



# DN200 Mathematical, Physical and Geological Sciences

- Applied and Computational Mathematics
- Mathematics
- Mathematical Science
- Statistics
- Applied Mathematics and Mathematics Education



©UCD

## Why study a Mathematical degree at UCD?

Studying in the UCD School of Mathematical Sciences is an enjoyable and intellectually challenging activity which rewards clear thinking and stimulates an inquiring mind. We see mathematical science as the systematic study of quantity, structure, space and change.

Choosing Applied and Computational Mathematics, Mathematics, Statistics, Mathematical Sciences or Applied Mathematics and Mathematics Education as

your degree will greatly enhance your career opportunities and is a prerequisite for graduate studies in a variety of disciplines.

Today, mathematical knowledge is a basic tool in all scientific subjects, including engineering, geography, computer science and economics. Advances in mathematical techniques and intensive numerical computation are also applied in biology, social science and finance.

## What will I study?

Some of the topics offered by the UCD School of Mathematical Sciences include:

- Oscillations and Waves
- Fluid Mechanics
- Dynamical Systems
- Groups, Rings and Fields
- Metric Spaces
- Topology
- Number Theory
- Measure Theory and Integration.
- Survey Sampling
- Stochastic Models
- Multivariate Analysis
- Climate Change Science
- Classical Mechanics and Special Relativity
- Relativistic Quantum Mechanics
- Computational Science
- Analysis
- Graphs and Networks
- Coding Theory
- Field and Galois Theory
- Probability Theory
- Statistical Data Mining
- Time Series Analysis
- Applied Statistical Modelling

computing and data visualization. The objective of the summer school is to learn computational techniques in order to tackle the emerging phenomenon of "Big data." For more details, see <http://www.ucd.ie/mathsciences/eventsoutreach>

## What are the career opportunities?

A degree from UCD School of Mathematical Sciences equips students to enter into a variety of careers. Students use a strong foundation in computational ability and abstract thinking to work in the following areas:

- **Computing and Technology** – Aeronautical or Mechanical Engineer, Financial Engineer, Quantitative Analyst, Software Engineer, Animator, Cryptographer, Statistician, Data analytics
- **Business, Finance and Insurance** – Actuary, Business Analyst, Financial Analyst, Statistician, Risk analysis
- **Academia and Research** – Graduate studies through MSc or PhD courses. PhD graduates can pursue research careers as postdoctoral researchers or third-level lecturers.
- **Meteorology and Climate** – Wind and wave energy, environmental modelling, scientist at European Space Agency
- **Teaching** – Post Primary School Mathematics and Science Teacher
- **Commerical Research and Development**
- **Public Health** – Epidemiologist

## What are the internship opportunities?

The School of Mathematical Sciences currently offers a number of individual 6-week summer research placements. These placements expose students to a wide range of cutting-edge research projects guided by leading experts in pure mathematics, statistics and applied and computational mathematics. Additionally, the School is hosting a 5-day summer school in 2013 on high-performance

“When it comes to specific knowledge areas, organisations feel the greatest lack of knowledge is in mathematics: a third of the employers surveyed see a shortfall here.”

[www.gradireland.com](http://www.gradireland.com) May 2011



# What are the career opportunities for graduates with Mathematical degrees?

## COMPUTING AND TECHNOLOGY



People who work in computing and technology help companies develop streamlined policies and management solutions. It is a profession that assists all kinds of companies across many different industries, but it is a highly technical field that requires solid understanding of advanced math principles, computer skills and quantitative reasoning skills.

These analysts utilize methods including statistical research, data mining, computer modeling, simulation and linear programming to find solutions to problems in business, manufacturing, pharmaceuticals and space technology. They forecast which materials and equipment are needed for various projects, help with organization and layout for stores, evaluate performance and design production facilities.

“My education at UCD has allowed me to collaborate with people in different areas, such as biotechnology, Internet technology and marine biology.”

Dr Donal McMahon, BAFS (UCD), MSc Statistics (UCD), PhD (Stanford)  
Statistician, Ads Quality Team, Google

## BUSINESS, FINANCE AND INSURANCE

Actuaries are responsible for evaluating and forecasting risk for companies' finances and profitability and also for insurance companies wanting advice on declaring premiums. The actuaries who work with insurance carriers (which is the majority of actuaries) work on property and casualty insurance and also life insurance and health insurance. They create highly scientific reports estimating potential losses and risks regarding car accidents, lifestyles, age, sex and more. Actuaries who work for companies evaluate things like credit, pension plans, securities, retirement, investments, shareholders and stocks.

“The BAFS degree at UCD is undoubtedly the best Actuarial course in Ireland. Small classes, tough exams, work and play hard.”

Elena McLroy De La Rosa, BAFS (UCD), FSAI, FIA  
Santander Insurance Ireland

## ACADEMIA AND RESEARCH

Mathematicians and Statisticians provide significant support to a number of industries, from the government to computers and technology to business to engineering to economics. They combine theoretical principles with technical skills and problem-solving strategies in their work, and although there are two categories of mathematics (theoretical and applied) most mathematicians use both in their careers. Theoretical mathematicians spend more time on research and solving complicated math theories, principles and proposals. They often work as lecturers as a supplement to their research. Applied mathematicians also conduct research but their focus is usually to solve real-world problems for companies, governments, engineering projects and related fields.

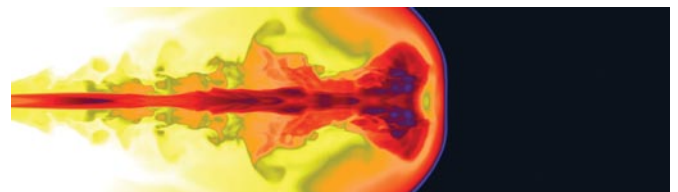
“The research activities in the UCD School of Mathematical Sciences make it an ideal environment to obtain a PhD. It was challenging and rewarding.”

Dr Caroline Brophy, PhD Statistics (UCD)  
Lecturer, NUI Maynooth

“I did my PhD in Mathematics at UCD in the areas of classical quadratic form theory and combinatorial number theory. I really enjoyed my time in Dublin.”

Dr Stefan De Wannemacker, PhD Mathematics (UCD)  
Research manager, iMinds-ITEC-K.U. Leuven

## ENERGY



A technology revolution reshaping the energy sector through streamlined operations, increased production, and improved distribution will create ample job opportunities for third-level graduates over the next decade. Energy companies deploy technology-laden smart grids, establish high-tech mission control centres, and embrace wireless sensors, predictive intelligence, wind and wave renewable devices, and other cutting-edge innovations. Graduates with technical and advanced degrees will be needed to fill lucrative positions as engineers, scientists, and technicians.

“By studying Applied Mathematics at UCD, I am well equipped with the mathematical and computational skills to achieve my goals.”

Dr Kenneth Doherty, BSc Experimental Physics and Applied Mathematics (UCD), PhD (UCD)  
Research Manager, Aquamarine Power

## How do I find out more?

You can get information about these courses by calling, emailing or writing to:

UCD School of Mathematical Sciences  
University College Dublin, Belfield, Dublin 4  
T: +353 1 716 7152  
E: [mathsciences@maths.ucd.ie](mailto:mathsciences@maths.ucd.ie)

<http://www.ucd.ie/mathsciences>