Ishaant Agarwal

Personal Data

Place and Date of Birth:	Guwahati, Assam, India | 28 August 1998
Address:	327-AH2, BITS Pilani K.K.Birla Goa Campus, Sancoale - 403726
Phone:	+91 70364 72439
email:	ishaant98@gmail.com | Github

Internships

Summer 2019 — Research Internship at Vetere Lab, ESPCI, Paris

Analysis of Spatial codes and Memory Changes in Rodents

Researched on the Visualization of anterodorsal thalamic nucleus activity during memory consolidation under Prof. Gisella Vetere. Used an RNN to perform motion correction and feature extraction on video data. After extracting calcium traces and processing the neural activity, also carried out overall analysis of this refined data. Developed and deployed a custom MATLAB package to this end which now serves as the default analysis software for the group.

Summer 2018 — Research Internship at IIIT-B, Bangalore

Population and Size Based Dynamical Modelling of Ectotherms

Researched on the Temperature Size Rule in ectotherms (especially ants and the fruit fly). Developed simulations of different non-linear systems that aimed to model the behaviour of organism populations to changes in temperature and extensive study of what the behaviour signified for a particular species. Further researched on temperature trends for their biomasses using the Keeling Curve.

Projects

November 2019 – Current — Laboratory Project under Prof. Sarang Dhongdi

Performance Analysis of Modulation Techniques in Underwater Channels

Setting up an experimental facility to test various modes of underwater acoustic communication. We aim to do a performance analysis on various modulation and encoding schemes to find the most optimal amongst these.

November 2019 – Current — Laboratory Project under Prof. Toby Joseph and Prof. P. Nandakumar

FCS Analysis of Diffusion across the Nuclear Membrane

We employed times lapse confocal fluorescence imaging to study the transport of dye labeled dextran molecules of different sizes through the nuclear pore complexes. It includes analysis of single photon as well as time-averaged fluorescence data obtained through a confocal microscope examination of cells during the diffusion process.

August-December 2019 — Design Project under Prof. Ashish Chittora

Monocular Depth Estimation

As a part of the Digital Image Processing course, I studied and implemented a paper on 'Monocular Depth Estimation' (Niantic Labs,ICCV 2019), MonoDepth2. It deals with monocular depth estimation from a single image using a self-supervised learning model.

August-December 2019 — Study Project under Prof. Toby Joseph

Auditory Transduction Modelling of Primary Neurons in the Cochlea

Worked on a project involving cochlear amplification and modelling auditory transduction in the inner ear with Prof. Toby Joseph. The project required MATLAB modelling of fluid mechanics and neuronal spiking in the inner ear, and investigation of the amplification process.

January-December 2018 — Study Project under Prof. Gaurav Dar

Synchronization and Collective Dynamics of Non-Linear Systems

Simulated different non-linear systems in Matlab and extensively studied the synchronization behaviour as seen in the Kuramoto Model for 'n' weakly coupled oscillators. Further searched for and found fixed points and new types of bifurcations corresponding to different parameters in the same model. Also looked into possible modifications to the model so as to control the generation of fixed points.

Education

Current	Master of Science (Hons.) (Int.) in Physics
August 2016-	and Bachelor of Engineering(Hons.) in Electrical and Electronics Engineering
July 2021	at **BITS Pilani K.K. Birla Goa Campus**, Goa
	under the Integrated Dual Degree Program
July 2016	Senior Secondary School Certificate at **Vijayaratna Junior College**, Hyderabad
	Percentage: 94.7
July 2014	Secondary School Certificate(CBSE) at **Sarala Birla Gyan Jyoti**, Guwahati
	Cgpa: 10/10

Teaching Experience

PHY F313: Computational Physics, Department of Physics, BITS Pilani
Teaching Assistant
Introduced students to numerical methods algorithms and simulations. Designed and conducted labs.

EEE F435: Digital Image Proccessing, Department of Electrical and Electronics Engg., BITS Pilani
Teaching Assistant
Taught undergraduate students foundational image processing techniques and algorithms using MATLAB.

Scholarships and Certificates

Dec 2016	SAT®: Subject Tests in Physics: 800/800 and Math Level II : 800/800
Nov 2016	SAT®: College Test 2400/2400
Jan 2014	2nd Rank in North-Eastern Region in International Math Olympiad
May 2008	Duke University, Durham - TIP Scholar

Relevant Courses

Digital Image Processing (A*), Computational Physics(A*), Theoretical Neuroscience (A*), Non-Linear Dynamics , Statistical Mechanics , Probability and Statistics, Optimization, Communication Systems, Digital Signal Processing, Multivariate Calculus, Linear Algebra Complex Analysis, Ordinary Differential Equations, Control Systems
A*: Top of the class | A: Top Grade

Computer Skills

Basic Knowledge:	C, html, Linux, R
Advanced Knowledge:	MATLAB,Python, C++, Excel, LaTeX

Interests and Activities

Debating, College Theatre, Ultimate Frisbee, Content Writing, Quizzing, Fantasy Fiction, Football

Positions of Responsibility

Secretary (2018-19), Quiz Club, BITS Pilani K.K. Birla Goa Campus
Debate Head (2017-18) Literary and Debate Club, BITS Pilani K.K. Birla Goa Campus

References

1. Prof. Gaurav Dar
gdar@goa.bits-pilani.ac.in

2. Prof. Toby Joseph
toby@goa.bits-pilani.ac.in

3. Prof. Gisella Vetere
gisella.vetere@espci.fr