

BHAVYA VASUDEVA

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EDUCATION

University of Southern California Ph.D. in Computer Science Advisor: Prof. Vatsal Sharan	2021 - Present
Indian Institute of Technology Roorkee B. Tech. in Electronics and Communication Engineering (GPA: 9.362/10, Rank: 3/84) Thesis: Compressive Sensing MRI Reconstruction using GANs Advisors: Prof. Saumik Bhattacharya & Prof. P. M. Pradhan	2016 - 2020

RESEARCH INTERESTS

Deep Learning Theory, Science of Language Models

EXPERIENCE

UC Berkeley Visiting Graduate Student, Simons Institute Program on Modern Paradigms in Generalization	Fall 2024
NTT Research at Harvard University Research Intern, PHI Lab and CBS Mentor: Dr. Hidenori Tanaka	May'24 - Aug'24
ISI Kolkata Visiting Researcher, CVPR Unit Mentors: Prof. Saumik Bhattacharya & Prof. Umapada Pal	June'20 - June'21
Northwestern University Undergraduate Intern, SN Bose Scholar Mentor: Prof. Yuan Yang	May'19 - July'19

PUBLICATIONS AND PREPRINTS

On Generalization of Spectral Gradient Descent: A Case Study on Imbalanced Data B. Vasudeva* , P. Deora*, C. Thrampoulidis	HiLD Workshop@ICML'25
Latent Concept Disentanglement in Transformer-based Language Models G. Hong*, B. Vasudeva* , V. Sharan, C. Rashtchian, P. Raghavan, R. Panigrahy	Submitted HiLD Workshop@ICML'25
The Rich and the Simple: On the Implicit Bias of Adam and SGD B. Vasudeva , J. W. Lee, V. Sharan, M. Soltanolkotabi Also as <i>Implicit Bias of Adam vs Gradient Descent in One-Hidden-Layer NNs</i> in <i>M3L Workshop@NeurIPS'24</i> .	NeurIPS 2025
In-Context Occam's Razor: How Transformers Prefer Simpler Hypotheses on the Fly P. Deora, B. Vasudeva , T. Behnia, C. Thrampoulidis Also as <i>Can Transformers Learn Tasks of Varying Complexity In-context?</i> in <i>SCSL Workshop@ICLR'25</i> .	COLM 2025 MOSS Workshop@ICML'25 (Oral)
Implicit Bias and Fast Convergence Rates for Self-attention B. Vasudeva* , P. Deora*, C. Thrampoulidis	TMLR 2025 BGPT Workshop@ICLR'24
Transformers Learn Low Sensitivity Functions: Investigations and Implications B. Vasudeva* , D. Fu*, T. Zhou, E. Kau, Y. Huang, V. Sharan Also as <i>Simplicity Bias of Transformers to Learn Low Sensitivity Functions</i> in <i>BGPT Workshop@ICLR'24</i> .	ICLR 2025
Mitigating Simplicity Bias in Deep Learning for Improved OOD Generalization and Robustness B. Vasudeva , K. Shahabi, V. Sharan	TMLR 2024 SCIS Workshop@ICML'23
Fast Test Error Rates for Gradient Methods on Separable Data P. Deora*, B. Vasudeva* , V. Sharan, C. Thrampoulidis	ICASSP 2024 HiLD Workshop@ICML'23

Compressed Sensing MRI Reconstruction with Co-VeGAN: Complex-Valued Generative Adversarial Network
B. Vasudeva*, P. Deora*, S. Bhattacharya, P. M. Pradhan WACV 2022

LoOp: Looking for Optimal Hard Negative Embeddings for Deep Metric Learning ICCV 2021
B. Vasudeva*, P. Deora*, S. Bhattacharya, U. Pal, S. Chanda

Structure Preserving Compressive Sensing MRI Reconstruction using Generative Adversarial Networks
P. Deora*, **B. Vasudeva***, S. Bhattacharya, P. M. Pradhan CVPR Workshops 2020

Multi-Phase Locking Value: A Generalized Method for Determining Instantaneous Multi-frequency Phase Coupling Elsevier Biomedical Signal Processing and Control
B. Vasudeva, R. Tian, D. H. Wu, S. A. James, H. H. Refai, L. Ding, F. He, Y. Yang

Efficient Implementation of LMS Adaptive Filter based FECG Extraction on an FPGA
B. Vasudeva, P. Deora, P. M. Pradhan, S. Dasgupta IET Healthcare Technology Letters
(*equal contribution)

AWARDS AND ACADEMIC ACHIEVEMENTS

- **Financial Assistance** for attending ICLR'25 2025
- USC **WiSE travel grant** for attending ICML'23 and NeurIPS'24 2023, 2024
- Selected for **EEML** and **CMMRS** Summer Schools 2021
- **Singhal's Tech. for Society Award** for best undergraduate thesis at institute level 2020
- **Viney K. and Sunita Jain Award** for academic excellence, IIT Roorkee 2020
- **3AI Pinnacle Student of the Year Award** for undergraduate thesis 2020
- **S. N. Bose Scholars Program**, among 50 students selected across India for an internship in the US 2019
- Third position, **International Robotics Challenge** at Techfest'17, IIT Bombay 2017
- Secured IIT JEE Advanced **All India Rank 978**, 99.5 percentile 2016
- Secured IIT JEE Mains **All India Rank 336** among 1.2 million candidates 2016
- Awarded **Kishore Vaigyanik Protsahan Yojana (KVPY)** science fellowship by IISc Bangalore 2015
- Awarded **National Talent Search Examination (NTSE)** scholarship by the Government of India 2014

SERVICE

- **Notable Reviewer:** ICLR 2025
- **Top Reviewer:** NeurIPS 2023
- **Reviewer (Conferences):** NeurIPS (2023, 2024, 2025), ICML (2024, 2025), ICLR (2024, 2025, 2026), COLM (2025), AISTATS (2025)
- **Reviewer (Workshops):** MOSS@ICML'25, HiLD@ICML'25, XAI4Science@ICLR'25, M3L@NeurIPS'24, TF2M@ICML'24, HiLD@ICML'24, SCIS@ICML'23
- **Volunteer:** ICML 2021, ICLR 2021

TEACHING AND MENTORING EXPERIENCE

- **Teaching**
 - TA for CSCI699: Theory of Machine Learning in Fall'23 at USC
 - TA for CSCI567: Machine Learning in Fall'22 at USC
- **Mentoring**
 - Jung Whan Lee (USC MS), Elliott Kau (USC BS-MS), Kameron Shahabi (USC BS-MS → UW PhD)
 - Youqi Huang: SURE'23 and CURVE'23-24 research programs (USC BS), Luke Pratt: SHINE'22 summer research program (K-12 STEM outreach), Devin Martin: SURE'22 summer research program (USC BS)

TALKS

- The Rich and the Simple: On the Implicit Bias of Adam and SGD
ICTP 6th Youth in High-Dimensions Workshop July 2025
- Transformers Learn Low-Sensitivity Functions: Investigations and Implications
Seminars on Formal Languages and Neural Networks (FLaNN) June 2025
- EnCORE Workshop on Theoretical Perspectives on LLMs at UCSD March 2025