

DISHA SHUR

disha.shur@gmail.com - [dishashur.github.io](https://github.com/dishashur)

Research interests: Scalable computational framework for interpretable and low-dimensional representation of developmental series with a current focus on single-cell sequencing with accuracy guarantees.

Education

Purdue University - Ph.D., Computer Science	2022 -
Advisor: Prof. David F. Gleich	
Purdue University - M.S., Electrical and Computer Engineering	2020 - 2022
Thesis: PageRank based representations, advised by Prof. David F. Gleich	
IIST, Shibpur - B.Tech., Electronics and Telecommunication Engineering	2014-2018

Publications

* denotes equal contribution

1. **A flexible PageRank-based graph embedding framework closely related to spectral eigenvector embeddings**
TLDR YouTube Video [here](#)
*Disha Shur**, *Yufan Huang**, *David F. Gleich*
Accepted, available on [this link](#).
2. **Smoothed analysis of leader election in distributed networks**
*Anisur R. Molla**, *Disha Shur**
Accepted and presented at [The 22nd International Symposium on Stabilization, Safety, and Security of Distributed Systems \(SSS 2020\)](#).
3. **Two Dimensional Microwave Imaging Using a Divide and Unite Algorithm**
Disha Shur, *K. Yaswanth*, *Uday K. Khankhoje*
Presented at [2017 Progress in Electromagnetics Research Symposium - Fall \(PIERS - FALL\)](#), Nov,2017, published in *IEEE Xplore*.

Skills

Julia, Python, MATLAB, PyTorch, TensorFlow, LaTeX, C++

Relevant Projects and Research Experience

Research on topological representation technique	May'24 -
Developing topology based interpretable representation technique with theoretical guarantees.	
Research on Language model explainability	Jul'23 -
Experiments to understand in-context learning including topological representation of transformer weights for different class of prompts.	
Julia package for GTDA	Jan'23 -
Wrote a preliminary Julia version of Graph-based Topological Data Analysis algorithm (GTDA)	
Project on Graph Explainability, Purdue	Aug'22 - Nov'22
<ul style="list-style-type: none">• Course project with Prof. Pan Li• Proposed a framework that adapts GSAT, originally meant for model interpretability on graph classification tasks, to node classification tasks.	
Research on Personalized PageRank embedding, Purdue	Jan'21 - Apr'22
<ul style="list-style-type: none">• Research Assistant with Prof. David F. Gleich• Developed a node embedding algorithm for graphs and hypergraphs with localized runtime proportional to seedset volume based on personalized PageRank.	
Project on Bidirectional Encoder Representations from Transformers (BERT), Purdue	Aug'20-Dec'20
<ul style="list-style-type: none">• Course project with Prof. David I. Inouye• Analyzed attention maps produced by the BERT model that verified and contrasted the attention mechanism with natural mechanism and semantic dependencies.	
Research on Location-Based Social Networks (LBSNs), IIT Hyderabad	Aug'20 - Dec'20
<ul style="list-style-type: none">• Interned with Prof. Srijith P.K at the Brain group• Compared the results using random walk based procedure and neural network, for location prediction on LBSNs and attempted to eliminate the use of social network information by proposing the dataset as a k-uniform hypergraph.	
Research on Smoothed Analysis of Distributed Algorithms, ISI Kolkata	Jan'20 - Aug'20
<ul style="list-style-type: none">• Interned with Prof. Anisur Molla• Developed an $O(\frac{\log n}{\sqrt{\epsilon}})$ round randomized and $O(\frac{\log^2 n}{\sqrt{\epsilon}})$ deterministic algorithm for smoothed analysis of distributed leader election problem.	

Research on Reconstruction with sub-Nyquist Sampling, IISc	Feb'19-Sep'19
<ul style="list-style-type: none"> Interned with Prof. Chandra Murthy Worked on reconstruction of field using few distribution-unaware samples using non-convex optimization techniques, majorization-minimization algorithm and finite rate of innovation. 	
Research on Image Reconstruction in the Microwave frequency, IIT Madras	May-Jul'17, Jul-Dec'18
<ul style="list-style-type: none"> Worked with Prof. Uday K. Khankhoje Developed an adaptive resolution based algorithm for reconstructing images developed via electromagnetic scattering in the microwave frequency range with application to tumor detection. 	

Teaching Experience

Graduate Teaching Assistant (TA), CS573: Data Mining, Purdue	Aug'22-Dec'22
TA with Prof. Rajiv A. Khanna for a class of 80 graduate students Conducted doubt sessions, graded assignments and prepared theoretical and programming solutions on a broad range of topics and tools used for data mining.	
Graduate Teaching Assistant (TA), ECE301: Signals and Systems, Purdue	Aug'21-Dec'21
TA with Prof. Fengqing Zhu for a class of 119 undergraduate students Aided with hiring a grader, conducted review classes and doubt sessions, graded assignments and prepared solutions for a first class on concepts in signals and systems.	

Volunteering Experience

Reviewer	
4th workshop on Graphs and Complex structures for Learning and Reasoning	Dec'23
18th Women in Machine Learning (WiML) workshop, NeurIPS 2023	Nov'23
Supervolunteer, WiML, NeurIPS 2021	Nov'21-Dec'21
Managed events at GatherTown for virtually hosting the workshop. Managed 3 volunteers spread across 3 events - 2 talks and 1 social, along with other postings and announcements.	
Volunteer, WiML, NeurIPS 2020	Nov'20-Dec'20
Blogged on the conference activities, particularly on talks, Mentored a poster presentation	

Co-curricular

Google Computer Science Research Mentorship Programme(CSRMP), 2021-B	Sep'21
Mentored by Google engineers and scientists on research pipelines and determining career pathway in Computer Science research.	
Global Alumni Association of Bengal Engineering and Science University (GAABESU)	Sep'17
Travel grant to Nanyang Technological University (NTU), Singapore to present my work on Microwave Imaging, by the alumni association of IEST (Formerly BESU).	
Summer Research Fellowship Programme (SRFP)	May'17
Research fellowship at IIT Madras for the summer of 2017.	
West Bengal Joint Entrance Examination(WBJEE)	June'14
Achieved a rank of 825 which stands at 99.5 percentile in WBjee , 2014.	
Army Welfare Education Society (AWES)	Mar'13
Education Scholarship Scheme for Serving Army Personnel (ESSA) was conferred by AWES for academic records.	

Other Interests

Watercolor Painting, Poetry, Exploring different languages