

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

- 2023-present **Assistant Professor**, *Computer Engineering Department, Kuwait University*, Sabah Al-Salem University City, Kuwait.
Committee service:
 - Engineering Ethics - Committee Coordinator (Fall 2024, Spring 2025)
 - Coordinator of cultural and social activities and scientific lectures (Fall 2024, Spring 2025)
 - CpE Student Affairs - Member (Fall 2023, Spring 2024)
 - CpE Programming Fundamentals Teaching Area Group - Member (Fall 2023, Spring 2024)
 - CpE Design Teaching Area Group - Member (Fall 2024)
- 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 Rupperecht, 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

- 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 Rupperecht, 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 Rupperecht, 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

- 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

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

Awards and Honors

- 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, Dallas, TX, USA.
- 2022 Grace Hopper Celebration virtual Hopper (Volunteer).
- 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 - One of the top 10 students graduating from College of Engineering and Petroleum – Graduates of Excellence Ceremony Class of 2012/2013 under the patronage and presence of HH the Amir of Kuwait.
- 2012 Accepted into the Kuwait Fund For Arab 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.

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 HiPC'25 (32nd IEEE International Conference on High Performance Computing, Data, and Analytics), IEEE Cluster'25, IPDPS'25, and REX-IO'24 (Workshop on Re-envisioning Extreme-Scale I/O for Emerging Hybrid HPC Workloads) in conjunction with IEEE Cluster'24
- Reviewer IEEE Transactions on Network Science and Engineering ('21, '22)
- Sub-Reviewer IPDPS('19 – '23), ICCD('19), ICDCS('19 – '22), BigData('19, '21), HPDC('20 – '22), Cluster('20, '21), ICS('21), ICMLA('21), SC('22), ECML PKDD('22)

Mentoring Experience

Graduate Students

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

Undergraduate Students

2021-2022 Yanlin Du, Virginia Tech

Coursework, Workshops, and Training

Training Certificates	Oak Ridge Leadership Computing Facility (OLCF) Hands-On HPC (HPC, MPI, OpenMP, CUDA programming) on Summit Supercomputer.
Graduate Coursework	Deep learning, Information storage and retrieval, Algorithms Design, Theory of Computation, Numerical Solutions Applied to Heat Transfer and Fluid Mechanics problems, Performance Evaluation, Networks, Digital Communications, Network Security, Operating Systems, Advanced Internet Services, Big Data Analytics, Next Generation Networks, Content Distribution Networks, etc.
Workshop Certificates	Team Building and Teamwork, Communication and Presentation Skills, Self and Time Management, Feasibility Study and Business Planning, Finance for Non Financials, Problem Solving and Decision Making, Project Management for Non Managerial, Contracts and Contract Management, Value Engineering, Report Writing, Organizational Structure and Work Ethics and Behavior, Health, Safety and Environment in Engineering Projects, Negotiation Skills.
Undergraduate Coursework	Data structures and Algorithms, C++ and Java, Operating Systems, Digital logic, Embedded Systems, Circuits and Electronics series, Signals and systems, Computer Organization and Architecture, Networks series, Databases, etc.