

Benjamin Hoover

AI Researcher, Engineer, Student

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Education

Machine Learning PhD Student

Aug 2021 - Present

Georgia Institute of Technology, Atlanta, GA

Advisor: Duen Horng (Polo) Chau

Master of Engineering: Electrical and Computer Engineering

May 2018

Duke University, Durham, NC

Bachelor of Science in Engineering: Biomedical Engineering

May 2017

Duke University, Durham, NC

Industry Research Experience

IBM Research

Sep '18 - Present

Visual AI Lab, Cambridge, MA

Mentors: Hendrik Strobelt • Dmitry Krotov

Member of the Visual AI Lab where we use visualization to breathe insight and interactivity into powerful AI systems.

Medtronic Diabetes

Summer '17

Algorithms R&D, Northridge, CA

Mentors: Peter Ajemba • Keith Nogueira

Analyze trends in patient blood glucose levels for the sensor R&D team, developing algorithms that were incorporated into product by the end of the summer.

Academic Research Experience

Georgia Institute of Technology

Aug '21 - present

Polo Club at School of Computational Science and Engineering, Atlanta, GA

Mentor: Polo Chau

Member of the Polo Club of Data Science where we innovate scalable, interactive, and interpretable tools that amplify human's ability to understand and interact with billion-scale data and machine learning models.

International Genetically Engineered Machine (iGEM)

Apr '15 - May '17

Lynch Lab, Durham, NC

Mentors: Eirik Adim Moreb • Michael D. Lynch

Designed experiments to analyze CRISPR-Cas9 binding effects in bacteria, using machine learning to discover patterns in the data.

Awards and Honors

Best Paper Award, Honorable Mention

July 2023

DiffusionDB receives a Best Paper, Honorable Mention Award at ACL 2023

Spotlight Paper Award

Dec. 2022

HAMUX is spotlighted (top 5 submissions) at the Deep Learning and Differential Equation Workshop at NeurIPS 2022

Highlighted Reviewer

ICLR 2022

Apr. 2022

Best Poster Award

RXNMapper wins Best Poster award at #IOPPoster 2020

July 2020

Best Demo Award

LMdiff is Best Demo at NeurIPS 2020

Dec. 2020

(Runner Up) Best Demo

exBERT is runner up for Best Demo at NeurIPS 2019

Dec. 2019

Dean's List

In the highest one third of engineering class by GPA at Duke

2013-2017

Raul Buelvas Award

Given to one freshman at Duke University who "best exemplifies honor, optimism, and selflessness"

Apr. 2014

Publications

Conference

Energy-based Attention for Associative Memory

Benjamin Hoover, Yuchen Liang, Bao Pham, Rameswar Panda, Hendrik Strobelt, Polo Chau, Mohammed J. Zaki, and Others
Conference on Neural Information Processing Systems (NeurIPS). 2023.

 PDF

ConceptEvo: Interpreting Concept Evolution in Deep Learning Training

Haekyu Park, Seongmin Lee, **Benjamin Hoover**, Austin Wright, Omar Shaikh, Rahul Duggal, Nilaksh Das, and Others
ACM International Conference on Information and Knowledge Management (CIKM). 2023.

 PDF

Diffusion Explainer: Visual Explanation for Text-to-image Stable Diffusion

Seongmin Lee, **Benjamin Hoover**, Hendrik Strobelt, Zijie J. Wang, ShengYun Peng, Austin Wright, Kevin Li, and Others
Conference on Computer Vision and Pattern Recognition (CVPR). 2023.

 Demo  PDF  Video  Code

DiffusionDB: A Large-scale Prompt Gallery Dataset for Text-to-Image Generative Models

Zijie J. Wang, Evan Montoya, David Munechika, Haoyang Yang, **Benjamin Hoover**, Polo Chau
Association for Computational Linguistics (ACL). 2023.

 Home  Github  Dataset  PDF

Interactive and Visual Prompt Engineering for Ad-hoc Task Adaptation with Large Language Models

Hendrik Strobelt, Albert Webson, Victor Sanh, **Benjamin Hoover**, Johanna Beyer, Hanspeter Pfister, Alexander Rush
IEEE Transactions on Visualization and Computer Graphics (VIS). 2022.

 PDF  Demo

Shared Interest: Measuring Human-AI Alignment to Identify Recurring Patterns in Model Behavior

Angie Boggust, **Benjamin Hoover**, Arvind Satyanarayan, Hendrik Strobelt
ACM Conference on Human Factors in Computing Systems (CHI). 2022.

 Project  Demo  Video  PDF  Code

Can a Fruit Fly Learn Word Embeddings?

Yuchen Liang, Chaitanya K. Ryali, **Benjamin Hoover**, Leopold Grinberg, Saket Navlakha, Mohammed J. Zaki, Dmitry Krotov
International Conference for Learning Representations (ICLR). 2021.

 Project  PDF  Poster  Code

Last rendered: Mon Oct 16 2023

The Design and Development of a Game to Study Backdoor Poisoning Attacks: The Backdoor Game

Zahra Ashktorab, Casey Dugan, James Johnson, Aabhas Sharma, Dustin Ramsey Torres, Ingrid Lange, **Benjamin Hoover**, and Others

International Conference on Intelligent User Interfaces (IUI). 2021.

 PDF

CogMol: Target-Specific and Selective Drug Design for COVID-19 Using Deep Generative Models

Enara Vijil, Payel Das, Samuel Hoffman, Hendrik Strobelt, Inkit Padhi, Kar Wai Lim, **Benjamin Hoover**, and Others

Neural Information Processing Systems (NeurIPS). 2020.

 Project

 Demo

 PDF

Journal

Operational response simulation tool for epidemics within refugee and IDP settlements

Joseph Bullock, Carolina Cuesta-Lazaro, Arnau Quera-Bofarull, Anjali Katta, Katherine Hoffmann Pham, **Benjamin Hoover**, Hendrik Strobelt, and Others

Public Library of Science: Computational Biology (PLOS). 2021.

 PDF

RXNMapper: Unsupervised Attention Guided Atom Mapping

Philippe Schwaller, **Benjamin Hoover**, JL Reymond, Hendrik Strobelt, Teodoro Laino

Science Advances (AAAS). 2020.

 Project

 Demo

 PDF

 Video

 Code

Managing the SOS Response for Enhanced CRISPR-Cas-Based Recombineering in E. coli through Transient Inhibition of Host RecA Activity

Eirik Adim Moreb, **Benjamin Hoover**, Adam Yaseen, Nisakorn Valyasevi, Zoe Roecker, Romel Menacho-Melgar, Michael D. Lynch

American Chemical Society: Synthetic Biology (ACS). 2017.

 PDF

Workshop

HAMUX: A Universal Abstraction for Hierarchical Hopfield Networks

Benjamin Hoover, Polo Chau, Hendrik Strobelt, Dmitry Krotov

Symbiosis of Deep Learning and Differential Equations II Workshop at NeurIPS (DLDE). 2022.

 Code

 Project

 PDF

 Video

Preprints

Memory in Plain Sight: A Survey of the Uncanny Resemblances between Diffusion Models and Associative Memories

Benjamin Hoover, Hendrik Strobelt, Dmitry Krotov, Judy Hoffman, Zsolt Kira, Polo Chau

ArXiv preprint (ArXiv). 2023.

 PDF

Fairytaylor: A multimodal generative framework for storytelling

Eden Bensaid, Mauro Martino, **Benjamin Hoover**, Hendrik Strobelt

ArXiv preprint (ArXiv). 2021.

 PDF

 Demo

Talks

Energy Transformer

McMahon Lab at Cornell University 

Last rendered: Mon Oct 16 2023

Sep 2023

Comparing Language Models with LMDiff

Demo at NeurIPS 2020

Dec 2020

HAMUX: Inventing Hopfield Networks 2.0

GA Tech CSE Hotseat

Nov 2022

exBERT: Exploring Learned Embeddings in Transformer Models

System Demonstration at ACL 2020

Jul 2020

IBM Exposition Demo at ICLR 2020

Apr 2020

System Demonstration at NeurIPS 2019

Dec 2019

Unsupervised Attention Guided Atom Mapping with RXNMapper

ML Interpretability for Scientific Discovery Workshop at ICML 2020

Jul 2020

IBM Exposition Demo at ICML 2020

Jul 2020

Breaking the Wall of Black Box AI

Falling Walls Lab Boston"

Oct 2020

The Inside Story

MEng Graduation elected speaker Invited

May 2018

Using Matlab's PRT to Accelerate Algorithm Development

Medtronic Diabetes R&D

Jul 2017

The Impact of Encouragement

Cary Christian School Valedictorian Speech Invited

May 2013

Teaching

Graduate Teaching Assistant

Fall '23

Georgia Institute of Technology, Atlanta, GA

Instructors: Polo Chau • Mahdi Roozbahani

Organized project teams, graded projects, and held weekly office hours for an online graduate course with 947 students enrolled.

Graduate Teaching Assistant

Spring '18

Duke University, Durham, NC

Instructor: Patrick Wang

Designed homeworks, supervised projects, and occasionally teach lectures.

Graduate Teaching Assistant

Spring '18

Duke University, Durham, NC

Instructor: Jonathan Viventi

Supervised and graded capstone projects where students designed and assembled 2-channel EEG readers

Graduate Teaching Assistant

Spring '18

Duke University, Durham, NC

Instructors: Stacy Tantum • Paul Bendich

As a TA, I helped setup class infrastructure (Python, jupyter) and initial curriculum for this 25 student pilot course for Duke's Data+ Program.

Undergraduate Teaching Assistant

Spring '17

Duke University, Durham, NC

Instructor: Jonathan Viventi

Prepared, supervised, and graded labs where students designed medical devices such as Ultrasound, ECGs, Baby Incubators, and functional FitBits.

Undergraduate Teaching Assistant

Jan '15 - May '18

Duke University, Durham, NC

Instructor: Stacy Tantum

Graded homeworks, held weekly office hours, supervised labs, and private tutored students.

Boeing Fellow

Duke University, Durham, NC

Instructor: Carmen Rawls

Jan '16 - May '17

| Wrote STEM lesson plans to engage middle and high school students in the Durham area.

Service

Reviewer

International Conference for Learning Representations (**ICLR**) 2024 · 2023 · 2022

International Conference for Machine Learning (**ICML**) 2023 · 2022

Blogpost Track at ICLR (**BP@ICLR**) 2023

Workshop on the Symbiosis of Deep Learning and Differential Equations at NeurIPS (**DLDE**) 2022

Neural Information Processing Systems (**NeurIPS**) 2021 · 2023

ACM Conference on Human Factors in Computing Systems (**CHI**) 2023