Gravitational wave analysis in the era of machine learning

Organisers: Mattia Emma, Ann-Kristin Malz, Greg Ashton, John Veitch, Vivien Raymond

This RAS specialist discussion meeting on the **10th of January 2025** will consist of three panel sessions, each focused on one distinct area in gravitational wave research; searches, parameter estimation and next-generation and future challenges. The event page and registration link can be found [here](#).

Each session will explore the advantages and challenges of various ML-based approaches within these fields. Topics of interest include, but are not limited to:

- The robustness of ML models to uncertainties
- The interpretability of ML-derived results
- The integration of ML algorithms into existing gravitational wave search and analysis pipelines

The format for each session will be as follows:

1. A speaker will provide an overview of the field.
2. Each panellist will briefly present a slide outlining open questions, challenges, or key discussion topics related to their expertise in the session's theme.
3. We will then open the floor for an engaging discussion, including contributions from the audience.

The timetable and lists of all panellists can be found on the next page.

Timetable

Below is the timetable for the **10th of January 2025**, including panellists for each session.
Names in bold will give the overview talk for that session.

Time	What	Session title	Panelists
10:00-10:30	Coffee & Tea		
10:30-10:35	Introduction		
10:35-11:40	Session 1	Searches	**Naren Nagarajan**, University of Glasgow, n.nagarajan.1@research.gla.ac.uk Vasileios Skliris, University of Cardiff, sklirisv@cardiff.ac.uk Joe Bailey, University of Glasgow, joseph.bayley@glasgow.ac.uk Patrick Sutton, University of Cardiff, suttonpj1@cardiff.ac.uk Chris Messenger, University of Glasgow, christopher.messenger@glasgow.ac.uk
11:40-11:55	Break		
11:55-13:00	Session 2	Parameter estimation	**Lucy Thomas**, California Institute of Technology, lmthomas@caltech.edu Nihar Gupte, Max-Planck Institute for Gravitational Physics, ngupte@umd.edu Sama Al-Shammari, University of Cardiff, al-shammaris@cardiff.ac.uk Matthew Mould, Massachusetts Institute of Technology, mmould@mit.edu Jess Irwin, University of Glasgow, j.irwin.1@research.gla.ac.uk
13:00-14:00	Lunch break		
14:00-15:30	Session 3	Next-generation and future challenges	**Ian Harry**, University of Portsmouth, ian.harry@port.ac.uk Lionel London, King's College London, lionel.london@kcl.ac.uk Justyn Janquart, UC Louvain, justin.janquart@uclouvain.be Vanessa Graber, Royal Holloway University of London, vanessa.graber@rhul.ac.uk Alex Göttel, University of Cardiff, gottela@cardiff.ac.uk Sebastian Khan, Starling Bank, sebastian.khan@starlingbank.com
15:30-16:00	Coffee & Tea		