

Hadeel Albahar

Assistant Professor
Department of Computer Engineering
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Research Interest

Systems for ML, ML for Systems, Cloud, and High Performance Computing. I am currently interested in optimizing the performance of systems for ML.

Education

2018-2023 **Ph.D. in Computer Engineering, Virginia Tech.**

Advisor: Ali R. Butt

2014-2015 **M.S. in Computer Engineering, Columbia University.**

2007-2011 **B.S. in Computer Engineering, Kuwait University.**

Distinction with Class Honors

Work Experience

09/25-09/26 **Visiting Researcher, Computer Science Department, Virginia Tech.**

2023-present **Assistant Professor, Computer Engineering Department, Kuwait University.**

Committee service:

- **Coordinator:** Engineering Ethics (Fall'24, Spring'25), CpE Cultural and Social Activities and Scientific Lectures (Fall'24, Spring'25)
- **Member:** Engineering Design Expo Project Assessment (Spring'24, Spring'25), CpE Student Affairs (Fall'23, Spring'24), CpE Programming Fundamentals TAG (Fall'23, Spring'24), CpE Design TAG (Fall'24, Spring'25)

2012,2016 **Technical Support Engineer, Kuwait Foundation for the Advancement of Sciences (KFAS).**

Technical support for Kuwait e Award. I organized submissions, facilitated demonstrations, coordinated with the panel of judges, and mentored a new technical support engineer.

2012-2013 **Intern, EXP, Chicago, Illinois, USA.**

A six-months internship program at the North American consulting firm 'exp US services Inc.' in Chicago, IL, USA in the Information Systems (IS) department as part of the Kuwait Fund for Economic Development Training Program. Skills obtained: HTML, Active Server Pages (ASP), Microsoft SQL Server, SQL Server Reporting Services (SSRS), SharePoint

Teaching Experience

2023-present **Instructor, Department of Computer Engineering, Kuwait University.**

- CpE 363: Introduction to Embedded Systems (Fall'23, Summer'24, Spring'25, Summer'25)
- CpE 445: Operating System Principles (Fall'23, Spring'24)
- ENGR 310: Engineering Ethics (Spring'24, Fall'24)
- CpE 262: Fundamentals of Digital Logic (Fall'24)

Fall 2021 **Graduate Teaching Assistant, Department of Electrical and Computer Engineering, Virginia Tech.**

- ECE 3524: Introduction to Unix for ECE — Lecture; Office hours; scripting; grading

Spring 2012 **Teaching Assistant, Department of Computer Engineering, Kuwait University.**

- CPE 264: Digital Logic Laboratory — laboratory lectures; office hours; grading
- CPE 456: Computer Networks II — Lectures; office hours; grading

Proposal Grants

Spring 2025 **Research Initiation Grant (RIG)**

Funding Agency: Kuwait University

Investigator(s): Hadeel Albahar (PI)

Title: Optimizing Resource Scheduling and Storage Efficiency In MLaaS for Large-Scale Deep Learning Workloads.

Publications

Journal Articles

- TOS'24 Nannan Zhao, Muhui Lin, **Hadeel Albahar**, Arnab K. Paul, Zhijie Huang, Subil Abraham, Keren Chen, Vasily Tarasov, Dimitrios Skourtis, Ali Anwar, and Ali R. Butt. *An End-to-End High-Performance Deduplication Scheme for Docker Registries and Docker Container Storage Systems.* doi.org/10.1145/3643819
- TACO'22 Peng Xu, Nannan Zhao, Jiguang Wan, Wei Liu, Shuning Chen, Yuanhui Zhou, **Hadeel Albahar**, Hanyang Liu, Liu Tang, and Zhihu Tan. *Building a fast and efficient LSM-tree store by integrating local storage with cloud storage.* doi.org/10.1145/3527452
- TPDS'20 Nannan Zhao, Vasily Tarasov, **Hadeel Albahar**, Ali Anwar, Lukas Rupprecht, Dimitrios Skourtis, Arnab K. Paul, Keren Chen, and Ali R. Butt. *Large-Scale Analysis of Docker Images and Performance Implications for Container Storage Systems.* doi.org/10.1109/TPDS.2020.3034517
- DII'18 IA Shehata Elhelf, **H Albahar**, U Shah, A Oto, E Cressman, M Almekkawy. *High intensity focused ultrasound: The fundamentals, clinical applications and research trends.* doi.org/10.1016/j.diii.2018.03.001

Conference Proceedings

- SoCC'25 Shruti Dongare, Redwan Ibne Seraj Khan, **Hadeel Albahar**, Nannan Zhao, Diego Meléndez-Maita, Ali R. Butt. Hybrid Learning and Optimization-Based Dynamic Scheduling for DL Workloads on Heterogeneous GPU Clusters. In Proceedings of the 2025 ACM Symposium on Cloud Computing. Accepted
- SoCC'25 Sabiha Afroz, Redwan Ibne Seraj Khan, **Hadeel Albahar**, Jingoo Han, Ali R. Butt. 10Cache: Heterogeneous Resource Aware Tensor Caching and Migration for LLM Training. In Proceedings of the 2025 ACM Symposium on Cloud Computing. Accepted
- CCGrid'22 **Hadeel Albahar**, Shruti Dongare, Yanlin Du, Nannan Zhao, Arnab K. Paul, and Ali R. Butt. SCHEDTUNE: A Heterogeneity-Aware GPU Scheduler for Deep Learning. doi.org/10.1109/CCGrid54584.2022.00079
- Cluster'21 Peng Xu, Nannan Zhao, Jiguang Wan, Wei Liu, Shuning Chen, Yuanhui Zhou, **Hadeel Albahar**, Hanyang Liu, Liu Tang, Changsheng Xie. Building A Fast and Efficient LSM-tree Store by Integrating Local Storage with Cloud Storage. doi.org/10.1109/Cluster48925.2021.00032
- ATC'20 Nannan Zhao, **Hadeel Albahar**, Subil Abraham, Keren Chen, Vasily Tarasov, Dimitrios Skourtis, Lukas Rupprecht, Ali Anwar, and Ali R. Butt. DupHunter: Flexible High-Performance Deduplication for Docker Registries. dl.acm.org/doi/10.5555/3489146.3489199
- Cluster'19 Nannan Zhao, Vasily Tarasov, **Hadeel Albahar**, Ali Anwar, Lukas Rupprecht, Dimitrios Skourtis, Amit S. Warke, Mohamed Mohamed, and Ali R. Butt. Large-Scale Analysis of the Docker Hub Dataset. doi.org/10.1109/CLUSTER.2019.8891000
- NER'17 Mohamed Almekkawy, James Cunningham, Yi Song, **Hadeel Albahar**, Thyagarajan Subramanian. In-vivo transcranial ultrasound imaging of induced Substantia Nigra hyperechogenicity using adaptive sparse Third Order Volterra Filter. doi.org/10.1109/NER.2017.8008366

Posters/Abstracts

- KICLS'25 Maryam Khafagy, **Hadeel Albahar**. Guided vs. Prohibited AI Assistance in Higher Education: Psychological and Ethical Implications. Accepted for presentation at the 4th Kuwait International Conference on Life Sciences 2025, Kuwait, Nov 2025. Accepted
- STM'18 Islam Elhelf, Hadia Abdelaal, Abeer Almekkawy, **Hadeel Albahar**, Mohamed Almekkawy. The Emerging Role of High Intensity Focused Ultrasound (HIFU) in Cancer Immunomodulation. [researchgate.net/Immunomodulation](https://www.researchgate.net/publication/Immunomodulation)

Dissertations

- PhD'23 **Hadeel Albahar**, Optimizing Systems for Deep Learning Applications. Ph.D. dissertation, Department of Electrical and Computer Engineering, Virginia Tech, U.S.A., 2023. <http://hdl.handle.net/10919/114021>

Awards and Honors

Awards & Competitive Recognitions

- 2025 Participant, Early Career Program @ SC'25, St. Louis, MO, USA
- 2022 SCinet @ SC'22 Student Volunteer, Dallas, TX, USA
- 2022-2023 GHC Student Scholarship & AnitaB.org Premium Student Membership
- 2014 Kuwait University Scholarship, Full scholarship to pursue M.S. and Ph.D. degrees
- 2013 Graduate of Excellence, Top 10 graduate, College of Engineering and Petroleum, Kuwait University
- 2012 Accepted into Kuwait Fund for Economic Development Training Program for Newly Graduated Engineers and Architects
- 2008-2011 Dean's Honor List and Outstanding Students List, College of Engineering and Petroleum, Kuwait University

Professional Development & Recognition

- 2021-2026 Member, I WILL Institute (Inspiring Women in Lifelong Leadership), Virginia Tech

Service & Outreach

- 2025-2026 Mentor, I WILL Institute (Inspiring Women in Lifelong Leadership), Virginia Tech
- 2025 Mentor, VA-WHPC Student Lightning Talks
- 2024 Judge, Hour of Code, CPES & KARS, Kuwait University
- 2023 Judge, Hour of Code, CPES & CLICKIT, Kuwait University
- 2022 Virtual Hopper Volunteer, Grace Hopper Celebration
- 2015 Hackathon Volunteer, Data Science Institute, Columbia University, New York, NY

Technical Skills

- General Python, Bash, git, LaTeX, Assembly, Matlab, Java, C/C++, SQL, HTML, ASP, Verilog
- Systems Linux, Docker Containers, Kubernetes, Slurm, Cloud Computing (AWS), Ray, Openwhisk
- Analytics Applied machine learning, scikit-learn, Pandas, matplotlib

Professional Service

- TPC Member SoCC'26, WHPC @ ISC'26, HiPC'25, IEEE Cluster'25, IPDPS'25, and REX-IO('25,'24)
- Reviewer IEEE Trans. on Computers'25, IEEE Trans. on Network Science and Engineering('22, '21)
- Sub-Reviewer FAST'26, IPDPS('23 – '19), SC'22, HPDC('22 – '20), ICDCS('22 – '19), ECML PKDD'22, IEEE Cluster('21,'20), BigData('21,'19), ICS'21, ICMLA'21, ICCD'19

Mentoring Experience

Graduate Students

- 2021-present Shruti Dongare, Virginia Tech
2022 Anish Reddy Ellore, Virginia Tech
2022-present Sabiha Afroz, Virginia Tech

Undergraduate Students

- 2025-present Maryam Khafagy, Kuwait University
2021-2022 Yanlin Du, Virginia Tech

Teaching Development

2025 CRA-WP Professional Development Workshops

- Working with Star Undergraduates in Your Research; Seamless Synergy – Integrating Research & Teaching

2022–2025 CIRTL Teaching Development Workshops

- Overcoming Learned Helplessness; Fostering a Growth Mindset; Scaffolding Independent Learning; Effective Assessment Strategies; Communicating to Learn in STEM; Leveraging the Strengths of Neurodiverse Students in the Classroom

2020–2025 Virginia Tech Pedagogical Workshops

- Technology-Enhanced Learning and Online Strategies (TLOS): Universal Design for Learning (UDL), Flexible Learning, Engagement Tools, Accessible Slides (2022); AI Essentials Exchange: AI-Conscious Course and Assignment Design (2025)
- Graduate Teaching Assistant Pedagogy Sessions: Ethics and Academic Integrity, Confidence in Teaching, Effective Communication, Supporting International Students, and Inclusive Learning Strategies (2020–2021)

Sep 2023 Teaching Excellence Workshop for New Faculty Members, Kuwait University

- Teaching Skills and Course Syllabus Preparation, Modern Teaching Methods, Educational Tools for Active Learning, Teacher–Student Relationship

Professional Development and Research Training

2025 SC25 Early Career Program

- Crafting Successful Proposals; Resilience and Career Transitions
- Communication and Leadership Workshops: Presentation best practices and storytelling, Elevator Pitch, Time Management, Leadership Foundations for Early Career Professionals, Guided by Greatness: How Mentorship Shapes Our Journeys (panel)

2022–2023 Virginia Women in HPC (VA-WHPC) Seminars

- Leadership roles seminar and DEI-focused professional development in HPC

2022 OLCF Hands-On HPC Training (SC22)

- MPI, OpenMP, CUDA programming on ORNL Summit Supercomputer

2017 Responsible Conduct of Research (CITI, PSU)

- Ethics, research integrity, authorship, mentoring, peer review

Service and Leadership

2026-present Co-Founder, Women in HPC MENA (WHPC MENA), WHPC affiliate

- Co-founded and helped establish a regional community supporting women in HPC across the Middle East and North Africa.

May 5–7, **Coordinator, Two-Day Seminar Series, Computer Engineering Department, Kuwait University**

- Organized a departmental seminar featuring four invited talks from faculty across Computer Engineering, Computer Science, and Information Science. Facilitated interdisciplinary discussions and enhanced departmental engagement.

Jun 2025 **Volunteer Instructor, Kuwait University AI and Robotics Society (KARS)**

- Two-day hands-on workshop: Introduction to Linux CLI and Docker Containers. Taught essential terminal commands, basic bash scripting, and container management to beginners through practical exercises and real-world examples.

Jan 2024 **Volunteer Instructor, Kuwait University AI and Robotics Society (KARS)**

- Two-day hands-on workshop: Linux basics — Bash scripting and terminal commands for beginners, including practical exercises to build foundational skills and foster engagement.