Research in Mathematics and Statistics

Research in Mathematics and Statistics at Murdoch University encompasses a wide range of topics from pure mathematics to applied mathematics and statistics. Applied research in Mathematics and Statistics is a strong focus of the Murdoch program. Our experienced staff work closely with students to produce an individualised research program of international standing.

Applied Mathematics

Applied mathematics is a broad research area that underlies and has important applications in engineering and computer science; the physical, environmental and biological sciences; economics, management and finance.

Statistics

Data are being collected and stored at an ever-increasing rate in the digital era. Researchers in statistics are concerned with the development and use of novel statistical methods in order to analyse and interpret data from many different sources.

Research areas

Research projects predominantly relate to the areas of:

- fluid dynamics
- modelling of industrial, environmental and biological processes
- computational mathematics
- discrete mathematics
- combinatorics
- differential and computational geometry
- mathematical materials science
- robust statistics
- time series analysis
- analysis of social networks
- biostatistics
- genomic data analysis and integration

Staff members in Mathematics and Statistics at Murdoch University undertake world-class research – their website profiles provide additional information on their individual expertise and experience.

Mathematics and Statistics researchers

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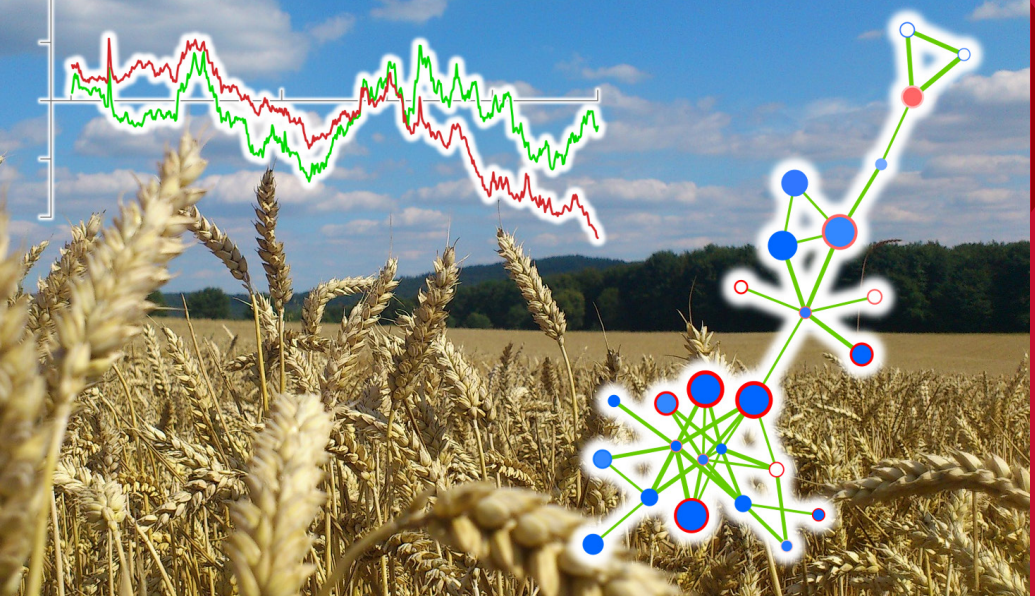
Collaborations in research programs with industry and other appropriate disciplines at Murdoch University are welcomed.

For further information

http://murdoch.edu.au/SEIT



"Murdoch has excellent facilities for research in mathematics and statistics and I value the academic atmosphere here. I plan to undertake post-doctoral research into the modelling of renewable energy."

Current topics

Research in Mathematics and Statistics is conducted in a diverse range of topics. The following are current areas of interest:

COMPUTATIONAL MATHEMATICS

- Ill-posed and inverse problems
- Integral equations
- Polynomial equations
- Spline smoothing

FLUID DYNAMICS

- Free surface flow
- Porous media flow
- Reservoir modelling
- Environmental fluid mechanics

GEOMETRY

- Stochastic geometry and spatial statistics
- Negatively curved interfaces and networks

MATHEMATICAL MATERIALS SCIENCE

- Nanomaterials: function from structure
- 3D imaging: microscopy and morphology
- Biomimetics: optimal designs inspired by nature

MATHEMATICAL MODELLING

- Mathematics in industry
- Glacier calving
- Rock mechanics in mining

PURE MATHEMATICS

- Combinatorics on words
- Discrete Mathematics
- Number Theory

STATISTICAL GENETICS AND BIOINFORMATICS

- Next generation sequencing experiments
- Epigenomic regulation
- Genomic data integration
- SNP-based association studies
- Probabilistic models for interference
- Meta-analysis methods

STATISTICAL THEORY AND APPLICATIONS

- Linear models
- Robustness theory and applications
- Time series (climate change)
- Analysis of social networks
- Saddlepoint approximation methods

Staff are engaged in collaborations with Australian and international researchers and research groups, including those given below.

- Sheffield University, UK: Centre for Materials Modelling; Department of Geography
- Karlsruhe Institute of Technology, Germany: Stochastic Geometry
- University of Limerick, Republic of Ireland: Mathematics Applications Consortium for Science & Industry
- Garvan Institute of Medical Research, Sydney: Genomics and Epigenetics Division

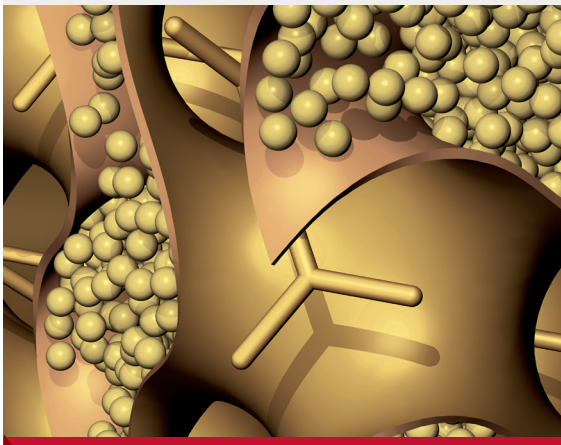
Other international associations include researchers from Canada, Iraq, Japan, Libya, South Africa, Spain, Switzerland and USA.

Travel to research institutions or conferences may be incorporated into the program of a research student at Murdoch University.

Postgraduate Students

"I've found brilliant staff for research in Dynamical Modelling at Murdoch University."

"I feel very fortunate to be able to pursue my PhD studies while still working."



Want to know more?
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