

ANIMIKH ROY

Phone:(+91) 9830157251 / (+44) 7949263225
email: roy.cosmology@gmail.com / ar505@sussex.ac.uk
Pronouns: he/him — Personality: INTJ
<https://www.royspaceboy.com/>

About Me

I am a student of Astronomy at the University of Sussex, in England and an independent AI Consultant for Tech-Enterprises, with passion & expertise in STEM oriented interdisciplinary applications of Physics, Mathematics & Computer Science leveraging advances in Astrophysics, Topological Data Analytics, Deep Learning and Data Science. I am currently affiliated to IUCAA (Pune) as a Visiting Research Fellow in Gravitational Wave & Multi-messenger Astronomy. I am a transhumanist, interdisciplinary thinker with Kinaesthetic Synaesthesia & a Mensa IQ score of 149. I aim to contribute towards the understanding of “Dark Matter” and making humankind an interplanetary species.

Research Interests

- Compact Binary Coalescence (CBC) Classifications & Search for Primordial Black Hole Dark Matter using Machine Learning & Topological Data Analysis
- LIGO-Virgo & Multi-messenger Data Analysis with Topological Graph Theory & R-K Diagrams
- Topological Classification of Terrestrial noise & Glitches in LIGO-Virgo detectors
- Topological Analysis of Eccentric, Precessing & Lensed Binaries

Education

Master of Science in Astronomy March 2021
University of Sussex, United Kingdom
Highest Distinction Awardee
Total Aggregate: 88% equivalent of Average unweighted GPA: 4.0/4.0

Bachelor of Science in Physics, Mathematics Jan. 2014
St. Xavier’s College (Autonomous) Kolkata, India
Average unweighted GPA: 6.28/10.0

Indian School Certificate (ISC) May 2010
St. Xavier’s College (Autonomous) Kolkata, India
Total Aggregate: 94.5%

Indian Certificate of Secondary Education (ICSE) May 2008
St. Xavier’s College (Autonomous) Kolkata, India
Total Aggregate: 95%

Awards and Honors

Highest Academic Distinction for Original Thesis on “*Search for PBH Dark Matter with GW Analysis using R-K Diagrams*”. Subsequently granted Academic Independence for pursuing original research with “*Roy-Kesselman Diagrams*” 2022

Award for the Highest Distinction in Astronomy (University of Sussex, UK) 2021

Mensa IQ (On-line, Norway) Score: 149 (99.94th Percentile) 2020

Chevening Fellowship (Finalist) 2016

Mani Bhaumik Fellowship (NIAS,IISc, Bangalore, India) 2015

Publications

Animikh Roy (University of Sussex, UK), Andor Kesselman (Pathr.ai, USA), "A Novel Approach to Topological Graph Theory with R-K Diagrams and Gravitational Wave Analysis." [[arXiv:2201.06923](https://arxiv.org/abs/2201.06923) [[astro-ph.HE](#)] (14 Dec 2021)]
<https://arxiv.org/abs/2201.06923> *Subjects: High Energy Astrophysical Phenomena (astro-ph.HE); Machine Learning (cs.LG); General Relativity and Quantum Cosmology (gr-qc)*

Research Experiences

LIGO & GW Astronomy: Gravitational Wave & Multi-messenger Data Analysis with Topological Graph Theory & Machine Learning

Sept. 2022 - Present

IUCAA (Pune, India)

Visiting Research Fellow under Prof. Sanjit Mitra (LIGO-India Project Coordinator)

- Applying Machine Learning and Topological Graph Theory to CBC (Compact Binary Coalescence) Classifications
- Application of the R-K Toolkit, Pipeline & Diagrams on GW & Multi-messenger data
- Topological Analysis of Terrestrial noise & Glitches in LIGO Virgo detector signals
- Applying Topological Graph Theory to study eccentric, precessing & lensed compact binaries

GW & Multi-messenger Astronomy: Machine Learning, Gravitational Waves & Geophysics

July 2022

University of Glasgow (UK)

Visiting Researcher and Invited Speaker by Prof. Siong Heng (Chief Organizer G2net Glasgow)

- Invited as a speaker to present Original Publication on "A Novel Approach to Gravitational Wave Analysis of Compact Binaries with R-K Diagrams"
- Participated in group research and discussions on future research on Machine Learning in GW & Multi-messenger Astronomy

Astronomy: Primordial Black Holes, Dark Matter & Gravitational Waves

Oct. 2016 - Aug 2022

University of Sussex (UK)

Adviser: Dr. Christian Byrnes (Royal Society Research Fellow & Reader of Astronomy)

- Researched extensively on identifying and classifying Primordial Black Hole Signatures based on a detailed study of Mass, Spin & Geometry
- Carried out simulation studies on the effective spins and masses of Compact Binaries & PBH candidates
- Built a sample computational framework for the identification and classification of Compact Binary-Mergers

Cosmology & Quantum Mechanics : The Quantum Measurement Problem

July 2015 - Dec. 2015

NIAS, IISc (India): *Mani Bahumik Research Fellowship Program*

Mentored by Prof. Sisir Roy (Professor of Physics & Mathematics)

- Worked on the different interpretations of Quantum Mechanics

- Researched on the Quantum Measurement & Quantum Eraser Problems
- Presented a review paper on “*The Role of Consciousness in the Quantum Measurement Problem*” at the International Conference on Consciousness at the NIAS, IISc.

Cosmology: Aspects of General Relativity & the Physics of Black Holes

June 2013 - Feb. 2014

Indian Association for the Cultivation of Science: *Research Internship*

Adviser: Prof. Soumitra Sengupta (Amal Kumar Raychaudhuri Chair Professor of Physics)

- Worked on the General Theory of Relativity & the physics of: Schwarzschild Black Holes, charged Reissner Nordstrom Black Holes, rotating Kerr Newman Black Holes
- Researched on Penrose Diagrams and the Penrose process of Energy-Extraction
- Submitted a thesis and review paper on ”The Physics of Black Hole” with extensive mathematical derivations & calculations

Cosmology: Particle Orbits in Schwarzschild Geometry & Penrose Diagrams of Black Holes

Dec. 2013 - Jan. 2014

Center for High-Energy Physics, IISc (India): *Winter Internship*

Adviser: Prof. Aninda Sinha (Professor of Physics)

- Worked on the Kruskal Extension of black-holes with Penrose diagrams
- Worked on computer simulations of particle orbits and innermost stable circular orbits in Schwarzschild Geometry.

Talks

”*A Novel Approach to Gravitational Wave Analysis of Compact Binaries using R-K Diagrams*” July 2022

e-COST ACTION: G2Net Innovation Conference on Machine Learning, Gravitational Waves & Geophysics

University of Glasgow (UK)

”*A Novel Approach to Gravitational Wave Analysis of Compact Binaries & the Search for Primordial Black Hole Dark Matter*” May 2022

Seminar on LIGO-Virgo & Gravitational Wave Astronomy

Inter University Center of Astronomy & Astrophysics (IUCAA) (Pune, India)

”*Primordial Black Holes as Candidate Dark Matter & their detection using Gravitational Wave Analysis*” Jan. 2021

Astronomy Projects & Thesis Presentation Series Talks

University of Sussex (UK)

https://youtu.be/JVtC_C41IvU?list=TLGGRLFmrqzMWUwODEyMjAyMQ

”*Computational Pipeline for Topological Graph Analysis of Gravitational Wave Data with R-K Diagrams*” Jan. 2021

Astronomy Projects & Thesis Presentation Series Talks

University of Sussex (UK)

<https://youtu.be/iwMsETob58w?list=TLGGpwVhXk3WJvIwODEyMjAyMQ>

“Mathematical Methods in Machine Learning & Neural Nets” Jun. 2019
Lecture Series for Programmers and Developers
Integra Micro Systems, (Bangalore, India)

“Big-Bang & The Early Universe” Dec. 2015
International Conference on Consciousness
National Institute of Advanced Studies, Indian Institute of Science, (Bangalore, India)

Posters

“The various interpretations of Quantum Mechanics & the Quantum Measurement Problem”

- December 2015: International Conference on Consciousness, NIAS, IISc, Bangalore, India. (*January 2016: Featured in Nature India*)

Relevant Coursework

- **Astronomy & Astrophysics:** General Relativity, Advanced Cosmology, Stellar and Galactic Astrophysics, Inflation & the Early Universe, Extragalactic Astronomy & Astrophysical Processes.
- **Mathematics:** Topology, Graph Theory, Tensor Calculus, Riemannian Geometry, Manifolds, Differential Geometry, Vector Analysis, Probability & Statistical Modelling.
- **Computer Science:** Python for Data science & Machine Learning Bootcamp, Deep Learning: Recurrent Neural Networks in Python, Deep Learning: Convolutional Neural Networks in Python, PowerBI for Business Intelligence, Big-Data & Hadoop for Beginners, The Git & GitHub Bootcamp.

Skills

- Programming languages: Python, Tensorflow, Pytorch, Java, CSS, HTML5
- Operating systems: Windows, Mac OS, Linux
- Software Tools: Python (Jupyter, Spyder & GWpy), Tensorflow, Matlab, Mathematica, Github, PowerBI, Tableau, BIRD, LaTeX

Professional Background

- **Co-Founder & Chairman - Wishtales LLC (Delaware, USA) & Wishtales Technologies Pvt. Ltd. (Bangalore, India) (2023-Present)**
Responsible for conceiving, building & leading the Generative AI SAAS Product www.wishtales.ai, which offers a unique combination of cutting-edge Generative AI solutions with Large-Language Models, Generative Image, Generative Videos, Narrative AI & Compositional AI.
- **AI Consultant, Senior Lead in R&D & AI Product Architect – Integra MicroSystems (2019-Present)**
Responsible for Product Management, Product Promotion, Customer Interfacing, Design & Development of the company’s flagship Chatbots and Virtual Assistant & Digital Worker: Hermes & KnowledgeBOT combining cutting-edge research in AI, ML, NLP, Big-Data & Visual Analytics with state-of-the-art UI/UX designs.
- **Senior Lead in R&D (Consultant) - BIRDAanalytics (2018-2021)**
Responsible for R&D in AI & ML to build state of the art AI Augmented Big-Data Analytics solutions while defining project roadmaps, business objectives and features for product development based on advances in AI driven Big-Data Analytics & market research

Outreach

Student Convener & Chief Student Representative, St. Xavier's College Department of Physics
June 2012 - June 2013

- Responsible for leading and organizing all inter-college and inter-departmental events, contests, conferences, symposiums talks and outreach activities related to the department of Physics at St. Xavier's College, Kolkata, India.

Inter-departmental Secretary & Student Head, St. Xavier's College Science Association
June 2011 - June 2013

- Responsible for leading and organizing all inter-college and inter-departmental events, contests, conferences, symposiums talks and outreach activities related to the St. Xavier's College Science Association (SXCSA).

Extracurricular Activities

Chief Student Editor., St. Xavier's College Physics Departmental Magazine & Journal
June 2012 - June 2013

- Led the editorial & publication teams of the Physics Department Magazine & Journal. Responsible for heading: announcements of scientific outreach activities, collaboration, planning, designing, editing, printing and publication.

Chief Student Editor., St. Xavier's College Science Association Magazine & Journal
June 2011- June 2013

- Led the editorial & publication teams of the Science Association Magazine & Journal. Responsible for heading: scientific outreach activities, collaboration, planning, designing, editing, printing and publication.

Debate: British Council Debating Matters (India) & Institute of Ideas (UK)

- Regional Champion (1st Prize) & Best Speaker of British Council National Debate, Delhi.
- Winner (1st Prize) & Best Speaker of the Science Debate on Space Exploration, British Council Regional Debate, Kolkata.
- Field Judge of British Council Debating Matters India, in Association with the Institute of Ideas (UK)

Music (Piano): Royal School of Music (London, UK)

- Recipient of Gold medal and distinction for scoring full marks (100/100) in Piano examination