

**Contents**

News from HoS

This Week

School Events

External Events

Funding Opps

Prize &amp; Award Opps

Research Awards

Staff News

Vacancies

**Links**

News Submissions

[Newsletter Archive](#)

School Strategy

School Intranet

School Seminars

ESNW Seminars

NaCTeM Seminars

**News from the Head of School****Computer Science Christmas party****19 Dec 12**

The CS Christmas party will be held on Wednesday 19 December at 3pm in the senior common room. This year there will be a quiz at 4pm so get there on time to be in with a chance to win. Pizza will be served at 5pm. As usual we would like everyone to contribute by bringing along something to drink.

**Movember is over**

The Manchester Mo Bros, led by Duncan Hull, raised an astonishing £1,233 and were 1,952th out of 31,597 teams in United Kingdom! Thanks to all our sponsors. If you find yourself wishing that you'd joined in, have a go next year and you too can look like this:



Movember raised a total of £17.25M in the UK and £71.2M world-wide.

**Atlas 50th anniversary symposium****5 Dec 12**

On 5<sup>th</sup> December there will be displays and exhibitions around the Kilburn Building and a Symposium in Lecture Theatre 1.1 celebrating the 50<sup>th</sup> anniversary of the Atlas supercomputer. To find out more and register for the Symposium, look here: <http://elearn.cs.man.ac.uk/~atlas/>

The first production Atlas was inaugurated at Manchester University on 7<sup>th</sup> December 1962 by Sir John Cockcroft, the Nobel prize-winning physicist who was Director of the UK's Atomic Energy Authority. At the time of its inauguration, Atlas was reckoned to be the world's most powerful computer. This event marks the 50th anniversary of Atlas and will bring together many of the scientists and engineers who built and operated the machine.

## Events

### Mutation Testing of Erlang Distributed and Concurrent Applications

3 Dec 12

10:00, Atlas 1, Kilburn building  
Qiang Guo

Mutation testing has been widely used in testing sequential programs. However, it has fewer applications in testing distributed and concurrent systems. In this talk, I will report the research outcomes from our recently completed EU FP7 project ProTest where we have investigated mutation testing of distributed and concurrent applications written in the functional programming language Erlang.

In our work, a set of mutation operators was defined for the generations of mutants from a distributed and concurrent application. Based on mutating a program at the source code level, the defined mutation operators aimed to explore possible semantic variations from the system under test. In mutation testing two programs are said to be equivalent if there exists no input that makes them distinguishable. Determining equivalent mutants is an important yet difficult task and, in general, is undecidable. In our work, a model based technique was proposed for the evaluation of program equivalence.

The proposed technique model-checks a program and its mutant to validate whether they are model-oriented equivalent. Model-oriented equivalent defines that, in terms of the system properties defined by a model, both programs achieve complete coverage, regardless of whether the programs are functionally equivalent or not. Compared to the evaluation of functional equivalence, model based evaluation is of polynomial complexity and often leads to much less computational cost. The proposed techniques were evaluated with regards to a set of experiments where a simple distributed and concurrent example was tested, which provides experimental evidence for their effectiveness.

### Empirical Software Engineering with Confidence

3 Dec 12

14:00, Atlas 1, Kilburn building  
Ibrahim Habli, University of York

I will provide an overview of my research on high-assurance software engineering, with emphasis on safety- and security-critical systems. I will briefly discuss my research on software architectures, model-driven engineering, verification and certification. I will then discuss in more detail three empirical studies on the software assurance of aero-engine control systems and unmanned aircraft systems, which I carried out in collaboration with Rolls-Royce and NASA. I will conclude with a discussion of my existing research interests in the assurance of complex healthcare systems of systems.

### Unleash the power of big data

4 Dec 12

10:00 - 15:00, Daresbury Laboratory

**Big Data is everywhere.** When the 2012 Summer Olympics took place in London earlier this year, the BBC serviced up to a third of the UK's Internet traffic, as well as hundreds of millions of fans around the globe simultaneously. In order to handle this traffic and still deliver real-time results to sports fans around the world, the Broadcaster turned to MarkLogic to solve this unique challenge. And on the other side of the Big Data spectrum, through the use of powerful supercomputers such as the SGI® UV®, Kalev Leetaru at the University of Illinois can now ingest millions of Twitter feeds in real time to analyse social sentiment around the globe. His findings concerning the recent US election, as well as Hurricane Sandy, are intriguing to say the least.

Of course this kind of high-quality Big Data analysis is dependent on both scientific expertise and custom designed technology. SGI and the STFC Scientific Computing Department cordially invite you to attend a one day seminar that will provide the knowledge needed to provide similar Big Data capabilities in your organisation. The seminar will feature senior-level experts from around the globe who will share both best-practices as well as specific use cases on how they have turned new data into practical knowledge and insight.

[Further information](#)

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## Featured publications this week (by Robert Stevens)

Send any publications to [Robert.Stevens@manchester.ac.uk](mailto:Robert.Stevens@manchester.ac.uk).

Rafael S. Gonçalves, Bijan Parsia, Ulrike Sattler: Concept-Based Semantic Difference in Expressive Description Logics. In Proceedings of the 11th International Semantic Web Conference (ISWC), Boston, MA, U.S.A., 2012.

We provide a modified formulation of Concept-Based difference which avoids logical triviality in expressive cases and supports a "direct/indirect" distinction which helps avoid application triviality. We then investigate a series of computable approximations of the concept diff problem.

[http://www.cs.man.ac.uk/~goncalvj/files/2012\\_iswc\\_diff.pdf](http://www.cs.man.ac.uk/~goncalvj/files/2012_iswc_diff.pdf)

Rafael S. Gonçalves, Bijan Parsia, Ulrike Sattler: Performance Heterogeneity and Approximate Reasoning in Description Logic Ontologies. In Proceedings of the 11th International Semantic Web Conference (ISWC), Boston, MA, U.S.A., 2012.

We investigate the reasoning performance behavior of subsets of "hard" ontologies (for certain reasoners). We find a startling correlation between non-linear performance growth on coarse grained, increasingly sized subsets of ontologies and the existence of "hot spots" -- small subsets whose removal improves reasoning performance dramatically.

[http://www.cs.man.ac.uk/~goncalvj/files/2012\\_iswc\\_hotspots.pdf](http://www.cs.man.ac.uk/~goncalvj/files/2012_iswc_hotspots.pdf)

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## Funding Opportunities

### School Research Office

Please contact us through [researchsupportcsm@manchester.ac.uk](mailto:researchsupportcsm@manchester.ac.uk).

There is information about support for grant writing and submission at <http://www.cs.manchester.ac.uk/reso/>

### UMRI – Pump Priming Programme

15 Dec 2012

- Closing date: **15 Dec 2012**

The University of Manchester Research Institute (UMRI) has up to £400,000 available to fund projects of up to £50,000 (though normally smaller than this), intended to support and pump-prime new interdisciplinary research programmes. For example:

- Support for workshops designed to explore opportunities for collaborative working;
- Pilot projects to establish the data or other background needed for proposals for future externally-funded joint projects (especially centre or programme funding);
- Support for high-level training activities designed to impart skills to researchers from other disciplines;

- Support for the collation and external presentation of work on key challenges to demonstrate the critical mass of work at Manchester.

Proposals should be up to 6 months in duration and funds should be expended by 31 July 2013. Applications (2 page [outline](#)) should be submitted by email to [james.evans@manchester.ac.uk](mailto:james.evans@manchester.ac.uk) by **15 December 2012**.

Further information on the [UMRI Pump Priming Programme](#).

#### **Wellcome Trust Translation Fund**

**7 Jan 2013**

- Closing date: **5pm 7 Jan 2013**

[Wellcome Trust Translation Awards](#) look to bridge the funding gap in the commercialisation of new technologies in the biomedical area, either through single projects or portfolio programmes.

The Trust are inviting projects covering any aspect of technology development from a range of disciplines - including physical, computational and life sciences. Projects must address an unmet need in healthcare or in applied medical research, offer a potential new solution, and have a realistic expectation that the innovation will be developed further by the market.

Initially prospective applicants should submit a concept note to Technology Transfer at [techtransfer@wellcome.ac.uk](mailto:techtransfer@wellcome.ac.uk).

#### **Graphene Bioscience Interdisciplinary Grand Challenges Funding**

**10 Jan 2013**

- Outline applications and completion of the Graphene Clinic Doodle Poll: **4pm 10 Jan 2013**
- Closing date: **4pm 14 Feb 2013**

The University of Manchester has committed £200K to pump-prime investigations into how Graphene-based solutions might be applied to biomedical/life science problems. Applications for pilot studies (up to 12 months in duration) are encouraged from researchers across the University.

The following major challenge areas for use of Graphene in life science/biomedical applications the main focus of this call, however they are **not exclusive** and alternative transformative ideas are also welcomed:

- Biointegration
- Biological barriers
- Biosensors
- Enzyme/material based hybrid systems
- Selective adsorptive properties of Graphene

General enquiries: [Kay.Hodgson@manchester.ac.uk](mailto:Kay.Hodgson@manchester.ac.uk) (x60552)

Outline/full applications: FMHS Research Deanery: [RD@manchester.ac.uk](mailto:RD@manchester.ac.uk).

Full information is available from the [Research Deanery](#).

#### **Neuroscience Research Institute – Event Funding Available**

**16 Jan 2013**

- Closing date: **noon 16 Jan 2013**

The Neuroscience Research Institute is offering support of up to £1000 towards the cost of hosting a Neuroscience event, **open to junior researchers and postgraduates**. The NRI can help with the promotion and logistics of the event if required and the event should be held before 31 July 2013.

To apply, send a one page outline (in 12 point font) of the topic, including the title and proposed format, along with suggestions for speakers (if applicable) to [nri@manchester.ac.uk](mailto:nri@manchester.ac.uk).

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## Research and Grant Awards

Congratulations to all those involved in the following successful awards!

### **A scalable dynamical core for Next Generation Weather and Climate Prediction (NGWCP) - Phase 2**

Funding Body: NERC

PI: **Graham Riley**

Award Amount: £48,660

This project follows on from Phase 1 of the project to improve the accuracy of numerical weather forecasts and climate simulations. The overall aim of the proposed project is to develop a three-dimensional, fully compressible dynamical core suitable for operational global and regional weather and climate prediction, as well as for research use, on massively parallel machines, and to demonstrate its accuracy, efficiency, and scalability. The accuracy should be comparable to that of existing state of the art algorithms, such as the Met Office Unified Model (UM) dynamical core on a suitable quasi-uniform spherical grid, with regional modelling capability. The algorithm must be efficient enough to run in the available operational time slots, and it must scale well on 100,000 to 1000,000 processors.

### **Text mining of food security grants across GFS partners**

Funding Body: BBSRC

PI: **Jock McNaught**

Award Amount: £27,000

BBSRC funding was awarded to develop a search system for grants relating to the Global Food Security (GFS) programme, where data originates from a variety of sources. This included assessing the use of Termine for determining food security grants from BBSRC's entire portfolio over the 2 year timeframe.

*Have we missed something? If you have some award news that you would like us to know about please contact [Sarah Chatwin](#).*