

# Ashwin Sekhari\*

CONTACT INFORMATION	Website: <a href="https://ashsek.me">https://ashsek.me</a> Phone: +91 98181 98151	University e-mail: 117CS0263@nitrrkl.ac.in E-mail: ashwinsekhari@gmail.com
INTERESTS	Blockchains, network systems, consensus protocols, cloud computing.	( <a href="#">GitHub</a> / <a href="#">CodeChef</a> )
EDUCATION	<b>National Institute of Technology (NIT) Rourkela, India</b> Bachelor of Technology in Computer Science and Engineering (GPA 8.51/10). Achieved Ex (Excellent) grade in 9 courses, awarded to top 10% of the students. <b>Delhi Public School (DPS), Faridabad, Haryana, India</b> AISSE (CBSE Board) - 10th Grade (GPA 10/10) AISSEE (CBSE Board) - 12th Grade (Score 93.8%)	2017-present   2015 2017
RESEARCH EXPERIENCE	<b>Stanford University, USA</b> Worked at <a href="#">Tse labs</a> at Stanford University with Prof. David Tse. <b>University of Waterloo, Canada</b> Worked with <a href="#">Sirius blockchain research group</a> with Prof. Srinivasan Keshav. <b>Indian Institute of Technology, Kanpur (IITK), India</b> Student research associate at <a href="#">Cyber Security Lab</a> , worked with Prof. Sandeep Shukla. <b>National Hydroelectric Power Corporation Ltd., India</b> Gained exposure to their infrastructure, communication and Supervisory Control and Data Acquisition (SCADA) system.	Summer 2020  Summer 2019  Summer 2018  Winter 2017
INVITED PRESENTATIONS	<b>Indian Institute of Technology, Bombay (IITB)</b> Presented a <a href="#">paper</a> at the <a href="#">Third Workshop on Blockchain Technologies and its Applications</a> which was attended by more than 100 participants. ( <a href="#">slides</a> ) <b>Israel Institute for Advanced Studies, Jerusalem (IIAS)</b> Presented a <a href="#">poster</a> at the 3rd advanced school in computer science and engineering: blockchains and cryptocurrencies which was attended by more than 150 participants.	Feb 2019  Dec 2018
PUBLICATIONS	<b>Entangled Blockchains in Land Registry Management</b> with Rishav Chatterjee, Ras Dwivedi, Rohit Negi, Sandeep K. Shukla ( <a href="#">paper</a> ). In Proceedings of the Third Workshop on Blockchain Technologies and its Applications, pp.8-13, Mumbai, February, 2019 . <b>Polaris: A Scalable Geo-distributed BFT Consensus Protocol for Blockchains</b> with L. Yang, Q. Duan, S. Lee, S. Rizvi, S. Keshav, B. Wong, P. Shenoy, W. Golab, S. Gorbunov (working paper).	
RESEARCH PROJECTS	<b>Rationality in Byzantine Consensus</b> Supervisor: <a href="#">Prof. David Tse</a> <ul style="list-style-type: none"><li>- Explored incentive based attacks in byzantine consensus and how certain blockchain protocols like FruitChains and Bitcoin-NG prevent selfish mining attacks.</li><li>- Worked on models and methods to achieve nash equilibrium for reward distribution in cryptocurrency mining in the presence of adaptive adversaries.</li></ul> <b>A Secure Scalable Quantum-Safe Blockchain for Critical Infrastructure</b> Supervisor: <a href="#">Prof. Srinivasan Keshav</a> <ul style="list-style-type: none"><li>- Implemented a Byzantine fault-tolerant Global Membership Service (GMS) based on the paper <a href="#">RCanopus</a>. It achieves byzantine fault tolerance by leveraging the features provided by Concord-BFT (VMWare), a generic state machine replication library that can handle malicious (byzantine) replicas.</li><li>- HMS was integrated with RCanopus using Remote Procedure Calls (RPC). During the project, I explored different aspects of networking, consensus algorithms, formal verification methods, post-quantum safety, and energy systems through group meetings, talks, and interactions with professors.</li></ul> <b>Permissioned Blockchains in Land Registry Management</b> Advisors: <a href="#">Ras Dwivedi</a> , <a href="#">Rohit Negi</a> ; Supervisor: <a href="#">Prof. Sandeep K. Shukla</a> (IITK)	Summer 20    Summer 19 ( <a href="#">GitHub</a> / <a href="#">Report</a> )    Summer 18 ( <a href="#">Report</a> )

\* Some of the hyperlinks may not work in the uploaded application. Please have a look at <https://ashsek.me/CV.pdf>

- Developed and implemented models to solve the double spending problem in the Indian land registration and maintenance system via blockchains. As a result, achieving significant security and transparency in transactions. This was implemented using “hyperledger-fabric”, a permissioned blockchain framework by IBM.
- Developed an efficient document verification algorithm for verification of land registry documents based on merkle trees. Hence, enabling us to verify documents without its physical availability with the use of tokens.
- Explored various aspects of cyber security and computer science through research talks and interactions with PhD students, researchers, and professors.

## OTHER PROJECTS

### Deflix (Winner at EtherPunk 2021)

A pay-as-you-watch streaming platform along with easy streaming license management using ERC-721 based NFT's.

Winning Titles:

- Superfluid - Best Application (Top Winner). (**\$1000**)
- Portis - 1st Place. (**\$500**)

### Blockchain-Enabled Energy Efficient Container Consolidation

Supervisor: [Prof. B.D.Sahoo](#) (undergraduate dissertation)

- Making resource allocation in data centers more fault tolerant and energy efficient.

### Analysis of Routing Protocols for Wireless Ad-hoc Sensor Networks

Supervisor: [Prof. Arun Kumar](#) (Network Simulation Laboratory, NIT Rourkela)

- Simulated and compared AODV, DSDV, and DSR routing protocols using NS-3 simulator and compared on metrics such as routing overhead, average delay, duplication overhead, packet delivery ratio, throughput and data delivery cost.

### Comparison of Face Recognition Algorithms

Supervisor: [Prof. Anup Nandy](#) (Machine Learning Laboratory, NIT Rourkela)

- Analysed and compared face recognition using PCA, LDA and ANN algorithms.

### Implementation of Cryptographic Ciphers

Supervisor: [Prof. Sujata Mohanty](#) (Cryptography Laboratory, NIT Rourkela)

- Implemented Caesar cipher, Vigenere cipher, Playfair cipher, Hill cipher, Rail Fence cipher, One Time Pad (OTP), Keyed Transposition cipher and Feistel cipher.

### Road Repair And Tracking System

Supervisor: [Prof. Judhistir Mahapatro](#) (Software Engineering Laboratory, NIT Rourkela)

- Developed Data Flow Diagram (DFD), Software Requirement Specification (SRS), decision trees and decision tables for a Road Repair and Tracking System.

March 2021

Ongoing

Fall 2020  
([Report](#))

Fall 2020  
([Notebooks](#))

Fall 2020  
([GitHub](#))

Spring 2019  
([Report](#))

## SCHOLASTIC ACHIEVEMENTS

- SuperFluid (Top Winner) and Portis (1st Prize) winners at EtherPunk 2021. 2021
- Team ranked among top 95 percentile at Codechef Insomnia 2019
- Secured 97 percentile in JEE ADVANCE and 99.7 percentile in JEE MAIN. 2017
- Admitted for undergraduate studies to the computer science department at University College London (UK), University of Edinburgh (UK), and University of Toronto (Canada). 2017
- Achieved All India Rank of 29 in the TECHNETHLON (conducted by IIT Guwahati). 2016
- Awarded FreeShip (100% scholarship) at Delhi Public School, Faridabad. 2016
- Received appreciation letter for excellence in CBSE examinations from Mrs. Smriti Zubin Irani (then education minister). 2015

## RELEVANT COURSEWORK

- [Internet-Scale Consensus in the Blockchain Era](#)<sup>†</sup>
- [Scaling Blockchains](#)<sup>†</sup>
- [Hyperledger Fabric \(IBM\)](#)\*
- [Bitcoin and Cryptocurrency Technologies](#)\*
- Google Cloud Platform<sup>‡</sup>
- Operating Systems
- Distributed Systems
- Machine Learning
- Compiler Design
- Cloud Computing
- [Introduction to Computational Thinking and Data Science](#)\*
- Data Science
- Object Oriented System Design
- Data Communication
- Linear Algebra

<sup>†</sup> Courses taught by Prof. David Tse at Stanford University. I [scribed](#) for some lectures.

\* Online course

<sup>‡</sup> 30 Days of google cloud: completed the cloud engineering track ([skill badges](#))

- Discrete Mathematics
- Probability and Statistics
- Data Structure and Algorithms
- Computer Organization and Architecture
- Formal Languages and Automata Theory
- Design and Analysis of Algorithms
- Database Engineering

#### SKILLS

**Programming Languages:** Python (2-3), C++, Go, Solidity, JavaScript  
**Blockchains:** Hyperledger Fabric, Truffle, Ganache, web3.js  
**Other tools:** Git,  $\text{\LaTeX}$ , Docker, gRPC, MySQL, CouchDB, MongoDB  
**Communication:** English (proficient), Hindi (proficient), Spanish (spoken)

#### CONFERENCE REFERRING

**Information Theory Workshop 2020**  
 Reviewer for [2020 IEEE Information Theory Workshop \(ITW\)](#), Riva del Garda, Italy.  
**IEEE Blockchain 2020**  
 Meta reviewer for Blockchain Technology and its Potential Applications ([BTPA 2020](#)) workshop organised under 3rd IEEE International Conference on Blockchain, Greece.

#### OTHER PROFESSIONAL SERVICE

**Student Mentor (2018-21):** Responsible for helping about 10 freshmen students in their transition to college, and addressing their academic, mental and socio-cultural issues.  
**Google Developer Students Club (2019-20):** Core Team Member and Blockchain lead of [Google Developer Students Club](#), NIT Rourkela.  
**SPAWN (2019):** Technical head for the official competitive coding club at NIT Rourkela, and was responsible for introducing people to sports programming.

#### SOCIAL SERVICE

**Yog Manav Vikas Trust, Chamba, India (2019):** Spent 20 days during December 2019 helping at the trust by giving general knowledge about "Basics of Computers" and "Hand on Computers" to underprivileged female trainees pursuing Vocational Training Courses in Certificate in Computer Applications (CCA) through Govt. of India.  
**Swachh Bharat Pakhwara Celebrations, Jammu, India (2018):** Gave a speech on the importance of sanitation as a part of the cleanliness drive in villages of Jammu, India.  
**Planatation Drive, NHPC, India (2018):** Helped in organizing the event. Together we planted more than 2000 saplings in a landslide prone area in north India.  
**National Service Scheme (NSS), NIT Rourkela, India (2017):** Guided about 100 students (along with 3 other group leaders) in completing various social service activities.