

ROHIT PAL SINGH

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EDUCATION

University of Cincinnati

PhD Computer Science Advisor : Philip A. Wilsey
Department of Electrical Engineering and Computer Science
Graduate Certificate in Statistical Science

August 2019 - August-2024

Overall GPA: 3.81/4

University of Florida

MS Computer Science Advisor : Markus Schneider
Department of Computer & Information Science & Engineering

August 2011 - June 2013

Overall GPA: 3.67/4

Jaypee University of Information Technology, India

B. Tech
Department of Computer Science and Engineering GRE 2011 : 321 GRE 2017: 307

August 2007 - 2011

Overall GPA: 8.3/10

RELEVANT COURSES

Bayesian Statistics, Statistical Machine Learning, Statistical Computing, Applied Linear Algebra, Time Series, Advanced Algorithms, Machine Learning, Deep Learning, Intelligent Systems, Big Data Analytics, Introduction to Functional Genomics, Applied Geometric and Computational Topology. Quantum Computing.

RECENT PUBLICATIONS

Resource Efficient Delaunay Triangulation for Higher Dimensional Topological Studies. IEEE International Conference on Data Mining 2024.

Piecewise Computation of Persistent Homology. IEEE International Conference on Big Data 2024.

Constructing ϵ -Constrained Sparsified β^s -Complexes using Space Partitioning Trees. IEEE International Conference on Data Mining 2024.

Compact Boundary Matrix from a Polytopal Complex for Computing Persistent Homology. IEEE International Conference on Big Data 2023.

Generating High Dimensional Test Data for Topological Data Analysis. International Symposium On Benchmarking, Measuring And Optimizing (Bench 2023).

Distributed Computation of Persistent Homology from Partitioned Big Data. IEEE International Conference on Cluster Computing 2021.

Polytopal Complex Construction and Use in Persistent Homology. IEEE International Conference on Data Mining 2022.

Persistence Homology of Proximity Hyper-Graphs for Higher Dimensional Big Data. IEEE International Conference on Big Data 2022.

Topological Study of β -Sparsified d -Uniform Hypergraph Based Simplicial Complexes. Journal of Mathematics (MDPI) 2026.

A Survey of Optimization Methods for Topological Complexes in the Computation of Persistent Homology. IEEE Transactions on Knowledge and Data Engineering (In Progress).

RESEARCH EXPERIENCE

University of Cincinnati

Graduate Student

August 2019 - December-2024

- Dr. Philip Wilsey, Department of Computer Science
- Idea : Topological Data Analysis is a technique to understand the nature of data with respect to evolving topology over time. This is quite helpful to have a better insight/understanding of high dimensional data. Persistent homology is a technique in TDA to extract meaning full features from data. These features can be used to enhance machine learning algorithms.

Research Project

- Distributed Computation of Persistent Homology, Sparsified Topological Spaces,
- Optimizing Complex Construction.
- Optimizing Computation of Delaunay Triangulation for higher dimensional spaces.
- Polytopal Complexes: a Succinct Representation of Topological Space.
- Piecewise Persistent Homology Computation
- Generation High Dimensional Test Data for Topological Data Analysis

Department of Neonatology, Perinatal and Pulmonary Biology, CCHMC,Cincinnati Research Assistant at Xu Lab

January 2021 - January 2022

- Worked on two project "Alveolar Capillary Dysplasia (ACD)" and "Mouse Lung Development".
- ACD Project involved Quality Control, Cell Clustering based on Marker and DE Genes, Cell Annotation and Trajectory inferences. Comparison of ControlUntreated vs SimulatedTreated conditions. Identification of Driver Genes and Condition likelihood.
- Mouse Time Series project involved Lineages/sub types clustering across time stamps, Identification of relevant clusters for particular time/lineage/sub-type of interest e.g. gastrulation at PND 7. Pathway analysis to identify important biological processes and activated pathways. Mapping pathway genes back to lineages and sub-types to reach important conclusions.
- Used python, R Studio programming languages and explored various libraries to infer and understand RNA-seq and Mouse time course data.
- Python Libraries viz : MELD, ScVelo, Trajectory Net, Cell Rank, PHATE, Scanpy.
- R packages viz : Seurat, Monocle, Tempora, Time Course, ANOVA.
- Explored tools for single cell analysis : LGEA, Pathway analysis using IPA, ToppGene, Toppcluster, Gene Ontology, STEM and DREM.
- Explored data science literature on oncology especially Topological Data Analysis(TDA) and Persistent Homology(PH).

Simulation Centre (Procter & Gamble), University of Cincinnati

Fall 2020 and 2023

Research Assistant with Mark Maupin

- Research Assistant for Procter and Gamble on a project "Self Preserving Formulations".
- Developed Applications in R and R-shiny.
- Implemented Data Science and Machine Learning models for microbial growth rates and kill rates under different environment conditions(pH,Temperature,water activity etc.) and under the effect of surfactants, acids and chelants.
- Designed Molecular Formula Descriptor based on properties of the different compounds.
- Fem Care Project with **Oya Aran**
- Worked on Image processing to identify optimal pad shapes.
- Worked on segmented images to extract statistics regarding stain shapes etc.

IIT Delhi

June-July 2017

FACULTY SUMMER RESEARCH FELLOWSHIP

High Performance Computation

- CEP/QIP Principle Investigator :: Subodh Kumar
- Implemented a radial frequency distribution function to find a correlation between the molecules of the substance under consideration.
- Graphic Processing Unit (GPU) based program are implemented to exploit parallelism in codes specific to molecular simulations trajectories and data analysis, hence reducing the time required.
- Understanding the threads addressing in CUDA based GPU applications and implementations for effective computation.
- Implemented openMP, MPI versions of the code.

University of Florida

May 2012 - March 2013

GRADUATE RESEARCH ASSISTANT

- Dr. Markus Schneider, Department of CISE Research Funding **Northrop Grumman**
- **Algorithm Designed**
- Efficient Algorithms for Digital Contour Extraction of Iso-intensity Regions From a Multi-Intensity 2D Grid.
- Parallel Traversal Approach to Efficiently Extract Contours Using a List Structure Whose Nodes Represents Regions.
- A Generic Linked List Implementation for Region Data Type.

TEACHING EXPERIENCE

JUIT, Wagnaghat

July-2026 to Present

Assistant Professor(Senior Grade) - Computer Science Department

- Data Structures
- Object Oriented Programming in Java
- Optimizations in Machine Learning

UPES, Dehradun

July-2025 to July 2026

Assistant Professor(Selection Grade) - Computer Science Department

- Algorithm Design and Analysis.
- Linux Lab
- Data Structure and Algorithms
- Statistics and Data Science

University of Wisconsin, Milwaukee

Fall-2024 to April-2025

Teaching Faculty II - Computer Science Department

- Data Structures and Algorithms.
- Algorithm Design and Analysis.
- Scientific Data Visualization.
- Fundamentals of Computer Graphics.

UC Libraries

Summer-2022

Graduate Assistant - Julia and Swift Programming Workshops

- Conducting Introductory Workshops for Swift and Julia Programming Languages.
- Workshops are offered on alternating weeks for Julia and Swift.

University of Cincinnati

Spring 2022 and 2023

Graduate Teaching Assistant - Programming for ECE/Computer Science I(EECE1080C/CS1021C).

- Delivered lectures, assignments, quizzes etc. to the class of around 80 students.
- Involved in course delivery through ZyBooks.

Teaching Assistant - Operating Systems

Fall-19, Spring-20, Fall-23

- Evaluated student Assignments and Exams. Frequently involves lecture deliveries.

JIIT, Noida, India

July, 2013 to 2019

Lecturer

Concurrent Programming (U.G.), Geometric Combinatorics (M.Tech), Theoretical Foundations of Computer Science (U.G.), Design Of Algorithms (U.G.), Operating Systems (U.G.), Data Structures (U.G.), Fundamentals of Algorithms (U.G.), Advance Programming and Data Structures (M. Tech)

- Taught core computer science subjects as follows:
 1. Concurrent Programming (U.G.)
 2. Geometric Combinatorics (M.Tech)
 3. Software Development Fundamentals (U.G.)
 4. Theoretical Foundations of Computer Science (U.G)
 5. Analysis and Design Of Algorithms (U.G)
 6. Operating Systems (U.G.)
 7. Data Structures (U.G.)
 8. Advance Programming and Data Structures (M. Tech)

SELECTED ACADEMIC PROJECTS

Compute intensive framework Development for Virtual Reality. Developed tools to simulate and evaluate the rover material tolerance in outer-space. Dynamic correlations for trajectories are compared using two particle correlation as well as three particle correlation Tech: OpenMP, MPI and GPU.

Interpolating and Capturing weather history in spatial temporal databases. Compute Weather Phenomenon Association using Pattern Recognition. Creating a Moving Object Database(MODB) capable of matching 3D objects across time-moving object that change topology over time. Tech: C++, Spatial Databases.

Transfer Model Learning for time series time analysis. Comparative analysis of ARIMA, AR and MA models to check for prediction accuracy. Tech: R, SAS and Python.

Build a convolutional neural network for deer's_frog's_truck's dataset. Applied GradCAM to check focused pixels. Applied VNN and Monte Carlo Uncertainty quantification methods to interpret the results.

Down Stream Analysis for Lung Carcinomas. Developed a tool to identify DEG and activated pathways triggered. Tech: Seurat, MELD, Cell Rank, Trajectory Net, Monocle, LGEA, ToppCluster, ToppGene, Gene Ontology, ANOVA, STEM and DREM

VOLUNTEER EXPERIENCE

Committee Head for Joint Engineering Co-op Institute (JCI) program. Planning and executing event for JCI exchange students

Technical team member for makeuc.io, a 24-hour IEEE hackathon. Provided technical assistance in developing hackathon content and website design

Faculty coordinator for the annual technical festival 'Cybersrishti' at IIIT. Organizing and content creation for the event.

Delivered talk to undergrad students on "Data Science Beyond Clustering" Talk about future research directions in the field of Data Science

Organizing member of UC Bhakti Yoga Club Organize spiritual uplifting sessions to help students relieve stress.

AWARDS AND HONOURS

IRiS fellowship from college of Arts and Sciences, University of Cincinnati for year 2023-24.

Herbold Fellowship recipient 2021-22 at the University of Cincinnati.

Research Assistantship with full funding offered by Dr. Markus Schneider.

NSF Award for contributing to NSF Funded Project "SPAL3D – Design and Implementation of a Type System for Three-Dimensional Spatial Data in Databases "

Achievement Award from University of Florida, Gainesville.

GIA/UGS from University of Cincinnati, Ohio.

Ranked 31st and 106th in Senior Secondary and Matriculation by HPBSE Respectively.

OPERATING SYSTEMS

Linux Distributions, Microsoft Windows XP, Windows VISTA, Windows 7.

PROGRAMMING

Proficient : C++/C , Java , R, R-Shiny, Python

Worked In : SQL, SCALA(Actor Model), OpenMPI, MPI, CUDA, PySpark, Map-Reduce, Matlab,

Tools Used : Valgrind, Adobe Dreamweaver, Netbeans, Macromedia Flash, Eclipse, Tex, Databases, Linux terminal ,GitHub, GitLab, Virtualbox, Anaconda, Office, GDB

COMMUNITY SERVICE AND INTERESTS

Reviewer for

Journal of Parallel and Distributed Computing

Physica A: Statistical Mechanics and its Applications

ACM Transactions on Knowledge Discovery from Data

Interests

Traveling, Reading, Programming, Data Science Enthusiast, Computational Biology, Parallel and Concurrent Computing, Persistent Homology(PH) and Topological Data Science(TDA), Nature Inspired Computing, Software Development.

Last Updated July 30, 2026