

Hadeel Albahar

Assistant Professor
Department of Computer Engineering
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Research Interest

Systems for ML, ML for Systems, 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 Polytechnic Institute and State University (Virginia Tech)*, Blacksburg, Virginia, USA.
Dissertation: Optimizing Systems for Deep Learning Applications.
Advisor: Ali R. Butt.
- 2014-2015 **M.S. in Computer Engineering**, *Columbia University in the City of New York*, NY, USA.
- 2007-2011 **B.S. in Computer Engineering**, *Kuwait University*, Khaldiya, Kuwait.
Distinction with Class Honors

Work Experience

- 09/25-09/26 **Visiting Researcher**, *Computer Science Department, Virginia Tech*, Blacksburg, VA.
- 2023-present **Assistant Professor**, *Computer Engineering Department, Kuwait University*, Sabah Al-Salem University City, Kuwait.
Committee service:
 - Engineering Ethics Committee - Coordinator (Fall'24, Spring'25)
 - Engineering Design Expo Project Assessment Committee - Member (Spring'24, Spring'25)
 - CpE Cultural and Social Activities and Scientific Lectures Committee - Coordinator (Fall'24, Spring'25)
 - CpE Student Affairs - Member (Fall'23, Spring'24)
 - CpE Programming Fundamentals Teaching Area Group - Member (Fall'23, Spring'24)
 - CpE Design Teaching Area Group - Member (Fall'24, Spring'25)
- 2012/2016 **Technical Support Engineer**, *Kuwait Foundation for the Advancement of Sciences (KFAS)*, Kuwait City, Kuwait.
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 Arab 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.

Funding Amount: 2000 KD

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

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>

Talks and Presentations

Jun 2025 **Kuwait University AI and Robotics Society (KARS)**. Introduction to Linux CLI and Docker Containers.

Jan 2024 **Kuwait University AI and Robotics Society (KARS)**. Linux - The basics of bash scripting and terminal commands.

Awards and Honors

2025 Participant, Early Career Program @ SC'25, St. Louis, MO, USA.

2025 Mentor, VA-WHPC Student Lightening Talks.

2025-2026 Member, I WILL (Inspiring Women in Lifelong Leadership) Institute, Virginia Tech.

2024 Judge, Hour of Code, programming competition by the Computer Engineering Society (CPES) and Kuwait University AI and Robotics Society (KARS), Sabah Al-Salem University City, Kuwait.

2023 Judge, Hour of Code, programming competition by the Computer Engineering Society (CPES) and the Information Science Club (CLICKIT), Sabah Al-Salem University City, Kuwait.

2022 Student Volunteer, SCinet @ SC'22, Dallas, TX, USA.

2022 Virtual Hopper (Volunteer), Grace Hopper Celebration.

2022-2023 AnitaB.org Premium Student Membership.

2022 GHC Student Scholarship to attend the virtual component of the Grace Hopper Celebration.

2021-2023 Member, I WILL (Inspiring Women in Lifelong Leadership) Institute, Virginia Tech.

2015 Hackathon Volunteer, the Data Science Institute at Columbia University, New York, NY.

2014 Kuwait University Scholarship recipient, Full scholarship to pursue M.S. and Ph.D. degrees.

2013 Graduate of Excellence - Top 10 graduate, College of Engineering and Petroleum, Class of 2012/2013; recognized at the Graduates of Excellence Ceremony under the patronage of His Highness the Amir of Kuwait.

2012 Accepted into the Kuwait Fund For Economic Development Training Program for Newly Graduated Engineers and Architects.

2008-2011 Dean's Honor List and Outstanding Students List, awarded for academic excellence, College of Engineering and Petroleum, Kuwait University

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 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-present Sabiha Afroz, Virginia Tech

Undergraduate Students

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

Teaching Development

2022–2025 CIRTL Teaching Development Workshops

- Overcoming Learned Helplessness: Helping Students Develop Strong Team Skills (2025)
- Fostering a Growth Mindset and Sense of Belonging (2025)
- Scaffolding Students' Success as Independent Learners (2025)
- Effective Assessment Strategies for Large Undergraduate Courses (2025)
- Communicating to Learn in STEM Courses (2023)

2025 CRA-WP Professional Development Workshops

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

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

2020–2022 Virginia Tech Pedagogical Workshops

- Universal Design for Learning (UDL), Flexible Learning, Engagement Tools, Accessible Slides (TLOS, 2022)
- Teaching Skills Sessions for Graduate Teaching Assistants: Ethics, Academic Integrity, Confidence in Teaching, Oral Communication, Teaching 101, Supporting International Students, Identifying Students in Distress, Creating Inclusive Learning Environments (2020–2021)

Professional Development and Research Training

2025 SC25 Early Career Program

- Crafting Successful Proposals
- Resilience and Career Transitions

- 2022 **OLCF Hands-On HPC Training (SC22)**
- MPI, OpenMP, CUDA programming on ORNL Summit Supercomputer
- 2022–2023 **Virginia Women in HPC (VA-WHPC) Seminars**
- WHPC Leadership Roles Seminar and DEI-focused professional development
- 2017 **Responsible Conduct of Research (CITI, PSU)**
- Mentoring; Research Misconduct; Plagiarism; Data Management; Authorship; Collaborative Research; Peer Review
- Scholarship and Research Integrity Seminar (Patrick McDaniel, PSU)
- 2012 **Kuwait Fund for Economic Development Training Program (First Phase)**
- Multi-module technical and professional training: communication, teamwork, project management, finance, feasibility studies, time management, HSE, negotiation, and ethics

Service and Leadership

- May 5–7, 2025 **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.