Arinjoy Basak

Contact Information

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Research Interests

Data Science, **Big Data Analytics**, Machine Learning, Artificial Intelligence, Application of Analytics to Healthcare and Software Engineering

Affiliation and Roles

Network Dynamics and Simulation Sciences Laboratory, Biocomplexity Institute, Virginia Tech

- Graduate Research Assistant, May 2017 - Present

The Honor Society of Phi Kappa Phi

- Inducted as member, December 2017

Education

Currently a PhD student in the Department of Computer Science, Virginia Polytechnic Institute and State University, Blacksburg, Virginia

- PhD Advisor: Anil Vullikanti
- Current GPA: 3.96/4.00
- Expected to graduate in 2021

Completed Bachelor of Engineering in Computer Science and Technology, Indian Institute of Engineering Science and Technology, Shibpur, West Bengal, India

- Passed in 2016, obtaining First Class with Honours. Final CGPA: 9.45/10.00

Completed Schooling from St. Xavier's Collegiate School, Kolkata, West Bengal, India

- ISC Examination Passed in 2012. Final percentage: 97.5%
- ICSE Examination passed in 2010. Final percentage: 94.2%

Publications

Arinjoy Basak, Jose Cadena, Achla Marathe, Anil Vullikanti, *'Detection of Spatio-Temporal Clusters of Opioid Users with Network Scan Statistics: A Multi-State Analysis',* submitted to the Journal of Medical Internet Research (JMIR).

Jose Cadena, **Arinjoy Basak**, Anil Vullikanti, Xinwei Deng, *'Graph Scan Statistics With Uncertainty',* accepted for presentation at the *Thirty-Second AAAI Conference on Artificial Intelligence (AAAI-18).*

Arinjoy Basak, Clark Cuccinel, Alexandra Cummings, Jose Cadena, Andrew Warren, Rebecca Wattam, Allan Dickerman, Anil Vullikanti, *'Finding Coordinated Expression Motifs in RNA-SEQ Data',* presented at the *18th International Conference on Systems Biology (ICSB 2017).*

Arinjoy Basak, Asit Kr. Das, *'A Graph Based Feature Selection Algorithm Utilizing Attribute Intercorrelation',* accepted for presentation in the *The 7th IEEE Annual*

Information Technology, Electronics and Mobile Communication Conference (IEEE-IEMCON 2016), and for publication in the IEEE Xplore Digital Library. The paper received the **Best Paper in Data Mining Award** in the conference.

Arpan Sen, Shrestha Ghosh, **Arinjoy Basak**, Harsh Parshuram Puria, Sushmita Ruj, *'Achieving Data Survivability and Confidentiality in Unattended Wireless Sensor Networks',* accepted for presentation in *The 29th IEEE International Conference on Advanced Information Networking and Applications (AINA-2015)* and for publication in IEEE CPS Conference Proceedings.

Teaching Experience

Spring 2017 Teaching Assistant and Guest Lecturer, Intro to Python CS 1064
Fall 2016 Teaching Assistant, Intro to Python CS 1064

Scientific Research Experience and Project Work

Fall 2017 - Present
Graduate Research Assistant (August 2017 - Present)
Focus: a) Dense subgraph mining in networks
b) Pattern Detection in Opioid Uses
c) Parallel/Distributed Algorithms for Scan Statistics
Advisor: Dr. Anil Vullikanti
NDSSL, Biocomplexity Institute,
Virginia Tech, Blacksburg, Virginia

Spring 2017 - Summer 2017
Graduate Research Assistant (March 2017 - August 2017)
Title: Graph Scan Statistics With Uncertainty
Advisor: Dr. Anil Vullikanti
NDSSL, Biocomplexity Institute,
Virginia Tech, Blacksburg, Virginia

Summer 2017
Graduate Research Assistant (May 2017 - August 2017)
Title: Finding Coordinated Expression Motifs in RNA-Seq Data
Advisor: Dr. Allan Dickerman, Dr. Anil Vullikanti
NDSSL, Biocomplexity Institute,
Virginia Tech, Blacksburg, Virginia

Fall 2016 - Spring 2017
Work on Software Analytics (August 2016 - February 2017)
Title: Towards Intermediate Integration: A Study of Integration Cycle Lengths in Continuous Integration
Advisor: Dr. Francisco Servant (Asstt. Prof),
SEALAB, Dept. of Computer Science,
Virginia Tech, Blacksburg, Virginia

2016
Final Year Project Work towards fulfilment of B.E. Degree
Title: A Graph Based Feature Selection Algorithm Utilizing Attribute Intercorrelation
Advisor: Dr. Asit Kr. Das (Assoc. Prof),
Dept. of Computer Science and Technology,
Indian Institute of Engineering Science and Technology, Shibpur

2015
Summer internship (9th May to 5th July, 2015)
Title: a) Data Analytics for IITBombayX (based on OpenEdx InSight) - Detection of difficulty regions in lecture videos for students.
b) Blended MOOCs Specification and User Documentation
Advisor: Ms. Sukla Nag (IT Project Manager)
Principal Invesigator: Prof. Deepak B. Phatak
Department of Computer Science and Engineering,

Indian Institute of Technology, Bombay

2014 — Summer internship (22nd May to 18th July, 2014)
Title: Achieving Data Survivability and Confidentiality in Unattended Wireless Sensor Networks
Advisor: Dr. Sushmita Ruj (Asstt. Prof)
Principal Investigator: Bimal K. Roy, Director, ISI
R. C Bose Centre for Cryptology and Security,
Indian Statistical Institute, Kolkata

2014 — 4th Semester Project Work
Title: a) Analysis of Twitter Data using the Quick Reduct Algorithm.
b) Development of an algorithm for dynamic extraction of most relevant features from a dataset using graph based algorithms.
Advisor: Dr. Asit Kr. Das (Assoc. Prof.),
Dr. Saptarshi Ghosh (Asstt. Prof.),
Dept. of Computer Science and Technology,
Indian Institute of Engineering Science and Technology, Shibpur

2013 — 3rd Semester Project Work
Title: Study of Rough Set theory and implementation of the Quick Reduct Extraction Algorithm using Rough Set theory.
Advisor: Dr. Asit Kr. Das (Assoc. Prof.),
Dept. of Computer Science and Technology,
Indian Institute of Engineering Science and Technology, Shibpur

2013 — Summer Project work
Title: a) Simulation of Data Structures: Arrays, Linked Lists, Stacks, Queues and Basic Operations.
b) Development of algorithms for checking graph connectivity, counting circuits,determining paths, obtaining spanning trees.
Advisor: Dr. Asit Kr. Das (Assoc. Prof.),
Dept. of Computer Science and Technology,
Indian Institute of Engineering Science and Technology, Shibpur

Relevant Skills

High Level Languages:	Python, Java, Matlab, R, C, C++, SchemeLISP, Prolog, Verilog HDL, VHDL
Web Technologies:	HTML, CSS, JavaScript, PHP, Django
Database Frameworks:	MySQL, Oracle 10g, PostGIS
Version Control and Documentation:	LaTeX, Git, Inkscape Vector Graphics
Big Data Technologies:	Apache Spark, Apache Hadoop, Apache Hive
Hardware Exposure:	Intel 8085, 8051, Atmega16 (Embedded C)
Machine Learning tools:	WEKA, Gephi

Skills Proficiency

Over 5000 lines:	Python, Java, C, MySQL, HTML
Over 1000 lines:	Apache Spark, C++, SchemeLISP, Prolog, LaTeX CSS
Libraries frequently used:	scipy, numpy, matplotlib, scikit-learn, pandas, seaborn, networkx

Achievements and Leadership Experiences

- Was inducted as a member of the national Honor Society of Phi Kappa Phi on December 5th, 2017. Phi Kappa Phi is a national Honor Society that recognizes

and promotes academic excellence in all fields of higher education and engages the community of scholars in service to others. Graduate students and undergraduate seniors determined by the Registrar to be in the top 10% of their class and undergraduate juniors in the top 7.5% of their class are eligible for membership.

- Conducted guest lectures in the position of Graduate Teaching Assistant for introducing and teaching students to use Python and associated libraries effectively in own work, during Spring 2017, Introduction to Python (CS 1064) course.

- Received the Best Paper in Data Mining Award for paper on 'A Graph Based Feature Selection Algorithm Utilizing Attribute Intercorrelation' presented at the 7th IEEE Annual Information Technology, Electronics and Mobile Communication Conference (IEEE-IEMCON 2016).

- Selected among 90 students to participate in the Eklavya Summer Internship Programme under Dr. D. B. Phatak, Department of Computer Science and Technology, Indian Institute of Technology, Bombay, from 9th May to 5th July, 2015. This project was supported by the MHRD National Mission on Education through ICT undertaken by the institute, and all the R&D contributions made by the students were released in open source. Was also selected Coordinator for the IITBombayX MIS System Specification activity, during May, 2015, where I worked on Use-Case specifications.

- Qualified with team as 1st Runner up in the Zonal Round, and participated in the National Round of the Indo-US Robo League 2014, in the Robotic Arm event, held on 22nd March, 2014, at IIT Bombay, during Aavriti 2014(formerly Aagomani), organised by EESA IIT Bombay, the qualifier for RoboGames, USA — World's Largest Robot Competition (Guinness Book of Records).

- Qualified for the award of the DST Inspire Scholarship - a scholarship awarded by the Department of Science and Technology, Government of India, to students in the top 1 percent in Class XII Board Examinations conducted by CISCE.

- Received the Winner's medal in 9th standard for the best essay in the 9th standard versus 10th standard English Essay Competition held in 2008 in St. Xavier's Collegiate School, Kolkata.

Relevant Graduate Coursework

- ❑ Data Analytics 1 and 2
- ❑ Probability Distribution Theory
- ❑ Statistical Inference
- ❑ Theory of Algorithms
- ❑ Numerical Analysis 1
- ❑ Convex Optimization

Relevant Undergraduate Coursework

- ❑ Data Structures
- ❑ Design and Analysis of Basic and Advanced Algorithms
- ❑ Discrete Structures and Logic
- ❑ Digital Logic
- ❑ Computer Architecture and Organization
- ❑ Programming Paradigms
- ❑ Engineering Mathematics
- ❑ Basic Electrical Engineering
- ❑ Theory of Computation
- ❑ Operating Systems
- ❑ Database Management Systems
- ❑ Compiler Design
- ❑ Computer Networks
- ❑ Microprocessor Based Digital Design
- ❑ Embedded Systems
- ❑ Basic Electronics Engineering

Workshops and Lectures Attended

- Lecture Series and Hands-on Workshop on "Practical Crypto and Security Tools", under Mr. Vijay Kumar, R. C. Bose Centre for Cryptology and Security, as

part of the Summer Internship Program in Cryptology, Indian Statistical Institute, Kolkata, June 2014.

- Attended workshop on Augmented Reality, conducted by Technophilia Systems, in association with Robotics and Computer Applications Institute of USA, held at Indian Institute of Technology, Bombay, on 23rd March 2014, which covered the basics of Augmented Reality using Java and Processing, and utilized the NyARToolkit library, GSVideo plugin, overlaying of 2D and 3D surfaces, markers and MetaIO SDK.

- Attended workshop on the iTouch Robotic Arm, conducted by Technophilia Systems, in association with Robotics and Computer Applications Institute of USA. This workshop was an integral part of the Indo-US Robo League 2013, which is the qualifier for Robogames, USA — World's Largest Robot Competition (Guinness Book of Records).

References

Dr. Anil Vullikanti, Associate Professor (Dept. of Computer Science), Network Dynamics and Simulation Sciences Laboratory, Biocomplexity Institute, Virginia Tech, `vsakumar@vt.edu`

Dr. Allan Dickerman, Research Assistant Professor (Dickerman Research Group), Network Dynamics and Simulation Sciences Laboratory, Biocomplexity Institute, Virginia Tech, `allan@vt.edu`

Dr. Francisco Servant, Assistant Professor, Dept. of Computer Science, Virginia Tech, `fservant@vt.edu`

Dr. Asit Kr. Das, Associate Professor, Dept. of Computer Science and Technology, Indian Institute of Engineering Science and Technology, Shibpur, `akdas@cs.iiests.ac.in`

Dr. Biplab Kr. Sikdar, Head of the Department, Dept. of Computer Science and Technology, Indian Institute of Engineering Science and Technology, Shibpur, `biplab@cs.iiests.ac.in`

Dr. Sushmita Ruj, Assistant Professor, Cryptology Research Group, Cryptology and Security Research Unit, Computer and System Sciences Division, Room No 921, ASU, S.N. Bose Bhavan, Indian Statistical Institute, Kolkata, `sush@isical.ac.in`

Ms. Sukla Nag, IT Project Manager, Department of Computer Science and Engineering, Indian Institute of Technology, Bombay, `sukla80@yahoo.co.in`