

# Welcome and Introduction

Monica



From Graph Neural Networks to Explainable AI:  
comprehending and trusting Machine Learning  
algorithms



# Aim of the School

Explainable artificial intelligence (XAI) is a set of processes and methods that allows human users to comprehend and trust the results and output created by machine learning algorithms.

Explainable AI is used to describe an AI model, its expected impact and potential biases. In this brief but intense school, we will start with learning how to design graph neural networks (GNNs) and then move to explainability methods, from saliency maps to data attributions. Concrete examples will be discussed spanning from fundamental particle physics to medical applications and neuroscience.

The School will feature lectures and presentations from physicists and computer scientists. Most importantly, participants will be invited to present briefly a project they are working on for which AI methods could be/are applied and, through an active learning approach, they will be able to discuss with experts most suitable XAI methods for their science case.

- **Very informal, everybody is here to learn even senior people 😊**
  - Usual code of conducts apply – be respectful of others, embrace spirit of collegiality and inclusivity
- **feel free to ask questions and discuss things you are curious of**

# What is MUCCA

- **Multi-disciplinary Use Cases for Convergent new Approaches to AI explainability**
- <https://www.chistera.eu/projects/mucca>
- Bring together researchers from different fields with complementary skills, essential to be able to understand the behaviour of the AI algorithms, that will be studied with an interesting set of multidisciplinary use-cases in which explainable AI can play a crucial role and that will be used to quantify strengths and highlight, and possible solve, weakness of the available explainable AI methods in different applicative contexts.
- As part of the school, we will have presentations on the MUCCA project tomorrow → useful to see practical cases where we are trying to apply these tools

# Agenda:

## Today

12:00	<b>Lunch and Welcome</b>  <i>SPINE Liverpool and University of Liverpool</i>	12:00 - 13:00
13:00	<b>Designing (graph) neural networks: Theory</b>  <i>Dr Simone Scardapane</i>	13:00 - 14:30
14:00	<b>Coffee Break</b>  <i>SPINE Liverpool and University of Liverpool</i>	14:30 - 15:00
15:00	<b>Designing (graph) neural networks: Tutorial</b>  <i>Dr Simone Scardapane</i>	15:00 - 16:30
16:00	<b>Flash talks - tell us about your project</b>  <i>Monica D'Onofrio</i>	16:30 - 17:55
18:00	<b>Evening reception - drinks and nibbles</b>  <i>SPINE Liverpool and University of Liverpool</i>	18:00 - 19:00

## Tomorrow

09:00	<b>Explainability, from saliency maps to data attribution: Theory</b>  <i>Alessio Devoto</i>	09:00 - 10:30
10:00	<b>Coffee Break</b>  <i>SPINE Liverpool and University of Liverpool</i>	10:30 - 11:00
11:00	<b>Explainability, from saliency maps to data attribution: Hands-on tutorial</b>  <i>SPINE Liverpool and University of Liverpool</i>	11:00 - 12:30
12:00	<b>Lunch</b>  <i>SPINE Liverpool and University of Liverpool</i>	12:30 - 13:30
13:00	<b>Applications of XAI methods to real studies: Part 1 (Particle Physics)</b>  <i>SPINE Liverpool and University of Liverpool</i>	13:30 - 15:00
14:00	<b>Coffee Break</b>  <i>SPINE Liverpool and University of Liverpool</i>	15:00 - 15:30
15:00	<b>Applications of XAI methods to real studies: Part 2 (Medical and Neuro Science)</b>  <i>SPINE Liverpool and University of Liverpool</i>	15:30 - 17:00
17:00	<b>Snacks</b>  <i>SPINE Liverpool and University of Liverpool</i>	17:00 - 17:30
17:30	<b>Keynote talk: Actionable and responsible AI in medicine</b>  <i>Prof. Pietro Liò</i>	17:30 - 18:30

## Friday

Print PDF Full screen Detailed view Filter

09:00	<b>GNN and XAI for you: how they can work for your project: Follow-up flash talks from day-1 (part 1)</b>  <i>SPINE Liverpool and University of Liverpool</i>	09:00 - 10:30
10:00	<b>Coffee Break</b>  <i>SPINE Liverpool and University of Liverpool</i>	10:30 - 11:00
11:00	<b>GNN and XAI for you: how they can work for your project: Follow-up flash talks from day-1 (part 2)</b>  <i>SPINE Liverpool and University of Liverpool</i>	11:00 - 12:00
12:00	<b>Conclusive remarks and Close-out</b>  <i>SPINE Liverpool and University of Liverpool</i>	12:00 - 12:30

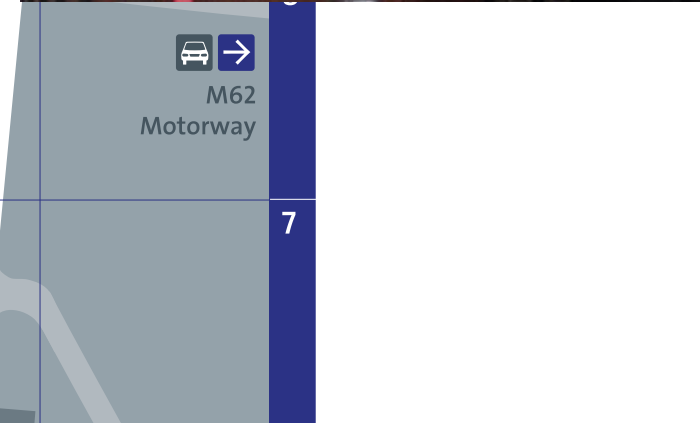
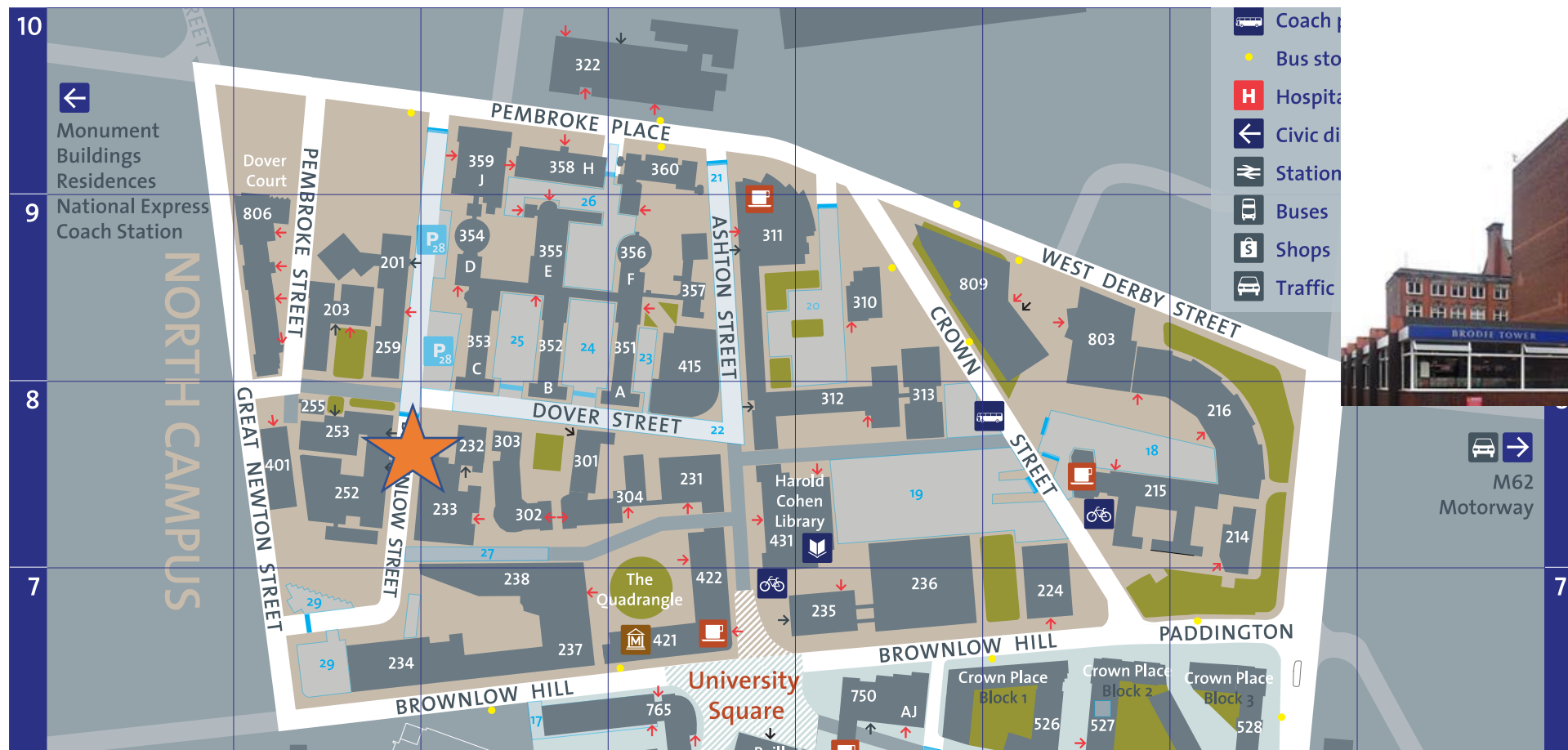


# Keynote talk

- Tomorrow at 5.30 pm
- **Professor Pietro Lio** (Prof in Computational Biology in the AI division, member of the Cambridge centre of AI and Medicine and The European Laboratory for Machine Learning). He will present applications of AI in medicine, focusing on how to build a digital patient twin using graph and hypergraph representation learning and considering physiological (cardiovascular), clinical (inflammation) and molecular variables (multi omics and genetics).

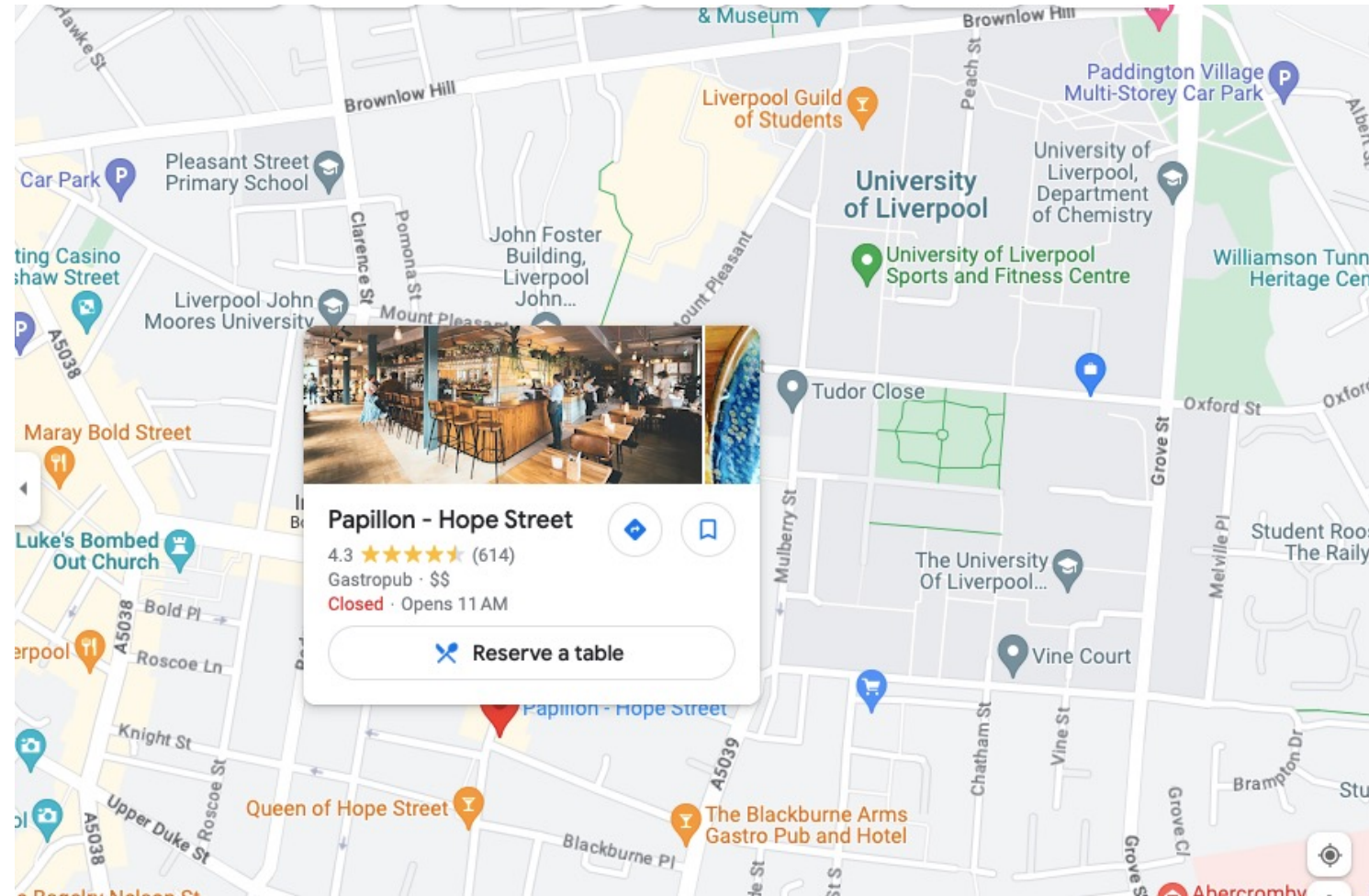
# Important: Location tomorrow and Friday

- Not here at the Spine but on campus – not very far from here
- [Brodie Tower](#), Room 406/406a – building 233 on [campus map](#)



# Dinner tomorrow

- Restaurant Papillon: 31 Hope St, Liverpool L1 9BQ, United Kingdom



# Wifi

- TODAY – provided by the Spine (I hope!)
  - Eduroam usually works but not for some ....
- Tomorrow and Friday:
  - I have a guestnet invite for all of those who are not from Liverpool
  - Come and pick it up today