Gravitational Wave Astronomy @ UWA Physics

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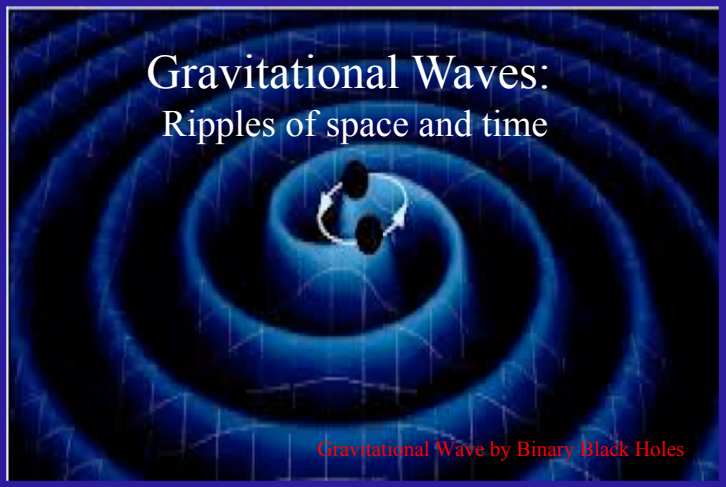
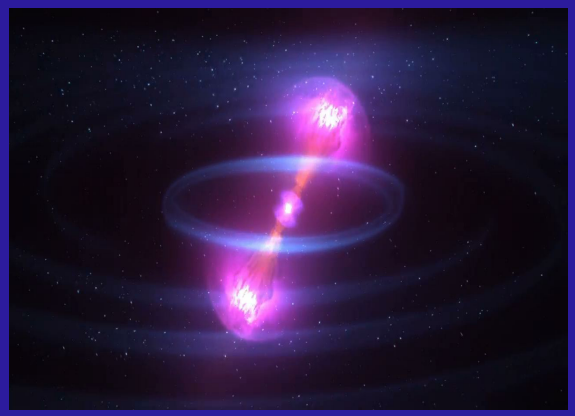
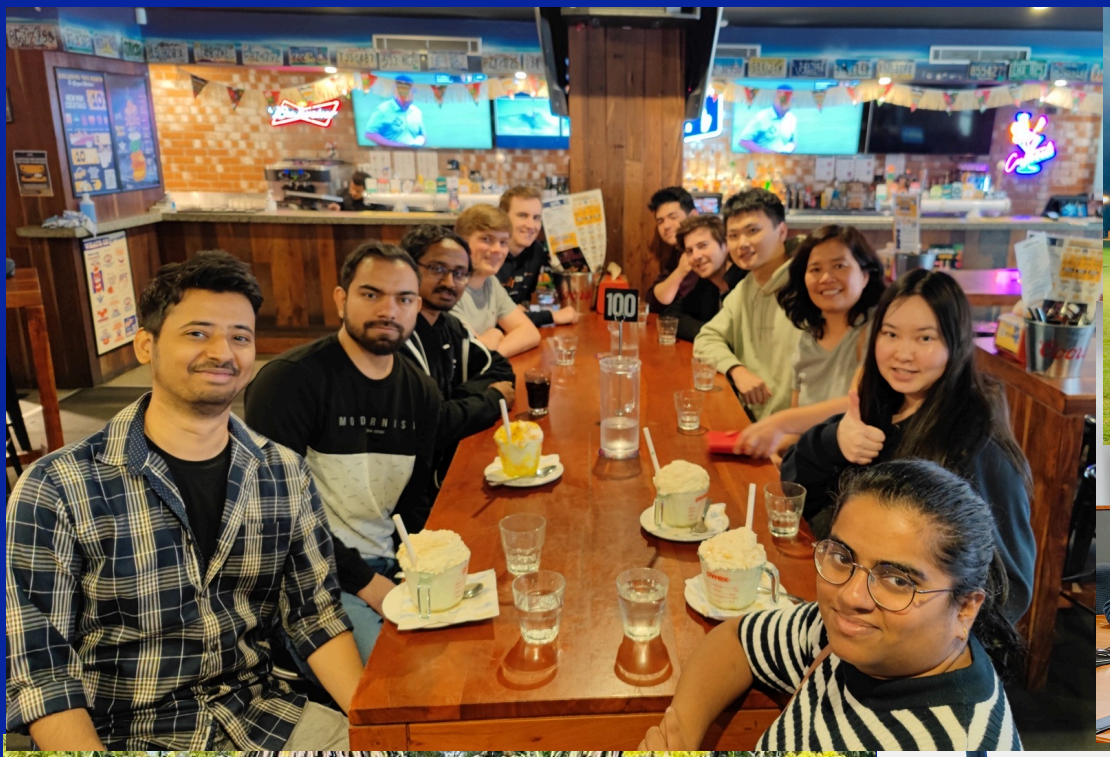
Exciting Time for GW Astronomy



- **2015: First detection of GWs from binary black hole merger of 30+35 Mo**
- **2017: Nobel Prize in Physics**
- **2017: First detection of GWs and light from binary neutron star merger**
- **> 100 detections made from binary coalescence**
- **Our team contributed to 80% confirmed online detections and public alerts**
  - 1 of 5 teams in the world
  - We can detect GWs within seconds
- **May 2023-: O4 detections on-going**



Gravitational Wave Astronomy Group Members



Project: GW Online Detection & Public Alert

On-going science run: May 2023 – Sep 2024

- Search for GW events using O4 online/offline data
  - One of the five teams in the world for this LVK project
- Detect binary coalescence before its final plunge and give early warnings to other telescopes
- Online significance and source classification of GW sources


Manoj Kovalam


Sunil Choudhary


Weichangfeng Guo


Siqi Yuan

Project: Machine Learning for Rapid GW Discovery

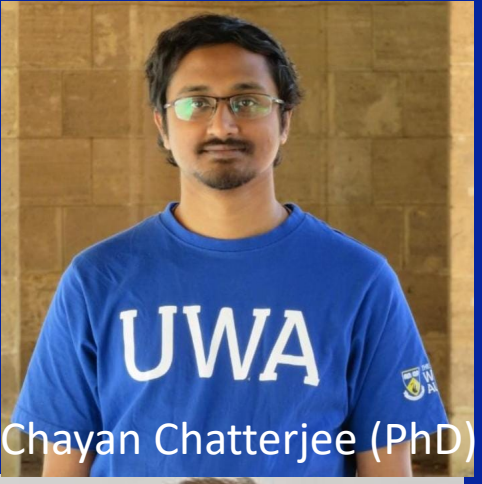
Most likely the most dominating technique used for O5 starting 2027+

In collaboration with ICRAR, Computer Science and A3D3 Institute, USA






Scott Hardie



Chayan Chatterjee (PhD)

ML for GW waveform extraction and localization

Scott Hardie (MS)


Damon Beveridge (PhD)

ML to detect GWs, pipeline development and integration with A3D3 GW development


Alistair Mcleod (PhD)

ML for GW early warning

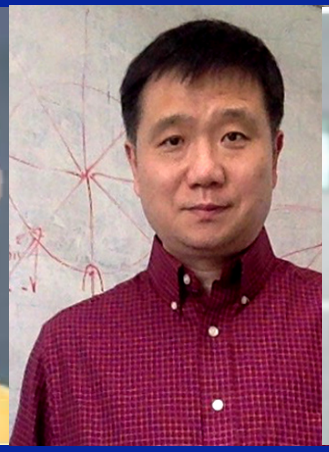
Project: EM Counterparts for GW Events

Cross-check ZTF/LSST/ANU-2.3m optical transient and fast radio bursts

Carlo Mungioli

Alexandra Moroianu

Clancy James (ICRAR-Curtin)



Bing Zhang (UNLV, US),

Anais Möller (Swinburne)

Chris Lidman (ANU)

Project Summary:

- Online GW detection and early warning
- Machine learning for rapid GW discovery
- Search for EM counterpart of GW sources (radio/optical)
- Theoretical modelling: triple black hole dynamics and interpretation of GW sources