

# KUMAIL ALHAMOUD

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## Education

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### Massachusetts Institute of Technology (MIT)

*PhD, Electrical Engineering and Computer Science*

- PhD Supervisor: Prof. Marzyeh Ghassemi

September 2023 – Present

Cambridge, MA

### King Abdullah University for Science and Technology (KAUST)

*M.S, Computer Science; GPA:3.96/4.00*

- Thesis Advisor: Prof. Bernard Ghanem
- **Relevant Courses:** Deep Generative Modeling, Low-resource Deep Learning, Algorithms in Bioinformatics

September 2021 – July 2023

Thuwal, Saudi Arabia

### Cornell University

*B.S, Electrical and Computer Engineering; GPA: 4.13/4.30*

- *Summa Cum Laude*
- Dean's List, all semesters
- **Relevant Courses:** Computer Vision, Natural Language Processing, Image Processing, Deep Learning

May 2021

Ithaca, NY

## Publications

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(\* indicates equal contribution)

- ***Kumail Alhamoud\****, Hasan Abed Al Kader Hammoud\*, Motasem Alfarrar, Bernard Ghanem. "Generalizability of Adversarial Robustness Under Distribution Shifts", *Transactions on Machine Learning Research (TMLR) 2023*. [awarded a **Featured Certification**]
- Yasir Ghunaim\*, Adel Bibi\*, ***Kumail Alhamoud***, Motasem Alfarrar, Hasan Abed Al Kader Hammoud, Ameya Prabhu, Philip H.S. Torr, Bernard Ghanem. "Real-Time Evaluation in Online Continual Learning: A New Paradigm", *CVPR 2023*. [**Highlight Paper, top 2.5%**]
- Andrés Villa, Juan C. Alcazar, Motasem Alfarrar, ***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 Escorcía, 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

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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

## Abstract & Poster Presentations

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- 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

## Research Experience

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

*Addressing Domain and Temporal Shifts in Healthcare with Federated and Continual Learning*

- Proposing 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 heuristic-based molecular representation learning technique; and investigated empirical and certified robustness generalizability.

*Video Continual Learning*

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

**London Geometry and Machine Learning Summer School** **July 2022**  
*Student Researcher* *Online*

*Exploring Network Medicine Principles Encoded by Graph Neural Networks (GNNs)*

- Investigated whether network medicine principles are implicitly learned by GNNs from heterogeneous biological networks.

**Boston University, Damp Lab** **June 2019 – August 2019**  
*Undergraduate Researcher* *Boston, MA*

*DNA Sequence Alignment Framework for Sequence Pathogenicity Screening*

- Helped develop a software tool based on the screening pipeline developed in this study, leading the lab to become a provisional member of the International Gene Synthesis Consortium, a group of leading organizations in biosecurity.

## Teaching Assistantships

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

**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

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