Alon Albalak

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About Me

I am a research scientist on the Open-Endedness team at Lila Sciences, where I research AI that doesn't just solve problems, but creatively explores new scientific frontiers.
Previously, I was the Data Team Lead at SynthLabs, where I worked on research for post-training large foundation models. I received my Ph.D from the Computer Science Department at the University of California, Santa Barbara, while I was a member of the NLP Group, co-advised by William Yang Wang and Xifeng Yan.
The primary focus of my research has been on the intersection of machine learning and data (data-centric AI). Throughout the course of my research, I have adapted and contributed to methods in multi-armed bandits, data selection, multitask learning, transfer learning, reinforcement learning, and neuro-symbolic methods. Additionally, I have worked on all aspects of language models, including pretraining, post-training, tool use, reasoning, and agentic systems.
In the future, I am most interested in 2 main directions of work. First, I would like to continue my pursuit of research by developing methods to help us better understand models. Additionally, I am also very excited to apply my background in data-centric AI to helping models generalize beyond their training data.

Education

2018–2024 *Ph.D, Computer Science*, *University of California, Santa Barbara*.
UCSB NLP Group
Dissertation: Understanding and Improving Language Models Through a Data-Centric Lens
Advisors: William Yang Wang and Xifeng Yan

2016–2018 *B.S., Mathematics*, *Wayne State University*.

Selected Publications (Full publication list)

2025 *The Common Pile v0. 1: An 8TB Dataset of Public Domain and Openly Licensed Text*.
Nikhil Kandpal, Brian Lester, Colin Raffel, . . . , Alon Albalak, ... Preprint

2025 *MAGPIE: A dataset for Multi-AGent contextual PrIvacy Evaluation* .
Gurusha Juneja, Alon Albalak, Wenyue Hua, William Yang Wang. Preprint

2025 *OpenThoughts: Data Recipes for Reasoning Models*.
Etash Guha, Ryan Marten, . . . , Alon Albalak, . . . , Alexandros Dimakis, Ludwig Schmidt. Preprint

2025 *Big-Math: A Large-Scale, High-Quality Math Dataset for Reinforcement Learning in Language Models*.
Alon Albalak, Duy Phung, Nathan Lile, Rafael Rafailov, Kanishk Gandhi, Louis Castricato, Anikait Singh, Chase Blagden, Violet Xiang, Dakota Mahan, Nick Haber. Preprint

2025 *Generalization vs. Memorization: Tracing Language Models' Capabilities Back to Pretraining Data*.
Antonis Antoniades, Xinyi Wang, Yanai Elazar, Alfonso Amayuelas, Alon Albalak, Kexun Zhang, William Yang Wang
ICLR, Main Conference, Paper

2025 *Towards System 2 Reasoning in LLMs: Learning How to Think With Meta Chain-of-Thought*.
Violet Xiang, Charlie Snell, Kanishk Gandhi, Alon Albalak, Anikait Singh, Chase Blagden, Duy Phung, Rafael Rafailov, Nathan Lile, Dakota Mahan, Louis Castricato, Jan-Philipp Franken, Nick Haber, Chelsea Finn. Preprint

2024 *A Survey on Data Selection for Language Models*.
Alon Albalak, Yanai Elazar, Sang Michael Xie, Shayne Longpre, Nathan Lambert, Xinyi Wang, Niklas Muennighoff, Bairu Hou, Liangming Pan, Haewon Jeong, Colin Raffel, Shiyu Chang, Tatsunori Hashimoto, William Yang Wang
TMLR, Transactions on Machine Learning Research, Paper [Github]

2024 *Generative Reward Models*.
Dakota Mahan*, Duy Van Phung*, Rafael Rafailov*, Chase Blagden, Nathan Lile, Louis Castricato, Jan-Philipp Fränken, Chelsea Finn, Alon Albalak*. Preprint

2024 *DataComp-LM: In search of the next generation of training sets for language models*.
Jeffrey Li*, Alex Fang*, Georgios Smyrnis*, Maor Ivgi*, ... Alon Albalak, ..., Achal Dave*, Ludwig Schmidt*, Vaishaal Shankar*
NeurIPS, Datasets and Benchmarks Track, Paper [Website] [Code]

2024 *Surveying the Effects of Quality, Diversity, and Complexity in Synthetic Data From Large Language Models*.
Alex Havrilla, Andrew Dai, Laura O'Mahony, Koen Oostermeijer, Vera Zisler, Alon Albalak, ... Preprint

2024 *The Responsible Foundation Model Development Cheatsheet: A Review of Tools & Resources*.
Shayne Longpre, Stella Biderman, Alon Albalak, Gabriel Ilharco, Sayash Kapoor, Kevin Klyman, ...
TMLR, Transactions on Machine Learning Research, Paper [Website]

2024 *Eagle and Finch: RWKV with Matrix-Valued States and Dynamic Recurrence*.
Bo Peng*, Daniel Goldstein*, Quentin Anthony*, Alon Albalak, ...
COLM, Conference on Language Modeling, Paper

2023 *Improving Few-Shot Generalization by Exploring and Exploiting Auxiliary Data*.
Alon Albalak, Colin Raffel, William Yang Wang
NeurIPS, Main Conference, Paper [code] [presentation]

2023 *Efficient Online Data Mixing For Language Model Pre-Training*.
Alon Albalak, Liangming Pan, Colin Raffel, William Yang Wang
NeurIPS, Workshop on Robustness of Few-shot and Zero-shot Learning in Foundation Models, Preprint

2023 *RWKV: Reinventing RNNs for the Transformer Era*.
Bo Peng*, Eric Alcaide*, Quentin Anthony*, Alon Albalak, ...
EMNLP, Findings, Paper [code]

2023 *Logic-LM: Empowering Large Language Models with Symbolic Solvers for Faithful Logical Reasoning*.
Liangming Pan, Alon Albalak, Xinyi Wang, William Yang Wang
EMNLP, Findings, Paper [code]

2023 *NeuPSL: Neural Probabilistic Soft Logic*.
Connor Pryor, Charles Dickens, Eriq Augustine, Alon Albalak, William Wang, L. Getoor
IJCAI, Main Conference, Paper [code]

2022 *FETA: A Benchmark for Few-Sample Task Transfer in Open-Domain Dialogue*.
Alon Albalak, Yi-Lin Tuan, Pegah Jandaghi, Connor Pryor, Luke Yoffe, Deepak Ramachandran, Lise Getoor, Jay Pujara, William Yang Wang.
EMNLP, Main Conference. Paper [code]

2022 *D-REX: Dialogue Relation Extraction with Explanations*.
Alon Albalak, Varun Embar, Yi-Lin Tuan, Lise Getoor, William Yang Wang.
ACL, NLP for Conversational AI Workshop. Paper [code]

2021 *Systems and methods for determining and using semantic relatedness to classify segments of text*.
Rohit Jain, Devin H. Redmond, Richard B. Sutton, Alon Albalak, Sharon Huffner.
US Patent 11914963, Patent

Professional Experience

May 2025 – present *Research Scientist*, *Lila Sciences*.
- Research towards open-ended learning and scientific discovery

April 2024 – May 2025 *Data Team Lead*, *SynthLabs*.

- Directed the data team, focused on enhancing alignment and complex reasoning capabilities in LLMs
- Determined and executed the internal research agenda on synthetic data generation, data filtering, and reward models
- Developed and led open-science collaborations with the broader research community
- **Resulting Publications:** (1) Generative Reward Models, (2) Towards System 2 Reasoning in LLMs: Learning How to Think With Meta Chain-of-Thought (3) Big-Math

June 2022 – September 2022 *Research Science Intern*, *Meta AI*.

- Directed and executed on 2 projects in collaboration with researchers across the company
- Explored data-efficiency through the use of multi-task learning and various prompting methods for small language models
- Explored the use of parameter-efficient methods for zero-shot generalization
- **Resulting Publications**: Data-Efficiency with a Single GPU

June 2019 – September 2020 *Research Associate*, *Theta Lake*.

- Built classifiers for automated risk detection in regulated industries through the use of natural language processing and other machine learning techniques
- Took multiple projects from inception to production, developing a patent along the way
- **Resulting Patent**: US Patent 11914963

Fellowships & Awards

2023 *Neurips Scholar Award*, *37th Conference on Neural Information Processing Systems*.

2018 *Integrative Graduate Education and Research Traineeship (IGERT) Fellow*, *University of California, Santa Barbara*.

2018 *Academic Excellence Fellowship*, *University of California, Santa Barbara*.

2018 *Chia Kuei Tsao Award*, *Wayne State University*.
For outstanding academic achievement in the undergraduate mathematics program

Service & Outreach

ACL 2023-24 Workshop Organizer - NLP For Conversational AI (NLP4ConvAI)

ACL 2023 Social Organizer - Mindfulness meditation in a time of NLP hyperactivity

NeurIPS 2022 Workshop Organizer - Transfer Learning for NLP (TL4NLP): Insights and Advances on Positive and Negative Transfer. Proceedings.

2022-2025 Program Committee: NeurIPS, ICML, ICLR, ACL, NAACL, EMNLP, AAAI

Technical skills

Tools Python, C++, Shell, AWS, Azure

Packages PyTorch, TensorFlow, HuggingFace, NumPy, SciPy

Machine Learning Natural Language Processing (NLP), Computer Vision (CV), Transformers, Generative AI

Military Experience

2012 – 2015 *Reconnaissance Sabotage Unit*, *Israel Defense Forces*.

- Engineering, demolitions, and reconnaissance specialty training
- Battalion lead navigator