

➤ **Monday November 5th, 13:30 a.m. – 16:30 p.m.**

CARMEN: Code Analysis, Repository and Modelling for e-Neuroscience

Frank Gibson, Colin Ingram, Mark Jessop, Alastair Knowles, Phillip Lord and Leslie Smith

Abstract:

The Central Nervous System (CNS) integrates billions of sensory inputs; encoding and processing information at molecular, cellular and network levels; supporting complex behaviour, cognition and decision making. It is architecturally novel and functionally quite different from any man-made computer processor. Neuroscientists study the CNS at many levels. Increasingly, their experiments generate massive datasets, which are heterogeneous and largely proprietary in nature. Further, large groups of theoreticians are hungry for data, to develop algorithms and models to make sense of phenomena that data describe. These resources and people are usually not physically collocated. Neuroinformatics is concerned with integrating data, software and human resources, both in real time, and over distance and time, to expedite our understanding of the CNS. CARMEN: Code, Analysis, Repository and Modelling for e-Neuroscience; is a UK e-Science Pilot Project, financed by the Engineering and Physical Sciences Research Council, to develop grid computing infrastructure for neurophysiology (research based on electrical and optically derived signals recorded from neural tissue). \$10M are committed to eleven UK universities over four years to develop a generic computer framework and deploy a series of test cases, to refine and enrich the framework for specific research studies. The test cases are highly codependent and illustrate the advantage of collaboration over data, software and human resources to address common scientific challenges. Indeed, the consortium brings together neuroscientists, neuroinformaticists and computer scientists to address the complete lifecycle of neuroscience data. Close interaction between the neuroscience and computer science teams will allow consensual scientific metadata to be developed, allowing intuitive software and programme interfaces to be provided. A normalised spatiotemporal data mapping will allow different data formats and types to be overlaid, and therefore co-analysed. Graphical workflow deployment tools will allow data, software and human resources to be linked in complex scientific processes. Compute clusters local to data will support processor intensive analysis routines. An enveloping security infrastructure will allow users to protect data and resources prior to publication or patent. A rich client portal will provide access to system resources, and support real-time collaboration. The system is deployed over a network of server nodes that message via web-services, providing flexibility to support geographically dispersed core partners and scalability to accommodate new research partners as the project grows. The demonstration will allow interested neuroscientists to explore and interact with key features of the system, including; access to remote data, the Signal Data Explorer (SDE), parcellation of analysis code as web services, scientific workflow deployment, and data visualisation in the CARMEN portal.

Demo Personnel

Frank Gibson (frank.gibson@ncl.ac.uk)

Colin Ingram (c.d.ingram@ncl.ac.uk)

Mark Jessop (mark.jessop@cs.york.ac.uk)

Alastair Knowles (alastair.knowles@ncl.ac.uk)

Phillip Lord (phillip.lord@ncl.ac.uk)

Leslie Smith (lss@cs.stir.ac.uk)

Website: <http://www.carmen.org.uk>