## Career Prospects

Graduates of applied mathematics have much to offer potential employers: including analytical, problem solving and computing skills. Numeracy and demonstrated abilities to learn and acquire new skills and deal with complex ideas mean that our graduates are in demand in the modern technologically advanced workplace. Our past graduates have developed successful careers in Management Information Systems, Financial Accounting, Financial Services, Insurance and Actuarial Work, Banking, Software Engineering, Computer Marketing, Computer Systems Software, Weather Forecasting, Fisheries Management, Aerospace Engineering and Software, Marine Engineering, Seismology/Earthquake Engineering, University Lecturing, Applied Mathematical Research and Consulting in Universities, Research Institutes and Industry, Secondary School Teaching, Directing Movies and even a University President!!

Department of Applied Mathematics,
School of Mathematical Sciences,
University College Cork

For Further Information
Please contact
Head of Department,
or Senior Executive Assistant,
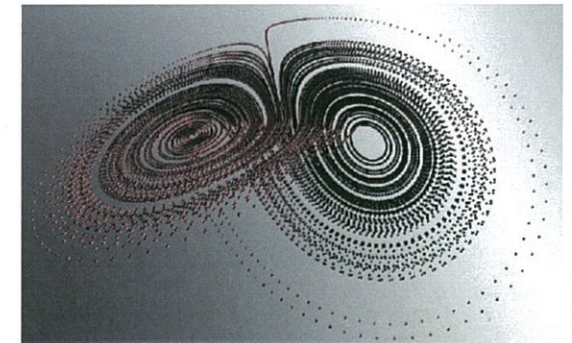Department of Applied Mathematics, NUI, Cork

Tel: (021) 4205819. Fax (021) 4205364
Email: applied.math@ucc.ie
See also: http://www.ucc.ie/en/euclid

Applied Mathematics Department,
*University College, Cork.*

B.A. Joint Honours Degree

# Applied Mathematics
## in the Faculty of
# Arts

http://www.ucc.ie/en/euclid

## What is Applied Mathematics?

Applied Mathematics is the application of mathematics to the modelling and solving of practical problems. Applied Mathematics is at the core of many disciplines, ranging from business, finance and economics, through geography and geology to all branches of engineering and the sciences. In University College Cork, the Department of Applied Mathematics (formerly, and now incorporating Mathematical Physics) is part of the School of Mathematical Sciences.

The applied mathematician must not only be a competent mathematician, with a strong and broad based "tool-box" of mathematical techniques, but must also be knowledgeable in the areas to which mathematics is applied. Thus the applied mathematician will be concerned with the definition, formulation, solution and interpretation of developed mathematical models. Being able to effectively communicate about problems and their solutions with those from other related disciplines is essential. Regardless of career path chosen, today's employers demand these types of skills and flexibility of approach.

Computers play a central role in applied mathematics. Traditional (pen and paper) mathematical analysis can provide tremendous insights. However, this is only half the story. Most problems can only be solved by making use of computers to perform immense numerical computations far beyond the power of human beings. Numerical computation encompasses scientific programming, the use of sophisticated mathematical software libraries, computer laboratory experiments and numerical analysis.
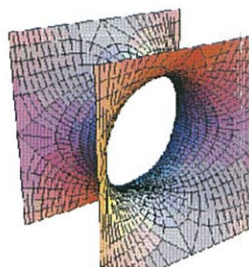
## Programme Description

As a consequence, this Degree Programme offered at Joint Honours level in Applied Mathematics, includes in its mathematical courses/modules material that ranges from some aspects of more classical applied mathematics in the form of elements of mechanics, to mathematical modelling methods and techniques, through a computer programming language and use of modern sophisticated symbolic software, such as Python, to numerical experimentation, to general mathematical methods, to elements of the very modern areas of chaos and dynamical systems. The emphasis throughout the three year programme is on developing and enhancing problem-solving skills.
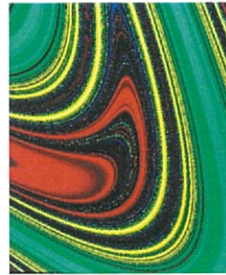
Note the First Year course in Arts assumes no previous knowledge of Applied Mathematics and there is extensive tutorial support available throughout the year.

## What topics are taught on the course?

The First Year Modules provide introductions to construction and analysis of mathematical models of a variety of problems/processes arising in business, finance, biology, physics, engineering, etc. in addition to elements of mechanics in which first and second order differential equations are used to gain insight and understanding of some significant natural systems. The use of Python as a tool for problem solving, or just simply doing Mathematics, is the core content of another First Year Module.

Throughout their Second and Third Years, students are equipped with more mathematical toolboxes, with computing skills (including a high level programming language), with insights into models and their mathematical analysis, with a deeper understanding of some classical problems and their methods of solution, as well as an insight into, and an understanding of, some elements of modern applied mathematics in the form of dynamical systems, chaos, etc. A Project Module helps the student to integrate and apply knowledge acquired in the other Modules.

## Eligibility

Any student admitted to the Faculty of Arts is entitled to pursue a Joint Honours B.A. Degree in which Applied Mathematics is one of the two equally-weighted subjects, the other chosen, subject to timetable restrictions, from a broad range available in the Faculty of Arts. Since the emphasis throughout the programme is on problem solving, a good feel for puzzles, games, mathematical conundrums, as well as being "great" at mathematics and mathematical problems generally, might well be indicators of why one might want to study Applied Mathematics.

It is compulsory that students who intend to take Applied Mathematics in their later years, must take the Mathematics Module MA1055 concurrently in First Year.

## Postgraduate Studies

Many graduates in Applied Mathematics, as well as graduates from other related disciples, go on to obtain Higher Degrees in Applied Mathematics. A significant number of mature graduates return from careers in business, in government, and in industry to acquire advance technological skills, especially in computing.

Suitably qualified graduates can obtain an M.A. Degree in Applied Mathematics or in Mathematical Physics and the M.Sc. in Applied Science (Modelling and Numerical Computing)

Some postgraduate degrees involve research alone, others require a combination of coursework and research. Research degrees are taken in areas reflecting the diverse research interests of staff of the department.