

2020 International Conference on Connected and Autonomous Driving (MetroCAD 2020)

**Detroit, Michigan, USA
27-28 February 2020**



**IEEE Catalog Number: CFP20S82-POD
ISBN: 978-1-7281-6060-3**

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

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

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP20S82-POD
ISBN (Print-On-Demand):	978-1-7281-6060-3
ISBN (Online):	978-1-7281-6059-7

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2020 International Conference on Connected and Autonomous Driving (MetroCAD) **MetroCAD 2020**

Table of Contents

Keynotes	viii
Committees	xiii
Sponsors	xv

Session I: Vision / Blue Sky Thinking

A Vision of Smart Traffic Infrastructure for Traditional, Connected, and Autonomous Vehicles	1
<i>Sanjay Ranka (University of Florida), Anand Rangarajan (University of Florida), Lily Elefteriadou (University of Florida), Siva Srinivasan (University of Florida), Emmanuel Poasadas (City of Gainesville), Dan Hoffman (City of Gainesville), Raj Ponnulari (Florida Department of Transportation), Jeremy Dilmore (Florida Department of Transportation), and Tom Byron (Florida Department of Transportation)</i>	
Cyber-Human-Physical Heterogeneous Traffic Systems for Enhanced Safety	9
<i>Yunyi Jia (Department of Automotive Engineering, Clemson University) and Beshah Ayalew (Department of Automotive Engineering, Clemson University)</i>	

Session II: Challenges and Methodologies

Collaborative Autonomous Driving: Vision and Challenges	17
<i>Zheng Dong (Wayne State University), Weisong Shi (Wayne State University), Guangmo Tong (University of Delaware), and Kecheng Yang (Texas State University)</i>	
Accurate Object Detection in Smart Transportation Using Multiple Cameras	27
<i>Zhinan Qiao (The University of North Texas), Andrew Sansom (The University of North Texas), Mara McGuire (Texas A&M University), Andrew Kalaani (Georgia Southern University), Xu Ma (The University of North Texas), Qing Yang (The University of North Texas), and Song Fu (The University of North Texas)</i>	
A Methodology of CAN Communication Encryption Using a Shuffling Algorithm	34
<i>Jeonghui Yeom (Korea Polytechnic University) and Sukhyun Seo (Korea Polytechnic University)</i>	

Poster Session

GARDS: Generalized Autonomous Robotic Delivery System	39
<i>Jade Zsiros (University of Central Florida), Brian Blalock (University of Central Florida), Darien Craig (University of Central Florida), Sudharsan Vaidhun (University of Central Florida), Alexander Wang (Trinity Preparatory School), and Zhishan Guo (University of Central Florida)</i>	
Equinox: A Road-Side Edge Computing Experimental Platform for CAVs	41
<i>Liangkai Liu (Wayne State University), Yongtao Yao (Wayne State University), Ruijun Wang (Wayne State University), Baofu Wu (Wayne State University, Hangzhou Dianzi University), and Weisong Shi (Wayne State University)</i>	
An Autoencoder Based Approach to Defend against Adversarial Attacks for Autonomous Vehicles	43
<i>Houchao Gan (Clarkson University) and Chen Liu (Clarkson University)</i>	

Session III: Prototypes and Simulators

HydraMini: An FPGA-Based Affordable Research and Education Platform for Autonomous Driving... 45	
<i>Tianze Wu (University of Chinese Academy of Sciences), Yifan Wang (University of Chinese Academy of Sciences), Weisong Shi (Wayne State University), and Joshua Lu (Xilinx)</i>	
HydraView: A Synchronized 360°-View of Multiple Sensors for Autonomous Vehicles	53
<i>Luodai Yang (Eastern Michigan University), Qian Jia (Eastern Michigan University), Ruijun Wang (Wayne State University), Jie Cao (Eastern Michigan University), and Weisong Shi (Wayne State University)</i>	
Analysis and Simulation of Cyber Attacks against Connected and Autonomous Vehicles	62
<i>Shahida Malik (University of Toledo) and Weiqing Sun (University of Toledo)</i>	
An Intelligent Driving Simulation Platform: Architecture, Implementation and Application	71
<i>Yongling Sun (GAC R&D Center Silicon Valley), Xiaosong Yang (GAC R&D Center Silicon Valley), Hai Xiao (GAC R&D Center Silicon Valley), and Hongwei Feng (GAC R&D Center Silicon Valley)</i>	

Session IV: Models and Algorithms

A Reliability Engineering Based Approach to Model Complex and Dynamic Autonomous Systems .	76
<i>Timo Frederik Horeis (IQZ GmbH), Tobias Kain (Volkswagen AG), Julian-Steffen Müller (Volkswagen AG), Fabian Plinke (IQZ GmbH), Johannes Heinrich (IQZ GmbH), Maximilian Wesche (Volkswagen AG), and Hendrik Decke (Volkswagen AG)</i>	

Towards Trustworthy Perception Information Sharing on Connected and Autonomous Vehicles	85
<i>Jingda Guo (University of North Texas), Qing Yang (University of North Texas), Song Fu (University of North Texas), Ryan Boyles (California State University - Sacramento), Shavon Turner (Grambling State University), and Kenzie Clarke (Texas Christian University)</i>	
2D Map Estimation via Teacher-Forcing Unsupervised Learning	91
<i>Zhiliu Yang (Clarkson University) and Chen Liu (Clarkson University)</i>	

Session V: Invited Paper

Cyber-Human-Physical Heterogeneous Traffic Systems for Enhanced Safety	98
<i>Yunyi Jia (Clemson University) and Beshah Ayalew (Clemson University)</i>	
Author Index	107