Honours in Mathematics and Statistics

Information Meeting 7 October 2015

- Admission requirements
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- Scholarships
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Why Honours?

• Exposure to advanced coursework and research
  • Preparation for postgraduate study
  • Certification of excellence in Mathematics & Statistics
  • A taste of cutting edge research, a glimpse of the edge of knowledge

• Develop valuable skills coveted by employers
  • Research skills
  • Technical writing and oral presentation skills
  • Focus, perseverance, and creativity
The Honours Year

• The Honours year is...
  • the final year of the Advanced Mathematics/Advanced Science degree
  • *or* an additional year at the end of your non-Honours Bachelor degree

• 3986 Advanced Mathematics and 3972 Advanced Science:
  • apply to School of Mathematics and Statistics

• 4500 Bachelor of Science (Honours):
  • apply to School of Mathematics and Statistics
  • successful applicants are then enrolled in program 4500
Honours Streams

• 4500 Bachelor of Science (Honours), 3972 Advanced Science
  – MATHPH Pure Mathematics
  – MATHAH Applied Mathematics
  – MATHTH Statistics
  – MATHNH Physical Oceanography

• 3986 Advanced Mathematics
  – as above *plus*
  – MATHR1 Quantitative Risk
Admission requirements

• Average above 70% in **Level III Mathematics courses**
• Average above 70% in **Core Level III Mathematics courses**

  – **Pure Mathematics:**
    - MATH3611 Higher Analysis
    - MATH3701 Higher Differential Geometry and Topology
    - MATH3711 Higher Algebra

  – **Statistics:**
    - MATH3801/3901 Probability ad Stochastic Processes
    - MATH 3811/3911 Statistical Inference
    - MATH 3821 Statistical Modeling and Computing

  – **Applied Mathematics:**
    - Three Level III courses depending on your chosen field (consult Applied Coordinator)
The Honours Year

- You enrol in MATH4001/4002 (Thesis A or B) plus 5 approved courses
  - **Project/Thesis**: 18 Units of Credit
  - **Coursework**: 30 Units of Credit (5 courses at 6 Units of Credit each)

- There is also a weekly honours seminar (pure and applied) and a practice talk session at the beginning of your last Honours semester (statistics)
Semester 1, 2016 Honours Courses

- MATH5165 Optimization (V Jeyajumar)
- MATH5185 Environmental Fluid Mechanics and Thermodynamics (T McDougall & S Keating)
- MATH5295 Finite Elements and Quasi-Monte Carlo Methods (F Kuo and W McLean)
- MATH5305 Computational Mathematics (T Tran)
- MATH5505 Combinatorics (T Britz)
- MATH5605 Functional Analysis (D Potapov)
- MATH5735 Modules and Representation Theory (J Du)
- MATH5805 Special Topics (Statistics) -- Bootstrap (G Geenens)
- MATH5806 Applied Regression Analysis (P Straka)
- MATH5835 Stochastic Processes (P Del Moral)
- MATH5916 Survival Analysis (J Olivier)
- MATH5960 Bayesian Inference and Computation (S Sisson)
- MATH5965 Discrete Time Financial Modelling (L Chan)
- MATH5975 Introduction to Stochastic Analysis (DM Salopek)
Semester 2, 2016 Honours Courses*

- MATH5175 Topics in Applied Maths (G Froyland)
- MATH5215 Topics in Appl Maths IV (C Tisdell)
- MATH5285 Fluids, Oceans and Climate (M Holzer)
- MATH5335 Computational Methods for Finance (J Dick)
- MATH6781 Bioinformatics
- MATH5535 Lie Groups (J Kress)
- MATH5715 Harmonic Analysis (F Sukochev)
- MATH5725 Galois Theory (D Chan)
- MATH5805 Special Topic (Statistics) – Advanced Monte Carlo Methods (P Del Moral)
- MATH5816 Continuous Time Financial Modelling (DM Salopek)
- MATH5825 Measure, Integration and Probability (I Doust)
- MATH5836 Data Mining (P Straka)
- MATH5845 Time Series (W Dunsmuir)
- MATH5905 Statistical Inference (S Penev) - N/A to students who have taken MATH3811/3911
- MATH5945 Categorical Data Analysis (J Olivier)
- MATH5985 Term Structure Modelling (DM Salopek)
Honours Year Project

• Independent study under the supervision of a member of staff
  • 40-60 page thesis (rule of thumb only)
  • 25-50 minute oral presentation

• Potential honours projects and supervisors are on the Honours webpage, but **you are responsible** for finding a supervisor and project

• Talk to as many people as you can, as early as you can before choosing. This should be organized **before** you start your Honours year!

• Your thesis will describe your project work and place your work in context with current research; any original project work is a bonus!
Honours Scholarships

• **Honours Relocation Scholarships**
  – $5000 for the cost of relocation of non-UNSW students

• **UNSW Honours Year Scholarships - UGCA1120**
  – Ten one-year scholarships of $5000 for students who achieve an average Distinction in their undergraduate degree program
  – only available to students in a degree program where Honours requires an extra year of full-time study over and above the requirements of the pass degree

• **Paradice Honours Year Scholarship UGCA 1433**
  – Two one-year scholarship of $5000 for female students undertaking Honours in Maths & Stats

• **H.C. and M.E. Porter Memorial Scholarship UCGA 1035**
  – One One-year scholarship of $5000

• **The Dean's Honours Year Scholarship in Science - UGCA1083**
  – One one-year scholarship of $2500 for outstanding students undertaking study at Honours level in the Faculty of Science.

• **School of Mathematics and Statistics Honours Year Award - UGCA1255**
  – covers CSP payment for Honours year in the School of Mathematics and Statistics
  – open to qualified students from all approved universities in Australia and overseas.

• **Scholarships to work on specific projects in Statistics** (see the Stats Honours Handbook)

- [https://www.maths.unsw.edu.au/currentstudents/honours-scholarships](https://www.maths.unsw.edu.au/currentstudents/honours-scholarships)
Next steps...

- Consult with the relevant Honours Coordinator to discuss your subjects
  - **Pure**: Catherine Greenhill (c.greenhill@unsw.edu.au) or Ian Doust (i.doust@unsw.edu.au)
  - **Applied**: Shane Keating (s.keating@unsw.edu.au)
  - **Statistics**: Feng Chen (feng.chen@unsw.edu.au)

- You should also talk to potential supervisors **as soon as possible**!
- Submit application form to School by **10 December** (including Advanced Mathematics and Advanced Science students)
- If you are *not* enrolled at UNSW, you must *also* submit an application form to Admissions by **10 December**
Next steps

• Get familiar with “The Honours Year” section on the School website
  
Next steps

• Look at courses offered at AMSI summer school: ss16.amsi.org.au

4 - 29 January 2016
RMIT University
Some past honours students

- Anthony Morris (2011) – "The ergodic approach to Szemeredi’s theorem and beyond"; Now a software engineer for Google
- Adam Gray (2014) – “Some topics in fractional differential equations”; now working at Goldman Sachs in Hong Kong
- Chin Pin Wong (2010) -"Comparing sums of random variables- the operator K approach”; Then a PhD at Oxford in functional analysis
- Tony Vo (2014) – “A geographic study of custom default and churn rates on residential mortgages using census data”; Now a business intelligence officer at Suncorp Group
- Alvin Huang (2013) – “Rare-event probability estimation via empirical likelihood maximisation”; now at Quantum.
- Pengxi Chen (2012) – “PIT residual diagnostics for count time series models”; Now at Inivio
- Francis Hui (2011) – “A discourse on conditional independence in two-way contingency tables”; Now doing Postdoc at ANU after completing PhD at UNSW