

The Centre for Scientific Computing is a multidisciplinary research centre hosting internationally competitive research groups that employ high performance computing tools to achieve their research goals. This research is underpinned by graduate and advanced level teaching, and by state-of-the-art computing facilities. The Centre has a broad research base and is inherently multidisciplinary in its research agenda. The Centre currently encompasses more than 20 academic staff and their research groups from most of the Natural Sciences at Warwick.

The CSC established itself as one of two national EPSRC-funded training centres in high-end computing and now leads the national consortium providing advanced short courses in high performance computing. The CSC also offers an MSc degree in Scientific Computing.

## RESEARCH DEGREES

MASTER'S BY RESEARCH (MScR)

DOCTOR OF PHILOSOPHY (PhD)

## TAUGHT MASTER'S DEGREES

MSc IN SCIENTIFIC COMPUTING

## CONTACT DETAILS

Centre for Scientific Computing  
University of Warwick  
Gibbet Hill Road  
Coventry, CV4 7AL, UK  
☎ +44 (0)24 7657 4111

Research and Taught degrees:  
✉ [csc-admissions@warwick.ac.uk](mailto:csc-admissions@warwick.ac.uk)

## RESEARCH GROUPS

### Fundamentals

Computational work in the natural sciences relies on advances in numerical mathematics, algorithms and computer science. Examples of such "fundamental" research are partial differential equations (PDEs), new strategies for parallel computation, algorithmic approaches to high-performance computing and many more which arise throughout science and engineering.

### Molecular Dynamics and Modelling

Broadly, molecular dynamics is concerned with the motion of particles and how that drives many natural processes. In many cases particles are atoms and molecules, which can be used to generate a fundamental understanding of nanomaterial design, of the mechanistic processes in biological membranes, or the formation of biomaterials such as bone. Molecular dynamics is also used to study much larger processes, such as colloids or chromosomes.

### Computational Engineering and Fluids

Computational engineering supports almost all branches of traditional engineering. For example, predicting what will happen, quantitatively, when fluids and gases flow, often with the complications of simultaneous flow of heat, mass transfer, chemical reaction (e.g. combustion, rusting), mechanical movement (e.g. of pistons, fans, rudders) stresses.

### Monte Carlo and Stochastic Simulation

Monte Carlo methods provide solutions to quantitative problems by inferring from samples produced through stochastic simulation. While the method itself is based on statistical simulation the problems solved can be both deterministic and probabilistic, with applications to all the natural sciences.

### Quantum Simulations

Ultimately, quantum mechanics governs how the world around us evolves. Thus we study how quantum effects at the microscopic level manifest themselves in macroscopic behaviour. Applications include photonic materials, organic conductors and chemical reactivity.

# CENTRE FOR SCIENTIFIC COMPUTING

[www.warwick.ac.uk/go/csc](http://www.warwick.ac.uk/go/csc)

## Computation of Living Systems

Biology as a quantitative science is increasingly reliant upon on large-scale computational approaches to understand the complex behaviour of living systems. This starts with investigations at the molecular level, continues to models of proteins, bio-polymers and their dynamics and culminates in the simulation of whole habitats.

## RESEARCH DEGREES

### MASTER'S BY RESEARCH (MScR)

**Standard Duration: 1 year full-time**

### DOCTOR OF PHILOSOPHY (PhD)

**Standard Duration: 3 – 3.5 years full-time**

In order to adequately support research which transcends traditional departmental boundaries, we offer tailored MSc and PhD degrees which allow more flexibility for both student and supervisor to shape the research agenda. Research opportunities exist in each of our six research groups (see above). Applicants should have, or expect to obtain, a degree in Biology, Chemistry, Computer Science, Engineering, Mathematics, Physics or Statistics. Applicants from closely-related disciplines will also be considered.

## APPLICATION FACT FILE (RESEARCH DEGREES)

### Entry Requirements

2:i degree or higher in a Science or Engineering discipline, sufficiently strong mathematical background (e.g. A Level in Mathematics); some experience of programming in C or Fortran.

### English Language Requirements

IELTS 6.5, TOEFL (iBT) 92 or equivalent

### Application

All applications are made online at [www.warwick.ac.uk/go/pgapply](http://www.warwick.ac.uk/go/pgapply)

### Application Deadline

31 August

### Tuition Fees

(2011/2012 fees. Please note that fees for 2012/13 will be published online in spring 2012.)

Home/EU: Full-time £3,900, Part-time £2,340

Overseas: (Band 2 – lab-based) Full-time £15,460, Part-time £9,276

### Funding

Details of the Chancellor's Scholarships and other funding opportunities are available from: [www.warwick.ac.uk/go/graduateschool](http://www.warwick.ac.uk/go/graduateschool)

## TAUGHT MASTER'S DEGREES

### MSc IN SCIENTIFIC COMPUTING

**Standard Duration: 1 year full-time**

The MSc programme offers an exciting interdisciplinary course in Scientific Computing, i.e. the use of computers to solve problems in science and engineering. This course is 50% lecture-based, with the other half comprising a research project and dissertation. Examples of advanced modules offered in the course include: Foundations of Scientific Computing & Serial Programming Methods; High Performance Computing; Computational Linear Algebra; Practical Algorithms and Data Structures; Monte Carlo Methods and Computational PDEs.

The research project can be in any area of scientific computing. Here, students apply the techniques learnt to real problems in their chosen area of scientific specialisation. Recent graduate destinations include the financial and IT sector. A large proportion of our MSc students continue on a PhD programme in a Science discipline.

## APPLICATION FACT FILE (TAUGHT DEGREES)

### Entry Requirements

2:i degree or higher in a Science or Engineering discipline, sufficiently strong mathematical background (e.g. A Level in Mathematics); some experience of programming in C or Fortran.

### English Language Requirements

IELTS 6.5, TOEFL (iBT) 92 or equivalent

### Application

All applications are made online at [www.warwick.ac.uk/go/pgapply](http://www.warwick.ac.uk/go/pgapply)

### Application Deadline

31 August

### Tuition Fees

(2011/2012 fees. Please note that fees for 2012/13 will be published online in spring 2012.)

Home/EU: Full-time £6,080, Part-time £3,040

Overseas: (Band 2, lab based)  
Full-time £16,000, Part-time £8,000

### Funding

Funding opportunities are listed on the Graduate School Website: [www.warwick.ac.uk/go/graduateschool](http://www.warwick.ac.uk/go/graduateschool)



**Edward Hurst**  
*MSc in Scientific Computing*  
*Centre for Scientific Computing*

“After completing a BSc in Mathematics at Warwick I was looking into postgraduate study. I’d enjoyed computational work throughout my study, and when I became aware of the MSc in Scientific Computing I knew it was the right course for me.

With modules in the Mathematics, Statistics, Engineering and Physics departments, I could use the knowledge that I had acquired in my previous degree, as well as studying new areas and finding new applications for the programming skills that I’d learned throughout the year. Due to the very different backgrounds of the students on the course each module didn’t assume too much prior knowledge of the subject, but at the same time required a high enough level of work to remain engaging. It was great to get the experience required to move into a more applied research area.

I have now gone on to study for a PhD in Computational Fluid Dynamics in Warwick’s School of Engineering. The taught part of the MSc gave me many of the skills required to study in this field, namely in parallel programming, computational linear algebra and computational PDEs, and the dissertation was a great introduction to research and self-motivated study.”



**James Bukosia Wafula**  
*MSc Statistics*  
*Department of Statistics*

“Pursuing a Master’s degree in Statistics was always on my mind since completing my bachelor’s degree in Kenya. I had a young family and siblings to take care of and therefore resources were scarce. I had two things to think about: how to secure funding for my studies and relocating my family to the United Kingdom. I had quite a lot of information about Warwick’s MSc Statistics programme. I contacted the University and got a lot of information about scholarship opportunities. I decided to apply for the Commonwealth Shared Scholarship Programme. I got a lot of support from Warwick with vetting and visa application, making travel arrangements for my family and myself, and finding accommodation.

The MSc programme has been quite an experience. I marvel at what I have gained within such a short time. Here at Warwick, you learn from the very best in the field. There is a lot of diversity, and students are given the freedom to choose study areas that they are most interested in, with guidance from personal tutors. Research at the Department of Statistics is world class. I plan to pursue a PhD after my MSc, and Warwick is definitely the natural place for me.”