



# Maths and Stats Careers at CSIRO

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**CSIRO MATHEMATICS , INFORMATICS & STATISTICS**  
[www.csiro.au](http://www.csiro.au)



# 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

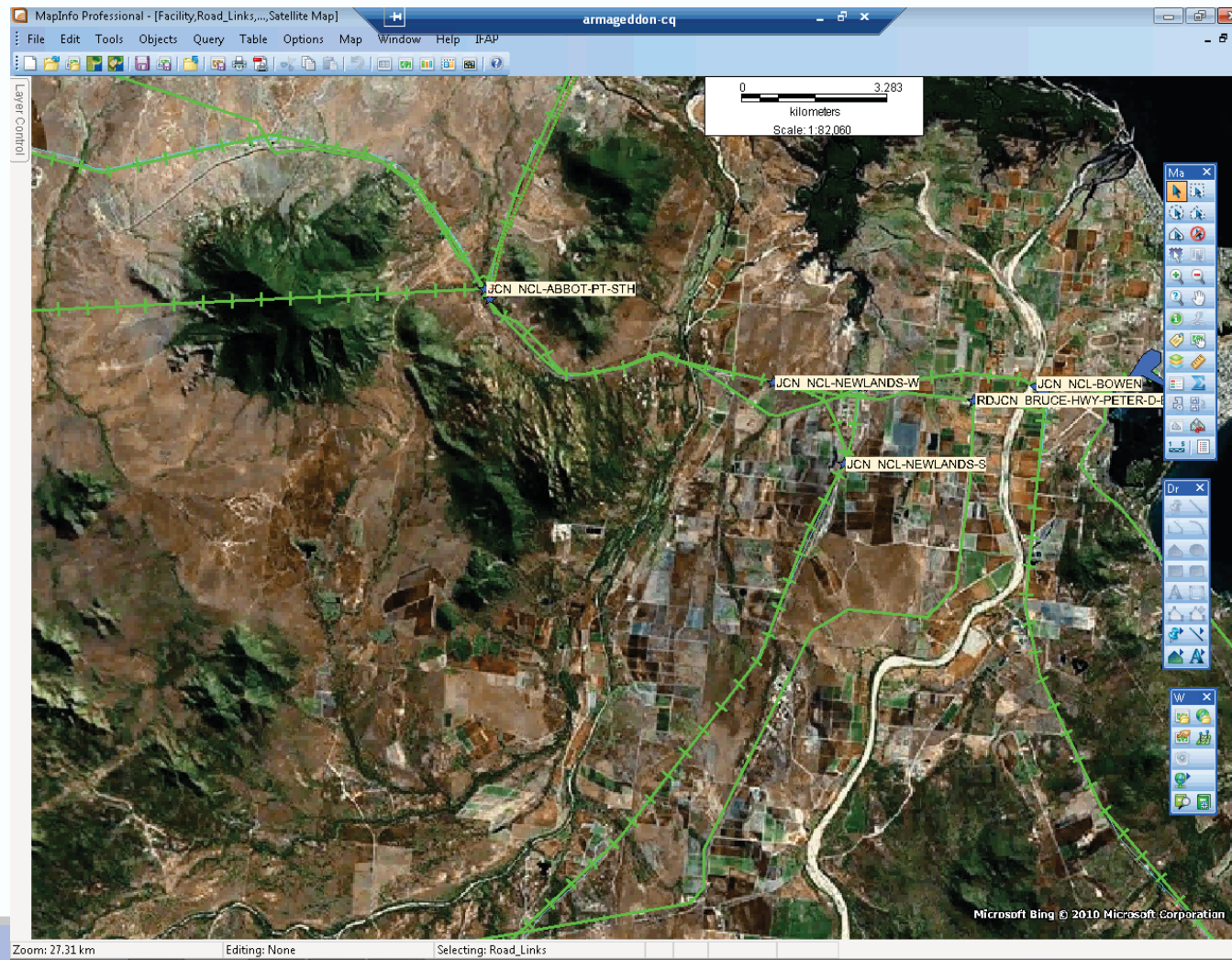
- Need to be able to write and present well
- Ability to listen & work in a team

## 4. Adaptability and focus on getting outcomes

- CSIRO does science to achieve positive impact not for its own sake



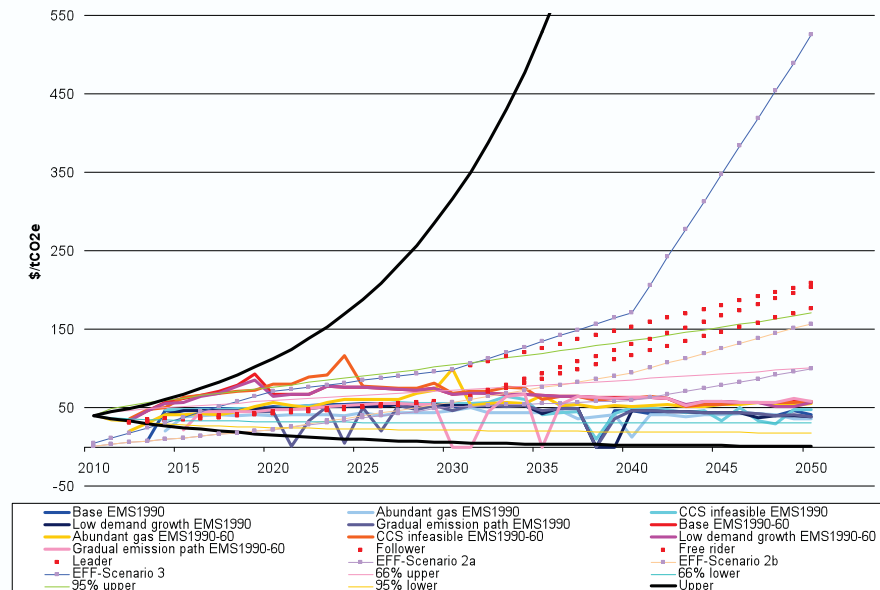
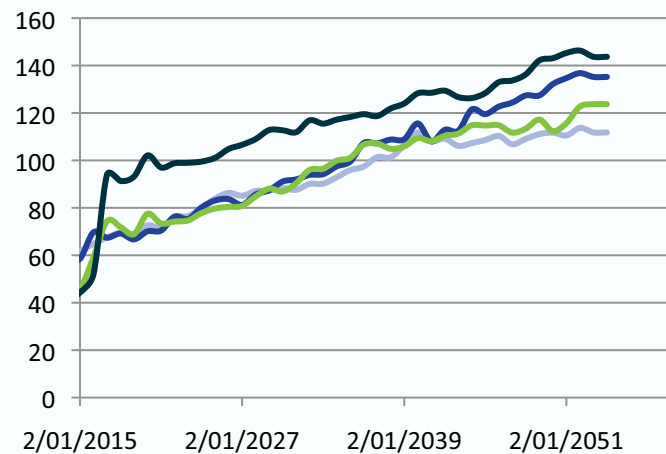
# Examples of CSIRO Maths & Stats projects: Planning regional infrastructure



# Electricity and Carbon Price Forecasts

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

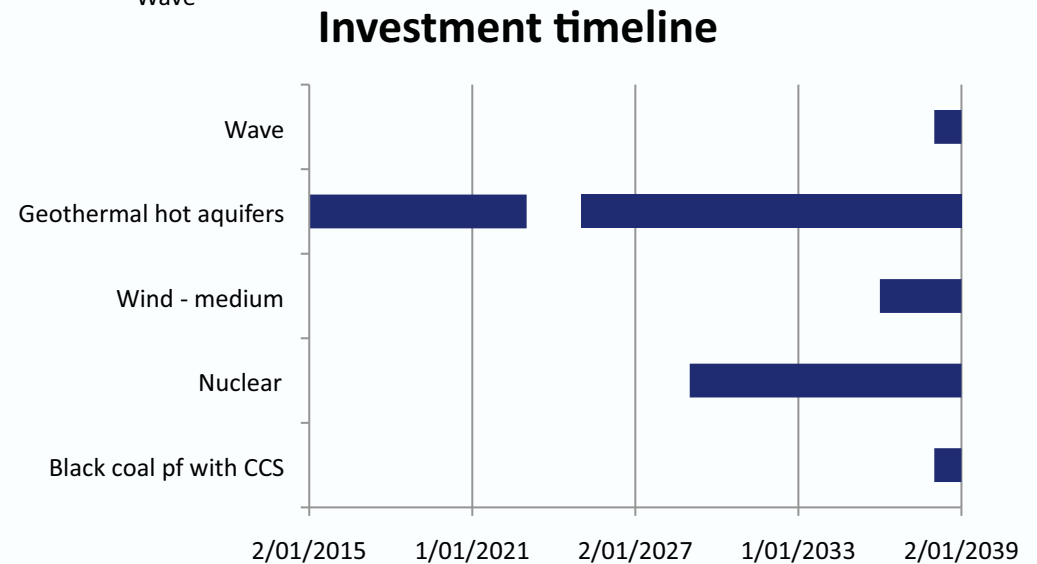
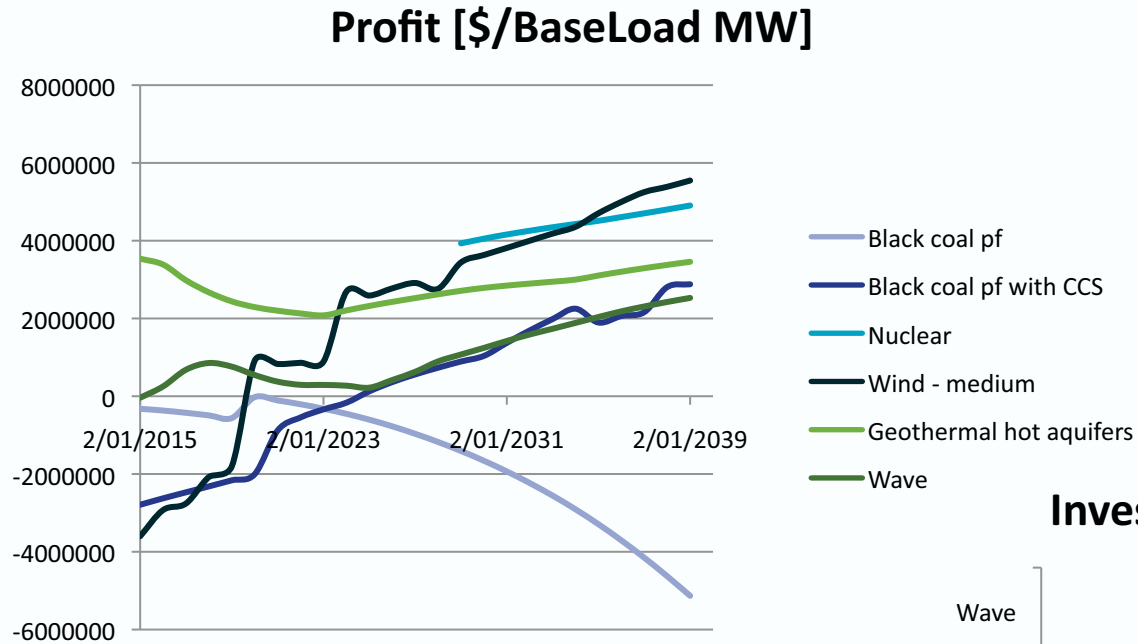
## Forecast electricity prices



## Carbon price forecast

- CPRS-5
- CPRS-15
- Garnaut-10
- Garnaut-25

# Investment selection and timing





# Australian Bureau of Statistics

Confidentialised data for social and economic research and analysis

- Various modes of access

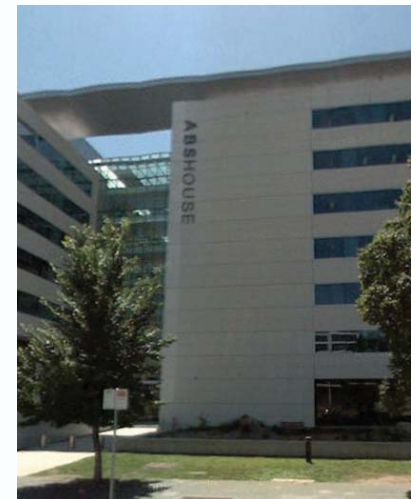
High user demand: more detail, more flexibility, more datasets

Census and Statistics Act 1905<sup>2</sup>

12 Publication etc. of statistics

...

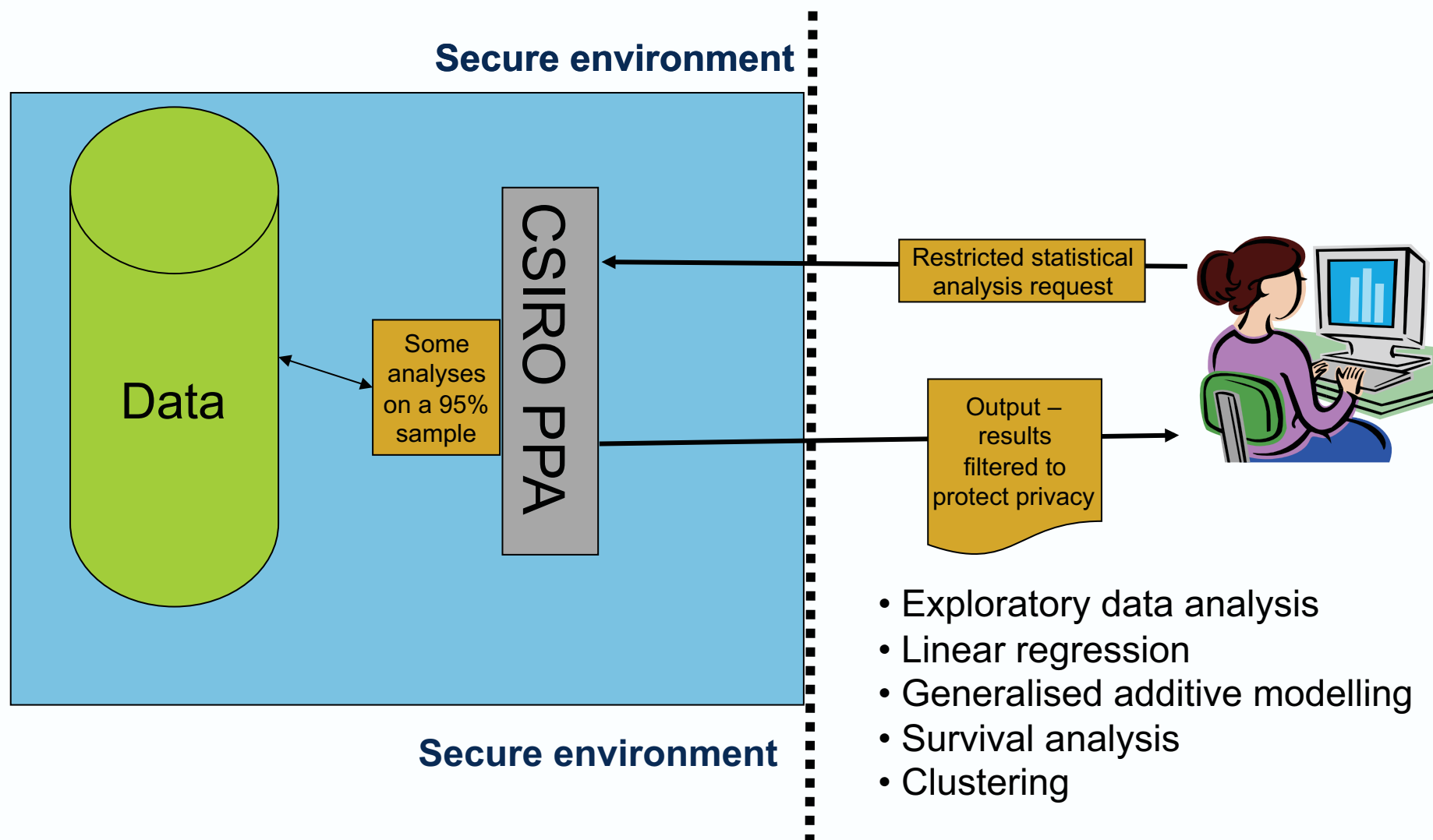
- (2) ... results or abstracts ... shall not be published or disseminated in a manner that is **likely to enable the identification of a particular person or organization.**



<sup>1</sup> [www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/EE2DF58E7FCE7C4DCA2576D50016B1D5?opendocument](http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/EE2DF58E7FCE7C4DCA2576D50016B1D5?opendocument)

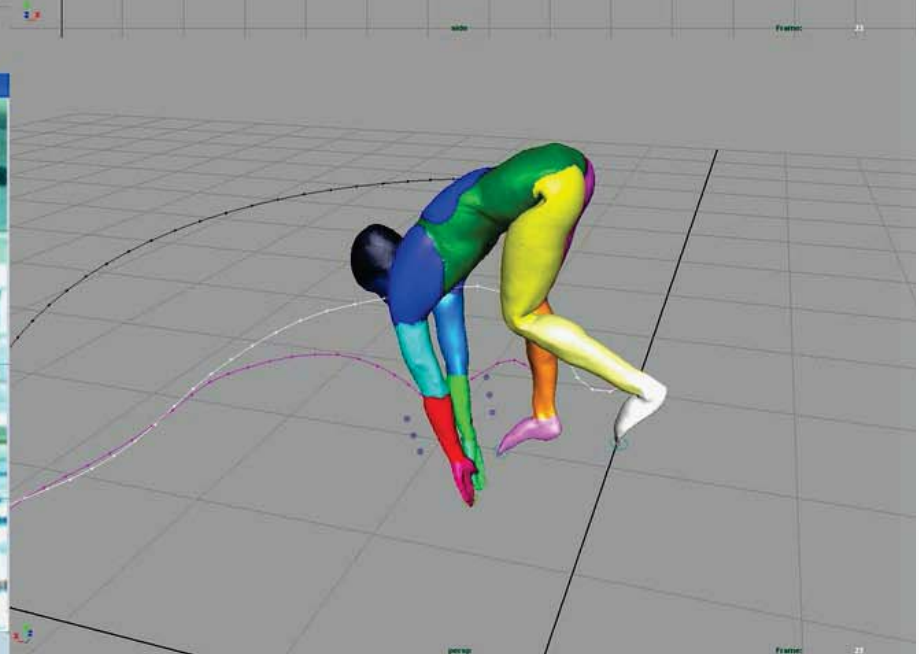
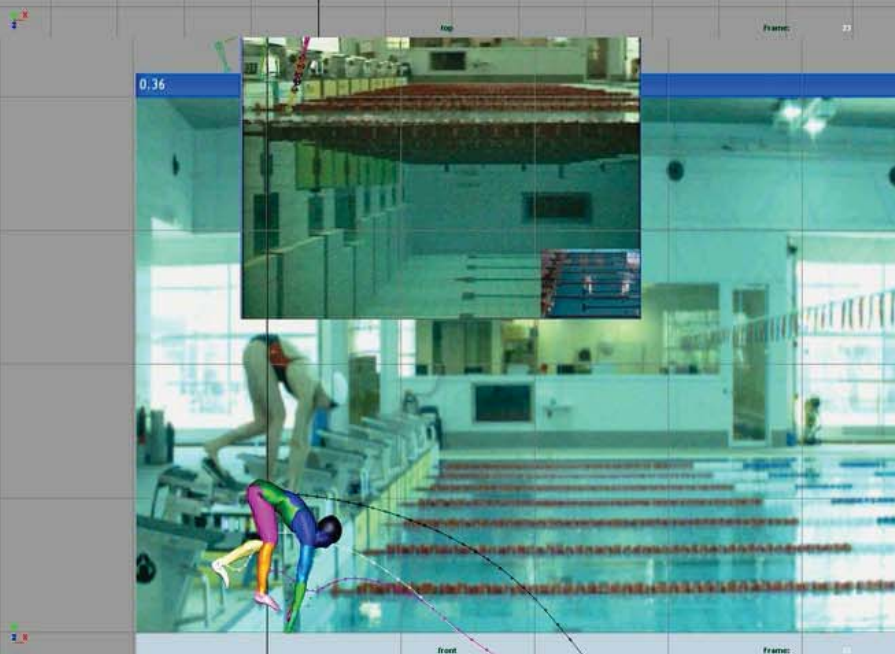
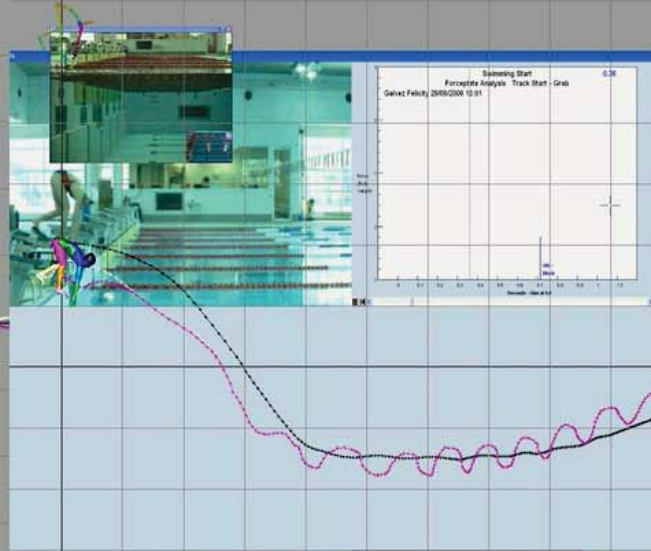
<sup>2</sup> [www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/C0DDEB8441B062B8CA2571550081B668/\\$file/CensStatisAct+1905\\_WD02.pdf](http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/C0DDEB8441B062B8CA2571550081B668/$file/CensStatisAct+1905_WD02.pdf)

# CSIRO's Privacy-Preserving Analytics (PPA)



<sup>1</sup>R. Sparks, C. Carter, J.B. Donnelly, C.M. O'Keefe, J. Duncan, T. Keighley and D. McAullay, *Comput Methods Programs Biomed.*, 91 (2008) 208-222

# Improving performance of swimmers



# Thank you

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