



Statistical Society of Australia Inc.

## Victoria Branch Newsletter: March 2006

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### 1) 2006 Annual General Meeting

The 2006 Annual General Meeting of the Victorian Branch will be held on **Tuesday 28 March 2006**, in the seminar room AR103, Graduate Research Centre, Swinburne University of Technology, Hawthorn campus. A map is available at

[http://www.swin.edu.au/cwis/maps/maps\\_hawthorn.htm](http://www.swin.edu.au/cwis/maps/maps_hawthorn.htm).

The meeting room is in building AR on that map. There is a similar (but better) map in the Melways (Page 581). There building AR is marked clearly as "The Graduate School of Research".

The schedule of events will be:

5:45pm - 6:15pm Wine and cheese

6:15pm - 6:30pm 2006 AGM (agenda below)

6:30pm - 7:30pm Invited speaker (abstract below)

The agenda for the 2006 Annual General Meeting is:

1. Apologies
2. Minutes of 2005 AGM .
3. Annual Report
4. Election of President for the 2007-2008 term
5. Election of councillors for the 2006 term

Any member wishing to lodge a proxy for the AGM should contact the secretary. Proxies need to be received at least 24 hours prior to the meeting commencing (i.e. by 6:15pm on Monday 27 March).

## **2) Election of incoming President and Council**

At the 2006 AGM, a President will be elected for the two year term 2007-2008. The President-elect will serve as Vice-President for the 2006 year, and serve again as Vice-President in 2009 in their role as Immediate Past President.

The AGM will also elect 8 further councillors (including at least one student member) to serve on the 2006 council. Nomination forms for President or Councillor are attached to this newsletter, or can be downloaded from

<http://www.statsoc.org.au/Branches/VIC/>

Please consider volunteering for the council! The council is very important to the running of the Branch, but does not take up a great deal of time. Councillors help to decide the speakers who are invited to address monthly meetings, the types of workshops or other events the Branch sponsors, and other activities for the benefit of members. Council meetings are held immediately before the regular monthly meetings

## **3) Invited Speaker and Abstract**

The AGM invited speaker is Professor Stephen R Clarke from Swinburne Sports Statistics, Faculty of Life and Social Sciences Swinburne University of Technology

Members and guests are invited to join the speaker for dinner at a nearby restaurant after the meeting.

### **Topic**

Betting on Statistics Beating (and joining) the bookies using statistical modeling

### **Abstract**

This talk will discuss the applications of statistical modeling to exploit inefficiencies in betting markets (academic language for making a profit out of gambling).

Betting in Australia was traditionally limited to horses and dog racing. However the growth in sports betting has seen opportunities for betting on a range of other sports. The head to head nature of most sporting contests means the bookmaker's percentage is necessarily much lower than is usual in racing, opening the door to profitable betting. Swinburne Sports Statistics has been involved in forecasting match outcomes for over 20 years. The last few years has seen its predictions profitably applied to betting markets.

However beating the bookies doesn't mean you cannot join them. Betting on events within a sporting contest (such as the number of runs in each over of cricket) allows an increase in both the bookmaker's percentage and the number of available bets. But the short time interval for posting prices does not allow them to be set by traditional bookmakers. Through a spinoff company, we have developed models that provide prices to the bookmakers for 'betting in running'.

Examples in Australian rules football, rugby, cricket, and tennis will be discussed.

#### 4) 2005 Belz Lecture Summary

##### **Sampling theory for vegetables**

At the October meeting of the Victorian Branch Professor Adrian Baddeley presented an exciting and entertaining seminar as the Belz Lecturer for 2005. The tone of presentation was clear at the very beginning, from the catchy title 'Sampling Theory for Vegetables'. It certainly was not Vege-Stats. Adrian started with an entertaining revisit to some of the ancient history relating to sampling theory referred to in the Mahabharata (400 AD): for example, how RtuPARna demonstrated his skill with numbers by applying sampling theory to estimate the number of fruits and leaves in a Vibhitaka tree by examining only a few twigs. I do not know of any references to statistical ideas extending as far back as 400 AD!



*Adrian Baddeley, the 2005 Belz Lecturer, and an image from the Mahabharata*

*Photo: Brian Phillips*

Adrian then started to focus on modern sampling theory and drew attention to an embarrassing error in neuroscience. Until 1995 it was widely believed that 'the human brain progressively loses neurons (nerve cells) with age'. Numerous studies had apparently demonstrated a decline in neuron density with age. These were based on samples of brain tissue. Later it was realised that the preparation of brain tissue for microscopy causes shrinkage of the tissue, and that younger brain tissue tends to shrink more. The observed decrease in density of neurons appears to be just an artefact of the preparation technique.

The subtleties of this problem introduced the main topic, Stereology. This originated as a technique for obtaining 3-D information from a single 2-D microscopic image. The geologist Delesse (1847) argued that the composition of a 2-D plane section is representative of the composition of the 3-D object, for example a rock. Thus the fraction of quartz by volume can be estimated from the fraction by area on a section.

While this relationship is fairly simple, there is no general relationship between the number of particles in 3-D and that seen on a 2-D plane section. To illustrate this Adrian chose an experiment that involves making a salad using 3 large red tomatoes and 3 small green tomatoes. Now, suppose that we place these six tomatoes on an evenly spaced ruled chopping board and slice them along the ruled lines. Then mix the slices to make the salad.

Soon it would be clear that even though we started with 50:50 Red/Green tomatoes, the salad does not consist of 50:50 Red/Green tomato slices. This illustrates the important result that the number of particle profiles seen on a section of a rock/mixture of tomatoes depends on both (i) the number of particles and (ii) sizes of particles. The mathematical difficulty is that there is no easy way of reversing the relationship to estimate the number of particles from (i) and (ii).

A solution to the problem uses the 'disector rule', which involves applying principles of sampling theory. The ideas that underlie this were used to illustrate estimation of the number of neurons in the brain. Finally, these were related to intricate ideas and methods in modern stereology. The ideas were illustrated using photographs of chopped apples, carrots, and broccoli.

Stereology contains similar techniques for measuring volumes of individual cells, surface areas of membranes, lengths of filaments, thicknesses of membranes, average sizes of grains, and the connectivity of a network of tubes. It has an enormous range of applications to different sciences, particularly geological, material and biological science.

The main message of the talk was that sampling techniques make it possible to estimate 3-D quantities from measurements on 2-D plane sections, but the methods are not obvious. Finally, for anyone interested in reading more about this, Adrian's recent monograph is highly recommended: A. Baddeley and E.B Vedel Jensen (2005). *Stereology for Statisticians*. Chapman and Hall/CRC Press: Boca Raton.

*Mervyn Silvapulle*

## **5) R System Workshop Summary**

On 23-24 November 2005 the Victorian Branch sponsored a highly successful two-day workshop on the *R* statistical package, presented by John Maindonald from the Centre for Bioinformation Science, Mathematical Sciences Institute, Australian National University. The workshop was held at the Swinburne University of Technology in Hawthorn, and was fully subscribed with 20 participants. It replaced the regular November Branch meeting, which has attracted variable attendance in recent years. The experiment was a clear success.



*John Maindonald*  
*Photo: Brian Phillips*

The workshop was designed to be at the level of professional development for consultant statisticians, although there were several participants from other backgrounds. The first day consisted of an introduction to the use of *R*, and a relatively advanced introduction to the use of graphics in *R*. This included the use of trellis graphics. The second day placed more emphasis on the use of *R* for statistical applications such as general linear models, generalised linear models and hierarchical multi-level models.

A wonderful aspect of the workshop was the infectious enthusiasm of John Maindonald and his extensive knowledge of the *R* system. As the majority of participants were sophisticated users of statistical methods, John received many 'more in depth' queries. John was able to answer these, without hesitation, in an insightful manner. He was able to extend topics well beyond the prepared material.

Finally, the participants had much fun learning from John. Prizes of *R* T-shirts for the most insightful questions and queries helped this. Thank you, John, for a great workshop.

*Kym Butler*

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**Secretary**

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**Nomination for President or Councilor  
2006**

**President**

We, the undersigned, nominate ..... for the  
post of President for the 2007-2008 term.

Nominated: ..... Date: .....

Seconded: ..... Date: .....

I accept the above nomination.

Signed: ..... Date: .....

*Note: the 2007-2008 term runs from the close of the 2007 AGM until the close of the  
2009 AGM*

**Councilor**

We, the undersigned, nominate ..... for the  
post of Councilor for the 2006 term.

Nominated: ..... Date: .....

Seconded: ..... Date: .....

I accept the above nomination.

Signed: ..... Date: .....