

# Stuti Pathak

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## EDUCATION

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| <b>University of Antwerp</b><br><i>Ph.D. in Applied Engineering</i>                        | 2022 - 2026 |
| <b>Indian Institute of Technology (IIT) Indore</b><br><i>M.Sc. in Physics, CPI 9.68/10</i> | 2019 - 2021 |
| <b>University of Delhi (DU)</b><br><i>B.Sc.(H) in Physics, CPI 8.216/10</i>                | 2015 - 2018 |

## EXPERIENCE

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| <b>GIM - Geographic Information Management</b><br><i>Research Internship with Data Scientist Dr. Nicholas Mboga</i>  | April 2024 - July 2024 |
| Worked in the area of machine learning-assisted 3D vision, specifically in the field of point cloud extraction and completion. Implemented data pre-processing pipelines and deep learning-based point cloud completion algorithms in the context of railway point clouds. |                        |

## INTERESTS

Point Cloud Processing, Graph Representation Learning, Network Science, Bayesian Machine Learning, Topological Deep Learning

## TECHNICAL SKILLS

**Languages:** Python, MATLAB, Scilab  
**Data Handling & Machine Learning:** PyTorch, scikit-learn, NumPy, SciPy, pandas, Matplotlib, seaborn  
**Miscellaneous:** MeshLab, CloudCompare, Meshroom, Open3D, PyTorch Geometric, PyTorch3D, NetworkX, GPyTorch, LaTeX, Docker, Cloud Computing

## PROJECTS

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| <b>Feature-Preserving Point Cloud Simplification</b><br><i>With Thomas M. McDonald, University of Manchester and Prof. Rudi Penne, UAntwerp</i>  | May 2022 - Aug 2023   |
| Proposed a novel simplification method which preserves both the salient structural features and the overall shape of a point cloud without any prior surface reconstruction step. This method employs Gaussian processes suitable for functions defined on Riemannian manifolds.             |                       |
| <b>Machine Learning Assisted System Identification of a Composite Plate (code)</b><br><i>With Dr. Ankhi Roy, IIT Indore and Dr. Rajendra Machavaram, IIT Kharagpur</i>   | Nov 2020 - Aug 2021   |
| The mechanical properties characteristic of any composite plate were identified in frequency as well as time domain using two types of neural networks: Multi-Layer Perceptron (MLP) and Radial Basis Function Network (RBFN).   |                       |
| <b>Predicting Structure from Dynamics using Neural Networks (code)</b><br><i>With Prof. Sarika Jalan, IIT Indore</i>   | Sept 2020 - Oct 2020  |
| Predicted the structure of an unknown dynamical system given its time series data. A neural network was trained to perform binary classification for two classes of networks: scale free networks and Erdős–Rényi random networks.   |                       |
| <b>Rumour Analysis using Twitter Mention Network (code)</b><br><i>With Prof. Sarika Jalan, IIT Indore</i>  | April 2020 - Aug 2020 |
| Natural Language Processing (NLP) techniques were used to pre-process and tokenize tweets written in Devanagari script, crawled for words related to COVID-19. Analysed how rumours spread through social media platforms and compared the results for two countries: India and South Korea. |                       |
| <b>Water-Level Controller using Microprocessor 8085</b><br><i>With Dr. Parul Yadav, University of Delhi</i>  | Feb 2017 - April 2017 |
| The controller built prevented overflowing of water tanks, hence minimized wastage of water.   |                       |

## PREPRINTS AND PUBLICATIONS

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- S. Pathak, T. M. McDonald, S. Sels, and R. Penne, “GP-PCS: One-shot Feature-Preserving Point Cloud Simplification with Gaussian Processes on Riemannian Manifolds,” *accepted in ICPR 2024* ([link](#))
- I. De Boi, S. Pathak, M. Oliveira, and R. Penne, “How to turn your camera into a perfect pinhole model,” in *Progress in Pattern Recognition, Image Analysis, Computer Vision, and Applications* (V. Vasconcelos, I. Domingues, and S. Paredes, eds.), CIARP 2023. Lecture Notes in Computer Science, vol 14469, Springer, Cham. ([link](#))

## ACHIEVEMENTS

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- Tutored UAntwerp’s The Company: Marketing and Finance academic course for engineering students. 2024
- Awarded Fonds Wetenschappelijk Onderzoek travel grant for attending summer school in United Kingdom. 2024
- Organized UAntwerp’s biannual Network on Gaussian Processes seminar where Prof. Dr. Stephen Roberts from University of Oxford presented his work on exoplanets. ([details](#)) 2023
- Gave an in-person talk on Understanding the Significance, Processing and Analysis of Point Clouds at Network on Gaussian Processes seminar held at UAntwerp. ([details](#)) 2022
- Secured the highest CPI among all the graduating students of the 2021 M.Sc. Physics batch of IIT Indore. 2021
- Secured All India Ranks of 358, 351 and 30 in Indian Institute of Technology Joint Admission test for Masters (IIT JAM) Physics, Joint Entrance Screening Test (JEST) Physics and Delhi University Entrance Test (DUET) Physics respectively. 2019, 2019, 2018
- Awarded Indian Council of Agricultural Research (ICAR) merit scholarships for outstanding success in the Indian Certificate of Secondary Education (ICSE) board examinations as well as the Indian School Certificate (ISC) board examinations. 2013, 2015

## SCHOOLS AND COURSES

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- **Oxford Machine Learning Summer School** in-person summer school tracks **MLx Health & Bio** and **MLx Representation Learning & Generative AI** conducted by University of Oxford and AI for Global Goals. ([certificate](#)) 2024
- **Level 1 Dutch language certificate** course conducted by Linguapolis, UAntwerp. ([certificate](#)) 2023
- **Gaussian Process and Uncertainty Quantification Summer School 2022** in-person summer school conducted by University of Sheffield. ([certificate](#)) 2022
- **Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization** online course conducted by DeepLearning.AI. ([certificate](#)) 2021
- **Neural Networks and Deep Learning** online course conducted by DeepLearning.AI. ([certificate](#)) 2021
- **Machine Learning** online course conducted by Stanford University. ([certificate](#)) 2019
- **Google AI, Explore ML Beginner Track** in-person course conducted by IIT Indore. ([certificate](#)) 2019
- **From the Big Bang to Dark Energy** online course conducted by The University of Tokyo. ([certificate](#)) 2016