

Ishaant Agarwal

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Education

BITS PILANI

M.Sc. PHYSICS

B.E. ELECTRONICS ENGINEERING

📅 Aug '16 - May '21

CGPA 8.1/10

Links

🌐 Website ishaant.github.io

🌐 LinkedIn [ishaant-agarwal](https://www.linkedin.com/in/ishaant-agarwal)

🌐 GitHub github.com/ishaant

Skills

LANGUAGES

Java • Python • C/C++ • SQL • MATLAB

LIBRARIES

• Keras • Tensorflow • K8s • J2EE

MISCELLANEOUS

Shell • Linux • Docker • Git • \LaTeX

Honors

- **SOF IMO 2014:** Region Rank 2
- **Teaching Assistant:** Computational Physics, Digital Image Processing
- Govt of India **INSPIRE Scholar**

Coursework

- Learning in Deep Artificial and Biological Neuronal Networks
- Data Structure and Algorithms
- Probability and Statistics
- Digital Image Processing
- Digital Signal Processing
- Statistical Mechanics
- Computational Physics
- Linear Algebra • Optimization

Selected Projects

FEEDBACK AND TARGET PROPAGATION IN BIOLOGICALLY PLAUSIBLE NEURAL NETWORKS

📅 Dec 2020 – Jun 2021

📍 Zürich, Switzerland

Advisors: Dr Benjamin Grewe, Dr Pau Aceituno

- ▶ Used a modified **Oja-based rule** to train shallow neural networks for **classification** and **PCA** tasks.
- ▶ Demonstrated that the rule can be successfully used to train rudimentary classifiers on **MNIST**.

RESTORATION AND RECONSTRUCTION OF 3D CRYOEM IMAGES- DEEPNOISE3D

📅 June 2020 - Present

📍 Zürich, Switzerland

Advisors: Dr Simon F. Nørrelykke, Dr Andrzej Rzepiela

- ▶ Built the **first 3D deep learning solution** to denoise cryoEM maps using a self compiled real-world dataset.
- ▶ Proposed a novel **frequency balancing loss** that boosts high frequency image data, crucial for protein sequencing and side-chain identification.

ANALYSIS OF SPATIAL CODES AND MEMORY CHANGES IN RODENTS 🐹

📅 May'19-Dec'19

📍 Paris, France

Advisors: Dr Gisella Vetere, Dr José Casanova

- ▶ Developed a **MATLAB** package for processing and analyzing video data from a single-photon microscope.
- ▶ Used an RNN along with traditional morphological processing to extract RoIs and calcium traces from these recordings and worked to register these cells to match them across different experiment runs.

SYNCHRONIZATION AND COLLECTIVE DYNAMICS OF NON-LINEAR SYSTEMS

📅 Jan'18-Dec'18

📍 Sancoale, Goa

Advisor: Dr. Gaurav Dar

- ▶ Extensively studied and simulated the synchronization behaviour of weakly coupled oscillators.
- ▶ Investigated topological events like **fixed points and bifurcations** and investigated their generation as a way of modulating seizure response in animals, using the Kuramoto Model for coupled neurons.

Experience

ORACLE CORP. | ORACLE ANALYTICS CLOUD

MEMBER OF TECHNICAL STAFF - SDE2

📅 July 2021 – Present

📍 Bangalore, India

- Rebuilt the data caching service as a fully independent **Kubernetes** microservice, reducing customer onboarding time by **97%** (40m⊕<1m).
- Delivered a usage monitoring tool for the microservice, providing key metrics (**1M+ dataset cache runs in FY22**) validating its business impact.
- Ensured **99.99% SLA** by implementing an automatic job restart feature on server crashes, saving **~300** devops man hours annually.

ETH ZÜRICH | IMAGE AND DATA ANALYSIS GROUP

VISITING RESEARCHER

📅 Apr 2020 – July 2021

📍 Zürich, Switzerland

- Used a **UNet** to denoise large 3D cryoEM images without ground truth.
- Compiled own cryoEM training dataset using real-world data from **EMDB**.
- Improved **SNR metrics by 30%** vs. current SOTA (BM3D, LAFTER).

ETH ZÜRICH | INSTITUTE OF NEUROINFORMATICS

RESEARCH INTERN

📅 Dec 2020 – May 2021

📍 Zürich, Switzerland

- Investigated and tested biologically plausible learning rules as **compute-efficient alternatives to backpropagation** in neural networks.
- Trained a classifier using a completely custom unsupervised learning rule on **MNIST** achieving **93%** accuracy.

ESPCI PARIS, PSL | BRAIN PLASTICITY LABORATORY

RESEARCH INTERN

📅 May 2019 – July 2019

📍 Paris, France

- Used calcium imaging to investigate brain activity in freely moving mice.
- Created an **automated CV pipeline** to extract neural response and mouse position from video feeds saving **>10 hours per run (~3 runs/week)**.

IISC BANGALORE | NAT. INSTITUTE OF ADVANCED STUDIES

SUMMER INTERN

📅 May 2018 – July 2018

📍 Bangalore, India

- Developed **non-linear models** to investigate the effects of **climate change** on the size and population of insects (particularly ants and fruit flies).