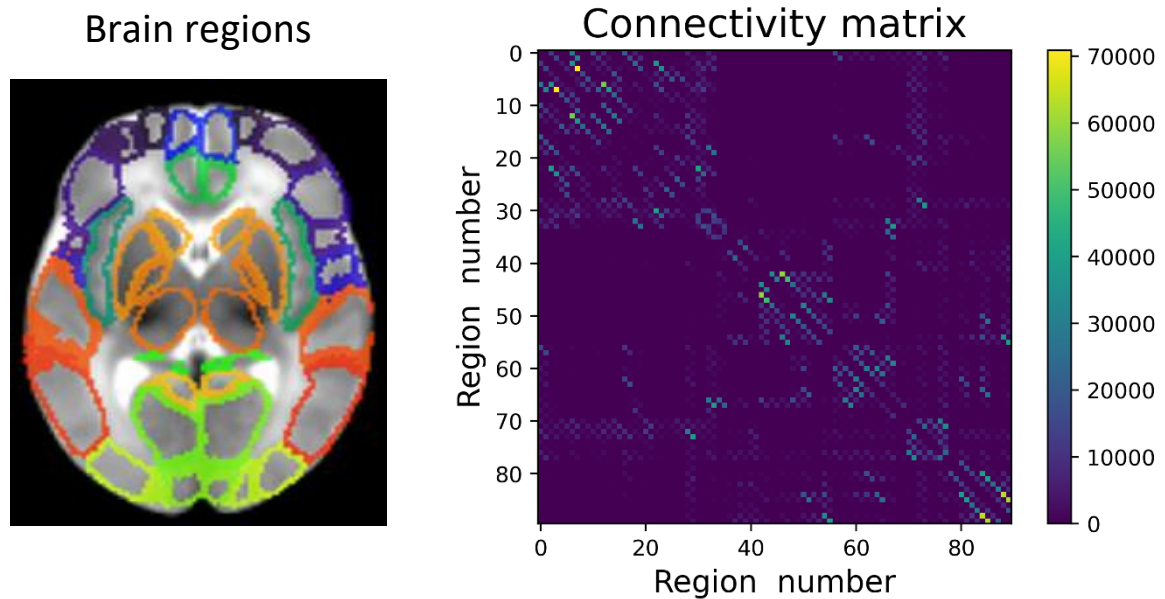


# Classification of prematurity using structural connectivity

## Mini Project – Part A

In this mini project you are asked to **predict whether the baby is born preterm** from the **structural connectivity matrices**. These matrices contain a measure of connectivity between pairs of brain regions. There is 90 regions and matrices have 90x90 values. They are symmetric and have zeros on the diagonal (the connectivity of a region with itself is not meaningful).



You are given a connectivity matrix for each baby, together with information about their age at scan and indication whether they were born preterm. Your goal is to build an accurate classifier to predict prematurity and identify connections that are most predictive of prematurity.

## Dataset

The data is provided in these files:

- **matrices.p** - the connectivity matrices as a 3D numpy array in pickle format
- **subject\_info.csv** – age at scan and prematurity status (1 = premature, 0 = term-born)
- **label\_names.csv** – names of the 90 brain regions
- **Mini Project A.ipynb** – a jupyter notebook template for your code. It contains code for loading the data.

## Submission

The submission consists of single **Jupyter notebook**, based on the provided template **Mini Project A.ipynb**. The code must be clean and working, otherwise it will not be marked. Results and plots need to be clearly displayed, we will not re-run your code while marking.

Upload your Jupyter notebook on **KEATS**.

**Deadline: 31<sup>st</sup> October 2022, 4pm**

## Marking Scheme

The marks will be awarded for different sections as follows:

Pre-processing: 4 marks

Analysis of the dataset: 14 marks

Evaluation framework: 25 marks

Classifier design and training: 42 marks

Results: 15 marks

**Total: 100 marks.** The resulting marks will be converted to **15% of your grade.**