

Welcome to Computer Science



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Welcome from the Head of Department

The Department of Computer Science at The University of Auckland is the largest and most diversified Computer Science department in New Zealand. The department has a strong research focus, with more than 40 academic staff actively undertaking research, much of it in collaboration with international researchers and local industry. We have the most PBRF "A" rated researchers in Computer Science of any tertiary institution in the country, and boast strong research expertise in the areas of algorithmic information theory, artificial intelligence, combinatorics, data communications and networks, distributed computing, graphics, computer vision, logic, knowledge based systems, robotics, software engineering, software security, theory of computation, visual programming, and computer science education. This means our degree programmes are leading edge, our graduates are well prepared for the challenges of the dynamic and fast growing software industry and are very much in demand by industry employers.



We offer a very broad range of courses spanning almost all aspects of Computer Science. This handbook describes the courses covered by the department, together with information to assist you in planning your degree programme.

All the best for your study in 2012.
Professor Gill Dobbie
Head of Department

What is Computer Science?

Computers are everywhere, and influence many aspects of society, from the enormous impact of computer games, social networking, email, and the web, through airline ticket booking and navigation systems to banking. There is an expectation that these technologies will behave safely, reliably and responsibly. As a result, the need for Computer Science graduates has increased dramatically, leading to a skills shortage across the IT sector.

The skills of logical thinking, problem solving, abstraction and systematic analysis acquired through the study of Computer Science are highly

transferable to other disciplines and greatly in demand. As technology improves and becomes an integral part of our society, it shapes and defines the way we live. An understanding of computers prepares us for a modern, web based society, and allows us to cope with the rapid changes in technology.

Computer Science study includes the following broad topics:

- How computers and computer systems work – architecture, systems software, programming languages, data communications, networks,

security and robotics

- How computers manage information – algorithms, data structures and data management
- Applications of computers in society - artificial

intelligence, human computer interaction, the internet, computer graphics and computer vision

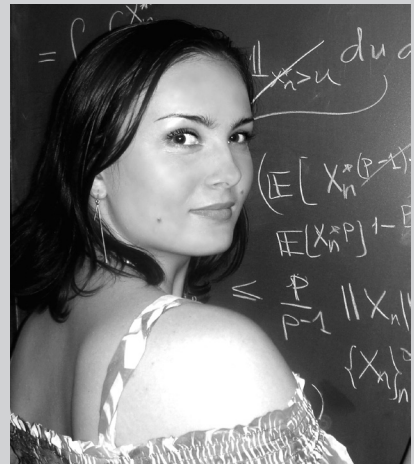
- The limits of computers – computability and complexity theory.

Careers in Computer Science

While businesses have made extensive use of computers for many years, there are now significant uses of computer technology in many other industries, such as manufacturing, transport, communication, health care and entertainment. In particular, the internet is changing the way we communicate and the way in which business is done. Almost all companies today make use of computer technology and require professional staff with computer expertise to develop and maintain the systems they use. Software development, a focus of studies in Computer Science, plays a major role in a wide range of businesses and industries.

Because Computer Science teaches you how to solve problems using a computer, graduates can find work in many fields. Graduates can get jobs designing and implementing software. This can include work involving web development, interface design, security issues, and mobile computing. They also find work devising innovative ways to use computers or developing effective ways to solve computing problems. Computer Science graduates can also be involved in planning and managing the technology infrastructure of companies and other large organisations.

There is a continuing shortage of skilled computing specialists in New Zealand at the moment. Here are some examples of the variety of computing occupations that are available in



Ekaterina Vinkovskaya graduated in 2007 with a Bachelor of Science majoring in Computer Science and Mathematics and then in 2008 with Bachelor of Science (Honours) in Statistics.

today's job marketplace:

- Business Analyst
- Telecommunications Specialist
- Database Developer
- Internet/Multimedia Developer
- Network Architect
- Network Support
- Software Architect
- Software Developer
- Software Engineer

- Systems Architect
- Systems Administrator
- Technical Consultant
- Website Developer

Even professions that are not directly involved in information technology need IT specialists. Banking, engineering, biology, health care, teaching, entertainment - there's scarcely an industry left nowadays that has not assimilated some level of computing technology. And they all need people with computing skills to keep them up to date. No matter where your interests lie, computing knowledge will always be an advantage.

Meet our graduates



"I'm currently working for Sidhe, New Zealand's largest video game developer. Previously involved with games for the PS2 and the Wii, I am now developing games for iOS and Android and have been doing so for the past two years."

Jeremy Lai graduated with a conjoint Bachelor of Science and Commerce in 2008, majoring in Computer Science and Information Systems.

"I am working as a software engineer at Navman, working on iPhone and Android projects. I enjoy working here because I get to work with a lot of talented people and with the latest technologies."

Konstantin Tchernov graduated with a Bachelor of Science (Honours) in Computer Science with first class honours in 2007.





"I'm currently an IT consultant at PwC Malaysia which provides risk assurance and advisory services to the clients to help them improve their information system security and processes. My degree has equipped me with good technical and communication skills to face various work related challenges."

Yap Pei Shan graduated with a Bachelor of Science (Honours) in Computer Science with first class honours in 2008. Her undergraduate degree was a double major in Computer Science and Information Systems.

After graduating, Alex moved to the US to attend Harvard Law School, where he was on the Harvard Law Review. He now practises patent litigation at a major law firm in New York, representing high-technology companies including Apple and Intel. The University of Auckland's Computer Science degree has proved invaluable to understanding the complex computer technology he deals with daily.

Alex Henriques graduated with a Bachelor of Science (Honours) in Computer Science with first class honours in 2006.



"After working for some time in London, I took a job in Guangzhou, China, where I develop software for a foreign exchange trading platform. My degree prepared me well for this complex and interesting work where speed and algorithm efficiency is crucial. Furthermore, being in the software development industry has allowed me to work in various countries across the world."

Daniel Flower graduated in 2006 with a Bachelor of Science (Honours) in Computer Science.