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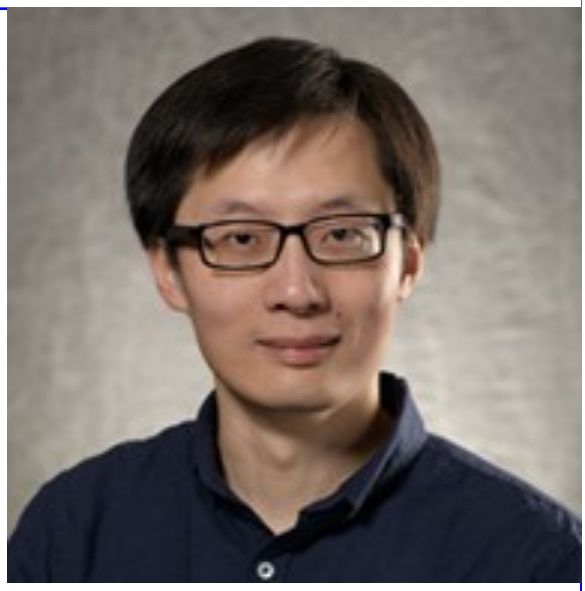
# CECS eNEWS

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

**Inside this Issue:**


- Huang Receives NFS Award
- ONR Sponsors Imani
- Odema Accepted to Rising Stars
- Accepted Papers
- Seminar
- Visitor Profile
- Publications


## Huang Receives NSF Faculty Early Career Award



CECS affiliated Assistant Professor of EECS Sitao Huang was recognized with Faculty Early Career Development (CAREER) award from the National Science Foundation (NFS). The CAREER Program supports early-career faculty with potential to serve as role models and lifelong leaders in research and education. NFS's Division of Computing and Communication Foundation awarded Prof. Huang $650,000 for his project "CAREER: High-Level Synthesis and Compilation for Domain-Specific Reconfigurable Heterogeneous Systems".

As the complexity and diversity of modern computing workloads grow rapidly, existing computer systems with homogeneous processors or accelerators show critical limitations in computing these complex workloads. This creates the incentive to create the next generation of heterogeneous hardware acceleration systems with diverse processors and accelerators, such as CPUs, GPUs, DSPs, and FPGAs.

Prof. Huang's project will develop an efficient complication and synthesis flow from high-level program, such as Python, to domain-specific reconfigurable heterogeneous acceleration systems.

## Office of Naval Research Sponsor Award for Imani



CECS affiliated Assistant Professor of Computer Science Mohsen Imani was recently awarded $398,000 by the Office of Naval Research for project title, “DURIP Integrating AI and Intelligent Sensing for Advanced Naval Operations.” This sponsor award will support Prof. Imani and his lab with data processing equipment during the 1-year contract period.

## Odema Selected as ML and System Rising Stars

CECS PhD alumni Mohanad Odema was selected as one of 38 graduate students to join the Machine Learning (ML) and Systems Rising Stars 2025 cohort. The MLCommons ML and Systems Rising Stars is an initiative of recently graduated PhD students to foster research and career growth, enable collaborations, and discuss career opportunities among rising generations of researchers at intersections of ML and systems.



## IEEE IoT Journal Accepted Paper

Paper “DisCovHAR: Contrastive Attention for Human Activity Recognition under Distribution Shifts” by student Luke Chen, guided by Professor Mohammad Al Faruque, has been accepted to be published in the IEEE IoT Journal with a impact factor 10.6. Congratulations Luke!



## CVPR 2025 Accepted Paper





Our paper “Hyperdimensional Uncertainty Quantification for Multimodal Uncertainty Fusion in Autonomous Vehicles Perception” by students Luke Chen, Junyao Wang, and Trier Mortlock, guided by Prof. Al Faruque, has been accepted to the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR’25) in June 2025.

# Yu Bai - "Optimizing AI Performance: Bridging Algorithmic and Hardware Innovations from Inference to Training "



**Title:** Optimizing AI Performance: Bridging Algorithmic and Hardware Innovations from Inference to Training

**Speaker**: Prof. Yu Bai

**Date and Time**: Wednesday, March 12, 2:00 p.m.

**Location**: ISEB 1200

**Hosted By:** Prof. Fadi Kurdahi and Prof. Mohammad Al Faruque



# Visitor Profile: David Martin



David Martin is a first year MS/PhD student in the Department of Electrical Engineering and Computer Science at UC Irvine. He graduated magna cum laude from Brigham Young University with a B.S. in Mechanical Engineering. He now works under the supervision of Professor Mohammad Al Faruque in the Autonomous and Intelligent Cyber-Physical Systems Lab (AICPS). He also enjoys his collaborations with professors Magnus Egerstedt, Pramod Khargonekar, and the members of the UCI Robot Ecology Lab.

David is passionate about developing autonomous systems capable of perceiving, interpreting and interacting with the physical world. His research interests encompass robotics, machine learning, and control theory. In his current work, he collaborates with the Air Force Research Lab to investigate how collaboration between individual autonomous agents can achieve objectives that are impossible for the individuals. Current projects include novel frameworks for collaborative perception and task assignment.

Outside of work, David enjoys hiking, mountain biking, camping, and, of course, the beach!

# Publications

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

## Author, Title, Publication

### Conference Proceedings

Takami Sato, Ryo Suzuki, Yuki Hayakawa, Kazuma Ikeda, Ozora Sako, Rokuto Nagata, Ryo Yoshida, Qi Alfred Chen, Kentaro Yoshioka: **On the Realism of LiDAR Spoofing Attacks against Autonomous Driving Vehicle at High Speed and Long Distance**. NDSS 202, February 24-28, 2025, San Diego, CA, USA

Ningfei Wang, Shaoyuan Xie, Takami Sato, Yunpeng Luo, Kaidi Xu, Qi Alfred Chen: **Revisiting Physical-World Adversarial Attack on Traffic Sign Recognition: A Commercial Systems Perspective**. NDSS 2025, February 24-28, 2025, San Diego, CA, USA

### Journal Articles

Yousef Emam, Gennaro Notomista, Paul Glotfelter, Zsolt Kira, Magnus Egerstedt: **Safe Reinforcement Learning Using Robust Control Barrier Functions**. IEEE Robotics Autom. Lett. 10(3): 2886-2893, March, 2025

Sugil Lee, Mohammed E. Fouda, Chenghao Quan, Jongeun Lee, Ahmed M. Eltawil, Fadi J. Kurdahi: **Mitigating the Impact of ReRAM I-V Nonlinearity and IR Drop via Fast Offline Network Training**. IEEE Trans. Comput. Aided Des. Integr. Circuits Syst. 44(3): 951-960, March, 2025

Zhiling Chen, Hanning Chen, Mohsen Imani, Ruimin Chen, Farhad Imani: **Vision language model for interpretable and fine-grained detection of safety compliance in diverse workplaces.** Expert Syst. Appl. 265: 125769, March, 2025

Matteo Mendula, Paolo Bellavista, Marco Levorato, Sharon Ladron de Guevara Contreras: **A novel middleware for adaptive and efficient split computing for real-time object detection. Pervasive Mob.** Comput. 108: 102028, March, 2025

Ping-Xiang Chen, Dongjoo Seo, Nikil D. Dutt: **Corrections to "FDPFS: Leveraging File System Abstraction for FDP SSD Data Placement"**. IEEE Embed. Syst. Lett. 17(1): 66, February, 2025

Hieu Le, Salma Elmalaki, Athina Markopoulou, Zubair Shafiq: **AutoFR: Automated Filter Rule Generation for Adblocking**. ACM Trans. Priv. Secur. 28(1): 11:1-11:36, February, 2025

Ahmed Nasser, Abdulkadir Celik, Ahmed M. Eltawil: **Joint User-Target Pairing, Power Control, and Beamforming for NOMA-Aided ISAC Networks**. IEEE Trans. Cogn. Commun. Netw. 11(1): 316-332, February, 2025

Sanggeon Yun, Ryozo Masukawa, Hanning Chen, Sungheon Jeong, Wenjun Huang, Arghavan Rezvani, Minhyoung Na, Yoshiki Yamaguchi, Mohsen Imani: **Hyperdimensional Intelligent Sensing for Efficient Real-Time Audio Processing on Extreme Edge**. IEEE Access 13: 43947-43955, February, 2025

Weihong Xu, Saransh Gupta, Justin Morris, Xincheng Shen, Mohsen Imani, Baris Aksanli, Tajana Rosing: **Tri-HD: Energy-Efficient On-Chip Learning With In-Memory Hyperdimensional Computing.** IEEE Trans. Comput. Aided Des. Integr. Circuits Syst. 44(2): 525-539, February, 2025

Rozhin Yasaei, Luke Chen, Shih-Yuan Yu, Mohammad Abdullah Al Faruque: **Hardware Trojan Detection Using Graph Neural Networks**. IEEE Trans. Comput. Aided Des. Integr. Circuits Syst. 44(1): 25-38, January, 2025

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### Journal Articles

Ahmed Didouh, Anthony Bahadir Lopez, Houda Labiod, Yassin El Hillali, Atika Rivenq, Mohammad Abdullah Al Faruque: **TileChain: A Blockchain-Based Framework for Security Service Management for Vehicular Communications**. IEEE Trans. Veh. Technol. 74(1): 1335-1351, January, 2025

Asmaa Abdallah, Ahmed Hussain, Abdulkadir Celik, Ahmed M. Eltawil: **Exploring Frontiers of Polar-Domain Codebooks for Near-Field Channel Estimation and Beam Training: A comprehensive analysis, case studies, and implications for 6G**. IEEE Signal Process. Mag. 42(1): 45-59, January, 2025

Ahmet M. Elbir, Abdulkadir Celik, Ahmed M. Eltawil: **Hybrid Beamforming for Integrated Sensing and Communications With Low Resolution DACs**. IEEE Wirel. Commun. Lett. 14(1): 103-107, January, 2025

Mariam Issa, Hanning Chen, Junyao Wang, Mohsen Imani: **CyberRL: Brain-Inspired Reinforcement Learning for Efficient Network Intrusion Detection**. IEEE Trans. Comput. Aided Des. Integr. Circuits Syst. 44(1): 241-250, January, 2025

Ismat Jarin, Yu Duan, Rahmadi Trimananda, Hao Cui, Salma Elmalaki, Athina Markopoulou: **BehaVR: User Identification Based on VR Sensor Data**. Proc. Priv. Enhancing Technol. 2025(1): 399-41, 2025

Ahmet Enes Duranay, Xhelja Kodheli, Amr M. Abdelhady, Abdulkadir Celik, Ahmed M. Eltawil, Hüseyin Arslan: **Post-Earthquake Network Restoration: Statistical Seismic Road Closure Prediction and Efficient MDRU Routing**. IEEE Open J. Commun. Soc. 6: 671-689, 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, 2025

### Other Publications

Diana Romero, Fatima M. Anwar, Salma Elmalaki: **MoCoMR: A Collaborative MR Simulator with Individual Behavior Modeling**. CoRR abs/2503.09874, March, 2025

Mahmoud Srewa, Tianyu Zhao, Salma Elmalaki: **PluralLLM: Pluralistic Alignment in LLMs via Federated Learning**. CoRR abs/2503.09925, March, 2025

Asmaa Abdallah, Abdulkadir Celik, Ahmed Alkhateeb, Ahmed M. Eltawil: **Explainable Autoencoder Design for RSSI-Based Multi-User Beam Probing and Hybrid Precoding**. CoRR abs/2503.08267, March, 2025

Zhuoyi Yang, Ian G. Harris: **LogLLaMA: Transformer-based log anomaly detection with LLaMA**. CoRR abs/2503.14849, March, 2025

Ryozo Masukawa, Sanggeon Yun, Sungheon Jeong, Wenjun Huang, Yang Ni, Ian Bryant, Nathaniel Bastian, Mohsen Imani: **PacketCLIP: Multi-Modal Embedding of Network Traffic and Language for Cybersecurity Reasoning**. CoRR abs/2503.03747, March, 2025

Luke Chen, Junyao Wang, Trier Mortlock, Pramod P. Khargonekar, Mohammad Abdullah Al Faruque: **Hyperdimensional Uncertainty Quantification for Multimodal Uncertainty Fusion in Autonomous Vehicles Perception**. CoRR abs/2503.20011, March, 2025

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**Author, Title, Publication** **Other Publications**

Hin Wai Lui, Jeffrey L. Krichmar: **STRMs: Spatial Temporal Reasoning Models for Vision-Based Localization Rivaling GPS Precision.** CoRR abs/2503.07939, March, 2025

Ziyu Wang, Elahe Khatibi, Kianoosh Kazemi, Iman Azimi, Sanaz R. Mousavi, Shaista Malik, Amir M. Rahmani: **TransECG: Leveraging Transformers for Explainable ECG Re-identification Risk Analysis**. CoRR abs/2503.13495, March, 2025

Yutong Song, Chenhan Lyu, Pengfei Zhang, Sabine Brunswicker, Nikil D. Dutt, Amir M. Rahmani: **DEMENTIA-PLAN: An Agent-Based Framework for Multi-Knowledge Graph Retrieval-Augmented Generation in Dementia Care**. CoRR abs/2503.20950, March, 2025

Yonatan Gizachew Achamyeleh, Shih-Yuan Yu, Gustavo Quiros Araya, Mohammad Abdullah Al Faruque: Bridging **the PLC Binary Analysis Gap: A Cross-Compiler Dataset and Neural Framework for Industrial Control Systems.** CoRR abs/2502.19725, February, 2025

Rokuto Nagata, Kenji Koide, Yuki Hayakawa, Ryo Suzuki, Kazuma Ikeda, Ozora Sako, Qi Alfred Chen, Takami Sato, Kentaro Yoshioka: **SLAMSpoof: Practical LiDAR Spoofing Attacks on Localization Systems Guided by Scan Matching Vulnerability Analysis**. CoRR abs/2502.13641, February, 2025

Yuntianyi Chen, Yuqi Huai, Yirui He, Shilong Li, Changnam Hong, Qi Alfred Chen, Joshua Garcia: **A Comprehensive Study of Bug-Fix Patterns in Autonomous Driving Systems**. CoRR abs/2502.01937, February, 2025

Hieu Le, Salma Elmalaki, Zubair Shafiq, Athina Markopoulou: **AutoLike: Auditing Social Media Recommendations through User Interactions**. CoRR abs/2502.08933, February, 2025

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

Chenyu Ni, Sijie Chen, Che-Kai Liu, Liu Liu, Mohsen Imani, Thomas Kämpfe, Kai Ni, Michael T. Niemier, Xiaobo Sharon Hu, Cheng Zhuo, Xunzhao Yin: **TAP-CAM: A Tunable Approximate Matching Engine based on Ferroelectric Content Addressable Memory**. CoRR abs/2502.05787, February, 2025

Sanggeon Yun, Ryozo Masukawa, Hanning Chen, Sungheon Jeong, Wenjun Huang, Arghavan Rezvani, Minhyoung Na, Yoshiki Yamaguchi, Mohsen Imani: **Hyperdimensional Intelligent Sensing for Efficient Real-Time Audio Processing on Extreme Edge**. CoRR abs/2502.10718, February, 2025

Se-Min Lim, Seongyoung Kang, Sang-Woo Jun: **Bancroft: Genomics Acceleration Beyond On-Device Memory**. CoRR abs/2502.16470, February, 2025

Hao Li, Di Huang, Ziyu Wang, Amir M. Rahmani: **Skewed Memorization in Large Language Models: Quantification and Decomposition**. CoRR abs/2502.01187, February, 2025

Mohammad Feli, Iman Azimi, Pasi Liljeberg, Amir M. Rahmani: **An LLM-Powered Agent for Physiological Data Analysis: A Case Study on PPG-based Heart Rate Estimation**. CoRR abs/2502.12836, February, 2025

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**Author, Title, Publication** **Other Publications**

Kianoosh Kazemi, Iman Azimi, Michelle Khine, Rami N. Khayat, Amir M. Rahmani, Pasi Liljeberg**: Multimodal Sleep Stage and Sleep Apnea Classification Using Vision Transformer: A Multitask Explainable Learning Approach.** CoRR abs/2502.17486, February, 2025

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

Mohamad Fakih, Rahul Dharmaji, Halima Bouzidi, Gustavo Quiros Araya, Oluwatosin Ogundare, Mohammad Abdullah Al Faruque: **LLM4CVE: Enabling Iterative Automated Vulnerability Repair with Large Language Models**. CoRR abs/2501.03446, January, 2025

Shaoyuan Xie, Lingdong Kong, Yuhao Dong, Chonghao Sima, Wenwei Zhang, Qi Alfred Chen, Ziwei Liu, Liang Pan: **Are VLMs Ready for Autonomous Driving? An Empirical Study from the Reliability, Data, and Metric Perspectives**. CoRR abs/2501.04003, January, 2025

Ziqin Chen, Magnus Egerstedt, Yongqiang Wang: **Ensuring Truthfulness in Distributed Aggregative Optimization**. CoRR abs/2501.08512, January, 2025

Efrain Mendez-Flores, Agaton Pourshahidi, Magnus Egerstedt: **RaccoonBot: An Autonomous Wire-Traversing Solar-Tracking Robot for Persistent Environmental Monitoring**. CoRR abs/2501.14151, January, 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**. CoRR abs/2501.13552. January, 2025

Nasir Khan, Asmaa Abdallah, Abdulkadir Celik, Ahmed M. Eltawil, Sinem Coleri: **Explainable and Robust Millimeter Wave Beam Alignment for AI-Native 6G Networks.** CoRR abs/2501.17883, January, 2025

Zhiling Chen, Hanning Chen, Mohsen Imani, Farhad Imani: **Can Multimodal Large Language Models be Guided to Improve Industrial Anomaly Detection?** CoRR abs/2501.15795, January, 2025

Yoshitomo Matsubara, Matteo Mendula, Marco Levorato: **A Multi-task Supervised Compression Model for Split Computing**. CoRR abs/2501.01420, January, 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 [contents]

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