

# ABHINAV AGRAWAL

Building AI products • GenAI Expert • Probabilistic ML PhD

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I bring a unique blend of deep expertise in machine learning, zero-to-one product experience in a fast-paced environment, and excellent communication skills. Read more below or [set up a short call](#).

## EDUCATION

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<b>University of Massachusetts Amherst</b> PhD in Computer Science, Advisor: Justin Domke	2020 - Present
<b>University of Massachusetts Amherst</b> MS in Computer Science, CGPA: 4/4	2018 - 2020
<b>Indian Institute of Technology Kanpur</b> B.Tech in Electrical Engineering, CGPA: 9.2/10	2014 - 2018

## EXPERIENCE

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<b>Research Assistant</b> University of Massachusetts Amherst Designed state-of-the-art sampling algorithms, publishing several first author papers in <a href="#">top ML conferences</a>	Aug '18 - Dec '24 Amherst, MA
<b>AI Product Lead</b> SigIQ.ai Led design, growth, & development of <a href="#">AI-based exam prep app</a> , growing from 0 to 200K+ users in < 8 months	Oct '23 - Jun '24 Berkeley, CA
<b>Research Scientist Intern</b> Microsoft Developed generative causal models for expensive simulators, reducing inference costs by three folds	May '22 - Sep '22 Redmond, WA
<b>Applied Scientist Intern</b> Amazon Deployed deep-learning-based ranking models for buy-it-again recommendations, improving accuracy by 2%	May '21 - Sep '21 Seattle, WA

## SELECTED PUBLICATIONS

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- [1] **Abhinav Agrawal**, Justin Domke. Disentangling impact of capacity, objective, batchsize, estimators, and step-size on flow VI. *In, AISTATS, 2025*.
- [2] **Abhinav Agrawal**, Justin Domke. Amortized Variational Inference for Simple Hierarchical Distributions. *In, NeurIPS, 2021*.
- [3] **Abhinav Agrawal**, Daniel Sheldon, Justin Domke. Advances in Black-Box VI: normalizing flows, importance weighting, and optimization. *In NeurIPS, 2020*.
- [4] Edmond Cunningham, Renos Zabounidis, **Abhinav Agrawal**, Ina Fiterau, Daniel Sheldon. Normalizing Flows Across Dimensions. *In workshop, ICML, 2020*.

## RELEVANT PROJECTS

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### AI tutor for India's toughest entrance exam (Indian Administrative Services (IAS))

- Managed a team of designers, engineers, and AI experts to build the **leading IAS preparation mobile app**
- Conceptualized user-focused AI features and grew the app from zero to 200K+ users in < 8 months

### Generative models to improve variational inference (VI)

- Designed **state-of-the-art VI** algorithms using normalizing flows—a generative modeling approach
- Redefined the standard for VI performance by surpassing leading Monte Carlo methods for the **first time**

### Scaling inference to large probabilistic models using efficient encoders

- Developed a **provably accurate** encoder-based approach for VI in probabilistic models with large datasets
- Engineered a novel architecture, leading to 10× improvement in scalability, accuracy, and speed

### Learning causal models for simulators

- Curated an algorithm to learn generative causal models for computationally costly numerical simulators
- Designed a loss criterion ensuring models were counterfactually accurate and 3× cheaper at inference

### Improved recommendations for repeated purchases

- Developed learn-to-rank (a deep learning method) for repeat purchase recommendations
- Incorporated order of recommendations into the ranking, enhancing accuracy over deployed methods

## REVIEWER

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Neural Information Processing Systems ( <b>NeurIPS</b> )	2019*, 2020, 2021, 2022*, 2023, 2024*
International Conference on Machine Learning ( <b>ICML</b> )	2020, 2021, 2022, 2025
International Conference on AI and Statistics ( <b>AISTATS</b> )	2024
Transactions of Machine Learning Research ( <b>TMLR</b> )	2022, 2023
International Conference on Learning Representations ( <b>ICLR</b> )	2021

\* top reviewer

## SCHOLARLY ACHIEVEMENTS

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- 2017 Awarded Academic Excellence Award by IIT Kanpur for three consecutive years
- 2016 Awarded **Overall Winner** in Google Devfest for Course Recommendation webapp at IIT Kanpur
- 2014 Top **99.9** percentile in Joint Entrance Exam (IIT-JEE) in among 1.4 million candidates
- 2013 **Gold Medal** by high school for 7 years of continued academic excellence

## SKILLS

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Language: Python | Frameworks: JAX, TensorFlow, PyTorch, Numpyro, Pyro, Transformers, OpenAI, vLLM

## OTHER ACTIVITIES

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- Teaching Assistant** Spring'19, '20, '21, Fall' 22, '24
- Probabilistic Graphical Models and Machine Learning UMass Amherst
- Led one-to-one and group tutoring sessions and designed course materials to enhance graduate-level learning