

# Shreya Ghosh, Ph.D.

✉ shreya@psu.edu    🐦 @shreya

🌐 LinkedIn Profile

🌐 <https://shregghosh.github.io/>



## Employment History

- 2021 – Present    📌 **Postdoctoral Researcher.** The Pennsylvania State University, State College, USA.
- 2020 – 2021    📌 **Senior Research Associate.** Indian Institute of Technology Kharagpur, India.

## Education

- 2016 – 2021    📌 **Ph.D., , Computer Science & Engg., Indian Institute of Technology (IIT) Kharagpur**  
Thesis title: *Semantic Analysis Of Trajectory Traces To Explore Human Movement Behaviour.*
- 2015 – 2016    📌 **MS (by research). Computer Science & Engg., IIT Kharagpur .**  
CGPA: 9.15/10
- 2011 – 2015    📌 **BTech. Computer Science & Engg., Indian Institute of Engineering Science and Technology, Shibpur (IEST), India.**  
CGPA: 8.90/10

## Research Publications (Selected)

Journal Articles (◇ Joint primary author, ‡ Corresponding author. Full Publication List: [See here](#))

- J1** **FEEL: FEderated LEarning Framework for ELderly Healthcare using Edge-IoMT**  
*Shreya Ghosh*<sup>‡</sup>, and Soumya K. Ghosh. IEEE Transactions on Computational Social Systems. [I.F.: 4.747] (Accepted, Oct 2022) [PDF]
- J2** **Mobi-IoST: Mobility-aware Cloud-Fog-Edge-IoT Collaborative Framework for Time-Critical Applications**  
*Shreya Ghosh*<sup>‡</sup>, Anwesha Mukherjee, Soumya K. Ghosh, and Rajkumar Buyya. IEEE Transactions on Network Science and Engineering (TNSE), Volume 7 (4), pp. 2271-2285, IEEE 2020 [I.F.: 5.03] [PDF]
- J3** **LYRIC: Deadline and Budget Aware Spatio-Temporal Query Processing in Cloud**  
Jaydeep Das<sup>◇</sup>, *Shreya Ghosh*<sup>◇</sup>, Soumya K. Ghosh and Rajkumar Buyya. IEEE Transactions on Services Computing, 2021. doi: 10.1109/TSC.2021.3073006. [I.F.: 11.019] [Accepted, in Press] [PDF]
- J4** **MCG: Mobility-aware Computation Offloading in Edge using Weighted Majority Game**  
Anwesha Mukherjee, *Shreya Ghosh*<sup>‡</sup>, Debashis De, and Soumya K. Ghosh. IEEE Transactions on Network Science and Engineering, 2022. [I.F.: 5.033] [Accepted, in Press] [PDF]
- J5** **MARIO: A spatio-temporal data mining framework on Google Cloud to explore mobility dynamics from taxi trajectories.**  
*Shreya Ghosh*<sup>‡</sup>, Soumya K. Ghosh and Rajkumar Buyya. Journal of Network and Computer Applications (JNCA), ISSN: 1084-8045, Elsevier, Amsterdam, The Netherlands Press, 2020. [I.F.: 7.574] [PDF]

## Conference Articles

- C6** **Clock Against Chaos: Dynamic Assessment and Temporal Intervention for Reducing Misinformation Propagation**  
*Shreya Ghosh*, Prasenjit Mitra and Preslav Nakov. The 18<sup>th</sup> International AAAI Conference on Web and Social Media (ICWSM) 2024 (accepted, to appear)
- C7** **Catching Lies in the Act: A Framework for Misinformation Detection on Social Media**  
*Shreya Ghosh* and Prasenjit Mitra. ACM Hypertext 2023 (accepted, to appear) [A rank]
- C8** **How Early can we Detect? Detecting Misinformation on Social Media Using User Profiling and Network Characteristics**

**Shreya Ghosh** and Prasenjit Mitra. ECML PKDD 2023 (accepted, to appear) [A rank]

- C9 Analysis of Elephant Movement in Sub-Saharan Africa: Ecological, Climatic, and Conservation Perspectives**  
Matthew Hines, Gregory Glatzer, **Shreya Ghosh** and Prasenjit Mitra. ACM SIGCAS/SIGCHI Conference on Computing and Sustainable Societies (COMPASS 2023) [Accepted, to appear] [PDF]
- C10 Activity-Based Mobility Profiling: A Purely Temporal Modeling Approach**  
**Shreya Ghosh**, Soumya K. Ghosh, Rahul Deb Das, and Stephan Winter. 27<sup>th</sup> International World Wide Web Conference (WWW), pp. 409-416, ACM, Lyon, France, Apr 23-27 2018. [A\* rank] [PDF]
- C11 Modeling of Human Movement Behavioural Knowledge from GPS Traces for Categorizing Mobile Users**  
**Shreya Ghosh**, Soumya K. Ghosh. 26<sup>th</sup> International World Wide Web Conference (WWW), pp. 51-58, ACM, Perth, Australia, Apr 3-7, 2017. [A\* rank] [PDF]
- C12 CLAWER: Context-aware Cloud-Fog based Workflow Management Framework for Health Emergency Services**  
**Shreya Ghosh**, Jaydeep Das, Soumya K. Ghosh and Rajkumar Buyya. 20<sup>th</sup> IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CCGrid 2020, IEEE CS Press, USA), pp. 810-817, Melbourne, Australia, May 11-14, 2020. [A rank] [PDF]

#### Other Peer-reviewed Articles (Demo (D\*), Poster (P\*) and Authored Book (B\*))






- B13 Machine Learning Techniques for Spatio-temporal Mobility Data.**  
**Shreya Ghosh** and Prasenjit Mitra. Cambridge University Press (in preparation) [PDF]
- D14 Lumos in the Night Sky: AI-enabled Visual Tool for Exploring Night-Time Light Patterns**  
Jakob Hederich, **Shreya Ghosh**, Zeyu He and Prasenjit Mitra. ECML PKDD 2023 (accepted, to appear) (Demo Track) [A rank] [PDF]
- D15 Understanding the Night-Sky? Developing AI-Enabled System for Exploring Night-Light Usage**  
Jakob Hederich, **Shreya Ghosh**, Zeyu He and Prasenjit Mitra. The 32nd International Joint Conference on Artificial Intelligence (IJCAI 2023) (accepted, to appear) (Demo Track) [A\* rank]
- P16 Can You Answer This? Exploring Zero-Shot QA Generalization Capabilities in Large Language Models**  
Saptarshi Sengupta, **Shreya Ghosh**, Preslav Nakov and Prasenjit Mitra. Thirty-Seventh AAAI Conference on Artificial Intelligence, 07-14 Feb, 2023. (Poster) [A\* rank] [PDF]
- P17 MANTRA: Semantic Mobility Knowledge Analytics Framework for Trajectory Annotation**  
**Shreya Ghosh**, and Soumya K. Ghosh. IEEE International Conference on Computer Communications (IEEE INFOCOM), 02-05 May, 2022 (Poster) [A\* rank] [PDF]
- P18 THUMP: Semantic Analysis on Trajectory Traces to Explore Human Movement Patterns**  
**Shreya Ghosh**, Soumya K. Ghosh. 25<sup>th</sup> International World Wide Web Conference (WWW), pp. 35-36, ACM, Montreal, Canada, Apr 11-15th, 2016. (Poster) [A\* rank] [PDF]

Google Scholar Profile: <https://scholar.google.co.in/citations?user=a50Ko7wAAAAJ&hl=en>





## Research Funding

- 2023 – 2025
- How far are we in developing sustainable ecosystem: AI-based Wildlife data analytics [\$34,000 Penn State Seed Grant]. PI/ Co-PI: Johnson Kinyua, **Shreya Ghosh**, Prasenjit Mitra, and Titus Adhola. **Lead the proposal development and submission.**
  - Unraveling the Impact of Human Activities on Wildlife: An AI-Powered Multimodal Data Analysis [\$50,000 BIG (Big Ideas Grant) Seed Funding 2023]. PI/Co-PI: Prasenjit Mitra, **Shreya Ghosh**, Bing Pan, Peter Newman. **Lead the proposal development and submission.**

## Professional Activities







- 2023, Nov      **1st ACM SIGSPATIAL International Workshop on AI-driven Spatio-temporal Data Analysis for Wildlife Conservation (GeoWildLife 2023). SigSpatial'2023** (Workshop Co-Chair with Prasenjit Mitra, Bistra Dilkina, Thomas Müller). **Lead the proposal development and website preparation** [\[LINK\]](#)
- 2023, Oct      **1st ACM SIGSPATIAL International Workshop on Geocomputational Analysis of Socio-Economic Data (GeoSocial 2023). SigSpatial'2023** (Workshop Co-chair with Soumya K Ghosh, Budhendra Bhaduri, Alexander Zipf) [\[LINK\]](#)
- 2023, Oct      **Info-Wild: Knowledge Extraction and Management for Wildlife Conservation. CIKM 2023** (Workshop Co-Chair with Prasenjit Mitra, Bistra Dilkina, Thomas Müller). **Lead the proposal development and website preparation** [\[LINK\]](#)
- 2022, June      **Misinformation and Disinformation in Social Media: Where we are and the Path Ahead** [16th International Conference on Web and Social Media (AAAI ICWSM 2022), 06-June-2022, Atlanta] [\[LINK\]](#) (Tutorial co-organized with Prasenjit Mitra) **Lead the tutorial material preparation and presentation**
- 2019 – Present      PC Member in CCGRID, ECML PKDD, IEEE Cloud, ACM SigCOMM, MiddleWare, ACM HyperText.

## Skills




- Coding      Python, R, C, SQL, XML/XSL, HTML, CSS, JavaScript, Apache Web Server,  $\text{\LaTeX}$ .
- Databases      MySQL, PostgreSQL, POSTGIS.
- Misc.      Tensorflow, Google Cloud, SUMO, QGIS.
- Languages      Strong reading, writing and speaking competencies in English, Bengali and Hindi.

## Miscellaneous Experience

### Teaching and Advising

- 2016      *Programming and Data structure of 120 students, IIT Kharagpur.* Conducting tutorial class (3 hours/ week) and help students to understand the basic concepts and how to solve problems using computer programmes.
- 2017 – 2019      *Cloud Computing Course of 90 students.* Served as a TA in three semesters, where I was mainly involved in taking tutorial (on MapReduce, public cloud platforms) and demo sessions (1 hour/ week), finalizing the question paper of final exams and evaluating and conducting the quizzes, demo presentations in small group of students.
- 2018 – 2020      *Geographical Information System Course.* Served as a TA in three semesters, where my major responsibility was finalizing and formatting the course materials and taking tutorial classes to illustrate spatial database namely Oracle Spatial and Graph, PostGIS, spatial processing tool QGIS.
- 2018 – 2021      **Study Webs of Active-Learning for Young Aspiring Minds (SWAYAM), Government of India:** (I) *Cloud Computing* (above 30,000 enrolled candidates). (II) *Google Cloud Computing Foundations*. (III) *Spatial Informatics*
- 2019 – 2021      **Mentoring (6 UG, 5 PG), IIT Kharagpur:** Successfully mentored final and pre-final year projects on *Internet of Health Things, hybrid path planning and crowd flow analysis*.
- 2022 – 2023      **Mentoring (1 MS, 2 PhD), Penn State:** Assisting students towards their dissertations on *nighttime light data analytics, opinion mining from social media and Question answering system*.

### Awards and Achievements

- 2018 – 2023      **Travel Grant**, ACM Hypertext'23, ECML PKDD D&I'23, Microsoft Research Travel (for WWW'17), ICPR/IAPR Travel'18, International Travel Scheme Award, SERB, DST'18 and IEEE Student Travel'18
- 2017 – 2020      **TCS PhD Research** Scholarship
- 2016      **Award in IBM Day Demo competition.** Title: *Mobility Summary and User Categorization based on Semantic Analysis of Human Movement Patterns*

## Miscellaneous Experience (continued)

- 2015     **2nd rank in Cognizant CIO's Challenge for Students**, Selected in IT foundation of Cognizant Certified Program. Developed an web-application titled *SQL-VAL: Validate your SQL queries without executing!* to upload and validate SQL query syntax without execution.
- 2011     **Government Merit Scholarship (TOP 10 in State)** for Graduate Study for Outstanding Performance in Higher Secondary Examination.
- 2011, 2015, 2019     **WBJEE'11** (Rank 278 among  $\approx 1.5$  lakh students), **The Graduate Aptitude Test in Engineering, GATE'15** (Rank 386 among  $\approx 1.2$  lakh students), **TOEFL IBT'19** (Score: 109/120)

## References

**Dr. Prasenjit Mitra.** Professor, Penn State, USA Email: pmitra@psu.edu. [Postdoc advisor]

**Dr. Soumya K. Ghosh.** Professor, IIT Kharagpur, India Email: skg@cse.iitkgp.ac.in. [PhD advisor]

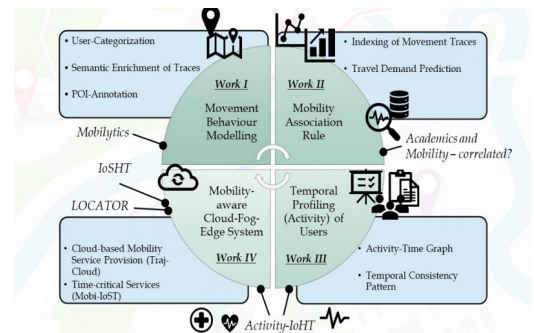
**Dr. Rajkumar Buyya.** Redmond Barry Distinguished Professor, The University of Melbourne, Australia. Email: rbuyya@unimelb.edu.au [Research collaborator]

## Research Summary

**Research Interests:** Natural Language Processing, Social Computing Analysis, Spatio-temporal Data Mining, Mobility on Demand, Cloud-Edge computing paradigm.

- **PhD Research Summary:** My PhD research work is motivated by the fact that human moves with an intent, and mapping the intent of the move with raw GPS log provides usable knowledge to build an effective system.

In this regard, the major objectives of this work are (i) extracting and modelling semantic knowledge of human movement behaviours, and (ii) finding the correlations among movement behaviour of people and other contexts by retrieving mobility association rules, (iii) deploying mobility-aware hierarchical and collaborative cloud-fog-edge-IoT architecture and provisioning mobility-as-a-service.



- **Understanding Public Perception and Identifying Misinformation Flow in Social Media** Social media plays a pivotal role in information acquiring, exchanging and expressing public opinions and perceptions in a unprecedented scale. Our aim is to develop a end-to-end social media data analytics framework to understand public opinion and public action effectively leveraging natural language processing and novel machine learning methods. Further, we attempt to identify misinformation propagation and echo-chamber effects in social network effectively.
- **Leveraging Generative Models for Semantic Trajectory Analysis** Leveraging the advancements in deep learning, as evident by progress in the field of natural language processing (NLP), computer vision, etc. we intend to create intelligent models that can study the semantic trajectories in various contexts, predicting future trends, increasing machine understanding of movement of animals, humans, goods, clouds, etc. enhancing human-computer interactions, and contributing to an array of applications ranging from urban-planning to personalized recommendation engines and business strategy.
- **Wildlife Mobility Pattern Analysis**  
Our goal is to analyse trajectory traces of wildlife and extracting traits and shape-based characteristics of mobility patterns of different animal species. Apart from spatio-temporal data (wildlife movement, landuse etc.) analysis, we aim to explore text-based survey and news data for understanding the perception of local community regarding human wildlife conflicts.

**\*\*My research statement is:** here.

**\*\*My teaching statement is:** here.