

# ARCCA High Performance Computing Seminar Series

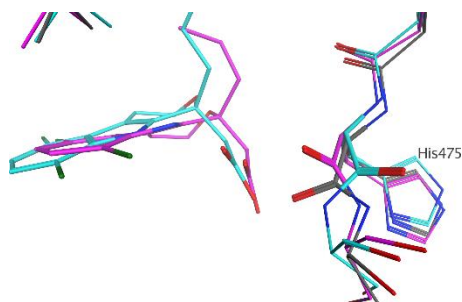
Wednesday 8<sup>th</sup> July 2-3:30 pm

Paul Spencer Lecture Theatre (2.60C), Redwood Building

## Programme

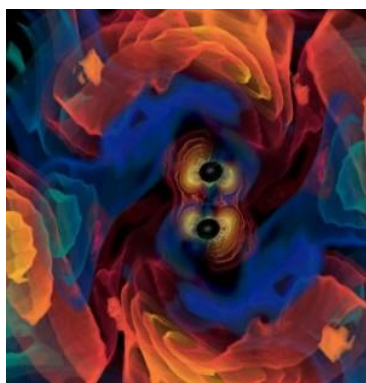
14:00 – 14:20 “GPUs in Drug Design: from Molecular Dynamics to Haptic-Driven Simulations”,

Andrea Brancale, Pharmacy



14:20 – 14:40 “Using GPUs to Find Gravitational Wave Signals”,

Paul Hopkins, Gravity Waves Group, Physics



To detect gravitational waves, such as those emitted from the merger of two binary black holes (pictured), it is necessary to search through the data from the detectors to find the GW signal. One technique is matched filtering; essentially convolving the data with thousands of possible signals predicted by your model. This makes use of FFTs, which is an ideal application for GPUs and much effort has been made by the community to take advantage of this. I will discuss the results of these efforts, including the implementation, benchmarking of various GPU cards, and how this has informed our hardware purchasing in LIGO.

14:40 – 15:00 “Accelerated Processing of Diffusion MRI Data”, Greg Parker, CUBRIC

Diffusion Weighted MRI can provide unique insight into the structure of tissues within the brain. The voxelised nature of this data - each voxel requiring independent, yet identical processing - makes it an ideal candidate for parallel processing. As a demonstration, we will examine a prototype DW-MRI tractography pipeline (a technique that builds upon voxel-wise fibre orientation estimates to create streamline representations of white matter pathways). By re-implementing key components of this pipeline to take advantage of GP-GPU technologies we achieve order-of-magnitude increases in performance, permitting larger more and complex studies to be achieved within acceptable time frames.

15:00 – 15:20 ARCCA Update & Discussion, Thomas Green & Christine Kitchen

15:20 – Refreshments

**ALL WELCOME – No booking required**