

# Sakshi Agarwal

Computer Science PhD Candidate

☎ (+1) 9495946701  
✉ [sakshia1@uci.edu](mailto:sakshia1@uci.edu)  
🌐 [My Webpage](#)  
in [Linkedin](#)



## Research Interests

**Developing Inference Algorithms**, My interests focus on developing inference algorithms that leverage pre-trained Deep Generative Models (such as Diffusion Models) and Vision-Language Foundation Models (like BLIP, CoCa) to address real-world user queries involving both images and text. My goal is to adapt and align predictions of these foundational models to enhance their reliability and robustness in specific application contexts..

## Education

- 2019–present **PhD, Computer Science**, University of California, Irvine, Advisor: Prof. *Erik Sudderth*.  
2013–2017 : **B.Tech in Electrical and Computer Engineering**, Indian Institute of Technology, Kharagpur, Advisor: Prof. *Sudeshna Sarkar*.

## Research Experience

[University of California, Irvine](#)

- 2024–Present **Producing Reliable Text Descriptions of surroundings for Low-Vision and Blind.**  
Working towards enhancing the text descriptions of images produced by Vision-Language Models.
- 2024–Present **Consistent Image Generation with Stable Diffusion.**  
Working towards enhancing the relevance of images generated using Stable Diffusion to user text prompts.
- 2023 **Solving Image Inverse Problems using (Latent) Diffusion Models.**
- Developed a variational inference method using latent diffusion models to solve image inverse problems.
  - Faster* and more *consistent* image recovery when compared with other contemporary works.
  - Preferred inference method for complex user queries with *high* image degradation.
- 2022 **Image Inpainting with Pre-trained (Hierarchical) VAEs.**
- Developed a (non-amortized) variational inference algorithm using Hierarchical Variational Autoencoders for image inpainting, showing improved image recovery than sampling, amortized inference methods.
  - Identified suboptimal behaviour of amortized inference networks for out-of-distribution observations.
- 2021 **Neural Networks for Message-Passing Inference Algorithms.**
- Developed an approximate message-passing inference algorithm; using neural networks for human-defined graphical models with discrete variables.
  - Improved* inference performance while also being *faster* over original.
- [Amazon.com, Seattle](#)
- 2020 **Theme Categorization, Applied Scientist Intern.**
- Categorized Q/A pairs on Amazon website into generic themes for improved user-experience.
  - Proposed suitable metrics to evaluate themes.

---

## Publications

### In Conference Proceedings

- 2023 **Sakshi, Agarwal**, Gabriel Hope, Ali Younis, and Erik B. Sudderth. A decoder suffices for query-adaptive variational inference. In Robin J. Evans and Ilya Shpitser, editors, *Proceedings of the Thirty-Ninth Conference on Uncertainty in Artificial Intelligence*, volume 216 of *Proceedings of Machine Learning Research*, pages 33–44. PMLR, 31 Jul–04 Aug 2023.
- 2022 **Sakshi Agarwal**, Kalev Kask, Alexander Ihler, and Rina Dechter. NeuroBE: Escalating NN approximations of bucket elimination. In *The 38th Conference on Uncertainty in Artificial Intelligence*, 2022.
- 2021 Yasaman Razeghi, Kalev Kask, Yadong Lu, Pierre Baldi, **Sakshi, Agarwal**, and Rina Dechter. Deep bucket elimination. In Zhi-Hua Zhou, editor, *Proceedings of the Thirtieth International Joint Conference on Artificial Intelligence, IJCAI-21*, pages 4235–4242. International Joint Conferences on Artificial Intelligence Organization, 8 2021. Main Track.

### In Workshops

- 2018 **Sakshi, Agarwal**, Krishnaprasad Narayanan, Manjira Sinha, Rohit Gupta, Sharanya Eswaran, and Tridib Mukherjee. Decision support framework for big data analytics. In *2018 IEEE World Congress on Services (SERVICES)*, pages 53–54, 2018.
- 2017 Mohit Yadav and **Sakshi, Agarwal**. Regularization and learning an ensemble of rnns by decorrelating representations. In *AAAI Workshops*, 2017.

---

## Patents

- 2021 **Sakshi, Agarwal** and SS Mannarswamy. Neural network architecture for subtle hate speech detection, us patent 10,936,817, 2021.
- 2020 **Sakshi, Agarwal**, Poorvi Agarwal, Arun Rajkumar, and Sharanya Eswaran. Method and system for forecasting in sparse data streams via dense data streams, us patent app. 16/112,768, 2020.
- 2019 Sharanya Eswaran, **Sakshi, Agarwal**, Sitara Shah, Narayanan Krishnaprasad, Banerjee Shisagnee, Johnston Terry, Avantika Gupta, and Tridib Mukherjee. Operational recommendations based on multi-jurisdictional inputs, us patent app. 15/988,247, 2019.

---

## Academic Achievements

- 2022 Reviewer at NeurIPS 2024, UAI 2024, AISTATS 2023
- 2013 Qualified in the Joint Entrance Examination (Advanced & Main), 2013 with a percentile of 98.3% and 99.7% respectively.
- 2011 Secured a rank of 648 in the 4th International Mathematics Olympiad (organized by SOF India) 2011.

---

## Programming Languages

Python, PyTorch, TensorFlow, Theano, R, C, C++

---

## Algorithms/Models

Variational Inference, Amortized Variational Inference, Diffusion Models, Deep Generative Models, Text-to-Image Generation, Out-of-distribution robustness

---

## Teaching Assistantship

- Winter, 2022 **CS175: Project In AI**, UC Irvine.
- Spring, 2021 **CS171: Intro to Artificial Intelligence**, UC Irvine.
- Winter, 2020 **CS265: Graph Algorithms**, UC Irvine.