

SARANSH CHOPRA

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EDUCATION

University of Delhi

Major: Information Technology and Mathematical Innovations

Minor: Computational Biology

New Delhi, India

2020 – 2024

CGPA 9.41

RESEARCH AND WORK EXPERIENCE

Institute for Research and Innovation in Software for High Energy Physics (IRIS-HEP)

Remote

IRIS-HEP fellow [Funded by IRIS-HEP]

June 2022 – Present

Dr. Henry Schreiner (Princeton University) and Dr. Jim Pivarski (Princeton University)

- Working on Vector, a mathematical library used by researcher at CERN, ATLAS, CMS, etc. to represent vectors and perform vector operations in Python

FluxML, The Julia Programming Language

Remote

Technical writer [Funded by The Julia Programming Language]

May 2022 – present

Mr. Dhairya Gandhi

- Working on Machine Learning inclined tutorials, documentation and API references for FluxML's ecosystem.
- Fixing minor bugs and contributing to the infrastructure of Flux.jl.

PyBaMM, NumFOCUS

Remote

Google Summer of Code student developer [Funded by Google]

May 2021 – August 2021

Dr. Valentin Sulzer (Carnegie Mellon University), Dr. Robert Timms (University of Oxford), Dr. Ferran Brosa Planella (University of Warwick)

- Worked closely with post-doctoral research fellows and PyBaMM core developers from around the world.
- Built an automated Twitter Bot capable of tweeting random Battery Simulations, including but not limited to different battery models, parameter sets, chemistries, degradation modes, and experiments.
- Developed a replying functionality through which users can direct the bot to run a specific Battery Simulation.
- Created a CI/CD pipeline using GitHub Actions and Heroku, and followed a micro-services-based architecture.

PUBLICATIONS

T. G. Tranter, R. Timms, V. Sulzer, F. Brosa Planella, G. M. Wiggins, P. Agarwal, **S. Chopra**, S. Allu, P. Shearing, D. J. L. Brett. *liionpack: A Python package for simulating packs of batteries with PyBaMM*. Journal of Open Source Software.

OPEN SOURCE RESEARCH SOFTWARE

PyBaMM

Maintainer and Core Developer - 250,000+ installs

PyBaMM (Python Battery Mathematical Modelling) solves physics-based electrochemical DAE models by using state-of-the-art automatic differentiation and numerical solvers.

- Collaborated with researchers from around the world and implemented various new features, fixed bugs, improved the documentation, CI/CD pipeline, infrastructure, and wrote advanced tutorials.

BattBot

Maintainer and Core Developer - 120+ followers

An automated Twitter Bot that Tweets random Battery Mathematical Modeling Simulations and replies to the requested Battery Simulations.

- Worked under Dr. Valentin Sulzer (Carnegie Mellon University), Dr. Robert Timms (University of Oxford), and Dr. Ferran Brosa Planella (University of Warwick) to build the bot and the infrastructure from scratch.

Vector

Maintainer and Core Developer - 50,000+ installs

Vector is a Python 3.6+ library for 2D, 3D, and Lorentz vectors, especially arrays of vectors, to solve common physics problems in a NumPy-like way..

- Collaborated with researchers from around the world and implemented various new features, fixed bugs, improved the documentation, CI/CD pipeline, infrastructure, and wrote advanced tutorials.

liionpack

Core Developer - 1,500+ installs

liionpack takes a 1D PyBaMM model and makes it into a pack. You can either specify the configuration e.g. 16 cells in parallel and 2 in series (16p2s) or load a netlist.

- Worked extensively with Dr. Thomas Tranter (University College of London) and Mr. Gavin Wiggins (Oak Ridge National Laboratory) on the CI/CD pipeline, documentation, and infrastructure of lionpack.

Other notable contributions

- **Colour:** *Colour Science for Python* - 2,500,000+ installs
Implemented the conversion between RGB and HCL colourspace.
- **DeepXDE:** *DeepXDE is a library for scientific machine learning* - 270,000+ installs
Implemented utility functions and improved the existing examples on solving partial differential equations using Physics-Informed neural networks.

PROJECTS

- ForMente** [NLP, Flutter, Dart, FastAPI, Python, Firebase, Firestore, Heroku, GitHub Actions] *June 2022*
- Using Natural Language Processing, ForMente lets you diagnose your feelings in the form of a secure personal diary.
 - The NLP model is deployed on Heroku using FastAPI, and the app uses Firebase and Firestore as its backend.
- ChaoticEncryption.jl** [Julia Package, GH Actions, GH pages, ODEs, Pseudo-Random Number Generators] *February 2022*
- Developed a Julia package for encrypting and decrypting images using custom Pseudo-Random Number Generators.
 - The algorithms were optimised to run 5-10 times faster than ordinary nested-for implementations
 - The package has been starred 22 times on GitHub and is available on JuliaHub here (11 downloads).
- SceneNet** [Transfer Learning, VGG19, CNNs, Python, Flutter, Dart, FastAPI, Heroku] *December 2021*
- Trained a CNN on 10,000+ images belonging to 67 categories and achieved an accuracy of 96% on the test set and 64% on the cross-validation set.
 - Developed a standalone public API for the model, and a Flutter application for the users.
- PopItUp** [Android, Kotlin, Firebase, Firestore, Google Sceneform SDK, Google ARCore SDK] *May – August 2021*
- An Augmented Reality shooting game developed in native android by manually adding and editing the Sceneform SDK.
 - Developed a live leaderboard using the FirestoreRecyclerView.

RELEVANT SKILLS

Languages:	Julia Python C/C++ Java Dart
Frameworks/Libraries:	Flutter NodeJS Tensorflow FastAPI DeepXDE
Platforms and Tools	Linux Heroku Google Cloud Elasticsearch Kibana Firebase Docker CI/CD
Research:	Machine Learning Scientific ML Research Software Development Computer Vision

AWARDS AND ACHIEVEMENTS

Awards:	<ul style="list-style-type: none"> - Received (1 of 500 people worldwide) the prestigious The Shubhra Kar Linux Foundation Training (LiFT) Scholarship in the "Developer Do-Gooders" category. - Received the Faraday Institute's Collaboration Award (The Faraday Institute, UK) for my work on the PyBaMM ecosystem.
Grants:	Received grants from PyCon Italia , PyCon APAC , and EuroPython to deliver talks and attend the conference in person.
Hackathons:	Winner of the Elastic hackathon (out of 2500+ registrations).
Asteroid Discovery:	Discovered an asteroid having a fixed orbit around Sun by analysing the data of Pan-STARRS.

PRESENTATION AND TALKS

PyCon APAC	<i>Upcoming (August 2022)</i>
◦ Will be leading a talk on "Code coverage through unit tests running in sub-processes/threads: Locally and automated on GitHub".	
EuroPython	<i>Upcoming (July 2022)</i>
◦ Will be leading a talk on "Code coverage through unit tests running in sub-processes/threads: Locally and automated on GitHub".	
PyBaMM Advanced workshop	<i>October 2021</i>
◦ Presented BattBot in front of researchers and industrialists belonging to various institutions.	

LANGUAGES

Hindi (mother tongue), English (fluent), German (basic), Punjabi (conversational)

MENTORSHIP

Google Summer of Code	<i>Upcoming (May - September 2022)</i>
◦ Will be mentoring students under PyBaMM, NumFOCUS, on projects involving, but not limited to, documentation, DevOps, parameterisation, and visualization.	
CodePeak	<i>December 2021</i>
◦ Mentored 10+ students in the field of open-source application development.	