

# Manish Kumar

## Curriculum Vitae

Shivaji Nagar, Jakkanpur, Patna, Bihar-800001

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### Education

- August 2019- **Integrated Ph.D.**, Indian Institute of Science Education and Research (IISER),  
Current Kolkata, West Bengal, India.
- August 2016- **B.Sc.(Hons.) in Mathematics**, CGPA: 9.54, Rajdhani College, University of  
May 2019 Delhi, Delhi, India.
- 2014-2016 **Higher Secondary in Science**, Percentage: 91.67%, D.A.V Public School,  
BSEB Colony Road, Patna, Bihar, India.
- 2014 **Class 10th**, CGPA: 10.0, R.P.S Public School, Pahari, Patna, Bihar, India.

### Research Interests

**Partial Differential Equations, Fluid Mechanics, Control Theory, Numerical Analysis:**

Linear and Nonlinear Partial Differential Equations, Fluid Mechanics, Compressible Navier-Stokes equations, Control of PDE (In particular Controllability, Stabilizability, Optimal control problem for Compressible Navier-Stokes equations, FitzHugh-Nagumo equation)

### Awards & Achievements

**PMRF Fellow**, Selected for Prime Minister Research Fellowship for May, 2021 cycle.

**Interviews**, Cracked IPhD interviews of IISER, TVM and IISER, Kolkata in 2019.

**JAM**, Got 491 rank in JAM exam in Mathematics in 2019.

**1st Topper**, In second year of my graduation at college level.

**2nd Topper**, In first year of my graduation at college level.

### Projects

#### ◦ Summer Project

Project Title: *Completion of incomplete metric space and basic topology*

I did this project in 2018 in IISER, TVM under the supervision of Dr. Srihari Sridharan and it was mainly about how the number system evolved from counting numbers to complex numbers and few approximation results of real analysis.

- **Summer Project**

Project Title: *Partial differential equations*

I did this project in 2020 under the supervision of my present PhD supervisor Dr. Rajib Dutta and it was a sort of introductory study in pde where I learned about Characteristic method of solving 1st order pde and also studied about the four important linear PDEs.

- **IPhd Project I**

Project Title: *Distribution theory and Sobolev Space*

I did this project in my 3rd semester of MS under the supervision of my PhD supervisor where I get to know about the generalisation of classical theories and about new spaces, using which we work in research.

- **IPhd Project II**

Project Title: *Controllability and Stability of ODEs*

I did this project in my 4th semester of MS under the supervision of my PhD supervisor where I got introduced to my research field,i.e., Control of PDEs. In this project because of ODE setup, everything was in finite dimension.

- **Summer Project**

Project Title: *Semigroup Theory For Operators And Control Of PDEs*

I did this project in the last summer under the supervision of my PhD supervisor where I learned the controllability and stability concepts in case of PDEs, for which I needed the semigroup theory as a tool.

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## Preprints

**Null Controllability of the Linear Stabilized Kuramoto-Sivashinsky System Using Moment Method.**

arxiv link: <https://arxiv.org/pdf/2205.03638.pdf>

**Null Controllability of a System Coupling Kuramoto-Sivashinsky-Korteweg-De-Vries and Transport Equations. .**

yet to be arxivd

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## Teaching Assistantship

Autumn 2021 **Linear Algebra I**, 2nd year undergraduate, IISER Kolkata.

- **Instructor:** Dr. Somnath Basu

Spring 2022 **Analysis II**, 2nd year undergraduate, IISER Kolkata.

- **Instructor:** Dr. Rajib Dutta

Spring 2022 **Mathematical Methods I**, 1st year undergraduate, IISER Kolkata.

- **Instructor:** Dr. Anandamohan Ghosh

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## Workshops and webinars attended

- **Title:** Webinar on PDE and related areas

**Organiser:** IIT Kanpur in collaboration with TIFR-CAM, IISER-Pune and IISER-Kolkata

**Date:** 3 September -15 December, 2020

- **Title:** NdAM Workshop - Analysis and Numerics of Design, Control and Inverse Problems  
**Organiser:** Giuseppe Floridia and Enrique Zuazua.  
**Date:** 1-7 July, 2020

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## References

- **PhD Supervisor: Dr. Rajib Dutta**  
Department of Mathematics  
Faculty  
IISER Kolkata  
West Bengal, India  
rajib.dutta@iiserkol.ac.in
- **Dr. Shirshendu Chowdhury**  
Department of Mathematics  
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## Additional responsibilities

- As a current member of Library committee of my department.
- As a current member of Outreach committee in my institute.

**Declaration:** I hereby declare that all the statements made herein are true to my best of knowledge and belief.

Place: Kolkata

Manish Kumar