



# MEMORANDUM OF UNDERSTANDING



Between

**Mr. Sudhanshu Kumar Biswas**

**Dr. Uttam Ghosh**

## Memorandum of Understanding

This Memorandum of Understanding (hereinafter called the MOU) is signed on the 21st day of March, 2020 between:

- Mr. Sudhanshu Kumar Biswas, Assistant Professor, Department of Mathematics, Sripat Singh College, Jiaganj, Murshidabad

and

- Dr. Uttam Ghosh, Assistant Professor, Department of Applied Mathematics, University of Calcutta, 92 APC Road, Kolkata 700009

regarding Research Collaborations in four published research articles on Mathematical Disease Modelling.

### Clauses of MOU

1. Research Ethics and Conflict of Interest: Both signing parties will adhere to strict research ethics, share ideas, and avoid any conflict of interest in the publication of documents or research articles.

2. Utilization of Research Grants: Both parties agree to utilize research grants from any source for the fulfillment of the project.

### Time Period of Collaboration

This MOU will remain effective until one of the signing parties wishes to withdraw from the agreement.

### Functionality of the MOU

Under this MOU, the following research publications were achieved:

1. COVID-19 Pandemic in India: A Mathematical Model Study, Nonlinear Dynamics, 102: 537-553, 2020.
2. Mathematical Modelling of COVID-19: A Case Study of Italy, Mathematics and Computers in Simulation, 194, 1-18, 2022.
3. An SEQAIHR Model to Study COVID-19 Transmission and Optimal Control Strategies in Hong Kong, Nonlinear Dynamics, 111, 6873-6893, 2022.
4. Effect of Sexual and Vertical Transmission on Zika Virus Dynamics under Environmental Fluctuations, International Journal of Biomathematics, 2450019, DOI: S1793524524500190, 2024.

### Signatories

#### First Party:

Mr. Sudhanshu Kumar Biswas  
Assistant Professor, Department of Mathematics,  
Sripat Singh College, Jiaganj, Murshidabad

#### Second Party:

Dr. Uttam Ghosh  
Assistant Professor, Department of Applied Mathematics,  
University of Calcutta, 92 APC Road, Kolkata 700009

Dated: March 21, 2020

### Signatures:

1. \_\_\_\_\_ (Mr. Sudhanshu Kumar Biswas)
2. \_\_\_\_\_ (Dr. Uttam Ghosh)