel Diaz-Zapata, Özgür Erkent and Christian Laugier

229. A Model to Helping the Construction of Creative Service-Based Software

Pei-Shu Huang, Faisal Fahmi and Feng-Jian Wang

SESS: The 5th IEEE International Workshop on Software Engineering for Smart Systems

WS 40

Friday July 16, 12:00 – 1:30

325. H-FFMRA: A Multi Resource Fully Fair Resources Allocation Algorithm in Heterogeneous Cloud Computing

Hamed Hamzeh, Sofia Meacham, Kashaf Khan, Angelos Stefanidis and Keith Phalp

326. A CNN Sign Language Recognition System with Single & Double-handed Gestures

Emanuele Lindo Secco

347. Towards a Digital Twin Framework for Autonomous Robots

Gill Lumer-Klabbers, Jacob Odgaard Hausted, Jakob Levisen Kvistgaard, Hugo Daniel Macedo, Mirgita Frasherì and Peter Gorm Larsen

SIS-SS: The 4th IEEE International Workshop on Smart IoT Sensors & Social Systems for eHealth & Well-Being Applications

WS41

Friday July 16, 2:00 – 3:00

176. Automatic Cataract Grading with Visual-semantic Interpretability
Xi Xu, Jianqiang Li, Yu Guan, Linna Zhao, Li Zhang and Li Li

476. IoTCaP : A Universal Framework for IoT and CPS Capabilities Composition
Khalid Halba, Ahmed Lbath, Anton Dahbura and Edward Griffor

**SSMLS: The 3rd IEEE International Workshop on Smart & Sustainable Mobility & Logistics
in Smart Cities**

WS42

Friday July 16, 2:00 – 3:00

361. Enhancing Port's Competitiveness Thanks to 5G Enabled Applications and Services
Andrea Porelli, Natalia Selini Hadjidimitriou, Mariangela Rosano and Stefano Musso

364. Smart Home Applied to Historic Buildings. A Real Case Study.
Andrea Bauchiero, Guido Perboli and Mariangela Rosano

385. Decision-Support System for the Optimal Technology Split of a Decarbonized Bus Network
Nathalie Frieß and Ulrich Pferschy

**SSMLS: The 3rd IEEE International Workshop on Smart & Sustainable Mobility & Logistics
in Smart Cities**

WS43

Friday July 16, 2:00 – 3:00

386. A Blockchain, 5G and IoT-based Transaction Management System for Smart Logistics: An
Hyperledger Framework
Vittorio Capocasale, Danilo Gotta, Stefano Musso and Guido Perboli

411. Mixing Machine Learning and Optimization for the Tactical Capacity Planning in Last-mile
Delivery
Stanislav Fedorov, Edoardo Fadda, Guido Perboli and Iván Darío Cárdenas Barbosa

473. A Complexity Reduction Method for Road Pricing Based on Demand Distribution
Koki Murata, Noriyoshi Yamamoto and Tomoya Kawakami

STA: The 13th IEEE International Workshop on Software Test Automation

WS44

Friday July 16, 2:00 – 3:00

25. A Requirement-based Regression Test Selection Technique in Behavior-Driven Development
Jincheng Xu, Qingfeng Du and Xiaojun Li

81. LTRUS: Learning-to-Rank Undersampling Technique to Alleviate the Class Imbalance Problem in Software Defect Prediction
Shuo Feng, Jacky Keung, Yan Xiao, Jie Liu, Xiao Yu and Miao Zhang

148. Formal Simulation and Verification of Solidity contracts in Event-B
Jian Zhu, Kai Hu, Mamoun Filali, Jean-Paul Bodeveix, Jean-Pierre Talpin and Haitao Cao

367. Metamorphic Testing for Block Ciphers
Mingjia Zhang, Dave Towey, T.Y. Chen and Zhi Quan Zhou

STPSA: The 15th IEEE International Workshop on Security, Trust & Privacy for Software Applications

WS45

Friday July 16, 2:00 – 3:00

102. Utilizing Obfuscation Information in Deep Learning-based Android Malware Detection
Junji Wu and Atsushi Kanai

233. Software Safety Verification Framework based on Predicate Abstraction
Haowei Liang, Chunyan Hou, Jinsong Wang and Chen Chen

253. Towards Verified Safety-critical Autonomous Driving Scenario Models with ADSML
Jiena Chen, Mingzhuo Zhang, Mingjun Ma and Dehui Du

342. A Taxonomy of XSS Attack Detection in Mobile Environment based on Automation Capabilities
Alexander Boyett, Atef Shalan, Hossain Shahriar and Mohammad Rahman

STPSA: The 15th IEEE International Workshop on Security, Trust & Privacy for Software Applications

WS46

Friday July 16, 3:00 – 4:00

353. Design Scheme of Perceptual Hashing based on Output of CNN for Digital Watermarking
Zhaoxiong Meng, Tetsuya Morizumi, Sumiko Miyata and Hirotsugu Kinoshita

357. Cybersecurity Risks and Mitigation Techniques During COVID-19 Pandemic
A B M Kamrul Islam Riad, Hossain Shahriar, Maria Valero and Mokter Hossain

387. Towards Concurrent Audit Logging in Microservices
Sepehr Amir-Mohammadian and Afsoon Yousefi Zowj

STPSA: The 15th IEEE International Workshop on Security, Trust & Privacy for Software Applications

WS47

Friday July 16, 3:00 – 4:00

433. Human Susceptibility to Phishing Attacks Based on Personality Traits: The Role of Neuroticism
Pablo López-Aguilar and Agusti Solanas

455. OPD: Network Packet Distribution after Achieving Equilibrium to Mitigate DDOS Attack
Abdullah Al Farooq, Thomas Moyer and Dewan Tanvir Ahmed

471. A Preliminary Study on Common Programming Mistakes that Lead to Buffer Overflow Vulnerability

Giovanni George, Jeremiah Kotey, Megan Ripley, Kazi Zakia Sultana and Zadia Codabux

