

Hadeel Albahar

Assistant Professor
Department of Computer Engineering
Kuwait University

Sabah Al-Salem University City, Kuwait

✉ hadeel.albahar@ku.edu.kw

🏠 hadeelalbahar.github.io

LinkedIn [hadeelalbahar](https://www.linkedin.com/in/hadeelalbahar/)

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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. Banned AI in Higher Education: Psychological and Ethical Perspectives. Accepted for presentation at the 4th Kuwait International Conference on Life Sciences 2025, Kuwait, Nov 2025.

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/330833338/The_Emerging_Role_of_High_Intensity_Focused_Ultrasound_(HIFU)_in_Cancer_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.

2025-2026 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 - 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 DistLLM'26, REX-IO('24,'25), HiPC'25, , IEEE Cluster'25, and IPDPS'25
- Reviewer IEEE Trans. on Computers'25, IEEE Trans. on Network Science and Engineering('21, '22)
- Sub-Reviewer FAST'26, IPDPS('19 – '23), ICCD'19, ICDCS('19 – '22), BigData('19, '21), HPDC('20 – '22), IEEE 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

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

Professional Development in Teaching

- Oct 2025 Effective Assessment Strategies for Large Undergraduate Courses, by Xiaoxia Zhang, CIRTL Workshop.
- Mar 2023 Communicating to Learn: Incorporating Scientific Communication into STEM Courses, by Dr. Rajan Kumar, CIRTL Workshop.
- Oct 2022 Universal Design for Learning (UDL), by Pearl Xie and Mark Nichols, Technology-enhanced Learning and Online Strategies (TLOS) Tool Showcase, Virginia Tech.
- Oct 2022 Flexible Learning, by Dale Pike, Technology-enhanced Learning and Online Strategies (TLOS) Tool Showcase, Virginia Tech.
- Oct 2022 Engagement tools, by Larry Cox, Technology-enhanced Learning and Online Strategies (TLOS) Tool Showcase, Virginia Tech.
- Aug 2022 Building Interpersonal Skills with VT Grad School Ombuds - Disrupting Academic Bullying, Facilitated by Bryan Hanson, Virginia Tech.
- Nov 2021 Accessible Slides in MS PowerPoint and Google Slides by Kimberley Homer and Mark Nichols, Technology-enhanced Learning and Online Strategies (TLOS) Accessible Technologies, Virginia Tech.
- Sep 2021 Teaching Ethics and Academic Integrity: Encouraging and Enforcing Honesty in the Classroom, by Cayce Myers, Teaching Skills Sessions for Graduate Teaching Assistants, Virginia Tech.
- Sep 2021 Oral Communication, by Kevin Edgar, Teaching Skills Sessions for Graduate Teaching Assistants, Virginia Tech.
- Sep 2021 Confidence in Teaching, by Rachel Arnold, Teaching Skills Sessions for Graduate Teaching Assistants, Virginia Tech.
- Sep 2021 Teaching 101: Tips and Tricks for New Instructors, by Sara Lamb, Teaching Skills Sessions for Graduate Teaching Assistants, Virginia Tech.
- Sep 2021 Teaching for International Students, VTGrATE Panel led by Jonilda Bahja, Teaching Skills Sessions for Graduate Teaching Assistants, Virginia Tech.

- Sep 2021 Identifying Students in Distress, by Rita Klein, Teaching Skills Sessions for Graduate Teaching Assistants, Virginia Tech.
- 2020 Creating Inclusive Learning Environments, by Jordan Laney and Graduate Academy for Teaching Excellence (GrATE) at Virginia Tech.

Professional Development and Training

- Oct 2025 Resilience and Career Transitions, feat. Kevin Huck, Laura Theademan, and Jane Yu, moderated by Mike Lam, part of the Early Career Program of SC25.
- Mar 2023 Mentoring and Advising Relationships: What Skills am I Developing?, Part of Be Your Own Driver: Imagining Post-PhD Career Versatility, CIRTL Workshop.
- Mar 2023 Career Conversation: Self-Promotion #iamRemarkable, by Meenakshi Iyer, AnitaB.org Member Workshops.
- Feb 2023 Navigating Transitions in Your Mid-Career, by LaTonyia Wade, Nicole Scharrenberg, and Sara Joseph (CDW), AnitaB.org Member Workshops.
- Jan 2023 Women in HPC & IT Leadership Roles, Part II, feat. Shannon Phillips and Virginia Evans, moderated by Gladys Andino, Virginia Women in HPC (VA-WHPC).
- Oct 2022 Women in HPC & IT Leadership Roles, Part I, feat. Robin Bryan and Corinne Picataggi, moderated by Gladys Andino, Virginia Women in HPC (VA-WHPC).
- Nov 2022 Tools to Level Up Your Career and Personal Well-Being, WHPC-SC22 Invited Talks.
- Nov 2022 Oak Ridge Leadership Computing Facility (OLCF) Hands-On HPC (HPC, MPI, OpenMP, CUDA programming) on Summit Supercomputer at SC22.
- Aug 2022 Empowering and Expanding the Role of Women and Minorities in HPC, Inspiring Diversity and Inclusion, feat. Jackie Milhans, Lara Timm, and Rachel Spraker, moderated by Eric Walter, Virginia Women in HPC (VA-WHPC).
- May 2022 Supercomputing For Everyone, Virginia Women in HPC (VA-WHPC).
- Oct 2019 Intro to HPC and ARC, Advanced Research Computing, Virginia Tech, USA.
- Oct 2017 Mentoring, Research Misconduct, Plagiarism, and Research, Ethics, and Society. Responsible Conduct of Research (RCR), Collaborative Institutional Training Initiative (CITI), PSU.
- Oct 2017 Peer Review, Responsible Conduct of Research (RCR), by Adil E. Shamoo, PhD, Collaborative Institutional Training Initiative (CITI), PSU.
- Oct 2017 Data Management, Responsible Conduct of Research (RCR), by Reid Cushman, PhD, Collaborative Institutional Training Initiative (CITI), PSU.
- Oct 2017 Collaborative Research, Responsible Conduct of Research (RCR), by Elizabeth Heitman, PhD and Sergio Litewka, MD, MPH, Collaborative Institutional Training Initiative (CITI), PSU.
- Oct 2017 Authorship, Responsible Conduct of Research (RCR), by Stephanie J. Bird, PhD, Collaborative Institutional Training Initiative (CITI), PSU.
- Oct 2017 Scholarship and Research Integrity: How to write a paper, Prof. Patrick McDaniel, SARI seminar, PSU.
- Jun 2012 - 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. Workshop Certificates, Phase I of Kuwait Fund For Arab Economic Development Training Program for Newly Graduated Engineers and Architects.
- Aug 2012