

39TH IEEE INTERNATIONAL PERFORMANCE COMPUTING AND COMMUNICATIONS CONFERENCE



VIRTUAL CONFERENCE 2020
NOVEMBER 6 - 8, 2020



Message from the IPCCC 2020 General Co-Chairs

It is our great pleasure to warmly welcome you to the 39th IEEE International Performance, Computing, and Communications Conference (IPCCC 2020). The IPCCC 2020 Virtual Conference brings together researchers from academia, government, and industry all around the world, to exchange their latest research achievements in computer and communication systems, as well as to inspire each other through discussions and presentations. We are very proud to see a high-quality program in the unprecedented virtual format in the history of IPCCC, including one research panel, 29 full papers, 16 short papers, 4 posters, and 11 workshop papers.

Firstly, we would like to thank all the authors of the submitted and accepted papers. Their contributions keep the research in the field active and make this conference a lively place for research discussions. Secondly, we would like to express our appreciation to Program Co-Chairs Feng Wang and Donghyun Kim, all the members of the Technical Program Committee, as well as the external reviewers for their tremendous effort and hard work in paper selection during the global pandemic. Their timely feedback is very valuable to both the conference and the authors. Thirdly, we would like to sincerely thank our organizing committee members, including but not limited to General Vice-Chairs Nils Aschenbruck and Ningfang Mi, Workshop Co-Chairs Ruozhou Yu and Yanhua Li, Poster Co-Chairs Zaobo He and Dahee Seo, Publication Chair Kathlene Hurt, Publicity Co-Chairs Zhuojun Duan, Gürkan Solmaz, and Yingjie Wang, Web Chair Neil Nelson, Financial Chair Nasr Ullah, and Registration Chair Jack Chen, for their enormous support and contribution in time. Their collective efforts during the challenging time make the first IPCCC virtual conference possible. It has been a privilege for us to work with such a marvelous group of dedicated professionals. Last but not least, we would like to thank IEEE Computer Society for their continuing sponsorship and support of this conference.

On behalf of the conference executive committee, we welcome you to the virtual IEEE IPCCC 2020 conference. We hope that you will enjoy the technical programs and have a wonderful time.

– Yingshu Li and Kuai Xu, IPCCC 2020 General Co-Chairs

Message from the IPCCC 2020 Technical Program Co-Chairs

Welcome to the 39th edition of the IEEE International Performance Computing and Communications Conference (IPCCC 2020)! 2020 has been a special and challenging year for everyone. We are fortunate and pleased to continue the tradition of the IEEE IPCCC, a premier conference on the performance of computer and communication systems, in offering a technical program in a virtual environment which strives to provide the same high-quality research presentation and engagement as in a face-to-face conference.

IPCCC 2020 received 99 legitimate paper submissions. Each paper was thoroughly reviewed by 3 to 5 reviewers with an average of 3.74 reviews per paper. Out of the 99 submissions, 29 papers were accepted as a full paper, resulting in an acceptance ratio of 29.3%. In addition, 14 papers were accepted as a short paper and 4 were accepted for poster presentation. Full papers, short papers, and poster papers are all included in the IPCCC conference proceedings.

We would like to express our sincere gratitude to many people who have contributed to this year's IPCCC program. First, we thank the paper authors for choosing IPCCC as the channel to present their quality research and for their quick adaptation of the new virtual format. Second, we are grateful to the 91 members of the Technical Program Committee for providing fair, timely, and constructive reviews. The program of the conference is based on their hard work. Third, we would like to thank the IPCCC 2020 Organizing Committee and the Steering Committee for their help and support. Finally, we would like to welcome the attendees to the conference and we greatly appreciate your participation.

We hope you find the IEEE IPCCC 2020 program interesting and stimulating and have a great virtual experience!

– Feng Wang & Donghyun (David) Kim, IPCCC 2020 Technical Program Co-Chairs

The International Performance, Computing and Communications Conference is the premier IEEE conference presenting research in the performance of computer and communications systems. For more than three decades IPCCC has been a research forum for academic, industrial and government researchers.

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October 29th - 31st 2021

PAPER ABSTRACT DUE: June 15th, 2021

FULL PAPER DUE: June 30th, 2021

ACCEPTANCE NOTIFICATION: August 15th, 2021

CAMERA READY DUE: August 30th, 2021

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IPCCC 2020 Day One – Friday, November 6

IPCCC 2020 Virtual Conference Program [US Central Standard Time]

Session 1: Best Paper Candidates

07:00 - 08:15 Chair: Feng Wang

Distributed Scheduling Algorithm for Optimizing Age of Information in Wireless Networks

Dongxiao Yu and Xinpeng Duan (Shandong University, China); Feng Li (Shandong University, China); Yi Liang (Georgia State University, USA); Huan Yang (Qingdao University, China); Jiguo Yu (Qufu Normal University, China)

LIDAUS: Localization of IoT Device via Anchor UAV SLAM

Yue Sun, Deqiang Xu, Zhuoming Huang, Honggang Zhang and Xiaohui Liang (University of Massachusetts Boston, USA)

Session 2a: Security and Privacy

08:15 - 10:15 Chair: Lixin Wang

SEC: Secure, Efficient, and Compatible Source Address Validation with Packet Tags

Xinyu Yang, Jiahao Cao and Mingwei Xu (Tsinghua University, China)

FProbe: Detecting Stealthy DGA-Based Botnets by Group Activities Analysis

Jiawei Sun (Institute of Information Engineering, Chinese Academy of Sciences & School of Cyber Security, University of Chinese Academy of Sciences, China); Yuan Zhou (Network Emergency Response Technical Team/Coordination Center Beijing, China); Shupeng Wang (Institute of Information Engineering, CAS, China); Lei Zhang (IIE CAS, China); Liu Junjiao (University of Chinese Academy of Sciences, China); Junteng Hou (School of Cyber Security, University of Chinese Academy of Sciences and Institute of Information Engineering, CAS, China); Zhicheng Liu (Institute of Information Engineering, Chinese Academy of Sciences, China)

Supporting Efficient Dynamic Update in Public Integrity Verification of Cloud Data

Jiawei Wan, Shijie Jia and Limin Liu (Institute of Information Engineering, Chinese Academy of Sciences, China); Yang Zhang (Institute of Information Engineering, CAS, China)

***NRV: Leveraging Secure Multi-Party Computation for Lightweight BGP Security Enhancement**

Guoqiang Zhang, Mingwei Xu and Jiang Li (Tsinghua University, China)

***Edge Computing Based Privacy-Preserving Data Aggregation Scheme in Smart Grid**

Songtao Guo (Chongqing University, China); Yuhao Kang and Pan Li (Southwest University, China); Yuanyuan Yang (Stony Brook University, USA)

Session 2b: Social Media Analysis and Big Data I

08:15 - 10:15 Chair: Honggang Zhang

A Multimodal Feature Fusion-Based Method for Individual Depression Detection on Sina Weibo

Yiding Wang, Zhenyi Wang, Chenghao Li, Yilin Zhang and Haizhou Wang (Sichuan University, China)

FluxInfer: Automatic Diagnosis of Performance Anomaly for Online Database System

Ping Liu (Tsinghua University, China); Shenglin Zhang and Yongqian Sun (Nankai University, China); Yuan Meng, Jiahai Yang and Dan Pei (Tsinghua University, China)

Budgeted Persuasion on User Opinions via Varying Susceptibility

Wenyi Tang, Xinrui Xu and Guangchun Luo (University of Electronic Science and Technology of China, China); Zaobo He (Miami University, USA); Kaiming Zhan (Sichuan Jiuyuan Yin Hai Software Co., Ltd, China)

***Website Recommendation with Side Information Aided Variational Autoencoder**

Pinhao Wang, Wenzhong Li and Zepeng Yu (Nanjing University, China); Baoguo Lu (Nanjing Research Institute of Electronics and Engineering, China); Sanglu Lu (Nanjing University, China)

****A Unite and Conquer Based Ensemble Learning Method for User Behavior Modeling**

Abdoulaye Diop (University of Versailles Paris Saclay & Atos Evidian, France); Nahid Emad (University of Versailles Saint-Quentin-en-Yvelines, France); Thierry Winter (Atos, France)

Poster Session

10:15 - 11:00 Chair: Zaobo He

Network Resource Scheduling For Cloud/Edge Data Centers

Yuhan Zhao (Qilu University of Technology, China); Wei Zhang (Qilu University of Technology (Shandong Academy of Sciences), China); Meihong Yang (Shandong Computer Science Center (National Supercomputer Center in Jinan), China); Huiling Shi (Shandong Computer Science Center, China)

UAV Swarm Communication Aware Formation Control via Deep Q Network

Chengtao M Xu, Kai Zhang and Houbing Song (Embry-Riddle Aeronautical University, USA)

REPROOF: Quantifying the Jam Resistance of REBUF

Joshua B Groen and Peter Howell (United States Military Academy, USA); Michael Collins (Laboratory for Advanced Cybersecurity Research, USA)

Design Alternatives for Performance Monitoring Counter based Malware Detection

Jordan Pattee and Byeong Kil Lee (University of Colorado at Colorado Springs, USA)

Break for Lunch - 11:00-13:00

IPCCC 2020 Day One [continued] – Friday, November 6

IPCCC 2020 Virtual Conference Program [US Central Standard Time]

Panel on “Privacy vs. Contact Tracing”

13:00 - 14:00 Moderator: Nils Aschenbruck

Stephen Farrell

Trinity College
Ireland

Zhiqiang Lin

Ohio State University
USA

Thorsten Strufe

Karlsruhe Institute of Technology
Germany

In the current pandemic situation, contact and proximity tracing apps have been developed and are deployed all over the world. Such apps can be helpful in managing a pandemic. A very wide acceptance and deployment of such apps is a crucial requirement for their effectiveness. The privacy of the users is probably the key challenge for the acceptance of such apps.

Session 3a: Deep Learning I and Cloud Computing

14:00 - 16:00 Chair: Houbing Song

Performance and Consistency Analysis for Distributed Deep Learning Applications

Danlin Jia (Northeastern University, USA); Manoj P Saha (Florida International University, USA); Janki Bhimani (Florida International University and Samsung Semiconductors, USA); Ningfang Mi (Northeastern University, USA)

On Machine Learning-Based Stage-Aware Performance Prediction of Spark Applications

Guangjun Ye (Zhejiang Sci-Tech University, China); Wuji Liu (New Jersey Institute of Technology, USA); Chase Q. Wu (New Jersey Institute of Technology and Oak Ridge National Laboratory, USA); Wei Shen (Zhejiang Sci-Tech University and University of Memphis, China); Xukang Lyu (Tianjin University, China)

Paradox of AlphaZero: Strategic vs. Optimal Plays

Ze-Li Dou, Liran Ma, Khiem Nguyen and Kien X Nguyen (Texas Christian University, USA)

* Modeling Energy Consumption of Virtual Machines in DVFS-Enabled Cloud Data Centers

Jianzhou Mao, Tathagata Bhattacharya, Xiaopu Peng, Cao Ting and Xiao Qin (Auburn University, USA)

* Privacy Preserving Inference with Convolutional Neural Network Ensemble

Alexander Weili Xiong (Rice University, USA); Michael Nguyen (USA); Andrew C So and Tingting Chen (California State Polytechnic University, Pomona, USA)

Session 3b: Network Security and Protocol

14:00 - 16:00 Chair: Michel Misson

Policy Units and Categories: Networking Models for Simplifying Security Policy Management

Madeline Van Ness and Xin Sun (Ball State University, USA)

Detect Stepping-stone Intrusion by Mining Network Traffic using k-Means Clustering

Lixin Wang, Jianhua Yang and Mary McCormick (Columbus State University, USA); Peng-Jun Wan (Illinois Institute of Technology, USA); Xiaohua Xu (Kennesaw State University, USA)

Lifecycle Management Protocols for Batteryless, Intermittent Sensor Nodes

Mathew L. Wymore, Vishal Deep, Vishak Narayanan, Henry Duwe and Daji Qiao (Iowa State University, USA)

*Experiments with Non-Cooperative Space DTN Routing

Ricardo Lent (University of Houston, USA)

*A Connection-Free Reliable Transport Protocol

JJ Garcia-Luna-Aceves (University of California at Santa Cruz, USA); Abdulazaz Albalawi (UC Santa Cruz, USA)

IPCCC 2020 Day Two – Saturday, November 7

IPCCC 2020 Virtual Conference Program [US Central Standard Time]

Session 4a: Deep Learning II

07:30 - 09:30 Chair: William Headley

Efficient Architecture Paradigm for Deep Learning Inference as a Service

Jin Yu (State Key Laboratory for Novel Software Technology & Chipnet Company, China); Xiaopeng Ke (State Key Laboratory for Novel Software Technology, Nanjing University, China); Fengyuan Xu and Hao Huang (Nanjing University, China)

Adaptive Video Streaming via Deep Reinforcement Learning from User Trajectory Preferences

Qingyu Xiao, Jin Ye, Chengjie Pang and Liangdi Ma (Guangxi University, China); Wenchao Jiang (Singapore University of Technology and Design, Singapore)

Improved Window Segmentation for Deep Learning Based Inertial Odometry

Siyu Chen (Wuhan Research Institute of Posts and Telecommunications, China); Yu Zhu and Xiaoguang Niu (Wuhan University, China); Zhiyong Hu (Wuhan Hongxin Technology of Service LLC, China)

*Automatic Recognition of Identification Schemes for IoT Identifiers via Sequence-to-Sequence Model

Xiaotao Li and Shujuan You (China Mobile Research Institute, China); Wai Chen (CMRI, USA)

Session 4b: Optimization and Performance

07:30 - 09:30 Chair: Suining He

Efficient Arithmetic Expression Optimization with Weighted Adjoint Matrix

Xianhua Liu and Chun Yang (Peking University, China); Zixin Guan (Guangdong Communications & Networks Institute, China)

A Dynamic Task Assignment Framework based on Prediction and Adaptive Batching

Lijun Sun (Qingdao University of Science & Technology, China); Xiaojie Yu, Shicong Chen and Yang Yan (Qingdao University of Science and Technology, China)

Hieff: Enabling Efficient VNF Clusters by Coordinating VNF Scaling and Flow Scheduling

Zenan Wang, Jiao Zhang, Haoran Wei and Tao Huang (Beijing University of Posts and Telecommunications, China)

*P4SFC: Service Function Chain Offloading with Programmable Switches

Junte Ma, Sihao Xie and Jin Zhao (Fudan University, China)

Session 5a: Security and Privacy II

09:30 - 11:30 Chair: Chunyu Ai

Secure Decentralized Application Development of Blockchain-Based Games

Natalia Trojanowska and Michal Kedziora (Wroclaw University of Science and Technology, Poland); Moataz Hanif and Houbing Song (Embry-Riddle Aeronautical University, USA)

An Encrypted Traffic Classification Method Combining Graph Convolutional Network and Autoencoder

Boyu Sun, Wenyan Yang, Mengqi Yan, Dehao Wu, Yuesheng Zhu and Zhiqiang Bai (Peking University, China)

What You See Is Not What You Get: Towards Deception-Based Data Moving Target Defense

Yaqin Zhang (State Key Laboratory of Information Security, China); Duohe Ma (Institute of Information Engineering, Chinese Academy of Sciences and State Key Laboratory of Information Security, China); Xiaoyan Sun (California State University, Sacramento, USA); Kai Chen (Institute of Information Engineering, Chinese Academy of Sciences, China); Feng Liu (State Key Laboratory of Information Security, China)

SEGIVE: A Practical Framework of Secure GPU Execution in Virtualization Environment

Ziyang Wang, Fangyu Zheng and Jingqiang Lin (Institute of Information Engineering, Chinese Academy of Sciences, China); Jiankuo Dong (Nanjing University of Posts and Telecommunications, Nanjing, China); Guang Fan (Institute of Information Engineering, Chinese Academy of Sciences, China)

Session 5b: Wireless Networks and Mobility

09:30 - 11:30 Chair: Hank Susanto

Evaluation of the Interest of an Extra-Slot for a Grouped Polling-Selecting Method

Guéréguin Der Sylvestre Sidibé and Michel Misson (Université de Clermont Auvergne, France); Marie Françoise Servajean (LIMOS, France); Nadir Hakem (Université du Québec en Abitibi-Témiscamingue and LRTCS Research Laboratory Télébec in Underground Communications, Canada); Raphaël Bidaud (Université de Clermont Auvergne, France)

A Modular and Distributed Setup for Power and Performance Analysis of Multi-Processor-System-on-Chip at Electronic System Level

Muhammad Mudussir Ayub (Technical University of Munich, Germany); Franz Kreupl (Technical University of Munich, Germany)

BonnMotion 4 - Taking Mobility Generation to the Next Level

Alexander Bothe and Nils Aschenbruck (University of Osnabrück, Germany)

*Interrupting Real-Time IoT Tasks: How Bad Can It Be to Connect Your Critical Embedded System to the Internet?

Ilya Behnke (Technische Universität Berlin, Germany); Lukas Pirl (Hasso Plattner Institute, Germany); Lauritz Thamsen and Robert Danicki (Technische Universität Berlin, Germany); Andreas Polze (Hasso Plattner Institute, Germany); Odej Kao (TU Berlin, Germany)

Break for Lunch - 11:30-13:00

IPCCC 2020 Day Two [continued] – Saturday, November 7

IPCCC 2020 Virtual Conference Program [US Central Standard Time]

Session 6: Big Data II and Wireless Communication

13:00 - 15:00 Chair: Xiaomei Zhang

Spatio-Temporal Data Mining for Aviation Delay Prediction

Kai Zhang, Yushan Jiang, Dahai Liu and Houbing Song (Embry-Riddle Aeronautical University, USA)

Deploying Network Key-Value SSDs to Disaggregate Resources in Big Data Processing Frameworks

Mahsa Bayati (Northeastern University, USA); Harsh Roogi and Ron Lee (Samsung Semiconductor Inc., USA); Ningfang Mi (Northeastern University, USA)

***AdaEmb-Encoder: Adaptive Embedding Spatial Encoder-Based Deduplication for Backing Up Classifier Training Data**

Yaobin Qin and David J. Lilja (University of Minnesota, USA)

***FPGA Implementation of a Pseudo-Random Signal Generator for RF Hardware Test and Evaluation**

Randeep S Baweja, Devin Ridge, Harpreet S Dhillon and William C Headley (Virginia Tech, USA)

***When is Enough Enough? “Just Enough” Decision Making with Recurrent Neural Networks for Radio Frequency Machine Learning**

Megan O Moore, William Clark IV, R. Michael Beuhrer and William C Headley (Virginia Tech, USA)

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IPCCC 2020 Would Like to Thank Our Conference Sponsors for Supporting this Forum for Academic, Industrial and Government Researchers:



IPCCC 2020 Day Three – Sunday, November 8

IPCCC 2020 Virtual Conference Program [US Central Standard Time]

Workshop on Management, Measurement, and Data Transmission of IoT

07:00 - 09:45 Chair: Fu Chen

Research on Knowledge Graph Technology and its Application in Agricultural Information Consulting Field

Fan Zhang, Jizhou Wu and Yingli Nie (Agricultural Information Institute of CAAS, China); Lihua Jiang (Chinese Academy of Agriculture Science, China); Ailian Zhou and Nengfu Xie (Agricultural Information Institute of CAAS, China)

Socially-Aware D2D Pair Strategy: A Stable Matching Approach

Xian Zhou, Daru Pan, Hui Song and Xu Huang (South China Normal University, China)

Research on Power Quality Data Placement Strategy Based on Improved Particle Swarm Optimization Algorithm

Chengdong Wang and Jun Fang (North China University of Technology, China); Zhao Zhuofeng (Research Center for Cloud Computing, North China University of Technology, China); Bo Zhao (North China University of Technology, China)

The Practical Application of IoT for Large-scale Instruments and Equipment Sharing Management Platform

Guangjun Shi and Liang Liu (Computer Network Information Center, Chinese Academy of Sciences, China); Fu Chen (Central University of Finance and Economics & CS, China)

Discussion on Application of the Internet of Things in Modern Agricultural Experimental Base

Lihua Jiang (Chinese Academy of Agriculture Science, China); Jiawei Yan and Nengfu Xie (Agricultural Information Institute of CAAS, China)

Deep Learning for IoT

Tao Lin (Amazon, USA)

Workshop on Security and Privacy for Internet of Things and Cyber-Physical Systems

09:45 - 12:00 Chair: Houbing Song

A Sensor Attack Detection Method Based on Fusion Interval and Historical Measurement in CPS

Xiaobo Cai (Yunnan Agricultural University, China); Ke Han (Kunming Metallurgy College, China); Yue Zhang (Yunnan Agricultural University, China)

Research on Security Estimation and Control of Cyber-Physical System

Xiaobo Cai (Yunnan Agricultural University, China); Ke Han (Kunming Metallurgy College, China); Yue Zhang (Yunnan Agricultural University, China)

Open Framework of Gateway Monitoring System for Internet of Things in Edge Computing

Xiaobo Cai (Yunnan Agricultural University, China)

Authentication Based on Blockchain

Norah Alilwit (Embry-Riddle Aeronautical University, USA)

Software Define Radio in Realizing the Intruding UAS Group Behavior Prediction

Joshua Eason (Creighton University, USA); Chengtao M Xu and Houbing Song (Embry-Riddle Aeronautical University, USA)

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October 29th - 31st 2021

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