PhD Vacancies 2014
School of Computer Science
www.nottingham.ac.uk/computerscience/research

This guide provides a summary of each of the School of Computer Science’s research divisions. These details were compiled in November 2013 and were correct at the time of publication.

For further information on academic staff within the School of Computer Science, and their areas of expertise and research supervision, please consult the School’s staff directory:
www.nottingham.ac.uk/computerscience/people

For further guidance on pursuing a PhD in any of these areas, please consult the School of Computer Science website or the website of relevant research division, or contact the relevant members of academic staff as listed below or in the staff directory.

For details of studentships available within the School of Computer Science in 2014, please see:
www.nottingham.ac.uk/computerscience/news/phd-studentships-2014.aspx

Agents Laboratory
www.agents.cs.nott.ac.uk

Group Leaders: Brian Logan (brian.logan@nottingham.ac.uk)
Natasha Alechina (natasha.alechina@nottingham.ac.uk)

Agents are software systems which perceive their environment and act in pursuit of their goals. Agents integrate a range of (often relatively shallow) competences, e.g., goals and reactive behaviour, planning, inference and emotion. As such they are central to the study of many problems in Artificial Intelligence, including modelling human mental capabilities and performing complex tasks (e.g., those combining perception, planning, and opportunistic plan execution). Agent systems are also increasingly being adopted as an implementation technology in areas such as advanced simulation and ubiquitous computing.

Research in the Agents Lab spans the specification, design and implementation of agent-based systems, including logics for agents, agent programming and verification, and the application of agents in simulation and virtual environments.

Algorithmic Problem Solving

Group Leader: Roland Backhouse (roland.backhouse@nottingham.ac.uk)

The algorithmic problem solving group conducts research into mathematical method, in particular the problem-solving skills involved in the formulation and solution of algorithmic problems. Our goal is to articulate these skills primarily by way of concrete examples, but also by the development of appropriate mathematical theory.
Automated Scheduling, Optimisation and Planning

www.asap.cs.nott.ac.uk

Group Leader: Robert John (robert.john@nottingham.ac.uk)

The Automated Scheduling, Optimisation and Planning (ASAP) research group carries out multi-disciplinary research into mathematical models and algorithms for a variety of real-world optimisation problems. ASAP research work aims to set the following research directions on the international agenda:

- Modelling the complexity and uncertainty inherent in complex, real-world problems across a wide range of application areas

- Developing intelligent systems that can automatically aid the design and implementation of more efficient, effective, reusable easier-to-implement/deploy/use general computational search methods that are applicable to a range of real-world problems

- Developing rigorous mathematical theories for a more profound understanding of randomised search heuristics, such as simulated annealing, evolutionary algorithms, etc

Our expertise in Computer Science and Operational Research allows us to bring a unique and novel perspective to traditional Operational Research problems, and also to bring new real-world problems to the Computer Science community.

Computer Vision Laboratory

www.cvl.cs.nott.ac.uk

Group Leader: Tony Pridmore (tony.pridmore@nottingham.ac.uk)

The Computer Vision Laboratory performs basic and applied research in image manipulation, analysis and computer vision. Our goals are to develop novel and efficient techniques for the extraction of quantitative descriptions of viewed objects from a variety of images and image sequences, and to translate those techniques into high quality software tools that can be used to address real world problems. A key feature of the Computer Vision Laboratory is its high level of engagement with other disciplines. We have strong links with colleagues in the life and medical sciences, and work closely with the HCI community.
Functional Programming Laboratory
www.fp.cs.nott.ac.uk

Group Leaders:  
Graham Hutton (graham.hutton@nottingham.ac.uk)  
Thorstén Altenkirch (thorsten.altenkirch@nottingham.ac.uk)

The aim of the Functional Programming Lab is to develop simple but powerful techniques for writing and reasoning about programs, by recognising and exploiting their underlying mathematical structure. Most of our work takes place within the context of functional languages such as Haskell and Agda, which are at the forefront of programming language research, and provide ideal vehicles for research of this nature.

Our research spans a range of topics in the area of functional programming, including category theory, corecursive structures, compiler correctness, declarative debugging, hybrid modelling, reactive programming, mathematical logic, program optimisation, program transformation, proof assistants, quantum computing, and type theory.

Intelligent Modelling and Analysis
www.ima.ac.uk

Group Leader:  
Jon Garibaldi (jon.garibaldi@nottingham.ac.uk)

The Intelligent Modelling and Analysis (IMA) group has established itself as a unique brand in the UK for end-to-end data modelling and analysis. We are a highly inter-disciplinary research group focusing on the development of models and techniques for real-world and multifaceted problems in data analysis.

We encompass researchers from a variety of backgrounds including computer science, the biomedical sciences, operational research, mathematics, statistics and complexity science. The group currently has seven permanent academics, two support staff, ten research staff and over 40 Marie Curie Fellows and PhD students. We hold over £33m in current external research funding and have led a further £6m of completed projects.

To undertake this world-leading research, we use a range of techniques including:

- AI-based Data Mining
- Bio-Inspired Algorithms
- Computational Modelling
- Discrete and Agent-Based Simulation
- Fuzzy Methodologies
- Multi-Sensor Data Fusion
- Qualitative Methods including Structured Interviews
IMA’s main research objectives are:

- Modelling and representation of challenging problems, with particular emphasis on biomedical and digital economy application domains
- Creating cutting-edge analysis methodologies, both for general purposes and specifically tailored to our main application domains
- Focussing on difficult, challenging and important real-world problems, with particular emphasis on large and noisy data sets.

Mixed Reality Laboratory

www.nottingham.ac.uk/research/groups/mixedrealitylab

Group Leaders: Steve Benford (steve.benford@nottingham.ac.uk)
Chris Greenhalgh (chris.greenhalgh@nottingham.ac.uk)

The Mixed Reality Laboratory (MRL) at the University of Nottingham is a dedicated studio facility where computer scientists, psychologists, sociologists, engineers, architects and artists collaborate to explore the potential of ubiquitous, mobile and mixed reality technologies to shape everyday life.

The MRL was first established in 1999 with £1.2M funding under the JREI programme and its facilities were updated in 2005 through a further £1M under SRIF 2. The laboratory is currently home to over fifty academics, research associates and PhD students who are undertaking a wide ranging programme of research into mixed reality and its applications. Between 2000 and 2007 the MRL has been the lead partner in EPSRC’s Equator IRC, a £10M, eight partner, initiative exploring the interweaving of physical and digital interaction for everyday life. More recently, the MRL has spearheaded the establishment of the Horizon Digital Economy Institute, together with the Horizon Doctoral Training Centre, funded by grants totalling £19 million from Research Councils UK. It is aimed to establish these as world-leading centres of excellence for innovation and knowledge transfer in the ubiquitous digital economy.

Our research is grounded in a user-centred approach, in which we build on a deep technical expertise in interaction and distributed systems design to rapidly prototype new interactive technologies, and employ multiple evaluation techniques, ranging from ethnographic studies to simulator experiments, to understand how these are experienced by people in the real world. Our research is therefore highly interdisciplinary, striving to integrate perspectives from Computer Science, Sociology, Psychology, and Art and Design.
Networked Systems

http://nsg.cs.nott.ac.uk

Group Leader: Derek McAuley (derek.mcauley@nottingham.ac.uk)

The Network Systems Group is a new research group engaging in research in topics including platform and operating systems design, network monitoring and protocol design, and distributed and mobile systems. We have particular interests in disruptive infrastructure technologies, in cloud and mobile computing, and in the ways that infrastructure both drives and is driven by user capabilities and needs. We seek to evaluate systems through deployment to real users, and so often collaborate with colleagues in the MRL and the Horizon Digital Economy Research Institute.

Interdisciplinary research

The impact of the School’s research is enhanced through the following interdisciplinary centres:

**Horizon Digital Economy Research**
www.horizon.ac.uk

Horizon is a national centre for digital economy research that combines a research hub and a centre for doctoral training.

**LANCS Initiative**
www.lancs-initiative.ac.uk

The LANCS Initiative is an initiative spanning four universities (Lancaster, Nottingham, Cardiff and Southampton) with the strategic aim of strengthening and growing operational research.

**Centre for Plant Integrative Biology**
www.cpib.ac.uk

The Centre for Plant Integrative Biology (CPIB) brings together computer scientists, biologists and engineers to tackle major challenges for the future of plant and crop science.

**Advanced Data Analysis Centre**
www.nottingham.ac.uk/adac

The Advanced Data Analysis Centre (ADAC) supports research that involves analysing large and complex data sets.