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**MLA - Machine Learning and its Applications Track**

**Track Co-Chairs:** Jee-Hyong Lee, Sungkyunkwan University, Korea

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*Pierre-Alain Fouque, IRISA, France*

*Thibaut Jacques, Orange Labs, France*

*Pascal Lafourcade, Université Clermont-Auvergne, France*

*Cristina Onete, XLIM, France*

*Léo Robert, Université Clermont-Auvergne, France*

**Towards Effective Preservation of Robust Safety Properties ..... 1665**

*Matteo Busi, University of Pisa, Italy*

*Pierpaolo Degano, IMT School for Advanced Studies and University of Pisa, Italy*

*Letterio Galletta, IMT School for Advanced Studies, Italy*

**ANUBIS: A Provenance Graph-Based Framework for Advanced Persistent Threat Detection ..... 1675**

*Md. Monowar Anjum, National Research Council, Canada*

*Shahrear Iqbal, National Research Council, Canada*

*Benoit Hamelin, Tutte Institute for Mathematics and Computing, Canada*

**Hardening the Security Analysis of Browser Extensions ..... 1685**

*Benjamin Eriksson, Chalmers University of Technology, Sweden*

*Pablo Picazo-Sanchez, Chalmers University of Technology, Sweden*

*Andrei Sabelfeld, Chalmers University of Technology, Sweden*

**Effective TLB Trashing – Unveiling the True Short Reach of Modern TLB Designs ..... 1695**

*Andrés R. Hernández C., University of Texas at San Antonio, USA*

*Wei-Ming Lin, University of Texas at San Antonio, USA*

**Security Risks of Porting C Programs to WebAssembly ..... 1704**

*Quentin Stiévenart, Vrije Universiteit Brussel, Belgium*

*Coen De Roover, Vrije Universiteit Brussel, Belgium*

*Mohammad Ghafari, University of Auckland, New Zealand*

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**What You See Is Not What You Get: A Man-in-the-Middle Attack Applied to Video Channels ..... 1714**

*Mauro Conti, University of Padua, Italy*

*Eleonora Losiouk, University of Padua, Italy*

*Alessandro Visintin, University of Padua, Italy*

**Deriving Optimal Deep Learning Models for Image-Based Malware Classification ..... 1718**

*Rikima Mitsuhashi, The University of Tokyo, Japan*

*Takahiro Shinagawa, The University of Tokyo, Japan*

**Theme: Information Systems**

**SONAMA - Social Network and Media Analysis Track**

**Track Co-Chairs:** Sang-Wook Kim, Hanyang University, Korea

Yunyoung Ko, Hanyang University, Korea

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**An Architecture for Data Integrity in Untrustworthy Social Networks ..... 1723**

*Carlos Eduardo da Silva, Sheffield Hallam University, UK*

*Angus Young, Sheffield Hallam University, UK*

**User Awareness and Defenses Against Sockpuppet Friend Invitations in Facebook ..... 1731**

*Sajedul Talukder, Southern Illinois University, USA*

*Nestor Hernandez, The MathWorks, Inc., USA*

*Mozhgan Azimpourkivi, Bloomberg LP, USA*

*Bogdan Carbunar, Florida International University, USA*



**Combining Clutter Reduction Methods for Temporal Network Visualization ..... 1739**

*Jean R. Ponciano, Federal University of Uberlândia, Brazil and Getulio Vargas Foundation, Brazil*  
*Claudio D.G. Linhares, University of São Paulo, Brazil*  
*Luis E.C. Rocha, Ghent University, Belgium*  
*Elaine R. Faria, Federal University of Uberlândia, Brazil*  
*Bruno A.N. Travençolo, Federal University of Uberlândia, Brazil*

**POSLAN: Disentangling Chat with Positional and Language Encoded Post Embeddings ..... 1747**

*Bhashithe Abeysinghe, Georgia State University, USA*  
*Dhara Shah, Georgia State University, USA*  
*Chris Freas, Georgia State University, USA*  
*Robert Harrison, Georgia State University, USA*  
*Rajshekhar Sunderraman, Georgia State University, USA*

**Incremental Communication Patterns in Blockchain Online Social Media ..... 1755**

*Barbara Guidi, Università di Pisa, Italy*  
*Andrea Michienzi, Università di Pisa, Italy*  
*Laura Ricci, Università di Pisa, Italy*

**D-FEND: A Diffusion-Based Fake News Detection Framework for News Articles Related to COVID-19 ..... 1762**

*Soeun Han, Hanyang University, Korea*  
*Yunyong Ko, Hanyang University, Korea*  
*Yushim Kim, Arizona State University, USA*  
*Seong Soo Oh, Hanyang University, Korea*  
*Heejin Park, Hanyang University, Korea*  
*Sang-Wook Kim, Hanyang University, Korea*

**Group Oriented Trust-Aware Location Recommendation for Location-Based Social Networks ..... 1770**

*Huseyin Alper Teoman, Middle East Technical University, Turkey*  
*Pinar Karagoz, Middle East Technical University, Turkey*

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**Characterizing the Impact of Fact-Checking on the COVID-19 Misinformation Combat ..... 1780**

*Cefas Garcia Pereira, Pontifical Catholic University of Minas Gerais, Brazil*  
*Humberto Torres Marques-Neto, Pontifical Catholic University of Minas Gerais, Brazil*

**A Comparison of Online Hate on Reddit and 4chan: A Case Study of the 2020 US Election ..... 1788**

*Fatima Zahrah, University of Oxford, UK*  
*Jason R.C. Nurse, University of Kent, UK*  
*Michael Goldsmith, University of Oxford, UK*

**Cluster Boosting and Data Discovery in Social Networks ..... 1792**

*Maria Tomasso, Texas State University, USA*  
*Lucas J. Rusnak, Texas State University, USA*  
*Jelena Tešić, Texas State University, USA*

**A Diversity Personalization Approach towards Recommending POIs for Jeju Island ..... 1795**

*Jongsoo Lee, Hanyang University, Korea*  
*Jung Ah Shin, Columbia University, USA*  
*Dong-Kyu Chae, Hanyang University, Korea*

## ***Theme: Software Design and Development***

### **SVT - Software Verification and Testing Track**

**Track Co-Chairs:** Erika Abraham, RWTH Aachen University, Germany  
Pascale Le Gall, Université Paris-Saclay, France

#### **Summarization of Branching Loops ..... 1799**

*Martin Blichla, Charles University, Czech Republic and Università della Svizzera italiana, Switzerland*

*Jan Kofroň, Charles University, Czech Republic*

*William Tatarko, Charles University, Czech Republic*

#### **Verifying Opacity by Abstract Interpretation ..... 1808**

*Isabella Mastroeni, Università degli Studi di Verona, Italy*

*Michele Pasqua, Università degli Studi di Verona, Italy*

#### **Leveraging Hardware-Dependent Knowledge Extraction with Multiple Program Analysis Techniques .... 1818**

*Thuy Nguyen, Japan Advanced Institute of Science and Technology, Japan*

*Takashi Tomita, Japan Advanced Institute of Science and Technology, Japan*

*Junpei Endo, Aisin Corporation, Japan*

*Geon-ung Kang, Aisin Corporation, Japan*

*Toshiaki Aoki, Japan Advanced Institute of Science and Technology, Japan*

#### **A Lightweight Approach for Sound Call Graph Approximation ..... 1828**

*Aharon Abadi, WhiteSource, Israel*

*Bar Makovitzki, The Open University of Israel, Israel*

*Ron Shemer, WhiteSource, Israel*

*Shmuel Tyszberowicz, Afeka Academic College of Engineering, Israel*

### ***Poster Papers***

#### **Model Sketching by Abstraction Refinement for Lifted Model Checking ..... 1836**

*Aleksandar S. Dimovski, Mother Teresa University, Macedonia*

#### **Verifying Redundant-Check Based Countermeasures: A Case Study ..... 1840**

*Thibault Martin, Université Paris-Saclay, France*

*Nikolai Kosmatov, Thales Research and Technology, France*

*Virgile Prevosto, Université Paris-Saclay, France*

#### **A Simple Proof of Data-Race Freedom and Data Coherence for Simpson's 4-Slot Algorithm ..... 1844**

*Xu Wang, East China Normal University, China*

*Qiwen Xu, University of Macau, China*

#### **Capturing Program Models with BISM ..... 1848**

*Chukri Soueidi, Université Grenoble Alpes and Inria, France*

*Yliès Falcone, Université Grenoble Alpes and Inria, France*

## **Theme: Information Systems**

### **SWA - Semantic Web and Applications Track**

**Track Co-Chairs:** Hyoil Han, Illinois State University, USA  
Soon Ae Chun, City University of New York, USA  
Sangsoo Sung, Google Inc., USA  
Cristian Mateos, UNICEN University - Tandil, Argentina  
Tim A. Majchrzak, University of Agder - Kristiansand, Norway  
Flavius Frasincar, Erasmus University Rotterdam, The Netherlands

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**Predicting the Category of Customers' Next Product to Buy in Web Shops** ..... 1853

*Laura Rekasiute, Erasmus University Rotterdam, The Netherlands*  
*Alvaro Jose Jimenez Palenzuela, Erasmus University Rotterdam, The Netherlands*  
*Nijole Salnaite, Erasmus University Rotterdam, The Netherlands*  
*Ramon Carrera Cuenca, Erasmus University Rotterdam, The Netherlands*  
*Flavius Frasincar, Erasmus University Rotterdam, The Netherlands*

**Could Jamstack Be the Future of Web Applications Architecture? An Empirical Study** ..... 1863

*Dragana Markovic, Mälardalen University, Sweden*  
*Milic Scekcic, Mälardalen University, Sweden*  
*Alessio Bucaioni, Mälardalen University, Sweden*  
*Antonio Cicchetti, Mälardalen University, Sweden*

**Knowledge Graph Enhanced Multi-Task Learning between Reviews and Ratings for Movie Recommendation** ..... 1873

*Yun Liu, Tokyo Institute of Technology, Japan*  
*Jun Miyazaki, Tokyo Institute of Technology, Japan*  
*Qiong Chang, Tokyo Institute of Technology, Japan*

**Generalized Graph Pattern Discovery in Linked Data with Data Properties and a Domain Ontology** .... 1881

*Tomas Martin, Université du Québec à Montréal, Canada*  
*Victor Fuentes, Université du Québec à Montréal, Canada*  
*Petko Valtchev, Université du Québec à Montréal, Canada*  
*Abdoulaye Baniré Diallo, Université du Québec à Montréal, Canada*  
*René Lacroix, LactaNet, Canada*

**A Blockchain-Based Framework for Drug Traceability: ChainDrugTrac** ..... 1891

*Eddy Kiomba Kambilo, CY Cergy Paris Université, France*  
*Hajer Baazaoui Zghal, CY Cergy Paris Université, France*  
*Chirine Ghedira Guegan, Université Jean Moulin Lyon III, France*  
*Vlado Stankovski, University of Ljubljana, Slovenia*  
*Petar Kochovski, University of Ljubljana, Slovenia*  
*Dan Vodislav, CY Cergy Paris Université,*

**EABlock: A Declarative Entity Alignment Block for Knowledge Graph Creation Pipelines** ..... 1899

*Samaneh Jozashoori, Leibniz University of Hannover, Germany*  
*Ahmad Sakor, Leibniz University of Hannover, Germany*  
*Enrique Iglesias, Leibniz University of Hannover, Germany*  
*Maria-Esther Vidal, Leibniz University of Hannover, Germany*

## Poster Papers

**v-TCM: Vertical-Aware Transformer Click Model for Web Search** ..... 1908  
*Kritarth Bisht, Delhi Technological University, India*  
*Seba Susan, Delhi Technological University, India*

**5D-IoT, a Semantic Web Based Framework for Assessing IoT Data Quality** ..... 1912  
*Shubham Mante, International Institute of Information Technology Hyderabad, India*  
*Nathalie Hernandez, University of Toulouse, France*  
*Aftab M. Hussain, International Institute of Information Technology Hyderabad, India*  
*Sachin Chaudhari, International Institute of Information Technology Hyderabad, India*  
*Deepak Gangadharan, International Institute of Information Technology Hyderabad, India*  
*Thierry Monteil, University of Toulouse, France*

## Theme: Distributed Systems

### WCN - Wireless Communications and Networking Track

**Track Co-Chairs:** Dongkyun Kim, Kyungpook National University, Korea

**UAV-VANET Authentication for Real-Time Highway Surveillance** ..... 1916  
*Otto B. Piramuthu, University of Illinois Urbana-Champaign, USA*  
*Matthew Caesar, University of Illinois Urbana-Champaign, USA*

**Cluster-Based AUV Communication for Delay-Sensitive Vulnerability Detection Using NDN** ..... 1923  
*Junho Seo, Kyungpook National University, Korea*  
*Ayesha Siddiqa, Kyungpook National University, Korea*  
*Muhammad Ashar Tariq, Kyungpook National University, Korea*  
*Malik Muhammad Saad, Kyungpook National University, Korea*  
*Dongkyun Kim, Kyungpook National University, Korea*

**A Reinforcement Learning-Based Path Planning for Collaborative UAVs** ..... 1929  
*Shahnaila Rahim, Kyungpook National University, Korea*  
*Mian Muaz Razaq, Kyungpook National University, Korea*  
*Shih Yu Chang, San Jose University, USA*  
*Limei Peng, Kyungpook National University, Korea*

**On Hybrid Front-Haul for 5G NR mmWave Indoor Coverage** ..... 1935  
*Syed Hassan Raza Naqvi, University of Waterloo, Canada*  
*Pin-Han Ho, University of Waterloo, Canada*

**A Meta-Policy Approach for Learning Suitable Caching Replacement Policies in Information-Centric Networks** ..... 1941  
*Stéfani Pires, Federal University of Bahia, Brazil*  
*Adriana Ribeiro, Federal University of Bahia, Brazil*  
*Leobino Sampaio, Federal University of Bahia, Brazil*

**Multi-Antenna Covert Communications in Random Wireless Networks with Full-Duplex Relay** ..... 1951  
*Yan Liu, Future University Hakodate, Japan*  
*Huihui Wu, Tsinghua University, China*  
*Yulong Shen, Xidian University, China*  
*Xiaohong Jiang, Future University Hakodate, Japan*

**Optimization of IoT Slices in WiFi Enterprise Networks ..... 1958**

*Foroutan Fami, École de Technologie Supérieure, Canada*

*Nessrine Hammami, École de Technologie Supérieure, Canada*

*Chuan Pham, École de Technologie Supérieure, Canada*

*Kim-Khoa Nguyen, École de Technologie Supérieure, Canada*

**Poster Papers**

**Lightweight VANET Authentication Protocols ..... 1966**

*Otto B. Piramuthu, University of Illinois Urbana-Champaign, USA*

*Matthew Caesar, University of Illinois Urbana-Champaign, USA*

**GPGPU Wide-Area Calculations for Estimation of Electromagnetic Field Human Exposure Levels ..... 1970**

*Dariusz P. Więcek, National Institute of Telecommunications, Poland*

*Jacek W. Wroński, National Institute of Telecommunications, Poland*

**An Intelligent Blockchain Application for Emergency Medical Services ..... 1974**

*Thomas Lavigne, INSA Centre Val de Loire, France*

*Bacem Mbarek, Masaryk University, Czech Republic*

*Tomáš Pitner, Masaryk University, Czech Republic*