Chayan Chatterjee

Address: 2/24, Cook Street, Crawley, Western Australia - 6009
Phone: (+61)-0410824026 • Email: chayan.chatterjee@research.uwa.edu.au

EDUCATION

- **Doctor of Philosophy in Physics** February 2020 - present
  The University of Western Australia, Australia
  Project topic: Real-time localization of gravitational wave events from compact binary coalescences using deep learning.
  Supervisors: Prof. Linqing Wen, Prof. Amitava Datta.

- **Master of Science in Physics** [List of Courses] Aug 2016 - Jan 2019
  Presidency University, Kolkata, India
  Specialization: Astrophysics and Cosmology
  CGPA: 7.6/10.00
  Supervisors: Prof. Debasish Majumdar, Dr. Suchetana Chatterjee.

- **Bachelor of Science (Hons) in Physics** [List of Courses] Jul 2013 - Jun 2016
  Presidency University, Kolkata
  CGPA: 7.58/10.00, **Division:** First Class
  Thesis: The Hertzsprung-Russell Diagram of stars in the SDSS Stripe-82 Catalog
  Supervisor: Dr. Saumyadip Samui.

- **Indian School Certificate Examination (ISC)** Mar 2013
  Institution: M.C. Kejriwal Vidyapeeth, Liluah, West Bengal
  Percentage: 93.25

- **Indian Certificate of Secondary Education Examination (ICSE)** Mar 2011
  Institution: M.C. Kejriwal Vidyapeeth, Liluah, West Bengal
  Percentage: 95.8

RESEARCH INTERNSHIPS

- **Visiting Research Student** March 2019 - February 2020
  The University of Western Australia, Australia
  Project topic: Using deep learning to localize gravitational wave sources.
  Supervisors: Prof. Linqing Wen, Prof. Amitava Datta, Prof. Kevin Vinsen.

- **Summer Internship Student** June 2017 - July 2017
  Indian Institute of Science Education and Research - Thiruvananthapuram
  Project topic: Duality relation between inflation and collapse via the Korteweg-De Vries equation
  Supervisors: Prof. S. Shankaranarayanan, IIT Bombay

RESEARCH INTERESTS

- Gravitational Waves: Data Analysis and Parameter Estimation.
- Deep learning
- Bayesian inference
- Computational Astrophysics and Cosmology.

RESEARCH PAPERS - PUBLISHED AND SUBMITTED

1. "Rapid mass parameter estimation of binary black hole coalescences using deep learning" - Alistair McLeod, Daniel Jacobs, Chayan Chatterjee, Linqing Wen, and Fiona Panther (Submitted) [ArXiv:2201.11126].
2. "Extraction of binary black hole gravitational wave signals from detector data using deep learning" - Chayan Chatterjee, Linqing Wen, Foivos Diakogiannis, Kevin Vinsen -(Published 16 September 2021) [Phys. Rev. D 104, 064046].
3. "Enhancing gravitational-wave science with machine learning" - Elena Cuoco et.al. - (Published 1 December 2020) [2021 Mach. Learn.: Sci. Technol. 2 011002].
4. "Using Deep Learning to Localize Gravitational Wave Sources", Chayan Chatterjee, Linqing Wen, Kevin Vinsen, Manoj Kovalam, Amitava Datta - (Published 26 November 2019) [Phys. Rev. D 100, 103025].

JOURNALS REFEREED

1. Referee for Science China Physics, Mechanics and Astronomy (2020)
2. LIGO Publications and Presentations reviewer.

SCHOLARSHIPS AND AWARDS

- J-P Macquart Best Student Talk Award - Australian National Institute for Theoretical Astrophysics (ANITA) Conference (2022) - Runner - Up.
- Australian Mathematical Sciences Institute (AMSI) Summer School - Participant Talks - Winner (2022).
- J-P Macquart Best Student Talk Award - Australian National Institute for Theoretical Astrophysics (ANITA) Conference (2021)- Winner.
- FameLab Western Australia finalist (2021).
- University of Western Australia Three Minute Thesis (3MT) competition winner (2020) and People's Choice Award winner (2020).
- Asia-Pacific 3MT finalist (2020).
- Scholarship for International Research Fees and International Living Allowance Scholarship for 2020 - awarded by The University of Western Australia.
- Indian Institute of Science Education and Research - Thiruvananthapuram Visiting Research Student Fellowship (2017).
- Matariki Network of Universities (MNU) 3MT finalist (2020).

STANDARDIZED EXAMINATION SCORES

TOEFL iBT September, 2018
Score: 107/120
Reading: 27/30, Listening: 27/30, Speaking: 25/30, Writing: 28/30.

Graduate Aptitude Test in Engineering (GATE)
Physics paper [Score Card] March, 2019
Rank: 1744 out of 16296 candidates.

TEACHING/SUPERVISION

1. Teaching Facilitator for unit SCIE1121: Our Universe at Department of Physics, The University of Western Australia. 2020 - present.
2. Supervision of three summer internship, Bachelors and Masters students for their project work on gravitational wave parameter estimation using machine learning. 2020 - 2021
3. Supervision of Physics students at field trip. 2021 - present.
4. Teaching instructor of Physics and Mathematics to high school students (Grade 11 and 12). 2016 - 2018.

PROFESSIONAL EXPERIENCE

- **Steering Committee Member** March 2022 - present
  Australian National Institute for Theoretical Astrophysics (ANITA).
  Responsibilities: Organize the annual ANITA Meeting and Harley Wood Winter School for providing training and professional development to Astrophysics PhD students in Australia.

- **Postgraduate Student Research Representative** Dec 2020 - present
  Postgraduate Student Association - University of Western Australia Student Guild
  Responsibilities: Address issues faced by Higher Degree by Research (HDR) students, liaise with Graduate Research School to improve postgraduate student experience, organize Research Week conference, workshops and social events.

- **Early Career Researcher Representative** Sep 2021 - present
  OzGrav-University of Western Australia
  Responsibilities: Responsible for co-organizing the annual OzGrav Retreat and Early Career Researcher Workshop. Provide ideas and suggestions for academic and social activities.

- **Mentor and Volunteer - NASA Space Apps Challenge 2021** Sep 2021 - Oct 2021
  NASA Space Apps Team - Perth, Western Australia
  Responsibilities: Responsible for promoting and marketing the NASA Space Apps Challenge 2021 event. Mentor participating teams in solving real world problems using NASA data.

- **Co-ordinator - Presidency University Physics League** March 2015 - April 2017
  Student-led Physics association at Presidency University, India
  Responsibilities: Organize student activities, seminars, coding workshops and tutorials. Organize alumni reunion of the Physics department and the national Physics symposium of Presidency University, India.

- **House Captain** March 2012 - March 2013
  Beta House - M. C. Kejriwal Vidyapeeth, West Bengal, India
  Responsibilities: Lead initiatives organized by the school, partcipate and lead in inter-house and inter-school competitions and sporting events

- **House Vice-Captain** March 2011 - March 2012
  Beta House - M. C. Kejriwal Vidyapeeth, West Bengal, India
  Responsibilities: Lead initiatives organized by the school, partcipate and lead in inter-house and inter-school competitions and sporting events

INVITED TALKS

- *"Parameter Estimation of Gravitational Wave Sources Using Deep Learning"*
  University of Wisconsin-Milwaukee, USA - CGCA seminar talk October, 2021
- *"Denoising and Parameter Estimation of Gravitational Waves Using Deep Learning"*
  Western Sydney University, Australia - Department of Physics seminar talk August, 2021
- *"Denoising and Localization of Gravitational Waves Using Deep Learning"*
  University of Western Australia - Department of Computer Science and Software Engineering seminar talk October, 2021
- *"How do we detect and localize gravitational waves in real-time?"*
  Presidency University Physics Department Alumni Lecture Series December, 2020
- *"Using Deep Learning to Localize Gravitational Wave Sources"*
  Deep Learning Specialization Workshop for Astronomers - International Centre for Radio Astronomy Research (ICRAR) November, 2020

CONFERENCE PRESENTATIONS

1. Oral presentation, *"Real-time localization of gravitational waves from compact binary coalescences using deep learning"* at:
   - Australian National Institute for Theoretical Astrophysics Conference February, 2022.
   - American Physical Society (APS) April Meeting April, 2022.
2. Oral presentation, *"Denoising and Localization of Gravitational Wave Sources Using Deep Learning"* at:
   - GW-MULL meeting July, 2021
   - Astronomical Society of Australia (ASA) Meeting July, 2021
   - OzGrav Rapid Transients Workshop May, 2021
   - Australian National Institute for Theoretical Astrophysics (ANITA) Conference February, 2021
3. Oral presentation, *"Denoising Gravitational Wave Signals Using Deep Learning"*, LIGO Machine Learning Applications telecon June, 2021
4. Oral presentation, *"Using Deep Learning to Localize Gravitational Wave Sources"* at:
   - LIGO-Virgo KAGRA (LVK) Collaboration Meeting September, 2020
   - Australian Institute of Physics (AIP), Western Australia Student Conference November 2019, November 2020
   - Compact Binary Coalescence group (East) teleconference - talk delivered to the Ligo-Virgo Collaboration (LVC) August 29, 2019
   - Machine Learning Applications group teleconference - talk delivered to LVC September, 2019
5. Poster presentations

- *"Gravitational Wave Denoising and Localization Using Deep Learning*, Amaldi Meeting - 2021. July, 2021
- *"Gravitational Wave Denoising and Localization Using Deep Learning*, LIGO-Virgo-KAGRA Meeting - 2021. July, 2021
- *"Using Deep Learning to Localize Gravitational Wave Sources*, OzGrav Retreat - 2019. November 19-22, 2019
- *"Dark Matter Self-Interactions and its impact on Large Scale Structures"*, 30th Meeting of the Indian Association of General Relativity and Gravitation (IAGRG) conference, 2019. January 3-5, 2019

PUBLIC TALKS AND OUTREACH

- Invited guest at podcast -*Curiosity Killed the Rat* (2021)
- Invited guest at podcast - *Astrophiz: An Astronomy Podcast* (2021)
- Invited guest at science talk show - *The Uncertainty Principle Presents: Science After Dark* - Perth Fringe Festival (2021).
- Oral presentation, *"Wonders of Physics - From quarks to the Cosmos"*, M.C. Kejriwal Vidyapeeth, India - 25th Foundation Year Celebration (2021).
- Oral presentation, *"The Life, Death and Afterlife of Stars"*, University of Western Australia - India Week Celebration (2021).
- Oral presentation, *"Why did I choose to do a PhD?"*, University of Western Australia - Summer Down Under Internship Programme (2021).
- FameLab Western Australia final (2021).
- UWA Three Minute Thesis (3MT) presentation (2020).
- Volunteer for SciVR event at UWA (2020).
- Volunteer at UWA Open Day - demonstrated Physics experiments (2019, 2021).
- Presenter for OzGrav at Astrofest 2020, 2021.
- *"Machine Learning Applications in Gravitational Wave Research"*
  JAM Coaching Institute, Kolkata October, 2020

MEDIA RELEASE

- *Curiosity Killed the Rat: Pint of Science Special Episode (ft. Chayan Chatterjee)* (2021)
- *Astrophiz122: Chayan Chatterjee – Gravitational Wave AI Detective.* (2021)
- Invited guest at science talk show - *The Uncertainty Principle Presents: Science After Dark* - Perth Fringe Festival (2021).
- *"Algorithms now helping find Gravitational Wave sources"* - Space Australia (2019).

TECHNICAL SKILLS

Programming Languages	Python, Fortran.
Softwares and Packages Used	NumPy, Scipy, Matplotlib, GADGET 2 , LaTeX.
Deep Learning Packages Used	TensorFlow 2, PyTorch, Scikit-Learn.
Operating Systems	Linux (Ubuntu), Windows.

OTHER SKILLS

- **Science communication**
- **Public speaking**
- **Creative Writing**
- **Painting**

REFEREES

- **Prof. Linqing Wen (Principal Supervisor): linqing.wen@uwa.edu.au**
- **Prof. Amitava Datta (Co-Supervisor): amitava.datta@uwa.edu.au**
- **Dr. Foivos Diakogiannis (Collaborator): foivos.diakogiannis@data61.csiro.au**
- **Kevin Vinsen (Collaborator): kevin.vinsen@uwa.edu.au**