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CECS eNEWS

Center for Embedded and Cyber-physical Systems, University of California, Irvine

Inside this Issue:

- MECPS Symposium 2025
- UCI-KMU AI Symposium
- Fahmy Visits CORSA Lab
- Kurdahi Honor and Promotion
- Al Faruque Named IEEE Fellow
- Alshammari Won Best Demo at USENIX
- Seminars
- Fellowship Profiles
- Publications

MECPS Symposium 2025



The MECPS Symposium is the annual end-of-the-year convention to showcase capstone projects of graduating MECPS students and prototype flyers of incoming MECPS students. The 2025 MECPS Symposium, hosted on December 5, 2025 at ISEB, celebrated the MECPS class of 2025.

At the Best Project ceremony, the following teams were recognized:

1st Place: **A Smart Maintenance System with Drones and Autonomous Rovers** by Zeyang Liu, Po-Hsun Wu, Hongyu Li, Aaron Liu, Aydin O'Leary, and Chia-Da Lu.

2nd Place: **Advanced Elderly Care System Using Amazon Sidewalk and LoRa** by Hoang Lan Pham, Royston Pinto, Rudrashis Gorai

Popular Vote/Honorable Mention: **Autonomous Rover Navigation** by Chaerin An, Selina Shrestha, Farhin Salman Mansuri, Sahil Mukeshbhai Kakadiya, Vaibhav Ashokbhai Gajera.

Congratulations students!

UCI-KMU AI Research Exchange Symposium

On August 22, 2025, CECS affiliated professors Nikil Dutt, Tony Givargis, Amir Rahmani, Alfred Chen, and Hyoukjun Kwon, along with Dean of ICS Marios Papefthymiou, partnered with Kookmin University (KMU) to host the UCI-KMU AI Research Exchange Symposium at UCI. Scholars from both universities presented in total 3 keynotes and 6 talks. This symposium built on the legacy of GREAT, a summer research internship program with KMU and several faculty sabbaticals from KMU over the years.

Fahmy Visits CORSA Lab

Professor Suhaib Fahmy is an Associate Professor of Computer Science at King Abdullah University of Science and Technology (KAUST) and the principal investigator of the KAUST Accelerated Connected Computing Laboratory (ACCL). In early November, Prof. Fahmy visited CECS faculty Sitao Huang's CORSA Lab where they shared research work, including FPGA and ASIC accelerators for LLMs, and exchanged insights and ideas. In the end, Prof. Fahmy invited Prof. Huang and the CORSA Lab to visit ACCL in KAUST.



WAAAUB OC Chapter Honors Kurdahi



On September 27, 2025, the Worldwide Alumni Association of American University of Beirut (WAAAUB) Orange County Chapter hosted a memorable dinner to honor CECS director Professor Fadi Kurdahi with the WAAAUB Orange County Chapter Lifetime Achievement Award. The event recognized Prof. Kurdahi's remarkable contributions to education and mentorship since he received his Bachelor of Engineering at AUB in 1981. As he accepted the award, Prof. Kurdahi urged alumni to invest in one another's futures: "Support one another, host interns, be mentors. Together, we can create a network of AUB alumni who uplift one another and future generations."

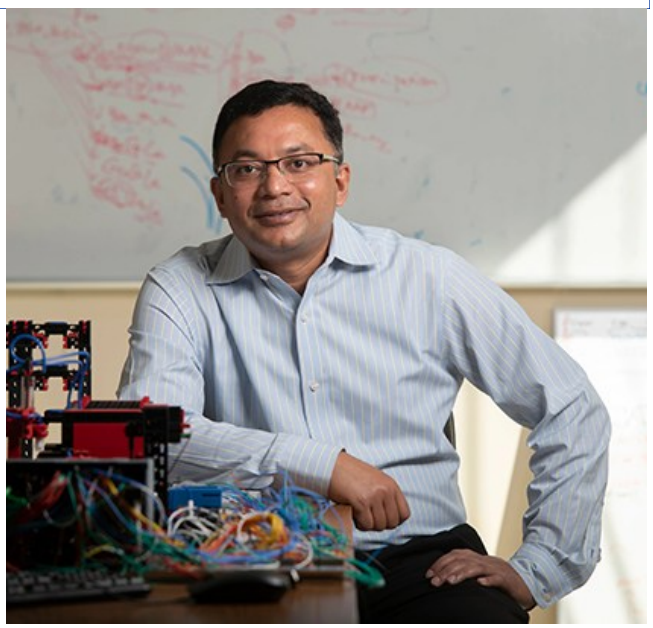
Kurdahi Promoted to Distinguished Professor





In addition to his Lifetime Achievement Award from WAAAUB OC Chapter, Prof. Fadi Kurdahi has been promoted to Distinguished Professor with joint appointment under the Department of Electrical Engineering and Computer Science and Donald Bren School of Information and Computer Science. A Distinguished Professor is the university's highest academic title and a reflection of outstanding leadership, deep commitment to education, and lasting impact in the field. Congratulations, Prof. Kurdahi!

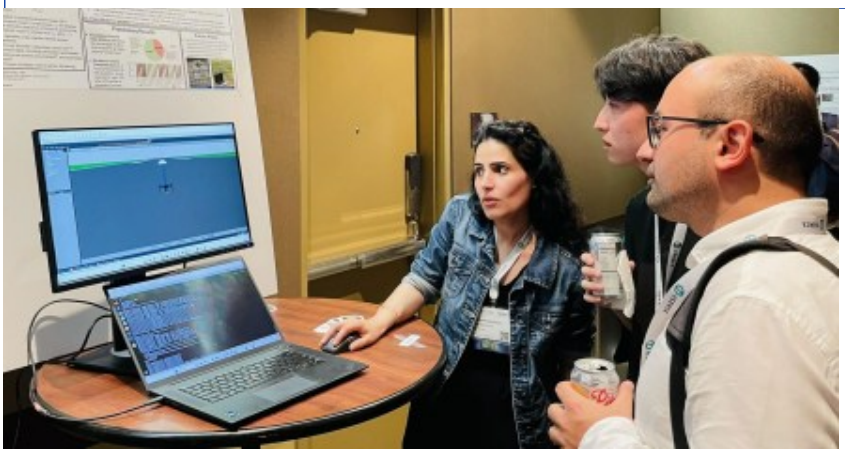
Al Faruque Named IEEE Fellow



CECS affiliated Professor of Electrical Engineering and Computer Science Mohammad Al Faruque has elevated to IEEE Fellow. This prestigious recognition highlights Prof. Al Faruque's outstanding research achievements and leadership. Awarded to no more than 0.1 percent of the organization's voting membership, IEEE recognized Prof. Al Faruque for his "contributions to design automation of energy-efficient, secure embedded, and cyber-physical systems."

Congratulations Prof. Al Faruque!

Alshammari Won Best Demo at USENIX Security Symposium



At the 3rd USENIX Symposium on Vehicle Security and Privacy (VehicleSec '25), CECS affiliated PhD student Fayzah Alshammari presented "CPExploiter: from Cyber to Physical: Understanding the End-to-End Physical Attack Capability of Cyber-Attacks on Robotic Vehicles." Alshammari's paper expresses that previous research focuses on vulnerability discovery without understanding the end-to-end impact of robotic vehicle cyber-attacks. Her demo uses VEI scenarios and automates escalation discovery via UAV-specific parameters to expose physical failure. CPExploiter won the Best Demo Award at VehicleSec '25. Congratulations Fayzah!

Xulong Tang - "Unleashing Multi-GPU Computing to the Next-Level "



Title: Unleashing Multi-GPU Computing to the Next-Level

Speaker: Prof. Xulong Tang

Date and Time: Wednesday, October 15, 2 p.m.

Location: EH 2430

Hosted By: Prof. Sitao Huang

Prabha Sundaravadivel - "Autonomy on a Budget..."

Title: Autonomy on a Budget: Enabling Intelligent Monitoring Through Low-Cost Embedded Systems

Speaker: Prof. Prabha Sundaravadivel

Date and Time: Tuesday, November 4, 2 p.m.

Location: EH 2430

Hosted By: Prof. Mohammad Al Faruque



CECS PhD Summer Fellowship Recipient: Praneetsai Iddamsetty



Praneetsai Iddamsetty is a first year MS/PhD computer engineering student in the Department of Electrical Engineering and Computer Science under Professor Mohammad Al Faruque. Prior to joining the graduate program, he completed his undergraduate studies in computer engineering here at UCI.

In the summers of 2023 and 2024, Praneetsai interned at Siemens Digital Industries Software in the NX software's computer aided manufacturing (CAM) team. During his time there, he worked on various projects for geometry visualization and CNC toolpath generation. On campus, he was involved with various organizations and activities like IEEE at UCI and E-SONIC.

Currently, Praneetsai is researching the security of autonomous vehicles and cyber-physical systems. He is exploring the vulnerabilities of sensors and autonomous navigation systems, with an emphasis on systems that utilize language models for motion planning and low-level control.

CECS PhD Summer Fellowship Recipient: Chaoran Yuan



Chaoran Yuan is a second-year PhD student in the Department of Electrical Engineering and Computer Science with a focus on autonomous systems, embedded computing, and system reliability. Prior to joining UCI, he completed his Bachelor of Engineering degree in Computer Science and Technology (Cyberspace Security) from Southeast University, China.

During his undergraduate studies, he received several academic and research recognitions, including an Outstanding Graduation Design Award and placement in national-level cybersecurity competitions. In 2023, Chaoran interned at Casco Products Corporation, where he worked on improving the security of automotive microcontrollers used in converters and sensors.

Currently, Chaoran works under the guidance of Professor Fadi Kurdahi in the CECS laboratory. He is leading the development of a Hardware-in-the-Loop platform for autonomous vehicle testing, with the goal of enabling scalable, scenario-based validation through the integration of virtual environments and physical control systems. His research aims to advance the reliability and efficiency of autonomous systems by exploring fault injection techniques, performance measurement of embedded components, and digital twin-based simulation. He plans to further extend this work toward creating standardized testing frameworks for safety-critical AI systems.

Publications

The following papers were published by CECS affiliates from July 2025 through December 2025 (and unreported papers from previous eNews).

Author, Title, Publication **Conference Proceedings**

Octavian Alexandru Trifan, Jason Lee Weber, Marc Titus Trifan, Alexandru Nicolau, Alexander V. Veidenbaum: **Grammar Pruning: Enabling Low-Latency Zero-Shot Task-Oriented Language Models for Edge AI.** EMNLP 2025: 16944-16957, Novmeber 4-9, 2025, Suzhou, China

Se-Min Lim, Seongyoung Kang, Sang-Woo Jun: **Bancroft: Genomics Acceleration Beyond On-Device Memory.** PACT 2025: 306-319, November 3-6, 2025, Irvine, CA, USA

Hanning Chen, Yang Ni, Wenjun Huang, Hyunwoo Oh, Yezi Liu, Tamoghno Das, Mohsen Imani: **LVLM_CSP: Accelerating Large Vision Language Models via Clustering, Scattering, and Pruning for Reasoning Segmentation.** ACM Multimedia 2025: 3932-3941, October 27-31, 2025, Dublin, Ireland

Hamidreza Alikhani, Anil Kanduri, Pasi Liljeberg, Amir M. Rahmani, Nikil D. Dutt: **Invited Paper: Mindful AI for Pervasive Health and Wellbeing (PHW)**. ICCAD 2025: 1-8, October 26-30, 2025, Munich, Germany

Ye Qiao, Zhiheng Chen, Yian Wang, Yifan Zhang, Yunzhe Deng, Sitao Huang: **COBRA: Algorithm-Architecture Co-optimized Binary Transformer Accelerator for Edge Inference.** ICCAD 2025: 1-8, October 26-30, 2025, Munich, Germany

Yu Hao, Juefei Pu, Xingyu Li, Zhiyun Qian, Ardalan Amiri Sani: **SyzSpec: Specification Generation for Linux Kernel Fuzzing via Under-Constrained Symbolic Execution.** CCS 2025: 813-826, October 13-17, 2025, Taipei, Taiwan

Chen Ma, Ningfei Wang, Zhengyu Zhao, Qian Wang, Qi Alfred Chen, Chao Shen: **ControlLoc: Physical-World Hijacking Attack on Camera-based Perception in Autonomous Driving**. CCS 2025: 738-752, October 13-17, 2025, Taipei, Taiwan

Yashuo Wu, Carla-Fabiana Chiasserini, Marco Levorato: **Distributed Context-Aware Resource Allocation for Dynamic Sensor Fusion in Edge Inference.** MASS 2025: 84-92, October 6-8, 2025, Chicago, IL, USA

Li Zhang, Mohammed E. Fouda, Ahmed M. Eltawil, Khaled Nabil Salama: **Hardware-aware Gradient-based Column-wise Mixed-Precision Quantization for Compute-in-Memory Accelerators**. SOCC 2025: 1-6, September 29-October 1, 2025, Dubai, United Arab Emirates

Mohamad Fakih, Rahul Dharmaji, Halima Bouzidi, Gustavo Quiros Araya, Oluwatosin Ogundare, Mst-Ayesha Siddika, Mohammad Abdullah Al Faruque**: LLM4CVE: Enabling Iterative Automated Vulnerability Repair with Large Language Models**. DSD 2025: 592-599, September 10-12, 2025, Salerno, Italy

Hsin-Yu Ting, Sing-Yao Wu, Leming Cheng, Eli Bozorgzadeh: **Dynamic Multi-Accelerator Management for Deep Learning Applications on the FPGA Edge**. DSD 2025: 106-113, September 10-12, 2025, Salerno, Italy

Lars Luchterhandt, Vivek Govindasamy, Yutong Wang, Christoph Scheytt, Wolfgang Müller, Rainer Dömer: **A Quantitative Guide to Navigate Speed/Accuracy Tradeoffs in System Level Design of RISC-V Processor Grids**. FDL 2025: 1-9, September 10-12, 2025, St. Goar, Germany

Publications

The following papers were published by CECS affiliates from July 2025 through December 2025 (and unreported papers from previous eNews).

Author, Title, Publication — Conference Proceedings

Matheus Isquierdo, Felipe Sampaio, Bruno Zatt, Nikil D. Dutt, Daniel Palomino: **Employing Approximate Storage for Rate-Distortion Optimization in VVC Encoders**. SBCCI 2025: 1-5, August 25-September 1, 2025, Manaus, Brazil

Yuxin (Myles) Liu, Habiba Farrukh, Ardalan Amiri Sani, Sharad Agarwal, Gene Tsudik: **Scoop: Mitigation of Recapture Attacks on Provenance-Based Media Authentication.** USENIX Security Symposium 2025: 4285-4304, August 13-15, 2025, Seattle, WA, USA

Hanning Chen, Yang Ni, Wenjun Huang, Hyunwoo Oh, Tamoghno Das, Fei Wen, Mohsen Imani: **Revisiting Reconfigurable Acceleration of Vision Transformer with Patch Pruning.** ISLPED 2025: 1-7, August 6-8, 2025, Reykjavik, Iceland

Yonatan G. Achamyeleh, Shih-Yuan Yu, Gustavo Quiros Araya, Mohammad Abdullah Al Faruque: **Bridging the Binary Analysis Gap: A Cross-Compiler Dataset and Neural Framework for Industrial Control Systems**. KDD (2) 2025: 5260-5269, August 3-7, 2025, Toronto, Canada

Deniz Najafi, Wanhao Yu, Mehrdad Morsali, Pietro Mercati, Mohsen Imani, Mahdi Nikdast, Li Yang, Shaahin Angizi: **Dyna-Optics: Architecting a Channel-Adaptive DNN Near-Sensor Optical Accelerator for Dynamic Inference.** COINS 2025: 1-7, August 4-6, 2025, Madison, WI, USA

Aniruddha Datta, Tamonash Bhattacharyya, Elahe Khatibi, Agasthya Seth, Ziyu Wang, Sanaz R. Mousavi, Amir M. Rahmani, Farshad Firouzi, Krishnendu Chakrabarty: **REACT: REinforcement Learning-Based Adaptive ECG Anonymization and Privacy Threat Mitigation*.** COINS 2025: 1-8, August 4-6, 2025, Madison, WI, USA

Gongjin Sun, Seongyoung Kang, Jane He, Se-Min Lim, Sang-Woo Jun: **Labidus: RISC-V Overlay with Streaming Asynchronous Custom Instructions.** ASAP 2025: 57-64, July 28-30, Vancouver, BC, Canada

Deniz Najafi, Mehrdad Morsali, Hamza Errahmouni Barkam, Brendan Reidy, Sepehr Tabrizchi, Arman Roohi, Mahdi Nikdast, Ramtin Zand, Mohsen Imani, Shaahin Angizi: **From Pixels to Reasoning: A Cross-Layer Photonic Design for Edge Visual Intelligence.** ISVLSI 2025: 1-6, July 6-9, 2025, Kalamata Greece

Mike Heddes, Narayan Srinivasa, Tony Givargis, Alex Nicolau: **Always-Sparse Training by Growing Connections with Guided Stochastic Exploration.** IJCNN 2025: 1-8, June 30-July 5, 2025, Rome, Italy

Zhuoyi Yang, Ian G. Harris: **LogLLaMA: Transformer-based log anomaly detection with LLaMA.** IJCNN 2025: 1-8, June 30-July 5,2025, Rome, Italy

Jingcheng Li, Ye Qiao, Haocheng Xu, Sitao Huang: **RSEND: Retinex-based Squeeze and Excitation Network with Dark Region Detection for Efficient Low Light Image Enhancement.** IJCNN 2025: 1-8. June 30- July 5, 2025, Rome, Italy

Ye Qiao, Haocheng Xu, Yifan Zhang, Sitao Huang: **MONAS: Efficient Zero-Shot Neural Architecture Search for MCUs.** IJCNN 2025: 1-8, June 30- July 5, 2025, Rome, Italy

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Author, Title, Publication **Conference Proceedings**

Mehrdad Morsali, Deniz Najafi, Amin Shafiee, Sepehr Tabrizchi, Pietro Mercati, Mohsen Imani, Arman Roohi, Navid Khoshavi, Mahdi Nikdast, Shaahin Angizi: **Event-Driven Spatiotemporal Processing-In-Sensor with Phase Change Memory-based Optical Acceleration.** ACM Great Lakes Symposium on VLSI 2025: 1-7, June 29, 2025, New Oreleans, LA, USA

Jaewon Park, Quang Anh Hoang, Jonathan Ta, Shinhaeng Kang, Kyomin Sohn, Sang-Woo Jun: **MAPLE: Flexible-Precision Processing-In-Memory Architecture for Efficient On-Device ML.** ACM Great Lakes Symposium on VLSI 2025: 192-199, June 29, 2025, New Oreleans, LA, USA

William Youngwoo Chung, Hamza Errahmouni Barkam, Tamoghno Das, Mohsen Imani: **Robust Reasoning and Learning with Brain-Inspired Representations under Hardware-Induced Nonlinearities.** ACM Great Lakes Symposium on VLSI 2025: 968-975, June 29, 2025, New Oreleans, LA, USA

Sungheon Jeon, Hamza Errahmouni Barkam, Hyunwoo Oh, Hanning Chen, Tamoghno Das, Zhen Ye, Mohsen Imani: **iTaskSense: Task-Oriented Object Detection in Resource-Constrained Environments.** DAC 2025: 1-7, June 22-25, 2025, San Fransico, CA, USA

Kun Wu, Jeongmin Brian Park, Xiaofan Zhang, Mert Hidayetoglu, Vikram Sharma Mailthody, Sitao Huang, Steven S. Lumetta, Wen-Mei Hwu: **SSDTrain: An Activation Offloading Framework to SSDs for Faster Large Language Model Training.** DAC 2025: 1-7, June 22-25, 2025, San Francisco, CA, USA

Langtian Qin, Yashuo Wu, Sameh Najeh, Marco Levorato, Carla-Fabiana Chiasserini: **HERACLES: Hierarchical Semantic Communications for Distributed Dynamic Sensor Fusion.** ICDCS 2025: 472-482, July 21-23, 2025, Glasgow, United Kingdom

Yongfan Liu, Hyoukjun Kwon: **Efficient Depth Estimation for Unstable Stereo Camera Systems on AR Glasses.** CVPR 2025: 6252-6261, June 10-17, 2025, Nashville, TN, USA

Giuseppe Esposito, Enrico Magliano, Nicola Scarano, Tamer Ahmed Eltaras, Juan-David Guerrero-Balaguera, Luca Mannella, Josie E. Rodriguez Condia, Annachiara Ruospo, Stefano Di Carlo, Marco Levorato, Alessandro Savino, Matteo Sonza Reorda: **AI-Based Classification of Adversarial Attacks vs. Hardware Fault Corruptions in the Split Computing Context.** IOLTS 2025: 1-7, July 7-9, 2025, Ischia, Italy

Rachid Karami, Sheng-Chun Kao, Hyoukjun Kwon: **Understanding the Performance Horizon of the Latest ML Workloads with NonGEMM Workloads.** ISPASS 2025: 1-14, May 11-13, Ghent, Belgium

Jamin Seo, Jianming Tong, Tushar Krishna, Hyoukjun Kwon: **Exploring Constrained Dataflow Accelerators for Real-Time Multi-Task Multi-Model MI Workloads.** ISPASS 2025: 1-11, May 11-13, Ghent, Belgium

Pere Vergés, Alexandru Nicolau, Tony Givargis: **Learning encoding phasors with fractional power encoding.** ICCAI 2025: 537-543 March 28-31, 2025, Kyoto, Japan

Publications

The following papers were published by CECS affiliates from July 2025 through December 2025 (and unreported papers from previous eNews).

Author, Title, Publication — Journal Articles

Ahmed Nasser, Abdulkadir Celik, Asmaa Abdallah, Ruiqi Wang, Yiming Yang, Atif Shamim, Ahmed M. Eltawil: **Acing Versatility of RIS Partitioning: An Experimental Proof-of-Concept Campaign**. IEEE Commun. Stand. Mag. 9(4): 144 -151, December, 2025

Zhongqi Yang, Amir M. Rahmani: **Personalized Causal Graph Reasoning for LLMs: An Implementation for Dietary Recommendations.** IEEE J. Biomed. Health Informatics 29(12): 8767-8774, December,2025

Hao-Lun Weng, Chung-An Shen, Mohammed E. Fouda, Ahmed M. Eltawil: **Single-Cycle Independent Component Analysis Processor for In-Band Full Duplex Systems**. IEEE Trans. Circuits Syst. I Regul. Pap. 72(12): 8056-8066, December, 2025

Abdelhay Ali, Amr N. Abdelrahman, Abdulkadir Celik, Ahmed M. Eltawil: **Autoencoder-Based Transceivers for Multiple Access Human Body Communication Networks**. IEEE Trans. Circuits Syst. I Regul. Pap. 72(12): 8132-8145, December, 2025

Yingjie Huang, Amr M. Abdelhady, Qianggang Wang, Jia Ye, Yuan Chi, Ahmed M. Eltawil, Amr A. El-Sherif, Tamer El-Batt: **Joint Beamforming and Power Allocation Design for Wirelessly Charged Unmanned Inspecting Vehicles in Power Transmission Systems**. IEEE Trans. Green Commun. Netw. 9(4): 1964-1979, December, 2025

Trier Mortlock, Luke Chen, Jonathon M. Smereka, Pramod P. Khargonekar, Mohammad Abdullah Al Faruque**: Fuse It or Lose It? Analyzing the Effects of Sensor Diversity on Multimodal Ensembles for Autonomous Vehicle Perception**. IEEE Trans. Intell. Transp. Syst. 26(11): 19833-19844, November, 2025

Kamilya Smagulova, Ahmed Elsheikh, Diego A. Silva, Mohammed E. Fouda, Ahmed M. Eltawil: **Efficient and real-time perception: a survey on end-to-end event-based object detection in autonomous driving**. Frontiers Robotics AI 12, November, 2025

Amr M. Abdelhady, Carles Diaz-Vilor, Mohammadreza Barzegaran, Hamid Jafarkhani, Ahmed M. Eltawil: **Optimization of Hybrid Laser-Battery-Powered UAV-Assisted Backscatter Communications**. IEEE Trans. Commun. 73(11): 11690-11706, November, 2025

Manoj Vishwanath, Steven Cao, Nikil D. Dutt, Amir M. Rahmani, Miranda M. Lim, Hung Cao: **Reducing interdataset covariate shift in sleep EEG of traumatic brain injured humans and mice using Transfer Euclidean Alignment**. Biomed. Signal Process. Control. 108: 107948, October, 2025

Ali Zakeri, Zhuowen Zou, Hanning Chen, Mohsen Imani: **Configurable hyperdimensional graph representation.** Artif. Intell. 347: 104384, October, 2025

Danny Abraham, Biswadip Maity, Bryan Donyanavard, Nikil D. Dutt: **Runtime Adaptivity for Efficient Neural Network Inference on Autonomous Systems**. ACM Trans. Embed. Comput. Syst. 24(6): 162:1-162:25, October, 2025

Ahmed Hussain, Asmaa Abdallah, Ahmed M. Eltawil: **Redefining Polar Boundaries for Near-Field Channel Estimation for Ultra-Massive MIMO Antenna Array**. IEEE Trans. Wirel. Commun. 24(10): 8193-8207, October, 2025

Publications

The following papers were published by CECS affiliates from July 2025 through December 2025 (and unreported papers from previous eNews).

Author, Title, Publication — Journal Articles

Luke Chen, Youssef Gamal, Yanda Li, Shih-Yuan Yu, Ihsen Alouani, Mohammad Abdullah Al Faruque: **DART: Distribution-Aware Hardware Trojan Detection**. IEEE Trans. Inf. Forensics Secur. 20: 9600-9609, September, 2025

Yifan Zhang, Xiaoyu Niu, Hongzheng Tian, Yanjun Zhang, Bo Yu, Shaoshan Liu, Sitao Huang: **A Sparsity-Aware Autonomous Path Planning Accelerator with HW/SW Co-Design and Multi-Level Dataflow Optimization.** ACM Trans. Archit. Code Optim. 22(3): 111:1-111:25 , September, 2025

Jeffrey L. Krichmar: **From Animals to Animats: The Tradition Continues.** Adapt. Behav. 33(5-6): 273-277, September, 2025

Calvin Yeung, Hamza Errahmouni Barkam, Zhuowen Zou, Sanggeon Yun, Nathaniel D. Bastian, Mohsen Imani: **Lipschitz-based robustness estimation for hyperdimensional learning.** Frontiers Artif. Intell. 8, September, 2025

Diego A. Silva, Ahmed Elsheikh, Kamilya Smagulova, Mohammed E. Fouda, Ahmed M. Eltawil: **Chimera: a block-based neural architecture search framework for event-based object detection**. Frontiers Artif. Intell. 8, September, 2025

Nasir Khan, Asmaa Abdallah, Abdulkadir Celik, Ahmed M. Eltawil, Sinem Coleri: **Explainable AI-Aided Feature Selection and Model Reduction for DRL-Based V2X Resource Allocation**. IEEE Trans. Commun. 73(9): 7633-7649, September, 2025

Ahmed Hussain, Asmaa Abdallah, Abdulkadir Celik, Ahmed M. Eltawil: **Near-Field ISAC: Synergy of Dual-Purpose Codebooks and Space-Time Adaptive Processing**. IEEE Wirel. Commun. 32(4): 64-70, August, 2025

Armon Barton, Timothy Walsh, Mohsen Imani, Jiang Ming, Matthew Wright: **PredicTor: A Global, Machine Learning Approach to Tor Path Selection.** ACM Trans. Priv. Secur. 28(3): 35:1-35:31, August, 2025

Harrison Espino, Jeffrey L. Krichmar: **Adaptive, Goal-Oriented Navigation Using a Model of Directionally-Polarized Place Cells.** Adapt. Behav. 33(5-6): 279-290, August, 2025

Gomez-Cabrera Alain, Ponciano Jorge Escamilla-Ambrosio, Mohammad Abdullah Al Faruque: **A Review of Resilience Enhancement Techniques for Cyber-Physical Systems**. IEEE Access 13: 138061-138082, July, 2025

Ruijie Du, Deepan Muthirayan, Pramod P. Khargonekar, Yanning Shen: **Long-Term Fairness for Real-Time Decision Making: A Constrained Online Optimization Approach.** IEEE Trans. Neural Networks Learn. Syst. 36(7): 13149-13161, July, 2025

Chetna Singhal, Yashuo Wu, Francesco Malandrino, Sharon L. G. Contreras, Marco Levorato, Carla-Fabiana Chiasserini: **Resource-Efficient Sensor Fusion at the Edge via System-Wide Dynamic Gated Neural Networks.** IEEE Trans. Mob. Comput. 24(12): 13243-13257, July, 2025

Publications

The following papers were published by CECS affiliates from July 2025 through December 2025 (and unreported papers from previous eNews).

Author, Title, Publication

Journal Articles

Ryozo Masukawa, Sanggeon Yun, Sungheon Jeong, Nathaniel D. Bastian, Mohsen Imani: **TriageHD: A Hyper-Dimensional Learning-to-Rank Framework for Dynamic Micro-Segmentation in Zero-Trust Network Security.** IEEE Access 13: 136806-136815, July, 2025

Pere Vergés, Mike Heddes, Igor Nunes, Denis Kleyko, Tony Givargis, Alexandru Nicolau: **Classification using hyperdimensional computing: a review with comparative analysis.** Artif. Intell. Rev. 58(6): 173, March 2025

Joann Qiongna Chen, Xinlei He, Zheng Li, Yang Zhang, Zhou Li: **A Comprehensive Study of Privacy Risks in Curriculum Learning.** Proc. Priv. Enhancing Technol. 2025(1): 613-631, January, 2025

Other Publications

Junchen Zhao, Ali Derakhshan, Dushyant Bharadwaj, Jayden Kana Hyman, Junhao Dong, Sangeetha Abdu Jyothi, Ian G. Harris: **IMPQ: Interaction-Aware Layerwise Mixed Precision Quantization for LLMs.** CoRR abs/2509.15455, December, 2025

Yu Zheng, Chenang Li, Zhou Li, Qingsong Wang: **Convergent Privacy Framework with Contractive GNN Layers for Multi-hop Aggregations.** CoRR abs/2506.22727, December, 2025

Yezi Liu, Hanning Chen, Wenjun Huang, Yang Ni, Mohsen Imani: **LUNE: Efficient LLM Unlearning via LoRA Fine-Tuning with Negative Examples.** CoRR abs/2512.07375, December, 2025

Yezi Liu, Hanning Chen, Wenjun Huang, Yang Ni, Mohsen Imani: **Cauchy-Schwarz Fairness Regularizer.** CoRR abs/2512.09467, December, 2025

Hanning Chen, Keyu Man, Kevin Zhu, Chenguang Zhu, Haonan Li, Tongbo Luo, Xizhou Feng, Wei Sun, Sreen Tallam, Mohsen Imani, Partha Kanuparthy: **TorchTraceAP: A New Benchmark Dataset for Detecting Performance Anti-Patterns in Computer Vision Models.** CoRR abs/2512.14141, December, 2025

Yezi Liu, William Youngwoo Chung, Hanning Chen, Calvin Yeung, Mohsen Imani: **Are Hypervectors Enough? Single-Call LLM Reasoning over Knowledge Graphs.** CoRR abs/2512.09369, December, 2025

Yezi Liu, William Youngwoo Chung, Yang Ni, Hanning Chen, Mohsen Imani: **Mitigating Bias in Graph Hyperdimensional Computing.** CoRR abs/2512.07433, December, 2025

Yifan Zhang, Zhiheng Chen, Ye Qiao, Sitao Huang: **PD-Swap: Prefill-Decode Logic Swapping for End-to-End LLM Inference on Edge FPGAs via Dynamic Partial Reconfiguration.** CoRR abs/2512.11550, December, 2025

Mohamad Fakih, Rahul Dharmaji, Youssef Mahmoud, Halima Bouzidi, Mohammad Abdullah Al Faruque: **Invisible Ears at Your Fingertips: Acoustic Eavesdropping via Mouse Sensors**. CoRR abs/2509.13581, November, 2025

Kohei Tsujio, Mohammad Abdullah Al Faruque, Yasser Shoukry: **RampoNN: A Reachability-Guided System Falsification for Efficient Cyber-Kinetic Vulnerability Detection**. CoRR abs/2511.16765, November, 2025

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The following papers were published by CECS affiliates from July 2025 through December 2025 (and unreported papers from previous eNews).

Author, Title, Publication **Other Publications**

Go Tsuruoka, Takami Sato, Qi Alfred Chen, Kazuki Nomoto, Ryunosuke Kobayashi, Yuna Tanaka, Tatsuya Mori: **Trapped by Their Own Light: Deployable and Stealth Retroreflective Patch Attacks on Traffic Sign Recognition Systems**. CoRR abs/2511.10050, November, 2025

Chen Ma, Ningfei Wang, Junhao Zheng, Qing Guo, Qian Wang, Qi Alfred Chen, Chao Shen: **T2I-Based Physical-World Appearance Attack against Traffic Sign Recognition Systems in Autonomous Driving**. CoRR abs/2511.12956, November, 2025

Nazmul Takbir, Hamidreza Alikhani, Nikil D. Dutt, Sangeetha Abdu Jyothi**: FlexiCache: Leveraging Temporal Stability of Attention Heads for Efficient KV Cache Management**. CoRR abs/2511.00868, November, 2025

Rajat Bhattacharjya, Sing-Yao Wu, Hyunwoo Oh, Chaewon Nam, Suyeon Koo, Mohsen Imani, Elaheh Bozorgzadeh, Nikil D. Dutt: **AVERY: Adaptive VLM Split Computing through Embodied Self-Awareness for Efficient Disaster Response Systems**. CoRR abs/2511.18151, November, 2025

Sanggeon Yun, Hyunwoo Oh, Ryozo Masukawa, Mohsen Imani: **DecoHD: Decomposed Hyperdimensional Classification under Extreme Memory Budgets.** CoRR abs/2511.03911, November, 2025

Octavian Alexandru Trifan, Karthik Sangaiah, Muhammad Awad, Muhammad Osama, Sumanth Gudaparthi, Alexandru Nicolau, Alexander V. Veidenbaum, Ganesh Dasika: **Eliminating Multi-GPU Performance Taxes: A Systems Approach to Efficient Distributed LLMs.** CoRR abs/2511.02168, November, 2025

Sanggeon Yun, Hyunwoo Oh, Ryozo Masukawa, Pietro Mercati, Nathaniel D. Bastian, Mohsen Imani: **LogHD: Robust Compression of Hyperdimensional Classifiers via Logarithmic Class-Axis Reduction.** CoRR abs/2511.03938, November, 2025

Tamoghno Das, Khanh Phan Vu, Hanning Chen, Hyunwoo Oh, Mohsen Imani: **ASTER: Attention-based Spiking Transformer Engine for Event-driven Reasoning.** CoRR abs/2511.06770, November, 2025

Sungheon Jeong, Ryozo Masukawa, Jihong Park, Sanggeon Yun, Wenjun Huang, Hanning Chen, Mahdi Imani, Mohsen Imani: **Draft and Refine with Visual Experts.** CoRR abs/2511.11005, Novmeber, 2025

Ruijie Du, Ruoyu Lin, Yanning Shen, Magnus Egerstedt: **Online Learning and Coverage of Unknown Fields Using Random-Feature Gaussian Processes**. CoRR abs/2509.08117, November, 2025

Hyunwoo Oh, KyungIn Nam, Rajat Bhattacharjya, Hanning Chen, Tamoghno Das, Sanggeon Yun, Suyeon Jang, Andrew Ding, Nikil D. Dutt, Mohsen Imani: **T-SAR: A Full-Stack Co-design for CPU-Only Ternary LLM Inference via In-Place SIMD ALU Reorganization.** CoRR abs/2511.13676, November, 2025

Ruoyu Lin, Gennaro Notomista, Magnus Egerstedt: **Disentangled Control of Multi-Agent Systems**. CoRR abs/2511.05900, November, 2025

Publications

The following papers were published by CECS affiliates from July 2025 through December 2025 (and unreported papers from previous eNews).

Author, Title, Publication **Other Publications**

Diana Romero, Xin Gao, Daniel Khalkhali, Salma Elmalaki: M**-CALLM: Multi-level Context Aware LLM Framework for Group Interaction Prediction**. CoRR abs/2511.14661, November, 2025

Zonglin Guo, Tony Givargis: **FlashMap: A Flash Optimized Key-Value Store.** CoRR abs/2511.08826, November, 2025

Hyunwoo Oh, Hanning Chen, Sanggeon Yun, Yang Ni, Wenjun Huang, Tamoghno Das, Suyeon Jang, Mohsen Imani: **QUILL: An Algorithm-Architecture Co-Design for Cache-Local Deformable Attention.** CoRR abs/2511.13679, November, 2025

Yonatan Gizachew Achamyeleh, Tongtao Zhang, Joshua Hyunki Kim, Gabriel Garcia, Shih-Yuan Yu, Anton Kocheturov, Mohammad Abdullah Al Faruque: **AGNOMIN - Architecture Agnostic Multi-Label Function Name Prediction**. CoRR abs/2509.25514, October, 2025

Tianyu Zhao, Mahmoud Srewa, Salma Elmalaki: **FinP: Fairness-in-Privacy in Federated Learning by Addressing Disparities in Privacy Risk**. CoRR abs/2502.17748, October, 2025

Diana Romero, Yasra Chandio, Fatima M. Anwar, Salma Hosni Emam Mohamed Elmalaki: **GIST: Group Interaction Sensing Toolkit for Mixed Reality**. CoRR abs/2507.11797, October, 2025

Manuel E. Segura, Pere Vergés, Richard Ky, Ramesh Arangott, Angela Kristine Garcia, Thang Dihn Trong, Makoto Hyodo, Alexandru Nicolau, Tony Givargis, Sergio Gago Masagué: **Advancing Intoxication Detection: A Smartwatch-Based Approach.** CoRR abs/2510.09916, October, 2025

Yurun Song, Zhuoyi Yang, Ian G. Harris, Sangeetha Abdu Jyothi: **AMAQ: Adaptive Mixed-bit Activation Quantization for Collaborative Parameter Efficient Fine-tuning.** CoRR abs/2510.05468, October, 2025

Boyi Wei, Benedikt Stroebl, Jiacen Xu, Joie Zhang, Zhou Li, Peter Henderson: **Dynamic Risk Assessments for Offensive Cybersecurity Agents.** CoRR abs/2505.18384, October, 2025

Ye Qiao, Zhiheng Chen, Yifan Zhang, Yian Wang, Sitao Huang: **TeLLMe v2: An Efficient End-to-End Ternary LLM Prefill and Decode Accelerator with Table-Lookup Matmul on Edge FPGAs.** CoRR abs/2510.15926, October, 2025

Yong Huang, Zhongqi Yang, Amir M. Rahmani: **MIMIC-Sepsis: A Curated Benchmark for Modeling and Learning from Sepsis Trajectories in the ICU.** CoRR abs/2510.24500, October, 2025

Mariam Rakka, Marios Fournarakis, Olga Krestinskaya, Jinane Bazzi, Khaled N. Salama, Fadi J. Kurdahi, Ahmed M. Eltawil, Mohammed E. Fouda: **Mixed-Precision Quantization for Language Models: Techniques and Prospects.** CoRR abs/2510.16805, October, 2025

Sanggeon Yun, Raheeb Hassan, Ryozo Masukawa, Mohsen Imani: **MissionHD: Data-Driven Refinement of Reasoning Graph Structure through Hyperdimensional Causal Path Encoding and Decoding.** CoRR abs/2508.14746, October, 2025

Publications

The following papers were published by CECS affiliates from July 2025 through December 2025 (and unreported papers from previous eNews).

Author, Title, Publication **Other Publications**

Rajat Bhattacharjya, Woohyeok Park, Arnab Sarkar, Hyunwoo Oh, Mohsen Imani, Nikil D. Dutt: **HYPERDOA: Robust and Efficient DoA Estimation using Hyperdimensional Computing.** CoRR abs/2510.10718, October, 2025

Lars Niedermeier, Vyom Shah, Jeffrey L. Krichmar: **A Multi-Threading Kernel for Enabling Neuromorphic Edge Applications.** CoRR abs/2510.17745, October, 2025

Sanggeon Yun, Ryozo Masukawa, Hyunwoo Oh, Nathaniel D. Bastian, Mohsen Imani: **A Few Large Shifts: Layer-Inconsistency Based Minimal Overhead Adversarial Example Detection.** CoRR abs/2505.12586, October ,2025

Halima Bouzidi, Haoyu Liu, Mohammad Abdullah Al Faruque: **See No Evil: Adversarial Attacks Against Linguistic-Visual Association in Referring Multi-Object Tracking Systems**. CoRR abs/2509.02028, September, 2025

Shaoyuan Xie, Mohamad Habib Fakih, Junchi Lu, Fayzah Alshammari, Ningfei Wang, Takami Sato, Halima Bouzidi, Mohammad Abdullah Al Faruque, Qi Alfred Chen: **FlyTrap: Physical Distance-Pulling Attack Towards Camera-based Autonomous Target Tracking Systems**. CoRR abs/2509.20362, September, 2025

Ardalan Amiri Sani, Chenren Xu, Przemyslaw Pawelczak, Swarun Kumar: **Proceedings of the 23rd Annual International Conference on Mobile Systems, Applications and Services, MobiSys 2025, Hilton Anaheim, Anaheim, CA, USA, June 23-27, 2025.** ACM 2025, ISBN 979-8-4007-1453-5, September, 2025

Zhou Li, Yu Zheng, Tianhao Wang, Sang-Woo Jun: **Network-Aware Differential Privacy.** CoRR abs/2509.04710, September, 2025

Yonatan Gizachew Achamyeleh, Yang Xiang, Yun-Ping Hsiao, Yasamin Moghaddas, Mohammad Abdullah Al Faruque: **Environmental Rate Manipulation Attacks on Power Grid Security**. CoRR abs/2509.25476, September, 2025

Yutong Guo, Weiyu Luo, Brian Demsky: **Automated Insertion of Flushes and Fences for Persistency**. CoRR abs/2509.19459, September, 2025

Riwa Karam, Ruoyu Lin, Brooks A. Butler, Magnus Egerstedt: **Resource Allocation with Multi-Team Collaboration Based on Hamilton's Rule**. CoRR abs/2505.09016, September, 2025

Olga Krestinskaya, Mohammed E. Fouda, Ahmed M. Eltawil, Khaled N. Salama: **CIMNAS: A Joint Framework for Compute-In-Memory-Aware Neural Architecture Search**. CoRR abs/2509.25862, September, 2025

Chenhan Lyu, Yutong Song, Pengfei Zhang, Amir M. Rahmani: **Domain-Specific Constitutional AI: Enhancing Safety in LLM-Powered Mental Health Chatbots.** CoRR abs/2509.16444, September, 2025

Jiacen Xu, Chenang Li, Yu Zheng, Zhou Li: **Entente: Cross-silo Intrusion Detection on Network Log Graphs with Federated Learning.** CoRR abs/2503.14284, September, 2025

Publications

The following papers were published by CECS affiliates from July 2025 through December 2025 (and unreported papers from previous eNews).

Author, Title, Publication **Other Publications**

Ye Qiao, Sitao Huang: **Q-ROAR: Outlier-Aware Rescaling for RoPE Position Interpolation in Quantized Long-Context LLMs.** CoRR abs/2509.14391, September, 2025

Ye Qiao, Haocheng Xu, Xiaofan Zhang, Sitao Huang: **Rethinking RoPE Scaling in Quantized LLM: Theory, Outlier, and Channel-Band Analysis with Weight Rescaling.** CoRR abs/2510.00028, September, 2025

Zhongqi Yang, Amir M. Rahmani: **Personalized Causal Graph Reasoning for LLMs: A Case Study on Dietary Recommendations.** CoRR abs/2503.00134, September, 2025

Oliver Brock, Jeffrey L. Krichmar: **From Animals to Animats 17 - 17th International Conference on Simulation of Adaptive Behavior, SAB 2024, Irvine, CA, USA, September 9-12, 2024, Proceedings.** Lecture Notes in Computer Science 14993, Springer 2025, ISBN 978-3-031-71532-7, September, 2025

Nitish Nagesh, Salar Shakibhamedan, Mahdi Bagheri, Ziyu Wang, Nima TaheriNejad, Axel Jantsch, Amir M. Rahmani: **FairTabGen: Unifying Counterfactual and Causal Fairness in Synthetic Tabular Data Generation.** CoRR abs/2508.11810, August, 2025

Nasir Khan, Asmaa Abdallah, Abdulkadir Celik, Ahmed M. Eltawil, Sinem Coleri: **Causal Beam Selection for Reliable Initial Access in AI-driven Beam Management.** CoRR abs/2508.16352, August, 2025

Jinhwa Kim, Ian G. Harris: **Context Misleads LLMs: The Role of Context Filtering in Maintaining Safe Alignment of LLMs.** CoRR abs/2508.10031, August, 2025

Xinhua Chen, Sitao Huang, Cong Guo, Chiyue Wei, Yintao He, Jianyi Zhang, Hai Helen Li, Yiran Chen: **DPad: Efficient Diffusion Language Models with Suffix Dropout.** CoRR abs/2508.14148, August, 2025

Ajan Subramanian, Amir M. Rahmani: **Personalized Counterfactual Framework: Generating Potential Outcomes from Wearable Data.** CoRR abs/2508.14432, August, 2025

Ziyu Wang, Elahe Khatibi, Farshad Firouzi, Sanaz R. Mousavi, Krishnendu Chakrabarty, Amir M. Rahmani: **Linkage Attacks Expose Identity Risks in Public ECG Data Sharing.** CoRR abs/2508.15850, August, 2025

Yuxin (Myles) Liu, Habiba Farrukh, Ardalan Amiri Sani, Sharad Agarwal, Gene Tsudik: **Scoop: Mitigation of Recapture Attacks on Provenance-Based Media Authentication.** Version 0.0.3. Zenodo, August, 2025

Ziyu Wang, Elahe Khatibi, Amir M. Rahmani: **MedCoT-RAG: Causal Chain-of-Thought RAG for Medical Question Answering.** CoRR abs/2508.15849, August, 2025

Derrick Lin, Tracie Tran, Shravan Thaploo, Jose Gabrielle E. Matias, Joy E. Pixley, Zoran Nenadic, An H. Do: **Perception of Brain-Computer Interface Implantation Surgery for Motor, Sensory, and Autonomic Restoration in Spinal Cord Injury and Stroke**. CoRR abs/2507.11572, July, 2025

Publications

The following papers were published by CECS affiliates from July 2025 through December 2025 (and unreported papers from previous eNews).

Author, Title, Publication — Other Publications

Alles Rebel, Bryan Donyanavard, Nikil D. Dutt: **OASIS CODES+ISSS 2025 Data and Analysis Source Code**. Zenodo, 2025 note: work in progress, July, 2025

Alles Rebel, Bryan Donyanavard, Nikil D. Dutt: **OASIS CODES+ISSS 2025 Source Code**. Zenodo, 2025 note: work in progress, July, 2025

Rajat Bhattacharjya, Arnab Sarkar, Ish Kool, Sabur Baidya, Nikil D. Dutt: **ACCESS-AV: Adaptive Communication-Computation Codesign for Sustainable Autonomous Vehicle Localization in Smart Factories**. CoRR abs/2507.20399, July, 2025

Nasir Khan, Asmaa Abdallah, Abdulkadir Celik, Ahmed M. Eltawil, Sinem Coleri: **Digital Twin-Assisted Explainable AI for Robust Beam Prediction in mmWave MIMO Systems**. CoRR abs/2507.14180, July, 2025

Danyu Sun, Jinghuai Zhang, Jiacen Xu, Yu Zheng, Yuan Tian, Zhou Li: **From Alerts to Intelligence: A Novel LLM-Aided Framework for Host-based Intrusion Detection.** CoRR abs/2507.10873, July, 2025

Ahmad M. Nazar, Abdulkadir Celik, Mohamed Y. Selim, Asmaa Abdallah, Daji Qiao, Ahmed M. Eltawil: **Multi-Modal Sensor Fusion for Proactive Blockage Prediction in mmWave Vehicular Networks**. CoRR abs/2507.15769, July, 2025

Yifan Zhang, Xiaoyu Niu, Hongzheng Tian, Yanjun Zhang, Bo Yu, Shaoshan Liu, Sitao Huang: **A Sparsity-Aware Autonomous Path Planning Accelerator with HW/SW Co-Design and Multi-Level Dataflow Optimization.** CoRR abs/2507.16177, July, 2025

Saptarshi Mitra, Rachid Karami, Haocheng Xu, Sitao Huang, Hyoukjun Kwon: **Characterizing State Space Model (SSM) and SSM-Transformer Hybrid Language Model Performance with Long Context Length.** CoRR abs/2507.12442, July, 2025

Zhicheng Xu, Jiawei Liu, Sitao Huang, Zefan Li, Shengbo Wang, Bo Wen, Ruibin Mao, Mingrui Jiang, Giacomo Pedretti, Jim Ignowski, Kaibin Huang, Can Li: **Fault-Free Analog Computing with Imperfect Hardware.** CoRR abs/2507.11134, July, 2025

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