



Australian Government

Department of Defence
Defence Science and
Technology Organisation

DSTO

Graduate and Post-Graduate Opportunities

Mathematical Sciences

DSTO is looking for the best and brightest graduates and postgraduates with excellent academic achievement or experience in the following areas:

- ▶ Mathematics
- ▶ Statistics
- ▶ Operations Research
- ▶ Numerical Simulation
- ▶ Modelling and Analysis

Current Research Projects

Crowd behaviour analysis

DSTO is developing a crowd behaviour modelling system that provides a capability for making predictions of complex crowd motions to assist in implementing effective intervention measures.

The way crowds move is of central concern to military commands as well as civilian authorities and disaster relief agencies. Some scenarios of interest include civilians passing through a combat zone to escape conflict, and persons fleeing natural disasters such as tsunamis, earthquakes and fire.

Weapons systems analysis and modelling

DSTO assists the Australian Defence Force through the development of an advanced weapon simulation and analysis capability that supports the acquisition and tactical employment of advanced weapon systems. This capability provides a range of integrated tools and techniques for weapons performance analysis including low-fidelity mission-level studies, highly detailed engineering/component level simulations and real weapon hardware exercises in a simulated virtual environment.

This research uses mathematics for weapon system modelling, numerical simulation and the subsequent analysis of simulation results. The mathematical disciplines involved include probabilistic and statistical analysis, numerical methods, operations research, modern control theory, computational fluid dynamics and visualisation.

DSTO also undertakes fundamental research related to modelling and simulation to address a variety of problems. These include: the dynamic real time synthesis of visual and infrared scenes, the application of evolutionary principles to synthesize processes, and algorithms that perform complex tasks such as route optimization and target recognition.

Cryptomathematics

DSTO researchers apply mathematics and computing science to Defence aspects of cryptology and information security. Research conducted using cryptomathematics (the mathematical theory of codes and ciphers) includes the assessment of cryptographic systems proposed for use by the Australian Government, the security and reliability of communications systems, and the measurement of unintended electromagnetic radiation.

Ship self-defence modelling

DSTO uses mathematical modelling to assess the effectiveness of naval ships' self-defence systems including the weapons, sensors and tactics a ship should use if under a missile or terrorist attack. Mathematical modelling is also useful in analysing the fallout of debris where a ship may be forced to shoot down a terrorist aircraft over a city or a port.



DSTO

Science and Technology for a Secure World

www.dsto.defence.gov.au