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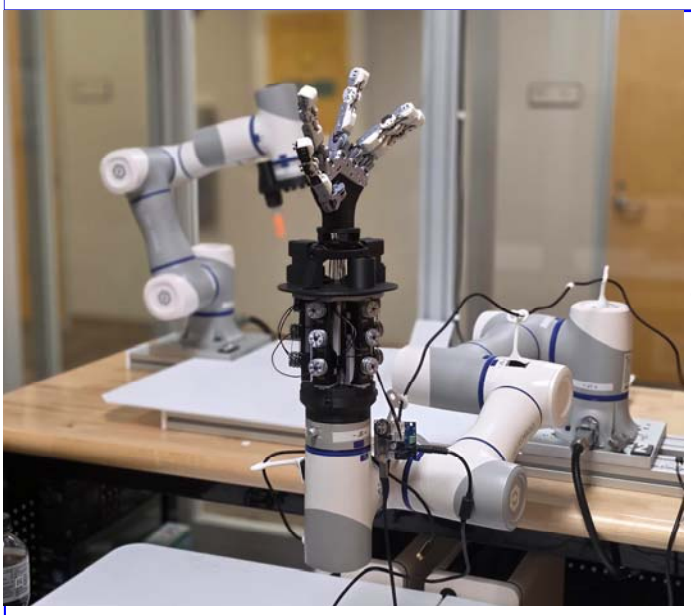
CECS eNEWS

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

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CECS Receives Dobot CR3 Donation



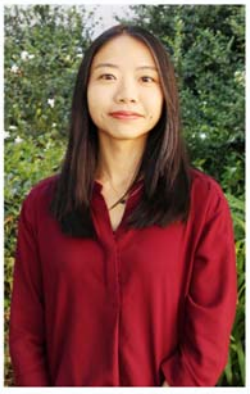
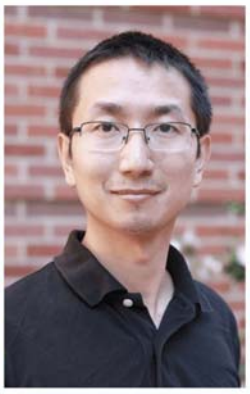
Dobot Robotics is a global leader in collaborative, desktop-grade and industrial robotic arms powered by proprietary technologies like Integrated Drive & Control and AI-powered Safety Systems. With over 100,000 units deployed across 100+ countries, Dobot provides solutions to industrial, retail, and educational sectors worldwide.

Since 2017, Dobot has collaborated with US institutions for K-12 and vocational training with their Dobot Magician model, the first educational robot that teaches students how to do things with robots rather than building or making robots.

Recently, Dobot and CECS have reached a partnership to co-develop advanced university/graduate-level robotics curricula. As part of this collaboration, Dobot generously donated two Dobot CR3 six-axis robotic arms. CECS-affiliated EECS Associate Professor Yasser Shoukry will integrate these robots into EPCS 215: Foundations of Autonomous Systems. In this graduate course, students learn about Robot Operating Systems (ROS) and implement algorithms for localization, mapping, and autonomous system control.

Dobot hopes this donation can be a catalyst for a long-term research and development partnership with the CECS and look forward to future collaboration workshops, potentially involving their latest humanoid or quadruped platforms.

Samueli Funded Partnership with UCLA

The Samueli Foundation, established in 2024, aims to deepen the cross-campus partnership between faculty from UCI and UCLA's Samueli Schools of Engineering. This year, the Samueli Foundation awarded ambitious high-impact research; one of the awardees is CECS affiliated Associate Professor Yasser Shoukry. Prof. Shoukry will co-lead with UCI Associate Professor Yanning Shen and UCLA Associate Professor Quanquan Gu to develop a two-part workshop titled "Engineering Trust: Toward a UCI-UCLA Roadmap for Transformative Trustworthy AI." This workshop explores AI performances under controlled settings versus real-world high-stakes applications, such as health care and autonomous systems, to understand AI's trustworthiness and societal potential.

CECS Faculty Recognized with Spring 2026 Proof of Product (PoP) Awards



UC Irvine Beall Applied Innovation recently announced the Spring 2026 Proof of Product (PoP) Awardees. Two faculty members from the Samueli School of Engineering were recognized for their innovative, high-impact research.

Professor Hung Cao received an award in the Medical Device Track for his project, "A Real-Time System for ECG Synthesis from Everyday Videos Using Generative AI".



Professor Zhou Li received an award in the General Track for his project, "SHIELD-Lite: Cost-Efficient AI-Driven Threat Detection for Enterprise Security Operations".

Oyku Deniz Kose - "Fairness-Aware learning over Graphs"



Title: Fairness-Aware learning over Graphs

Speaker: Oyku Deniz Kose

Date and Time: Tuesday, April 2nd, 12:00pm

Location: EH 2430

Biography: Oyku Deniz Kose received the B.S. and M.S. degrees in electrical and electronics engineering from Bogazici University, Istanbul, Turkey, in 2017 and 2020, respectively. She is currently working towards a Ph.D. degree with the Department of Electrical Engineering and Computer Science, University of California Irvine, Irvine, CA, USA. She received the Samueli Endowed Fellowship in 2021 and was a research intern at Google in 2023. Her research mainly focuses on trustworthy machine learning with a specific interest in graph-based learning.

Abstract: Graphs are powerful mathematical tools that can represent complex real-world systems, such as financial markets and social networks, and the relations within them. Due to this, machine learning (ML) over graphs has attracted significant attention recently, and showed promising success in various applications. Despite the success, the large-scale deployment of graph-based ML algorithms in real-world systems relies heavily on how socially responsible they are. While graph-based ML models nicely integrate the nodal data with the connectivity, they also inherit potential unfairness. Using such ML models may therefore result in inevitable unfair results in various decision- and policy-making in the related applications. While fairness and explainability have attracted increasing attention in responsible ML, they are mostly under-explored in the graph domain. Motivated by this, in this talk, we first focus on the analysis of sources of bias in graph-based learning and then present fairness-aware learning algorithms that combat the identified bias sources. In addition, we will talk about certain real-word challenges that need to be considered in addition to fairness, e.g., efficiency, convergences.

PhD Defenses

Yonatan Gizachew Achamyeleh - "Securing Cyber-Physical Systems: From Sensor-Layer Attacks to Firmware Binary Analysis"



Title: Securing Cyber-Physical Systems: From Sensor-Layer Attacks to Firmware Binary Analysis

Speaker: Yonatan Gizachew Achamyeleh

Date and Time: Monday, May 18, 2026 1:00 PM

Location: ISEB 1010

Committee: Prof. Mohammad Al Faruque, Prof. Zhou Li, Prof. Yasser Shoukry

Danny Abraham - "Adaptive Sparsity for Efficient and Reliable Machine Learning Inference in Autonomous Vehicles"

Title: Adaptive Sparsity for Efficient and Reliable Machine Learning Inference in Autonomous Vehicles

Speaker: Danny Abraham

Date and Time: Monday, June 8, 2026 10:00 AM

Location: DBH 4011

Committee: Prof. Fadi Kurdahi, Prof. Mohsen Imani



Student Profile: Ruben Torres Romero



Ruben Torres Romero is a second-year Ph.D. student in Computer Engineering in the EECS Department at the University of California, Irvine. He is co-advised by Dr. Quoc-Viet Dang and Dr. Fadi Kurdahi. His research interests include cyber-physical systems, with a particular focus on autonomous vehicles and robotics. Prior to joining UCI, Ruben earned his bachelor's degree in Computer Engineering from California Polytechnic University, Pomona. He participated in several research programs, including the McNair Scholars Program and the Cal-Bridge Program. Through the Ph.D. program at UCI, he will also earn his master's degree.

Ruben is currently developing an autonomous vehicle that charges through a wireless power transfer (WPT) system, communicates through NFC tags, and uses PID control to navigate along a track. He has designed specialized tracks with embedded flexible coils and capacitors that resonate at 6.78 MHz, allowing the WPT signal to propagate along the track. The vehicle uses an NFC reader with a custom filter to communicate with the tags, enabling on-the-fly data exchange during operation. Using a PID controller, the vehicle follows an optimal voltage range to remain on the track while charging.

Outside of research, Ruben enjoys spending time with friends and family. As a first-generation college student and the first in his family to be accepted into a Ph.D. program, he hopes to inspire those around him through his work and dedication. He lives by the quote, "Excellence is not being the best; it is doing your best." — Anonymous

Publications

The following papers were published by CECS affiliates from January 2023 through March 2023 (and unreported papers from previous eNews).

Author, Title, Publication

Conference Proceedings

Chaoran Yuan, Fadi J. Kurdahi: **Kolmogorov-Arnold Networks for Autonomous Driving: A Hardware-in-the-Loop Comparison with Conventional Deep Neural Networks.** DATE 2026: 1-7, April 20-22, 2026, Verona, Italy

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.** DATE 2026: 1-7, April 20-22, 2026, Verona, Italy

Saptarshi Mitra, Rachid Karami, Haocheng Xu, Sitao Huang, Hyoukjun Kwon: **Characterizing State Space Model and Hybrid Language Model Performance with Long Context.** ISPASS 2026: 15-27, April 26-28, 2026, Seoul, Republic of Korea

Kohei Tsujio, Mohammad Abdullah Al Faruque, Yasser Shoukry: **RampoNN: A Reachability-Guided System Falsification for Efficient Cyber-Kinetic Vulnerability Detection.** ICCPS 2026: 76-87, May 11-14, 2026, Saint Malo, France

Zixia Xia, Marco Levorato: **SmartFusion-SLAM: From Passive Fusion to Temporal Uncertainty-Aware Sensor Adaptation in BEV SLAM.** ICCPS 2026: 1-11, May 11-14, 2026, Saint Malo, France

Langtian Qin, Ian Harshbarger, Leïla Nasraoui, Carla-Fabiana Chiasserini, Marco Levorato: **OMNIS: Semantic RAN Slicing via Dynamic Split Neural Networks.** INFOCOM 2026: 1-10, May 18-21, 2026, Tokyo, Japan

Ian Harshbarger, Marco Levorato: **AdaptaNet: Towards Modular and Dynamic Slimmable Neural Networks for Adaptive Edge Computing.** IFIP Networking 2026: 1-9, May 24-27, 2026, Lugano, Switzerland

Zhiqiang Zhao, Daniele Brevi, Marco Levorato, Francesco Malandrino, Claudio Pastrone, Carla-Fabiana Chiasserini: **ADEx: Adaptive Early Exit DNNs for Inference Robustness to Popularity Drift.** IFIP Networking 2026: 1-9, May 24-27, 2026, Lugano, Switzerland

Arvin Delavari, Amirtha Chandrasekaran, Boris Vaisband: **Multi-Range Communication for Chiplet-Based Systems.** ACM Great Lakes Symposium on VLSI 2026: 724-729, June 22-24, 2026, Canandaigua, NY, USA

Journal Articles

Yuxin (Myles) Liu, Habiba Farrukh, Ardalan Amiri Sani, Sharad Agarwal, Gene Tsudik: **Scoop: Mitigation of Recapture Attacks on Provenance-Based Media Authentication.** GetMobile Mob. Comput. Commun. 30(1): 29-33, April, 2026

Sri Hrushikesh Varma Bhupathiraju, Takami Sato, Michael Clifford, Takeshi Sugawara, Qi Alfred Chen, Sara Rampazzi: **To Go or Not to Go: Shedding Light on Traffic Light Signal Manipulation and Defense Strategies.** ACM Trans. Cyber Phys. Syst. 10(2): 16:1-16:23, April, 2026

Yenchia Yu, Matteo Mendula, Marco Levorato, Marina Papatriantafilou, Carla-Fabiana Chiasserini: **Efficient Tensor Compression and Reconstruction in Split DNNs for Edge-Based Object Detection.** IEEE Internet Things J. 13(8): 16085-16101, April, 2026

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Rozhin Yasaei, Ashley Sayuri Masuda, Yasamin Moghaddas, Mohammad Abdullah Al Faruque: **Graph Deviation Network for Anomaly Detection and Localization in Additive Manufacturing Systems.** ACM Trans. Cyber Phys. Syst. 10(2): 17:1-17:23, April, 2026

Xuming Chen, Deniz Najafi, Chengwei Zhou, Pietro Mercati, Arman Roohi, Mohsen Imani, Mahdi Nikdast, Shaahin Angizi, Gourav Datta: **Light-Bound Transformers: Hardware-Anchored Robustness for Silicon-Photonic Computer Vision Systems.** CoRR abs/2604.04330, April, 2026

William Youngwoo Chung, Hamza Errahmouni Barkam, Tamoghno Das, Mohsen Imani: **Robust Reasoning and Learning with Brain-Inspired Representations under Hardware-Induced Nonlinearities.** CoRR abs/2604.12079, April, 2026

Sungheon Jeong, Ryozo Masukawa, Sanggeon Yun, Mahdi Imani, Mohsen Imani: **State-Centric Decision Process**. CoRR abs/2605.12755, May, 2026

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Prathyush Poduval, Calvin Yeung, Neel Desai, Mohsen Imani: **ReSAE: Residualized Sparse Autoencoders for Multi-Layer Transformer Interventions.** CoRR abs/2605.27819, May, 2026

Yuchen Hou, Yongshan Chen, Zhuowen Zou, Calvin Yeung, Mohsen Imani, Tian Lan, Mahdi Imani: **FedQHD: Closed-Form Function-Space Federated Reinforcement Learning.** CoRR abs/2605.29002, May, 2026

Amirtha Chandrasekaran, Samuel Dayo, Mousa Karimi, Boris Vaisband: **Near Real-Time Spike-Driven Synaptic Plasticity for CTT-Based Neuromorphic Systems.** IEEE J. Emerg. Sel. Topics Circuits Syst. 16(2): 593-606, May, 2026

Alexander A. Nguyen, Faryar Jabbari, Magnus Egerstedt: **Collaborative Pace Regulation for Aerial-Ground Robot Teams.** IEEE Control. Syst. Lett. 10: 667-672, June, 2026

Yonggan Cui, Chubo Liu, Zheng Xiao, Wenjun Jiang, Anthony Theodore Chronopoulos, Alex Nicolau, Kenli Li: **BPP: Branch pipeline parallelism strategy for accelerating DNN training.** Neurocomputing 680: 133312, June, 2026

Jiayu Zhou, Manas Gaur, Amir M. Rahmani, Sharath Chandra Guntuku, Xiaofan Fred Jiang, Tristan Naumann: **Introduction to the Special Issue on Large Language Models, Conversational Systems, and Generative AI in Health - Part 2.** ACM Trans. Comput. Heal. 7(3): 53:1-53:3, June, 2026

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Elahe Khatibi, Ziyu Wang, Ankita Sharma, Krishnendu Chakrabarty, Sanaz Rahimi Moosavi, Farshad Firouzi, Amir-Mohammad Rahmani: **CARE-ECG: Causal Agent-based Reasoning for Explainable and Counterfactual ECG Interpretation.** CoRR abs/2604.10420, April, 2026

Halima Bouzidi, Haoyu Liu, Yonatan Gizachew Achamyeleh, Praneetsai Vasu Iddamsetty, Mohammad Abdullah Al Faruque: **Out of Sight, Out of Track: Adversarial Attacks on Propagation-based Multi-Object Trackers via Query State Manipulation.** CoRR abs/2604.00452, April, 2026

Ziyu Wang, Elahe Khatibi, Ankita Sharma, Krishnendu Chakrabarty, Sanaz Rahimi Moosavi, Farshad Firouzi, Amir-Mohammad Rahmani: **Membership Inference Attacks Expose Participation Privacy in ECG Foundation Encoders.** CoRR abs/2604.10424, April, 2026

Zhenyu Lu, Mahyar Abbasian, Amir M. Rahmani: **Query-Conditioned Graph Retrieval for Contextualized LLM Reasoning in Personalized Wearable Data.** CoRR abs/2605.18763, April, 2026

Lars Niedermeier, Jeffrey L. Krichmar: **Full Feature Spiking Neural Network Simulation on Micro-Controllers for Neuromorphic Applications at the Edge.** CoRR abs/2604.16474, April, 2026

Walaa Amer, Uday das, Fadi J. Kurdahi: **ConfLayers: Adaptive Confidence-based Layer Skipping for Self-Speculative Decoding.** CoRR abs/2604.14612, April, 2026

Jinane Bazzi, Mariam Rakka, Fadi J. Kurdahi, Mohammed E. Fouda, Ahmed M. Eltawil: **EdgeCIM: A Hardware-Software Co-Design for CIM-Based Acceleration of Small Language Models.** CoRR abs/2604.11512, April, 2026

Brooks A. Butler, Xiao Tan, Aaron D. Ames, Magnus Egerstedt: **Collaborative Altruistic Safety in Coupled Multi-Agent Systems.** CoRR abs/2604.04772, April, 2026

Timothy K. Johnsen, Marco Levorato: **CADENCE: Context-Adaptive Depth Estimation for Navigation and Computational Efficiency.** CoRR abs/2604.07286, April, 2026

Ye Qiao, Yian Wang, Zhiheng Chen, Hyoukjun Kwon, Sitao Huang: **FASQ: Flexible Accelerated Subspace Quantization for Calibration-Free LLM Compression.** CoRR abs/2605.04084, April, 2026

Yutong Song, Jiang Wu, Weijia Zhang, Chengze Shen, Shaofan Yuan, Weitao Lu, Jian Wang, Amir Rahmani, Nikil D. Dutt, Yu Wang: **CARD: Cluster-level Adaptation with Reward-guided Decoding for Personalized Text Generation.** CoRR abs/2601.06352, April, 2026

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Diana Romero, Xin Gao, Daniel Khalkhali, Salma Elmalaki: **TeamLLM: Exploring the Capabilities of LLMs for Multi-modal Group Interaction Prediction.** CoRR abs/2604.08771, April, 2026

Diana Romero, Mutahar Ali, Momin Ahmad Khan, Habiba Farrukh, Fatima M. Anwar, Salma Elmalaki: **Follow My Eyes: Backdoor Attacks on VLM-based Scanpath Prediction.** CoRR abs/2604.08766, April, 2026

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Tianyu Zhao, Siqi Li, Yasser Shoukry, Salma Elmalaki: **Can LLMs Discern the Traits Influencing Your Preferences? Evaluating Personality-Driven Preference Alignment in LLMs.** CoRR abs/2602.07181, April, 2026

Ibrahim Albool, Malak Gamal El-Din, Salma Elmalaki, Yasser Shoukry: **From Dead Neurons to Deep Approximators: Deep Bernstein Networks as a Provable Alternative to Residual Layers.** CoRR abs/2602.04264, May, 2026

Yuxin (Myles) Liu, Sekar Kulandaivel, Ardalan Amiri Sani, Jorge Guajardo: **Patchlings: Safety-Preserving Flash-Based Hotpatching for Automotive Microcontrollers.** CoRR abs/2605.27804, May, 2026

Zhongqi Yang, Mahkameh Rasouli, Neda Mohseni, Yong Huang, Iman Azimi, Amir M. Rahmani: **Personalized Digital Health Modeling with Adaptive Support Users.** CoRR abs/2605.02004, May, 2026

Nitish Nagesh, Mahdi Bagheri, Arshia Harish Puthran, Pengbao Zhou, Muhjaazee Love, Aadi Sharma, Ian Harris, Amir M. Rahmani: **Memisis: Orchestrating and Evaluating Synthetic Data for Tabular Health Datasets.** CoRR abs/2605.17758, May, 2026

Danyu Sun, Jinghuai Zhang, Yuan Tian, Zhou Li: **HIDBench: Benchmarking Large Language Models for Host-Based Intrusion Detection.** CoRR abs/2605.21773, May, 2026

Riwa Karam, Ruoyu Lin, Brooks A. Butler, Magnus Egerstedt: **Learning Altruistic Collaboration in Heterogeneous Multi-Team Systems.** CoRR abs/2605.21723, May, 2026

Yutong Song, Jiang Wu, Pengfei Zhang, Wenjun Huang, Honghui Xu, Nikil D. Dutt, Amir M. Rahmani: **Can the Environment Speak for Itself? T2-GRPO: A Turn-Trajectory Group Relative Policy Optimization for Caregiver Agents.** CoRR abs/2606.08875, June, 2026

Mahyar Abbasian, Elahe Khatibi, Saba A. Farahani, Nitish Nagesh, Arshia Ilaty, Hooman Sajjadi, Amir M. Rahmani, Ramesh Jain: **Personal Care Utility: Health as Everyday Infrastructure.** CoRR abs/2606.14145, June, 2026

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Pengfei Zhang, Hoang H. Nguyen, Yutong Song, Wenjun Huang, Tahmid Imtiaz Imu, Henry Peng Zou, Jiang Wu, Honghui Xu, Amir M. Rahmani: **AP-GRPO: Anchor-Gated Phonetic Alignment with Policy Optimization for Pathological Speech Reconstruction.** CoRR abs/2606.15540, June, 2026

Saptarshi Mitra, Yifan Zhang, Rachid Karami, Phyo Pyae Moe Aung, Nazmul Takbir, Sreetama Sarkar, Souvik Kundu, Sitao Huang: **MOSAIC: Efficient Mixture-of-Agent Scheduling via Adaptive Aggregation and Inference Concurrency.** CoRR abs/2606.03014, June, 2026

Saba A. Farahani, Elahe Khatibi, Manoj Vishwanath, Amir M. Rahmani, Hung Cao: **Beyond AHI: An Interpretable Causal-Discovery-Guided Framework for Sleep Recovery in Connected Health.** CoRR abs/2606.18506, June, 2026

Saba A. Farahani, Elahe Khatibi, Thomas Hughes, Ariana M. Nelson, Hung Cao, Amir M. Rahmani: **Event-Aligned Analysis of Multi-Rater Pain Assessments Using Continuous Wearable Physiology.** CoRR abs/2606.23705, June, 2026

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Pengfei Zhang, Hoang H. Nguyen, Kazi Shaharair Sharif, Yutong Song, Wenjun Huang, Henry Peng Zou, Pinxin Liu, Honghui Xu, Amir M. Rahmani: **From Sounds to Scenes: A Benchmark for Evaluating Context-Aware Auditory Scene Understanding in Large Audio Language Models.** CoRR abs/2606.25391, June, 2026

Arvin Delavari, Leonid Popryho, Inna Partin-Vaisband, Boris Vaisband: **SHIFT: Dynamic Compute Relocation Framework for Communication-Aware Chiplet-Based Systems.** CoRR abs/2606.28754 , June, 2026

Sing-Yao Wu, Fengshuo Song, Eli Bozorgzadeh: **Terastal: Layer-Variant-based Scheduling for Real-Time Multi-DNN Workloads on Heterogeneous Accelerators.** CoRR abs/2606.06818, June, 2026

Mahmoud Srewa, Praneetsai Vasu Iddamsetty, Mohammad Abdullah Al Faruque, Salma Elmalaki: **PersonaDrive: Human-Style Retrieval-Augmented VLA Agents for Closed-Loop Driving Simulation.** CoRR abs/2606.12616, June, 2026

Halima Bouzidi, Mboutidem Ekemini Mkpong, Haoyu Liu, Mohammad Abdullah Al Faruque: **Off the Rails: Hijacking the Scoring Head in Generative End-to-End Driving Planners with Safety-Violating Adversarial Perturbations.** CoRR abs/2606.30807, June, 2026

Luke Chen, Cheng-Ju Wu, David R. Martin, Qilin Ye, Pramod P. Khargonekar, Mohammad Abdullah Al Faruque: **HydraCollab: Adaptive Collaborative-Perception for Distributed Autonomous Systems.** CoRR abs/2607.00191, June, 2026

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Author, Title, Publication

Previously Unreported

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Yasra Chandio, Diana Romero, Salma Elmalaki, Fatima M. Anwar: **What Sensors See, What People Feel: An Exploratory Study of Subjective Collaboration Perception in Mixed Reality.** VR 2026: 162-172, Marh 21-25, 2026, Daegu, Republic of Korea

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Vivek Govindasamy, Rainer Dömer: **Mixed-Level Modeling and Evaluation of a Cache-less Grid of Processing Cells.** ACM Trans. Embed. Comput. Syst. 25(2): 23:1-23:23, March, 2026

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Mike Heddes, Igor Nunes, Tony Givargis, Alex Nicolau: **Approximating Tensor Network Contraction with Sketches.** CoRR abs/2603.07387, March, 2026

Nitish Nagesh, Elahe Khatibi, Thomas Hughes, Mahdi Bagheri, Pratik Gajane, Amir M. Rahmani: **Evaluating Causal Discovery Algorithms for Path-Specific Fairness and Utility in Healthcare.** CoRR abs/2603.15926, March, 2026

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