

Joshua Engels

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GitHub: github.com/JoshEngels Website: joshengels.com Google Scholar: [\[link\]](#)

EDUCATION

Massachusetts Institute of Technology

August 2023 - August 2028

PhD in Computer Science

Cambridge, MA

Advisor: Prof. Max Tegmark

Rice University

August 2018 - December 2021

Bachelor of Science in Computer Science

Houston, TX

Bachelor of Arts in Mathematics

Graduated summa cum laude (4.00 GPA)

SELECTED PUBLICATIONS

[Not All Language Model Features Are Linear](#)

Joshua Engels, Eric J. Michaud, Isaac Liao, Wes Gurnee, and Max Tegmark

International Conference on Learning Representations (ICLR) 2025.

[Efficient Dictionary Learning with Switch Sparse Autoencoders](#)

Anish Mudide, **Joshua Engels**, Eric Michaud, Max Tegmark, Christian Schroeder de Witt

International Conference on Learning Representations (ICLR) 2025.

[Approximate Nearest Neighbor Search with Window Filters](#)

Joshua Engels, Benjamin Landrum, Shangdi Yu, Laxman Dhulipala, Julian Shun

International Conference on Machine Learning (ICML) 2024.

[DESSERT: An Efficient Algorithm for Vector Set Search with Vector Set Queries](#)

Joshua Engels, Benjamin Coleman, Vihan Lakshman, and Anshumali Shrivastava

Advances in Neural Information Processing Systems (NeurIPS) 2023.

[Practical Near Neighbor Search via Group Testing.](#)

Joshua Engels*, Benjamin Coleman*, and Anshumali Shrivastava

Advances in Neural Information Processing Systems (NeurIPS) 2021: Spotlight - top 3%

* indicates equal contribution

[Missed One! How Ballot Layout and Visual Task Strategy Can Interact to Produce Voting Errors.](#)

Joshua Engels, Xianni Wang, Michael D. Byrne

International Conference on Cognitive Modeling 2020

SELECTED PREPRINTS

[Decomposing The Dark Matter of Sparse Autoencoders](#)

Joshua Engels, Logan Riggs, Max Tegmark

[Low-Rank Adapting Models for Sparse Autoencoders](#)

Mathew Chen*, **Joshua Engels***, Max Tegmark

* indicates equal contribution

[The Geometry of Concepts: Sparse Autoencoder Feature Structure](#)

Yuxiao Li*, Eric J. Michaud*, David D. Baek*, **Joshua Engels**, Xiaoqing Sun, Max Tegmark

* indicates equal contribution

TALKS

[Not All Language Model Features Are Linear](#)

Joint Mathematics Meetings AMS Special Session on Geometry and Machine Learning, 2025

[Not All Language Model Features Are Linear](#)

BITS Physics of Intelligence Workshop Talk, 2024

[DESSERT: An Efficient Algorithm for Vector Set Search with Vector Set Queries](#)

NeurIPS 2023: Poster talk.

[Practical Near Neighbor Search via Group Testing](#)

NeurIPS 2021: Spotlight talk.

[Missed one! How ballot layout and visual task strategy can interact to produce voting errors.](#)

International Conference on Cognitive Modeling 2020.

SELECTED HONORS

NSF Graduate Research Fellowship (GRFP) **2024 - 2027**

Louis J. Walsh Scholarship in Engineering **2020, 2021**

National Merit Finalist Scholarship **2018 - 2019**

OTHER RESEARCH EXPERIENCE

ThirdAI Corp **August 2021 - May 2023**

Artificial Intelligence Engineer

Houston, TX

Lead engineer on nearest neighbor search. Made core contributions to ThirdAI's internal machine learning engine, including work on the computation DAG (directed acyclic graph), distributed training, and extensive sparsity-based optimizations. Created DESSERT, a general algorithm for performing vector-set search with vector-set queries.

Rice University Sketching and Hashing Lab **August 2020 - August 2021**

Undergraduate Researcher, PI: Prof. Anshumali Shrivastava

Houston, TX

Implemented and benchmarked FLINNG, a high performance C++ nearest neighbor search algorithm build with locality sensitive hashing and group testing.

TEACHING AND MENTORING EXPERIENCE

MIT Graduate Application Assistance Program **August 2023 - December 2023**

Mentor

Cambridge, MA

Mentored students from underrepresented backgrounds applying to graduate schools.

Rice University Computer Science Department **January 2020 - May 2020**

Algorithmic Thinking (Comp 182) Teaching Assistant

Houston, TX

Held office hours and led review sessions for Rice's algorithms and discrete mathematics intro class.

Rice University Catalyst Eureka Program **September 2018 - May 2019**

Mentor

Houston, TX

Mentored a high school student working on a year-long research project to investigate characteristics of popular songs.