

EDUCATION

- **Ph.D. in Computer Science at Virginia Tech (2023-Present)**
Coursework: Security Risks of Generative AI; Scientific Knowledge-Guided Machine Learning.
- **M.Sc. in Data and Knowledge Engineering at Otto-von-Guericke Universität Magdeburg (2016-2019)**
Selected Coursework: Data Mining; Frequent Pattern Mining; Recommender Systems; Bayesian Networks; Advanced Databases; Distributed Data Management; Machine Learning; Information Retrieval.
- **B.Tech. in Computer Science and Engineering at GITAM University, India (2009-2013)**
Selected Coursework: Probability & Stats; Data Mining; Artificial Intelligence; Data Structures & Algorithms; Discrete Math; Databases; C, C++, Java & Unix Programming; Computer Architecture; Operating Systems.

PUBLICATIONS

- **Sindhuja Madabushi** and Parameswaran Ramanathan, “[Two-Cloud Private Read Alignment to a Public Reference Genome](#),” *Privacy Enhancing Technologies Symposium (PETS) 2023*.
- **Sindhuja Madabushi**, “[Graph Sketches and Embeddings: A Study of their Applications in Graph Databases](#),” *Master’s Thesis*, Faculty of Computer Science, Otto-von-Guericke-Universität Magdeburg, 2019.
- **Sindhuja Madabushi**, “Novel Network System with Miscellaneous Features,” *Bachelor’s Thesis*, Department of Computer Science and Engineering, GITAM University, 2013.

RESEARCH PROJECTS

- **Is this for real? Hallucination Analysis in LLMs (2023)**
 - Designed appropriate prompts to input to GPT3 using API calls.
 - Designed a QA dataset by perturbing LLM parameters such as temperature and top-p sampling.
 - Incorporated metrics such as LLM self-evaluation and exact match for hallucination detection.
- **Knowledge-Guided Protein-Protein Interaction Prediction (2023)**
 - Designed architectures using equivariant graph neural networks for PPI prediction.
 - Worked with ESM, MSA Embeddings and PDB files for protein graphs.
 - Incorporated scientific knowledge from protein structures and leveraged equivariant GNNs to understand their influence on PPI prediction.
- **Two-Cloud Private Read Alignment to a Public Reference Genome (2020-2022)**
 - Designed a *scalable cloud-based algorithm for private alignment* of DNA sequence data.
 - Worked with the whole human genome and high volumes of Next Generation Sequencing (NGS) data.
 - Evaluated scalability and accuracy using RNA-Seq, CHIP-Seq, SAMtools, and SimLord.
 - Experienced with data privacy techniques such as differential privacy and secure multi-party protocols.
- **Graph Sketches and Embeddings: A Study of their Applications in Graph Databases (M.Sc. Thesis)**
 - Performed a comprehensive study on graph sparsification and graph representation learning methods.
 - Evaluated effect of graph sparsification on graph properties of social network data such as page rank, community detection, and betweenness centrality.
 - Examined effect of graph embedding methods such as *DeepWalk*, *Node2Vec*, and *GNNs* on node similarity.
 - Created stored procedures for different graph queries in the Neo4j graph database to evaluate results.
- **Evaluation of High-Performance Application-level Caching of Generic Graph Structured Data (2018)**
 - Implemented several hashing techniques and graph algorithms in Java.
 - Evaluated the effects of these hashing techniques on graph properties using SNAP datasets.
- **Supporting Non-Relational Models with Flexible Schema Storage (2017)**
 - Created mappings between NoSQL and relational data stores to tile-based architectures.
 - Evaluated get and count queries for these mappings.

- **Novel Network System with Miscellaneous Features** (Bachelor's Thesis).
 - Designed a two-step authentication protocol to securely store files on a network disk using Rijndael cypher.
 - Developed a web application to demonstrate my approach.

WORK EXPERIENCE

- **Student Research Intern at PisaSales CRM** (2017-2018)
 - Performed a detailed evaluation study of existing visualization libraries and pitched to senior management a library to integrate with the existing software system.
 - Implemented visualization elements such as heat maps, chord diagrams, Venn diagrams, and hive plots.
 - Designed and integrated a *flexible visualization widget* for customer sales data onto a graphical dashboard.
- **Software Engineer 1 at Innominds Software** (2015-2016)
 - Created *versatile UI elements* such as chatbots, visualizations, and navigation menus for BenchmarkONE's Customer Relationship Management and Sales Automation toolkit.
- **Systems Engineer at Tata Consultancy Services** (2013-2015)
 - Developed a communication portal using C# and Microsoft SQL for Microsoft India's weekly newsletters.
 - Migrated the portal to the cloud based on the client's specifications.
 - Responsible for client communication and maintaining content on the cloud.

TECHNICAL SKILLS

- **Languages:** Python; C#; Java; SQL; JavaScript; \LaTeX
- **Libraries:** PyTorch; TensorFlow; Scikit-learn; NumPy; Matplotlib; Pandas
- **Environments & IDEs:** Linux; Git; Google Cloud Platform; MPI; Cluster Computing; Jupyter Notebook
- **Databases:** Neo4j; MongoDB; Cassandra; Redis; MySQL
- **Frontend and Visualization:** SharePoint; HTML5; CSS3; Bootstrap; d3.js; Dimple.js; Gephi

AWARDS AND SERVICE

- **ACSAC Conferenceship Travel Award** (2023). Received travel award to attend the 2023 Annual Computer Security Applications Conference.
- **Volunteer at STEM Santa Fe** (2022). Led the team that mentored ~ 100 school girls for the "Pathways for Girls conference" held in Santa Fe, NM in November 2022.
- **Master's Mentor at Otto-von-Guericke Universität** (2017-2018). Organized social events for 100 incoming Master's students. Mentored international students on adapting to changes in cultural environments.
- **Organizer at Magdeburg Indians** (2017-2018). Organized a Summer Fest for about 1000 participants. Led the cultural team that organized several other annual cultural events.
- **Awards and Other Achievements** (2004-2013). Top 10 ranks in the Indian Math Talent Search Exam; Degree in South Indian classical music; Several prizes in the performing arts.