KUMAIL ALHAMOUD

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Education

Massachusetts Institute of Technology (MIT)   **September 2023 – Present**

PhD, Computer Science and Artificial Intelligence Lab (CSAIL)   *Cambridge, MA*
- PhD Supervisor: Prof. Marzyeh Ghassemi

King Abdullah University for Science and Technology (KAUST)   **September 2021 – July 2023**

M.S, Computer Science; GPA:3.96/4.00   *Thuwal, Saudi Arabia*
- Thesis Advisor: Prof. Bernard Ghanem
- **Relevant Courses:** Deep Generative Modeling, Low-resource Deep Learning, Algorithms in Bioinformatics

Cornell University   **May 2021**

B.S, Electrical and Computer Engineering; GPA: 4.13/4.30   *Ithaca, NY*
- *Summa Cum Laude*
- Dean's List, all semesters
- **Relevant Courses:** Computer Vision, Natural Language Processing, Digital Signal Processing, Deep Learning

Publications

(* indicates equal contribution)

- ***Kumail Alhamoud****, Yasir Ghunaim*, Motasem Alfarra, Thomas Hartvigsen, Philip Torr, Bernard Ghanem, Adel Bibi, Marzyeh Ghassemi. "A Unified Framework for Addressing Demographic and Temporal Shifts in Medical Imaging", *Under Review.*

- ***Kumail Alhamoud****, Hasan Abed Al Kader Hammoud*, Motasem Alfarra, Bernard Ghanem. "Generalizability of Adversarial Robustness Under Distribution Shifts", *Transactions on Machine Learning Research (TMLR) 2023.* [**awarded a Featured Certification → will be presented in ICLR 2024**]

- Yasir Ghunaim*, Adel Bibi*, ***Kumail Alhamoud***, Motasem Alfarra, Hasan Abed Al Kader Hammoud, Ameya Prabhu, Philip Torr, Bernard Ghanem. "Real-Time Evaluation in Online Continual Learning: A New Hope", *CVPR* 2023. [**Highlight Paper, *top 2.5%***]

- Andrés Villa, Juan C. Alcazar, Motasem Alfarra, ***Kumail Alhamoud***, Julio Hurtado, Fabian Caba, Alvaro Soto, Bernard Ghanem. "PIVOT: Prompting for Video Continual Learning", *CVPR* 2023.

- Andrés Villa, ***Kumail Alhamoud***, Juan C. Alcazar, Fabian Caba, Victor Escorcia, Bernard Ghanem. "vCLIMB: A Novel Video Class Incremental Learning Benchmark", *CVPR* 2022. [**Oral Paper, *top 2.5%***]

- Akshay Ajagekar, ***Kumail Alhamoud***, Fengqi You. "Hybrid Classical-Quantum Optimization Techniques for Solving Mixed-Integer Programming Problems in Production Scheduling", *IEEE Transactions on Quantum Engineering* 2022.

Fellowships, Scholarships & Recognition

Abdul Latif Jameel PhD Fellowship for ML and Health at MIT	**September 2023**
Saudi Leadership Society Fellow	**April 2022**
Best Poster Award at SCML 2022	**November 2022**
KAUST Graduate Studies Fellowship	**September 2021**
MISK Fellowship	**June 2021**
The 2021 Outstanding Teaching Assistant Award at Cornell	**June 2021**
2021 Rhodes Scholarship Finalist	**January 2021**
Cornell Engineering Learning Initiatives Student Grant Program	**Summer 2020**
KAUST Gifted Student Program Scholar	**September 2016 – May 2021**

- A full-ride, merit-based scholarship for undergraduate studies

Examples of Research Experience

MIT, Healthy ML Group   **August 2023 – Present**
PhD Student   *Cambridge, MA*

Enhancing Negation Understanding of Vision-Language Models
- Advancing a multimodal learning approach to equip vision-language models with the capability to discern and articulate the absence of features in images (i.e., what is *not* present in an image), a critical yet often neglected linguistic construct.

Addressing Domain and Temporal Shifts in Healthcare with Federated and Continual Learning
- Proposed novel learning strategies to harness decentralized patient data across hospitals, aiming to develop a generalizable model adaptive to evolving medical practices and diverse patient populations.

KAUST, Image and Video Understanding Lab (IVUL)   **September 2021 – August 2023**
Graduate Researcher   *Thuwal, Saudi Arabia*

Generalization and Transferability of Neural Network Representations
- Developed a chemistry-informed representation learning technique to improve generalizability of molecular embeddings.
- Investigated the generalizability of empirical and certified robustness to unseen visual domains.

Video Continual Learning
- Innovated a methodology to allow deep learning models to efficiently learn from continuous streams of video.

Abstract & Poster Presentations

*KAUST Conference on Scientific Computing and Machine Learning [**Best Poster Award**]*   *November 2022*
- **Chemistry-informed Graph Representation Learning for Molecular Conformation Generation and Beyond**
  Kumail Alhamoud, Yasir Ghunaim, Guohao Li, Bernard Ghanem

Cornell Engineering Learning Initiatives Summer Presentation   *August 2020*
- **Harnessing Quantum Computing to Improve the SOTA in Solving Industrial-Scale Scheduling Problems**
  Kumail Alhamoud, Akshay Ajagekar, Fengqi You

Boston University 22nd Annual UROP Undergraduate Research Symposium   *October 2019*
- **DNA Sequence Alignment Framework for Sequence Pathogenicity Screening**
  Kumail Alhamoud, Samuel M.D. Oliveira, Douglas Densmore

Teaching Assistant Experience

KAUST   **Thuwal, Saudi Arabia**
CS 323 Deep Learning for Visual Computing   *August 2022 – December 2022*

Cornell University   **Ithaca, NY**
*CS 4300 Language and Information [**InfoSci Department Outstanding TA Award**]*   *January 2021 – May 2021*
CS 2800 Discrete Structures   *September 2020 – December 2020*
ECE 3250 Mathematics of Signals and System Analysis   *September 2020 – December 2020*

Boston University   **Boston, MA**
MA 226 Differential Equations   *January 2019 – May 2019*

Academic Experience

- Reviewer for CVPR'23, NeurIPS'23, and TPAMI papers