# Computational modelling of memory processing in sleep

**Description of Research Opportunity:**How does the brain store memories?  Various computational models exist to explain this, but none of these incorporate sleep. Our experimental work has indicated that processing is quite different in the various stages of sleep, and that this is critical for creating richly complex networks of learned information that are characteristic of human knowledge. This PhD will aim to create a computational model which incorporates not only a learning phase (in wake) but also ‘offline’ processing of memories in the various stages of sleep.  The student will use computational modelling (likely PDP and or Deep nets) to gain a better understanding of how memories are consolidated in sleep, and how memory replay in sleep underpins integration of new memories with old and the recombination of ideas which is involved in creativity.  A background in computational modelling or related areas of computer science would be ideal.

The Neuroscience and Psychology of Sleep (Naps) lab is a thriving community of computer scientists and sleep researchers studying all aspects of how sleep impacts on cognition (see our nascent [web pages](http://www.cardiff.ac.uk/research/explore/research-units/neuroscience-and-psychology-of-sleep-lab-naps).

Cardiff University’s Brain Research Imaging Centre (CUBRIC) opened in Spring 2016, housing a unique combination of facilities and expertise that will further its world-leading research in Neuroimaging, Cognitive Neuroscience and Biological Psychiatry.  Further details of CUBRIC can be found on our web-page: <http://sites.cardiff.ac.uk/cubric>. /

**Award:**

The studentships will commence in 1 October 2019 and will cover your tuition fees (at UK/EU level) as well as a maintenance grant. In 2017-18 the maintenance grant for full-time students was £14,553 per annum. As well as tuition fees and a maintenance grant, all School of Psychology students receive conference and participant money (approx. £2250 for the duration of the studentship).They also receive a computer and office space, additional funding for their research, and access to courses offered by the University’s Doctoral Academy and become members of the University Doctoral Academy.

**Eligibility:**

Full awards (fees plus maintenance stipend) are open to UK Nationals, and EU students.

Send a CV to Penny Lewis: [lewisp8@cardiff.ac.uk](mailto:lewisp8@cardiff.ac.uk) for more info – please title the email ‘Modelling PhD’, by June 25th (you will need to apply through a more official channel after I look at your CV).