Maths and Stats Careers at CSIRO

Andreas Ernst | Operations Research Group Leader
31 January 2012
My background

• PhD in Network Optimisation at the University of W.A.
• Started as post-doc in CSIRO
• Currently group leader of the Operations Research Group
  • Looking after group of 18 staff in Melbourne, Canberra, Sydney & Brisbane
  • Working on projects for industry or government departments
  • Collaborative research with other disciplines and other parts of CSIRO
  • Academic research: publishing, conferences, PhD student supervision, ...
It’s a great time to do maths & stats ...

1. Big Data
   - More data becoming available in all areas of life & science: customer transaction information, gene sequence data, sensor networks, images, ...
   - Statistics and mathematical analysis is essential to make sense of this data

2. Computational analysis and modelling
   - Computers are becoming more parallel but not faster per processor.
   - Need new algorithms designed for parallel/distributed computing
   - Increasing use of computational models in all areas: biology, social science,...

3. Skills shortage in maths and stats
   - Need a lot of professional mathematicians and statisticians over the next few years to replace wave of retirements of baby boomers
   - Increasing need for more numerate and analytical people in many organisations across government and industry
Opportunities at CSIRO

1. Research Scientist positions
   • Permanent/indefinite positions, require a PhD as prerequisite
   • Work with industry, government, university collaborators etc

2. Postdoctoral fellowships
   • 3 year term appointments
   • Greater emphasis on strategic research and career development

3. PhD top-up scholarships.
   • Typically about $7K/annum + travel/equipment money on top of APA

4. Graduate fellowships
   • 2 year appointment for recent graduate (bachelor), project work + research

5. Vacation scholarships & casual positions
   • 10 week vacation scholarships will be advertised in July for start in late Nov.
What CSIRO is looking for

1. T-shaped individuals
   • Depth in one specialised area
   • Broad knowledge across a large number of other areas

2. Strong computing skills
   • Can’t create impact with maths & stats without some computing skills

3. Good communication skills
   • Need to be able to write and present well
   • Ability to listen & work in a team

4. Adaptability and focus on getting outcomes
   • CSIRO does science to achieve positive impact not for its own sake
Examples of CSIRO Maths & Stats projects: Planning regional infrastructure
Electricity and Carbon Price Forecasts

CSIRO Energy-Sector-Model for the long-term forecasts

Forecast electricity prices

Carbon price forecast
Investment selection and timing

Profit [$/BaseLoad MW]

Investment timeline
Australian Bureau of Statistics

Confidentialised data for social and economic research and analysis
• Various modes of access

High user demand: more detail, more flexibility, more datasets

Census and Statistics Act 1905\textsuperscript{2}
12 Publication etc. of statistics

... (2) ... results or abstracts ... shall not be published or disseminated in a manner that is likely to enable the identification of a particular person or organization.
CSIRO’s Privacy-Preserving Analytics (PPA)

Improving performance of swimmers
Thank you

Andreas Ernst
Operations Research Group Leader

t  +61 3 9545 8044
e  Andreas.Ernst@csiro.au
w  www.csiro.au/people/Andreas.Ernst