Debajyoti Halder

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EDUCATION

- **Stony Brook University** — Stony Brook, NY, USA
  Ph.D. Student - Computer Science; GPA: 3.8 / 4.0 — *August 2022 - On-going*
  Courses: *Distributed Systems (A), Grad. Operating Systems (A-), Grad. Machine Learning (A), Natural Language Processing (A-)*

- **Indian Institute of Technology (IIT) Bhilai** — Raipur, India
  Bachelor of Technology - Computer Science Engineering; GPA: 8.2 / 10.0 — *July 2018 - May 2022*
  Courses: *Computer System Design (A), Advanced Computer Networks (A-), Adversarial Machine Learning (A)*

HONORS AND AWARDS

- Alumni Association's Young Researcher Award at IIT Bhilai - June, 2022
- Research Fellowship Award from Arista Networks - June, 2021 – Publication
- Honorary Mention Award at IEEE ComSoc Student Competition - November, 2021 – Preprint

PUBLICATIONS

- **Empirical Evaluation of ML Models for Per-Job Power Prediction**: HotCloudPerf 2024, **D. Halder**, M. Acharya, A. Malsane, A. Gandhi, and E. Zadok, DOI

- **RIDS : Real-time Intrusion Detection System for WPA3 enabled Enterprise Networks**: GLOBECOM 2022 - 2022 IEEE Global Communications Conference, R. Saini, **D. Halder**, and A. M. Baswade, DOI

- **fybrrLink: Efficient QoS-aware Routing in SDN enabled Future Satellite Networks**: IEEE Transactions on Network and Service Management - Special Issue on 'Smart Management of Softwarized Networks', P. Kumar, S. Bhushan, **D. Halder**, and A. M. Baswade, DOI

- **fybrrStream: A WebRTC based Efficient and Scalable P2P Live Streaming Platform**: 2021 International Conference on Computer Communications and Networks (ICCCN), **D. Halder**, P. Kumar, S. Bhushan and A. M. Baswade, DOI

SKILLS SUMMARY

- **NodeJS, Express, MongoDB**: 4+ years, 7-8 projects
- **C++**: 4+ years, Implemented **Raft** protocol, and fault-tolerant k-v store in Distributed System course at SBU
- **Python**: 4+ years, 3-4 projects
- **Java and Spring MVC**: 1.5 years, Internship project
- **Android**: 2 years, 3 projects
- **WebRTC, IPFS, WebTorrent**: 2+ years, 3-4 projects
- **Interests**: Sustainability, Reliability, Distributed Systems, Networks (P2P, ICN), IPFS

RESEARCH & WORK EXPERIENCE

- **Reliability of Server Components** — Stony Brook University
  Supervisors: Dr. Anshul Gandhi and Dr. Erez Zadok — *Jan 2024 - On-going*
  - **Reliability Estimation**: Investigating workload-induced reliability degradation in DRAM, SSDs, and HDDs.
  - **DRAM Reliability**: Developing regression models to predict Remaining Useful Lifetime (RUL) of DRAM using error logs from publicly available datasets. Studying correlations between workload characteristics and observed memory errors to refine failure estimation.
  - **SSDs & HDDs**: Built regression models to predict SSD/HDD RUL using SMART values, achieving a Mean Absolute Error (MAE) of ~13 days.
  - **Per-job RUL Impact**: Constructing models to estimate per-job-induced reliability degradation, linking job profiles with component stress levels.
  - **Novelty**: Prior works focus on classification-based failure prediction; this work employs fine-grained regression models to estimate per-job impact on component reliability for a more granular analysis.

- **Per-job Operational and Embodied Carbon Emissions** — Stony Brook University
  Supervisors: Dr. Anshul Gandhi and Dr. Erez Zadok — *August 2022 - On-going*
  - **Per-job Power Prediction**: Developed machine learning models to track per-job resource usage and predict power consumption across CPU, DRAM, Disk, and GPU. Integrated GPU profiling tools (`CUPTI`, `Nsight Systems`) to enhance GPU power estimation accuracy.
  - **ML Model Evaluation**: Conducted extensive evaluations of various ML models; the final XGBoost model achieves ~7% MAPE for per-job operational power prediction.
  - **Embodied Carbon Modeling**: Built a model to estimate embodied carbon emissions from server configurations, initially covering CPUs, DRAM, and disks. Expanded to GPUs, incorporating GPU lifecycle emissions and manufacturing impact.

- **Real-time Monitoring Tool**: Developed a resource monitoring tool that provides per-job embodied share per unit time, helping analyze resource utilization in real time.
- **ACCEPTED in HotCloudPerf 2024**: *Empirical Evaluation of ML Models for Per-Job Power Prediction - [DOI](#).*

Research Fellowship from Arista Networks — IIT Bhilai
Supervisor: Dr. Anand M. Baswade — *Jun 2021 - Apr 2022*
- **Real-time IDS for WPA3**: A two stage architecture for real-time intrusion detection for an enterprise scenario.
- **Attacks on WPA3 testbed**: A new, open source dataset for attacks on WPA3-enabled device.
- **ML based IDS**: A lightweight ML-based classifier for attack detection with high accuracy in real-time.
- **ACCEPTED at GlobeCom '22**: *RIDS : Real-time Intrusion Detection System for WPA3 enabled Enterprise Networks - [DOI](#)*

Research on SDN in Satellite Networks — IIT Bhilai
Supervisor: Dr. Anand M. Baswade — *Jan 2021 - Jun 2022*
- **QoS aware routing**: Developed an algorithm (linear time) better than Dijkstra to find the shortest as well as QoS aware route in a Satellite Network.
- **Protocols for flow rule transfer**: Developed protocols for flow rule transfer in SDN which ensure non-disruptive service during satellite handovers.
- **ACCEPTED in IEEE TNSM**: *fybrrLink: Efficient QoS-aware Routing in SDN enabled Future Satellite Networks -* [DOI](#)

Intern at DMLab, Chile — Remote
Software Engineer Intern — *Sep 2020 - Apr 2022*
- **Aeris**: Live peer-to-peer video calling based physiotherapy.
- **Computer Vision**: Pose estimation for diagnosis using Mediapipe (Tensorflow).
- **P2P platform**: Implemented fybrrChat - WebRTC based P2P video calling for the appointment system.
- **Website**: Visit [DMLab, Chile](#)

Intern at Elogix Softwares Pvt. Ltd., Kolkata — Kolkata, India
Full Stack Development Intern — *May 2019 - Jul 2019*
- **PLMS**: RFID based Plant Logistics Management System. Used Java and Spring framework for the development.
- **Tracking and analysis**: Real-time truck inventory issuing, anomaly/theft detection.
- **Data Analysis**: Generated custom Jasper reports for Data Analysis.
- **Website**: Visit [Elogix, Kolkata](#)

VOLUNTEER EXPERIENCE

Student Lead at Google Developer Student Club - IIT Bhilai — IIT Bhilai
Institute-wide hackathons, workshops, projects, open-source awareness — *Aug 2020 - Jun 2021*

Club Co-ordinator of Swara - The Music Club - IIT Bhilai — IIT Bhilai
College band lead, inter-college band performances — *Apr 2019 - March 2020*