Mansi Sakarvadia

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EDUCATION

University of Chicago, Chicago, Il — Expected 2027
Ph.D. Computer Science, Advisor: Dr. Ian Foster, Dr. Kyle Chard

University of North Carolina at Chapel Hill, Chapel Hill, NC — 2019 - 2022
B.S. Computer Science, B.S. Mathematics, Minor in Environmental Studies and Science — **GPA:** 3.9

HONORS AND AWARDS

IEEE SaTML $1000 Travel Award (2023)
Computational Science Graduate Fellowship (2022- 2026)
University of Chicago Crerar Fellowship (2022)
Honors Student, University of North Carolina Chapel Hill (2021-2022)
Marine Sciences Field Site Student, UNC Institute of Marine Sciences (2021)
Eleanor Barnes Study Abroad Scholarship Recipient (2021)
Phi Beta Kappa Honor Society Member (2021)

RESEARCH EXPERIENCE

Research Aide — Sept 2021 - May 2022

Argonne National Laboratory, Leadership Computing Facility
Advisors: Dr. Kyle Felker, Dr. Taylor Childers

Project: Vision Transformers Infrastructure on High Performance Systems
Modernized machine learning pipeline for image reconstruction work at Advanced Photon Source at ANL by replacing legacy convolution-based neural networks with optimized vision transformer-based architectures with distributed training capability; demonstrated elevated task accuracy utilizing vision transformers. Additionally, built a set of distributed training and benchmarking utilities for vision transformer models targeting several supercomputers (e.g.Theta, Polaris) and next-generation AI hardware (e.g. SambaNova, Cerebras).

Summer Research Intern — June 2021 - Aug 2021

Argonne National Laboratory, Leadership Computing Facility
Department of Energy, Science Undergraduate Laboratory Internships
Advisors: Dr. Kyle Felker, Dr. Taylor Childers

Project: FLOPs-Aware Deep Learning
Studied construction of neural networks that optimize peak FLOPs on a given architecture and measure the impact on prediction performance and time to model convergence. Explored novel strategies for batching, layer decomposition, and model parallelism to maximize single device throughput for training

and inference. Established clear methodology to scale neural networks to enable higher hardware utilization. Showed that high-FLOPs networks had little to no degradation on model accuracy.

Undergraduate Research Assistant Aug 2021 - May 2022
Colin Raffel's Research Group
University of North Carolina, Computer Science Department
Advisor: Dr. Colin Raffel

Project: Natural Language Processing: Model Distillation
Conducted experiments for a deep learning model distillation project which established a consistent methodology to map large pre-trained neural network models onto smaller pre-trained models while preserving model performance after fine tuning for downstream tasks. Focused on building model-calibration mechanisms to ensure usefulness of knowledge distillation despite unique data-preprocessing pipeline for various pre-trained models.

Research Intern Aug 2021 - Dec 2021
Marine Robotics and Remote Sensing Lab
Duke University Marine Lab
Advisor: Dr. David Johnston

Project: Deep Learning Pose Prediction on Drone Imagery of Whales
Developed a deep learning framework for pose prediction on drone videos of whales. Project has provided animal behavioral scientists with a quantifiable mechanism to track and predict an animal's movements and conduct further statistical behavioral analysis.

Research Intern June 2019 - Aug 2021
Neuro Image Research Analysis Laboratories (NIRAL)
University of North Carolina, Computer Science Department
Advisors: Dr. Martin Styner, Dr. Juan Perieto

Project: Computational Image Processing and Biostatistics for Global Extra-Axial Cerebrospinal Fluid (EA-CSF) Investigation (2019-2021)
Investigated elevated EA-CSF levels in infants as a potential biomarker for atypical neurological development. Established a physiological difference in EA-CSF volumes in twins versus non-twin infants. Established the significant adverse role of elevated EA-CSF at infancy in a child's performance in a battery of behavioral, cognitive, and emotional tests administered at age 1 and 2.

Project: Multiview Medical Deep Learning: FlyBy CNN (2020-2021)
FlyBy is a software that aims to capture 2D views from 3D objects and use the generated image sequences to train deep learning algorithms or make inference once the model is trained. Extended functionality functionality of FlyBy software pipeline to generate and classify image sequences of infant brain MRIs.

SERVICE

IEEE SECON reviewer (2023)

TEACHING

Computer Organization (COMP 311) Teaching Assistant Jan 2021-Aug 2021
University of North Carolina, Computer Science Department
Lead homework and quiz creation team; planned course content, assignments, and schedules; created and grades homework assignments, labs (software and hardware components), and assessments; hosted office hours.

Physics with Advanced Topics Teaching Assistant 2018-2019
North Carolina School of Science and Mathematics, Physics Department
Graded physics homework, quizzes, and labs; assisted students with homework and class material during nightly tutorials; led review sessions.

PRESENTATIONS

UNC Chapel Hill Institute for Marine Sciences and Institute for the Environment Morehead City Field Site Independent Research Symposium, December 2021. Sakarvadia, M. "Deep Learning Based Pose Prediction and Statistical Behavioral Analysis of Blue Whales" (presentation)

Institute of Marine Sciences Undergraduate Capstone Presentation Morehead City Field Site, December 2021. Sakarvadia, M; et al. "Ecological Functions and Ecosystem Services of Overwash Ponds on North Core Banks, NC - Geomorphology & Hydrology" (technical report & presentation).

Learning of the Lawn Event, Virtual, Argonne National Labs, August 2021. Sakarvadia, M; Felker, K; Childers, T. "FLOPs-Aware Deep Learning" (presentation).

Perinatal Preterm and Pediatric Image Analysis workshop at the Medical Image Computing and Computer Assisted Interventions conference, 2020. Sakarvadia, M; et al. "Atypical Neonate Extra-Axial CSF is Associated with Reduced Cognitive Development at Age 1 and 2" (abstract & poster).

State of North Carolina Undergraduate Research and Creativity Symposium, 2020. Sakarvadia, M; et al. "Atypical Neonate Extra-Axial CSF is Associated with Reduced Cognitive Development at Age 1 and 2" (abstract & poster).

PROFESSIONAL EXPERIENCE

Private Tutor 2016-Present
Subjects: college-level Micro and Macro Economics to University Students, elementary level math through Pre-Calculus to students K-12, reading comprehension, vocabulary and writing to elementary students.

Residential Computing Consultant Aug 2019-Aug 2020
ResNet, University of North Carolina Chapel Hill

Provided in-house technical support for residential communities on campus through the ResNET program. Assisted students with different needs concerning their devices, networking, software, and any other technical issue. Participated in educational technology fairs campus-wide focused on technical education and exploration. Assisted with technical setup for housing events, as well as large on-campus technical events.

TECHNICAL SKILLS

Computational Skills
Profiling and benchmarking processes on high performance computers
Deep Learning, Machine Learning
Computational Image Processing
Data modeling and statistical analysis
Python, C, Java, Bash/Shell scripting, Linux/UNIX Environment

Languages
Hindi/Urdu (Intermediate)
Gujarati (Native Proficiency)