

Ankush G. K. (un-koo-sh)

(Ankush Gargeshwari Kumar)

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EDUCATION

M.Sc. Physics and B.E. Mechanical Engineering (Integrated)

CGPA: 7.862/10.0

BITS Pilani Hyderabad Campus

Hyderabad, India

2017 – 2022

EXPERIENCE / PROJECTS

Quantification of mixing of two liquids in small-scale, low Re open flows

Project

Supervisors: [Dr. Meenakshi Vishwanathan](#) and [Dr. Aravinda N. Raghavan](#)

BITS Pilani Hyderabad Campus

Hyderabad, India

Jan 2020 – Present

- Quantified two different flow fields: An Oscillatory flow (in the presence of a Tear-Drop shaped obstacle), and a flow with entrained vortex (due to a pair of baffle), using Okubo-Weiss parameter (Q) distinguishing the stretched and rotational parts of the flow.
- Found that the stirring due to Tear-drop obstacle and baffles gave rise to a sequence of: stretch, rotation and stretch, which sharpened the concentration gradient leading to higher mixing.
- Trying to connect the topological features of the flow, Q and the onset of chaotic behaviour to quantify mixing in small-scale open flows.

Growth Dynamics of Filamentous Fungal Biofilms

Thesis (Remote Work) - [Link](#)

Supervisor: [Dr. Aravinda N. Raghavan](#)

BITS Pilani Hyderabad Campus

Hyderabad, India

Jan 2022 – May 2022

- Worked with the team involved in the study of the properties of filamentous fungal biofilms – used in treating industrial effluents.
 - Simulated a mesoscopic model of biofilm growth with five main components: active part density, inactive part density, tip density, internal concentration and external concentration.
 - Varied the internal, external concentration and the geometry to mimic the experimental observations.
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Coupling of Electrophysiology and Mechanics of Heart Muscle

Thesis (Remote Work) - [Link](#)

Supervisor: [Dr. Yong Wang](#)

Max-Planck Institute for
Dynamics and Self-organization
(MPI-DS)

Gottingen, Germany

Aug 2021 – Dec 2021

- Worked as part of the group whose aim is to build an Engineered Heart Muscle patch to treat diseased hearts.
 - Simulated a coupled model of an excitable domain where an electrical impulse propagates, and deforms the domain at its wake – using COMSOL.
 - Focussed on one-way coupling where the electrophysiology (FitzHugh Nagumo model) dictates how the domain deforms (hyperelastic material model) and not vice versa.
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Analysis of Surface Ozone variation

Summer Internship (Remote Work) - [Link](#)

Supervisor: [Dr. Narendra Ojha](#)

Physical Research Laboratory
(PRL)

Ahmedabad, India

May 2021 – July 2021

- Applied Linear and Multiple Linear Regression models to predict Surface Ozone levels and compared it with the existing data.
 - Used Nitrous Oxides, Temperature and Relative Humidity as the training data for Surface Ozone prediction.
 - Found that the relationship between Surface Ozone and its precursors is highly non-linear and Linear Regression models are not suitable.
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General Relativity and LISA

Summer Internship - [Link](#)

Supervisor: [Prof. Sanjeev Dhurandhar](#)

Inter-University Center for
Astronomy and Astrophysics
(IUCAA)

Pune, India

May 2019 – July 2019

- Learnt the fundamentals of Special and General Theory of Relativity.
 - Applied the concept to address the problem of flexing of Laser Interferometer Space Antenna (LISA)'s arms.
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SCHOOLS & WORKSHOPS

○ [Bangalore School on Statistical Physics – XIII](#)

- Pattern Formation in Biology
- Statistical Physics of Long-range Systems

International Centre for
Theoretical Sciences (ICTS TIFR)

Bangalore, India

July 2022

○ [FINESSE Workshop: Hands-On Interferometer Modelling](#)

Inter-University Centre for
Astronomy and Astrophysics
(IUCAA)

Pune, India

Dec 2019

RELEVANT COURSES

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|---|--------------------------|
| ▪ Statistical Mechanics (Stanford Theoretical Minimum Series) [online] | ▪ Fluid Mechanics |
| ▪ Finite Element Method for Problems in Physics (University of Michigan) [online] | ▪ Computational Physics |
| ▪ Probability & Statistics | ▪ Multivariable Calculus |
| ▪ Mathematical Methods in Physics | ▪ Computer Programming |
| | ▪ Mechanics of Solids |
| | ▪ Electromagnetic Theory |

SKILLS & ACTIVITIES

○ **Computing/Software:** Python, MATLAB, COMSOL Multiphysics, LaTeX

○ **Activities:**

- Led the University Ultimate Frisbee Team.
- Part of the Physics Association conducting events and talks for the university audience.