Jayjeet Chakraborty

jayjeetc.github.io | jayjeetc@ucsc.edu | github.com/JayjeetAtGithub

Objective

To explore the field of Big data processing, Storage systems, and Distributed systems, perform research and solve problems, and spend a career building technologies for tackling critical Systems challenges.

Education

- **University of California, Santa Cruz** — Santa Cruz, CA
  PhD, Computer Science And Engineering — *Expected Grad: June, 2026*
- **National Institute Of Technology, Durgapur** — Durgapur, WB, India
  B.Tech, Computer Science And Engineering, CGPA: 7.65/10 — *Graduated: June, 2021*
- **Hem Sheela Model School, Durgapur** — Durgapur, WB, India
  Senior Secondary Education, CBSE, Percentage: 92.6% — *Graduated: April, 2017*

Experience

- **IRIS-HEP Winter Fellow** — Remote
  Princeton University and CROSS, UC Santa Cruz — *Jan 2021 - July 2021*
  - Completed working on SkyhookDM, an Arrow-Native storage system based on Ceph. Integrated Coffea, a distributed scientific data processing framework from CERN with Skyhook to enable compute offloading in HEP data analytics. Also, working on a Pull request to contribute Skyhook to the Apache Arrow project. [ArXiv]
- **IRIS-HEP Summer Fellow** — Remote
  Princeton University and CROSS, UC Santa Cruz — *June 2020 - October 2020*
  - Built scalable and reproducible Popper workflows for running experiments on large datasets stored in a SkyhookDM cluster. Also, performed experiments on a SkyhookDM deployment and studied the performance gains due to push-down. [report]
  - Redesigned SkyhookDM to store and process data in Arrow IPC and Parquet format and also extended the Arrow framework with a Skyhook Dataset API to be able to natively connect to a Ceph/RADOS cluster with SkyhookDM plugins and push-down compute tasks.
- **Winter Research Intern** — Varanasi, India
  Indian Institute Of Technology, BHU — *December 2019 - January 2020*
  - Studied and analyzed several terrain rendering techniques and implemented the ROAM(Real-time Optimally Adapting meshes) and Incremental Delaunay Triangulation algorithms for Level Of Detail based rendering of large terrain datasets. [report]
  - Developed a visualization tool in C++ using OpenGL to render terrains from Li-DAR datasets at 60 fps and benchmarked both the algorithm implementations on GPU.
- **Google Summer Of Code Student** — Remote
  Centre for Research in Open Source Software, UC Santa Cruz — *May 2019 - August 2019*
  - Extended the Popper workflow engine by adding support for additional container runtimes like Singularity, added more sub-commands, implemented concurrent execution capabilities, and other CI/CD features. Also, wrote unit tests to achieve an 87% test coverage and added documentation for the newly added features. [report]
  - Contributed plugins to facilitate the execution of Popper workflows on Virtual machines, Kubernetes clusters, and Slurm based HPC clusters.
- **Software Engineering Intern** — Mumbai, India
  LogN Software — *May 2018 - July 2018*

- Worked on developing the backend APIs for a client-facing Ionic application using Django Rest Framework and MySQL. Also, built and integrated parts of UI of the application. Also, built the payment gateway of the application using the Stripe Payments SDK.

Publications

- Jayjeet Chakraborty, Carlos Maltzahn, Ivo Jimenez. Enabling Seamless Execution of Computational and Data Science Workflows on HPC and Cloud with the Popper Container-Native Automation Engine. Paper at CANOPIE-HPC Workshop 2020, 12 November, 2020. [paper]
- Jayjeet Chakraborty, Ivo Jimenez, Carlos Maltzahn, Arshul Mansoori, Quincy Wofford. Popper 2.0: A Container-native Workflow Execution Engine For Testing Complex Applications and Validating Scientific Claims. Poster at 2020 Exascale Computing Project Annual Meeting, Houston, TX, February 3-7, 2020. [poster]
- Partha Kumbhakar, Abhirup Roy Karmakar, Gour P. Das, Jayjeet Chakraborty, Chandra Sekhar Tiwary and Pathik Kumbhakar. Reversible temperature-dependent photoluminescence in a semiconductor quantum dot for development of smartphone-based optical thermometer. Nanoscale, 2021. [paper]
- Biswas, S., Chakraborty, J., Agarwal, A. and Kumbhakar, P., Gold nanostructures for the sensing of pH using a smartphone. RSC Advances Journal, 2019. [paper]

Research

- **Student Researcher** Remote
  Centre for Research in Open Source Software, UC Santa Cruz
  - Extended the Popper ecosystem by building Popper workflows for automating the MLPerf benchmark suite and for end-to-end benchmarking of bare-metal machines. Also, developed a Python library to compute the confidence intervals for measuring the variability in CPU, Memory, Disk, and Network performance of CloudLab machines.
  - Currently, working on extending the Coffea and Awkward Array libraries to be able to read NanoEvents data from SkyhookDM using the Arrow Dataset API.
- **Research Assistant** Durgapur, India
  Nanoscience Lab, NIT Durgapur
  - Cleaned and Pre-processed experimental data collected by scholars in the lab and built Deep learning models using them for making predictions of several parameters like pH and temperature.
  - Developed algorithms using ML techniques to facilitate performing scientific experiments through smartphones. Built 2 Android apps that take pictures of samples and use these algorithms on the images to make predictions of different scientific parameters. One of the works is currently under review at the RSC Advances Journal.

Presentations

- Presented SkyhookDM and it's recent developments at the SNIA Storage Developers Conference 2021, September 28-29, 2021. [slides]
- Presented the IRIS-HEP Winter Fellowship project on building Arrow-Native SkyhookDM and it's integration with Coffea at the IRIS-HEP Topical Meeting, 30 June, 2021. [slides]
- Talked about "Reproducible and Automated Storage systems experimentation with Popper" at the Second K8s-HEP Meetup, December 1-2, 2020. [slides]
- Presented the paper entitled "Enabling Seamless Execution of Computational and Data Science Workflows on HPC and Cloud with the Popper Container-Native Automation Engine." at the CANOPIE-HPC Workshop, November 12, 2020. [slides]

- Presented the IRIS-HEP Summer Fellowship project on making SkyhookDM and Ceph Experiments Reproducible at the CROSS Research Symposium, October 6-9, 2020 and at IRIS-HEP Topical Meeting, October 5, 2020. [slides]

Skills

Languages: C, C++, Python, Go, Java, JavaScript, Bash script, MATLAB.
Tools: Git, Docker, Jupyter, Kubernetes, Ansible, Azure, GCP, AWS, MongoDB, MySQL, Prometheus, Grafana.
Frameworks: Flask, React, Boost, Qt, NumPy, Pandas, Matplotlib, Seaborn, Android Framework.
Operating Systems: Ubuntu, Centos, MacOS.

Teaching/Mentoring Experience

- Served as a mentor in Google Summer Of Code 2021 and OSRE (Open Source Research Experience) 2021 as a part of the organization "Centre for Research in Open Source Software" at UC Santa Cruz.
- Took workshops on Open Source Software Development topics like Linux, Git, GitHub, and Python programming during college fests every year.
- Mentored 2 freshman year students from IIT Roorkee during Kharagpur Winter of Code (KWoC) 2018 on Back-End Web Development projects. Also, guiding new contributors in the getpopper.io community.

Extracurricular Activities

- Served as the Open Source Head of GNU/Linux User's Group, NIT Durgapur to help spread knowledge and awareness about Open Source software development between students.
- Writing Articles and Blogs on Computer Systems topics and Open Source Development on my Medium.

राष्ट्रीय प्रौद्योगिकी संस्थान दुर्गापुर भारत
NATIONAL INSTITUTE OF TECHNOLOGY DURGAPUR INDIA
शैक्षणिक अनुभाग
Academic Section
Mahatma Gandhi Avenue, Durgapur - 713209

TRANSCRIPT **Date : June 30, 2021**

NAME : **JAYJEET CHAKRABORTY** | INSTITUTE ROLL NO. : **17CS8036**

BRANCH : **COMPUTER SCIENCE AND ENGINEERING** | INSTITUTE REGISTRATION NO. : **17U10298**

Course of study : 4 YEAR (8 - SEMESTER) B.Tech. Programme

FIRST SEMESTER 2017-2018

SUBJECT CODE	CREDIT UNIT	GRADE
CSC01	3	B
ECC01	3	C
EEC01	3	B
MAC01	3	A
XEC01	3	D
CSS01	1	EX
ECS01	1	B
EES01	1	A
HSC01	0	S
WSS01	1	A
XES01	0	U

TGP =150 SGPA = 7.89

CGPA = 7.89

SECOND SEMESTER 2017-2018

SUBJECT CODE	CREDIT UNIT	GRADE
BTC01	2	P
CYC01	3	C
ESC01	2	D
MAC02	3	D
PHC01	3	C
CYS01	1	B
HSS01	2	B
MES01	2	B
PHS01	1	A
XES02		U

TGP =131 SGPA = 6.89

CGPA = 7.39

THIRD SEMESTER 2018-2019

SUBJECT CODE	CREDIT UNIT	GRADE
CSC301	3	P
CSC302	3	C
CSC303	4	P
MAC331	4	D
PHC331	3	C
CSS351	1.5	A
CSS352	2	EX
PHS381	1.5	A
XXS381		U .

TGP =148.0 SGPA =6.73

CGPA = 7.15

FOURTH SEMESTER 2018-2019

SUBJECT CODE	CREDIT UNIT	GRADE
CSC401	4	C
CSC402	3	P
CSC403	4	C
CSC404	2	A
CSC405	3	P
EEO440	3	P
CSS451	1.5	B
CSS452	1.5	EX
CSS453	1.5	A

TGP =159.5 SGPA = 6.79

CGPA = 7.05

FIFTH SEMESTER 2019-2020

SUBJECT CODE	CREDIT UNIT	GRADE
CSC501	3	C
CSC502	4	C
CSC503	3	C
CSC504	3	B
MEO541	3	A
CSS551	1.5	C
CSS552	1.5	A
CSS553	1.5	A

TGP =158.5 SGPA = 7.73

CGPA = 7.18

SIXTH SEMESTER 2019-2020

SUBJECT CODE	CREDIT UNIT	GRADE
CSC601	3	B
CSC602	4	B
CSE615	3	B
CSE616	3	C
HSC631	3	B
CSS651	1.5	A
CSS652	1.5	EX
CSS653	1.5	A

TGP =167.0 SGPA = 8.15

CGPA = 7.34

SEVENTH SEMESTER 2020-2021

SUBJECT CODE	CREDIT UNIT	GRADE
CSE710	3	A
CSE715	3	A
CSE719	3	EX
MEO740	3	A
MSC731	3	A
CSS751	1.5	A
CSS752	2.5	EX
CSS753	1	A
CSS754	1	A

TGP =194.5 SGPA =9.26

CGPA =7.62

EIGHTH SEMESTER 2020-2021

SUBJECT CODE	CREDIT UNIT	GRADE
CHO841	3	C
CHO851	3	C
CSE813	3	B
CSS851	5	A
CSS852	1.5	B
CSS853	1	B

TGP =131.0 SGPA = 7.94

CGPA = 7.65

TGP = Total Grade Point ; SGPA = Semester Grade Point Average ; CGPA = Cumulative Grade Point Average
(See reverse for the explanation of the Grading and Evaluation system)

SESSION OF COMPLETION OF THE COURSE : **2020-2021**

30.06.2021

Dean (Academic Courses)

Dean (Academic Courses)
National Institute of Technology
Durgapur-713209 India

S. Biswas
Checked by

Telephone Office : (0343) 2752040 / 2752043
Fax : (0343) 2547375
Website : www.nitddgp.ac.in

7 - SCALE GRADE SYSTEM

(Full Marks of Theory/ Sessional /Laboratory Course = 100)

Range of marks scored	Performance	Grade awarded	Grade point per credit unit	Remarks
90 and above	Excellent	Ex	10	Pass marks for laboratory/sessional is 50and there is no 'P' grade for it. Score less than 50 in laboratory/sessional and score less than 40 in theory course is awarded 'F'.
Between 80 & 89	Very good	A	9	
Between 70 & 79	Good	B	8	
Between 60 & 69	Fair	C	7	
Between 50 & 59	Average	D	6	
Between 40 & 49	Pass	P	5	
Below 40	Fail	F	0	

S – Satisfactory

U – Unsatisfactory

Grade point per course = Credit unit of the course x Corresponding Grade point per credit unit.
TGP = Summation of Grade points earned in all courses in the semester.
SGPA = TGP/Total credit unit of the semester.
CGPA = Cumulative Grade Point/ Cumulative credit unit of all the courses up to the current semester.

MAXIMUM POSSIBLE 'SGPA' AND 'CGPA'IS 10.00
The students awarded 'F' in particular course(s) are eligible for the supplementary backlog examination in that / those course(s).The TGP,SGPA, and CGPA shown in that case is tentative and the amended TGP,SGPA,and CGPA in supplementary examination are indicated in Supplementary Grade Card.

Classes awarded based on the final CGPA:
Distinction : CGPA≥ 8.00, provide all the courses passed in regular examinations.
First Class : CGPA≥ 6.50
Second Class : CGPA<6.50

No distinction is awarded in post Graduate Programmes.
Equivalent percent marks:
For Semester Examination : Equivalent % marks=(SGPA – 0.5)x 10
For Final CGPA : Over all equivalent % marks = (CGPA – 0.5) x 10
Medium of Instruction and evaluation is English.

SEMESTER I	
CSC01	INTRODUCTION TO COMPUTING
CSS01	COMPUTING LABORATORY
ECC01	BASIC ELECTRONICS
ECS01	BASIC ELECTRONICS LABORATORY
EEC01	ELECTRICAL TECHNOLOGY
EES01	ELECTRICAL TECHNOLOGY LABORATORY
HSC01	VALUES AND ETHICS
MAC01	MATHEMATICS-I
WSS01	WORKSHOP PRACTICE
XEC01	ENGINEERING MECHANICS
XES01	CO-CURRICULAR ACTIVITIES-I

SEMESTER II	
BTC01	LIFE SCIENCE
CYC01	ENGINEERING CHEMISTRY
CYS01	CHEMISTRY LABORATORY
ESC01	ENVIRONMENTAL SCIENCE
HSS01	PROFESSIONAL COMMUNICATION
MAC02	MATHEMATICS - II
MES01	ENGINEERING GRAPHICS
PHC01	ENGINEERING PHYSICS
PHS01	PHYSICS LABORATORY
XES02	CO-CURRICULAR ACTIVITIES - II

SEMESTER III	
CSC301	DISCRETE MATHEMATICS
CSC302	DIGITAL LOGIC DESIGN
CSC303	DATA STRUCTURES AND ALGORITHMS
CSS351	DIGITAL LOGIC DESIGN LABORATORY
CSS352	DATA STRUCTURES AND ALGORITHMS LABORATORY
MAC331	MATHEMATICS - III
PHC331	PHYSICS OF SEMICONDUCTOR DEVICES
PHS381	SEMICONDUCTOR DEVICES LABORATORY
XXS381	CO-CURRICULAR ACTIVITIES - III

SEMESTER IV	
CSC401	COMPUTER ORGANIZATION AND ARCHITECTURE
CSC402	THEORY OF COMPUTATION
CSC403	DESIGN AND ANALYSIS OF ALGORITHMS
CSC404	OBJECT ORIENTED PROGRAMMING
CSC405	SIGNALS AND SYSTEMS
CSS451	COMPUTER ORGANIZATION LABORATORY
CSS452	OBJECT ORIENTED PROGRAMMING LABORATORY
CSS453	SIGNAL PROCESSING LABORATORY
EEO440	FUNDAMENTALS OF POWER SYSTEMS

SEMESTER V	
CSC501	OPERATING SYSTEMS
CSC502	DATABASE MANAGEMENT SYSTEM
CSC503	COMPILER DESIGN
CSC504	MICROCONTROLLER BASED SYSTEMS
CSS551	DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY
CSS552	MICROCONTROLLER BASED SYSTEMS LABORATORY
CSS553	OPERATING SYSTEMS LABORATORY
MEO541	EXPERIMENTAL METHODS IN ENGINEERING

SEMESTER VI	
CSC601	SOFTWARE ENGINEERING
CSC602	DATA COMMUNICATION AND COMPUTER NETWORKS
CSE615	OPTIMIZATION TECHNIQUES
CSE616	ARTIFICIAL INTELLIGENCE
CSS651	COMPILER LABORATORY
CSS652	DATA COMMUNICATION AND COMPUTER NETWORKS LABORATORY
CSS653	DATABASE MANAGEMENT SYSTEM LABORATORY
HSC631	ECONOMICS AND MANAGEMENT ACCOUNTANCY

SEMESTER VII	
CSE710	MACHINE LEARNING
CSE715	DIGITAL IMAGE PROCESSING
CSE719	MULTIMEDIA INFORMATION SYSTEMS
CSS751	SOFTWARE ENGINEERING LABORATORY
CSS752	MODELLING AND SIMULATION LABORATORY
CSS753	VOCATIONAL TRAINING/ SUMMER INTERNSHIP AND SEMINAR
CSS754	PROJECT-I
MEO740	3D PRINTING TECHNOLOGY
MSC731	PRINCIPLES OF MANAGEMENT

SEMESTER VIII	
CHO841	BIOENGINEERING AND INDUSTRIAL APPLICATIONS
CHO851	SUSTAINABILITY. NOW ENERGY, ENVIRONMENT AND SUSTAINABILITY
CSE813	OPTICAL NETWORKS
CSS851	PROJECT-II
CSS852	PROJECT SEMINAR
CSS853	VIVA VOCE