Women in Chemistry: personal, historical and future perspectives
21 June 2011

Professor Margaret Sheil
Australian Research Council

Halpern Lecture 2011
Minister for Innovation, Industry, Science & Research

Department of Innovation, Industry, Science & Research
Australian Research Council Act 2001
CSIRO
AIMS
ANSTO
AAO
Chief Scientist

Web: arc.gov.au  |  Email: info@arc.gov.au
Government Investment in R&D 2011-12

- Business & Innovation: 24%
- Universities: 21%
- Other Health: 6%
- Energy and the Environment: 5%
- Other: 11%
- Investigator Driven: 4.5%
- ARC: 9%
- NHMRC: 8%
- CRCs: 2%
- Other Science: 4%
- Rural: 2%
Whole of Government

• Commitment to Budget Surplus in 2013
• Natural Disasters and Australian dollar impacting on revenue
• Tight political situation raising expectations and requirements
  – Stakeholders
  – Reporting
• Big ticket items-health, mining tax, carbon tax etc.
Strategic Objectives

• To *support* excellence in *research*
• To *build* Australia’s research *capacity*
• To *provide* informed high quality *policy advice* to government
• To *enhance* research outcomes through effective *evaluation*
• To *raise the profile* of Australia’s research effort and *be an effective advocate* for its benefits
The ARC

National Competitive Grants Program
$810M in 11-12

Discovery & Fellowships
$502 M

Linkage & Centres
$308 M

Evaluation and Policy
Excellence in Research for Australia

- Statutory Agency established 2001
- Mission: *to deliver policy and programs that advance Australian research and innovation globally and benefit the community*
- Fund direct costs to Universities and partners
- All disciplines except clinical medicine & dentistry
Peer Review underpins........

• Research Publications

• Grant selection committees
International Collaboration 2010

USA, 24.3%
UK, 14.5%
France, 5.8%
Germany, 7.6%
Canada, 5.5%
China, 4.3%
Japan, 4.0%
Other, 34.1%
Ethical and Regulatory Framework

- Universities
- NHMRC
- ARC
- Government
- Human and Animal Ethics
- Research Misconduct
- Licensing guidelines
- Gene Technology Regulation .......
Encouraging Opportunity

Australian Laureate Fellowships
- 2x PhD
- 2x Post-Doc
- 17 5-year awards

Discovery Early Career Researcher Award (DECRA)
- $125,000
- 200 p.a. 3-year awards

Researchers in Industry Training Awards
- $30,000
- 100 3-year awards (bi-annual)

Future Fellowships
- Up to $143,000
- 200 p.a. 4-year fellowships
Proportion of male and female applicants and corresponding success rates by career age (DPs, 2001-10)
Proportion of Female Applicants, Chemistry

- Male number
- Female number
- % female

Data for Year 2010 does not include LP11 Round 2.
Each chemist is counted once per year.
Funding instances for female scientists by 2-digit discipline (2001-09)

Note: Data is the total instances of funding for female scientists.

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Australia’s Female Chemists

Doreen Clark AM
President of RACI
1994

Dr Jean Youatt
Monash

Joy Bear AM
Leighton Medal 1998

“I did twice go and see professors about promotion, but I got no encouragement at all and I didn’t know then what to do. To this day I don’t know what the process is. I didn’t know you could go ahead and apply anyway, so I just gave up. But that was part of my upbringing too: I had the reverse of assertiveness training.”
ARC Federation and Laureate Fellows

2008
Bernadette McSherry
Cheryl Praeger

2009
Frances Baum
Tanya Monro
Michelle Simmons

2010
Lesley Head
Jennifer Martin

2011
Hilary Charlesworth
Margaret Jolly
Hanna Kokko
Lorraine Mazerolle
Women have the ability to succeed in science & engineering
- Women lost out at every career transition
- Problem is not simply the pipeline
- Women are likely to face discrimination in all fields
- Evidence that most people have implicit biases
- Measures of success in performance-evaluation systems are often arbitrary and frequently place disadvantage women. "Assertiveness," for example, may be viewed as a socially unacceptable trait for women but suitable for men
Evaluation of Fellowship Applications: Gender

“…the success rate of female scientists applying for postdoctoral fellowships at the [Swedish Medical Research Council] during the 1990s has been less than half that of male applicants.”

Women applying for a post-doctoral fellowship had to be 2.5 times more productive to receive the same reviewer rating as the average male applicant.

Similar findings:
- USA/GAO report on Peer Review in Federal Agency Grant Selection (1994)
- European Molecular Biology Organization Reports (2001)
What is the ARC doing?

- More women (re workload) and “well trained” men on committees
- Ease restrictions on fellowships (PT, longer entry periods)
- Track record replaced with ROPE
Research Opportunity and Performance Evidence (ROPE)

• Changing how we measure excellence
  Track record v. Performance evidence

• Assessors take into account any career interruptions, such as:
  – Childbirth
  – Carer’s responsibility
  – Misadventure
  – Debilitating illness
Success rate of female scientists by funding scheme (2001-10)

Success rate by scheme (2001 - 2010)

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<thead>
<tr>
<th>Scheme</th>
<th>Female</th>
<th>Male</th>
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<tbody>
<tr>
<td>Special Research...</td>
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<td>Linkage Infrastructure</td>
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<td>Super Science Fellowships</td>
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<td>Linkage Projects</td>
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<td>ARC Future Fellowships</td>
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<td>Discovery Projects</td>
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<td>Federation Fellowships</td>
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<td>Australian Laureate...</td>
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<td>Linkage - APD CSIRO</td>
<td>24.2%</td>
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<tr>
<td>SRI (Thinking Systems)</td>
<td>23.8%</td>
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Participation of female scientists by funding scheme (2001-10)

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Australian Laureate Fellowships

FOCUS
• International repute
• Sustained leadership & mentoring

OBJECTIVES
• Attract and retain outstanding research leaders
• Build and strengthen world-class research capability
• Provide excellent research –training environment
• Expand knowledge base
• Forge strong links
• Support research
McClintock
Cornell  ~ 1931

Waxy

Purple

+ 

Not Waxy

Not Purple

Not Waxy

Purple

Waxy

Not Purple
Barbara McClintock
Nobel Prize
Physiology and Medicine 1983

- >30 years after initial research on controlling elements of genes
- Work done in plants (not animals or humans)
- Woman without tenure
- #7 in sciences
- Science took a long time to catch up (communication?)
- Sole winner
- Published relatively few papers
“The Dept of Botany does not wish to reappoint her, chiefly because they realise her interest is entirely in research ........; partly as she was not entirely successful as a teacher of undergraduate work. The Dept. Obviously prefers a less gifted person who will accept a large amount of routine duty.”

• Weaver on McClintock 1933
The ARC aims to:

• Provide opportunities for researchers at every career stage
• Foster a range of different cohorts

Strategic Objectives

Research-only

Researchers in industry

Women

Teaching and research

Indigenous

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The ARC does not:

• Employ researchers directly

• Aim to provide a complete externally funded career structure

• Funds all the excellent research proposals it receives
ARC – the latest developments

NCGP
- Evaluation of Linkage Projects
- Improvements to Peer Review (first stage)
- Changes to Discovery Projects and Discovery Indigenous
- New schemes (DECRA and RITA)
- Two additional Laureate Fellowships
- Simplified NCGP Funding Rules
- Removing Duplication
I have frequently been questioned, especially by women, of how I could reconcile family life with a scientific career. Well, it has not been easy.

Marie Curie
UNSW 1987

Utah 1988-9
ANU 1990
3-5,000 Da
Great Advice

“Its ridiculous to suggest this technique will have any value in understanding the changes in proteins due to cataract ...... HE demonstrates a fundamental lack of understanding or experience protein chemistry and would have to rely on the postdoc to do the experiments”

UoW1992-9
20-150,000 Da