The Australian Research Scene

Prof Richard Coleman
Executive Director, PMIS

ICT Deans, Annual Meeting, Hobart, July 26, 2011
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

- Support research excellence
- Funding for facilities and equipment that researchers need to be internationally competitive
- Support future researchers
- Provide incentives for partnerships and collaboration nationally and internationally
Government Investment in Research
2011-12

Total: $9.4B

- Universities: 20%
- NHMRC et al: 14%
- CSIRO: 8%
- Energy and Environment: 5%
- Industry Tax Concession: 19%
- Other business: 5%
- Other R&D agencies: 11%
- CRCs & other science: 9%
ARC and Innovation

• Supporting integrity and independence of the research system
• Expanding fellowships to attract the world’s best researchers
• Measuring the quality of Australian research (ERA)
• Building research capacity through collaboration
• Encouraging collaboration between research and business internationally
NCGP Funding

- Funding for the NCGP in 2010-11 is $708.733 million

- Announced $67.4 million in funding for Linkage Grants scheme supporting 219 innovative projects in 2011 (11 in IT areas, most (7) in 0801)

- Announced $255.9 million in 13 new ARC Centres of Excellence to commence in 2011

- Current rounds of DP, DECRA, FT, LP, LIEF, FL
NCGP Programs & Schemes

Discovery Program

- Discovery Projects + DECRA
- Discovery Indigenous Researcher Development
- Future Fellowships
- Australian Laureate Fellowships

Linkage Program

- Linkage Projects
- Linkage Infrastructure, Equipment and Facilities
- Linkage Learned Academies Special Projects
ARC Changes

- New schemes/substantial changes:
  - Discovery Early Career Awards (DECRA)
  - Changes to Discovery – Discovery Outstanding Researcher Award (DORA)
  - To come – Research Industry Training Awards (RITA)
- Revision and simplification of Funding Rules
- Changes to Peer Review of NCGP schemes (A-E)
- Updating of assessor databases
- New coding of RMS modules
Discovery Projects

Average Annual Proportion of ARC funding for new and ongoing DP projects (2002 - 2009) by discipline

PE 23%
BSB 21%
EE 18%
MIC 13%
SBE 15%
HCA 10%

Total ARC Funding (new and ongoing) for DP (2002 to 2009)

- PE: $792,571,438
- BSB: $730,793,885
- EE: $619,713,779
- SBE: $504,331,451
- MIC: $449,164,285
- HCA: $356,913,631
Average Annual Increase in ARC Funding (2002 - 2009)

<table>
<thead>
<tr>
<th>Category</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCA</td>
<td>16%</td>
</tr>
<tr>
<td>SBE</td>
<td>16%</td>
</tr>
<tr>
<td>BSB</td>
<td>13%</td>
</tr>
<tr>
<td>EE</td>
<td>13%</td>
</tr>
<tr>
<td>MIC</td>
<td>13%</td>
</tr>
<tr>
<td>PE</td>
<td>9%</td>
</tr>
</tbody>
</table>
Total funding for new projects in MIC by Primary RFCD (2005 to 2009)
Proposals received in ICT with comparison to Engineering and Natural Sciences

![Graph showing number of proposals in ICT, Engineering, and Natural Sciences over years 2001 to 2010. The graph indicates a trend where ICT proposals are consistently lower than both Engineering and Natural Sciences. The peak for Natural Sciences is around 2007 with 348, while ICT's peak is slightly lower. The number of proposals for Engineering is relatively constant.]

Web: arc.gov.au  Email: info@arc.gov.au
Proposals received in ICT by schemes and submit year

Number of applications (ICT only)

Submit year

Discovery - Projects
Federation Fellowship
Australian Laureate Fellowships
ARC Future Fellowships
Linkage - APAI Only
Linkage - Infrastructure
Linkage - Projects
Involvement of ICT components (by RFCD) in natural sciences and engineering research (cross-disciplinary research)
Number of proposals received in ICT in Submit Year 2011 and comparison with Engineering and Natural Sciences

<table>
<thead>
<tr>
<th></th>
<th>DECRA</th>
<th>DP</th>
<th>IN</th>
<th>LE</th>
<th>LP</th>
<th>Total</th>
<th>%</th>
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<tr>
<td>Engineering</td>
<td>341</td>
<td>593</td>
<td>0</td>
<td>47</td>
<td>103</td>
<td>1084</td>
<td>25%</td>
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<tr>
<td><strong>ICT</strong></td>
<td>168</td>
<td>299</td>
<td>1</td>
<td>9</td>
<td>31</td>
<td>508</td>
<td>12%</td>
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<tr>
<td>Nat. Sciences</td>
<td>996</td>
<td>1507</td>
<td>6</td>
<td>104</td>
<td>163</td>
<td>2776</td>
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<tr>
<td><strong>Total</strong></td>
<td>1505</td>
<td>2399</td>
<td>7</td>
<td>160</td>
<td>297</td>
<td>4368</td>
<td>100%</td>
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</table>

FL – 8 applications; FT – 37 applications (~50% in 0801)
Funding for projects in ICT, natural sciences and engineering since 2001 (not including co-funded Centres and some Special Research Initiatives projects)

- Engineering
- ICT
- Natural Sciences

Submit year

Funding over project life (all schemes)

Millions

$0 $100 $200 $300 $400 $500 $600

$20 $35 $532

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

Web: arc.gov.au  Email: info@arc.gov.au
Funding proportion among ICT, natural sciences and engineering projects
Funding for ICT by primary RFCD/FOR disciplines, since commencement year 2002

Funding by primary RFCD/FOR - since commencement year 2002 (inclusive)
Funding for ICT by scheme (since commencement year 2002)

Total funding for ICT by scheme since commencement year 2002 (inclusive)

- Discovery - Projects
- Linkage - Projects
- Centres of Excellence
- Linkage - Infrastructure
- ARC Future Fellowships
- Federation Fellowship
- SRI (Thinking Systems)
- ARC Research Networks
- Special Research Initiatives
- Australian Laureate Fellowships
- Linkage International
- Super Science Fellowships
- Discovery - Indigenous
Funding for ICT by scheme and commencement year since 2006

<table>
<thead>
<tr>
<th>Scheme \ Commencement year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tr>
<td>ARC Future Fellowships</td>
<td></td>
<td></td>
<td></td>
<td>$6,689,600</td>
<td>$4,761,591</td>
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<tr>
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<td>$2,064,351</td>
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<td></td>
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<td>$30,000</td>
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<tr>
<td>Discovery - Projects</td>
<td>$20,406,072</td>
<td>$20,832,243</td>
<td>$20,992,493</td>
<td>$23,798,140</td>
<td>$22,106,000</td>
<td>$20,675,176</td>
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<td>$1,581,110</td>
<td>$1,606,210</td>
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<tr>
<td>Linkage - Infrastructure</td>
<td>$2,402,000</td>
<td>$1,741,967</td>
<td>$429,776</td>
<td>$150,000</td>
<td>$469,410</td>
<td>$1,230,000</td>
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<tr>
<td>Linkage - Projects</td>
<td>$6,704,697</td>
<td>$6,804,102</td>
<td>$8,102,791</td>
<td>$9,256,420</td>
<td>$7,928,459</td>
<td>$8,249,371</td>
</tr>
<tr>
<td>Linkage International</td>
<td>$219,730</td>
<td>$51,900</td>
<td>$153,083</td>
<td>$255,100</td>
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<tr>
<td>SRI (Thinking Systems)</td>
<td>$6,600,000</td>
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<td></td>
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<tr>
<td>Super Science Fellowships</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>$278,400</td>
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<td>Total</td>
<td>$37,913,609</td>
<td>$31,036,422</td>
<td>$29,678,143</td>
<td>$42,243,611</td>
<td>$35,543,860</td>
<td>$30,154,547</td>
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</tbody>
</table>

NICTA funding – 2002/03-2010/11: $379.1M (ARC $187.2M)
Success rate for ICT proposals in comparison with natural sciences and engineering disciplines combined, by scheme

Total success rate (2001 to 2010)

- Federation Fellowship
- Australian Laureate Fellowships
- ARC Future Fellowships
- Discovery - Projects
- Linkage - Infrastructure
- Linkage - Projects
- Linkage - APAI Only

ICT vs. Nat. Sci. and Engineering
Success rate of ICT proposals in comparison with natural sciences and engineering disciplines combined, by submit year
ICT proposals received in ICT and success rate - Submit Year

![Graph showing the number of ICT proposals received and success rate by year.](chart.png)
ERA Process Overview

<table>
<thead>
<tr>
<th>Volume &amp; Activity</th>
<th>Ranked Outlets</th>
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</thead>
<tbody>
<tr>
<td>Citation Analysis</td>
<td>Esteem</td>
</tr>
<tr>
<td>Research Income</td>
<td>Applied Measures</td>
</tr>
</tbody>
</table>

Peer Review

International Benchmarks

Research Evaluation Committees
Objectives of ERA

• Establish an **evaluation framework** that gives government, industry, business and the wider community assurance of the excellence of research conducted in Australia’s institutions;

• Provide a **national stocktake** of discipline-level areas of research strength and areas where there is opportunity for development in Australia’s higher education institutions;

• Identify **excellence** across the full spectrum of research performance;

• Identify **emerging research areas** and opportunities for further development;

• Allow for **comparison** of Australia’s research nationally and **internationally** for all discipline areas.
ERA 2010 at a glance

• All 41 eligible institutions participated

• 2435 units of evaluation assessed at the two- and four-digit level

• Over 330,000 research outputs and 55,000 researchers represented

• All ERA outcomes are available on the ARC website
ERA 2010 – 08 summary
### 0803 Computer Software

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
<th>Esteem count(s)</th>
<th>Patent(s)</th>
<th>Res. comm. income ($)</th>
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</thead>
<tbody>
<tr>
<td>FTEs</td>
<td>195</td>
<td>14</td>
<td>1</td>
<td>1,012,819</td>
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<td>2,234</td>
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<th>3</th>
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</table>

### Research outputs by type

- Book: 10%
- Book chapter: 1%
- Conf. paper: 3%
- Journal article: 79%
- NTRO: 1%

### FoR rating distribution

- 1: 16%
- 2: 3%
- 3: 3%
- 4: 3%
- 5: 1%

### 0804 Data Format

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
<th>Esteem count(s)</th>
<th>Patent(s)</th>
<th>Res. comm. income ($)</th>
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<tbody>
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</table>

<table>
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<tr>
<th>Total Rating Distribution</th>
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<th>Total</th>
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<td>0</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

### Research outputs by type

- Book: 11%
- Book chapter: 3%
- Conf. paper: 3%
- Journal article: 29%
- NTRO: 3%

### FoR rating distribution

- Insufficient data
### 0805 Distributed Computing

<table>
<thead>
<tr>
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<th>FTEs</th>
<th>Esteem count(s)</th>
<th>Average National Rating</th>
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<tbody>
<tr>
<td>% assessed UoEs rated at or above world standard</td>
<td>100%</td>
<td>120</td>
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<td>Research outputs</td>
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<td>Research income $</td>
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<tr>
<td>UoEs assessed</td>
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<tr>
<td>Rating</td>
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<td>3</td>
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<tr>
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### 0806 Information Systems

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<th>FTEs</th>
<th>Esteem count(s)</th>
<th>Average National Rating</th>
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</thead>
<tbody>
<tr>
<td>% assessed UoEs rated at or above world standard</td>
<td>100%</td>
<td>530</td>
<td>24</td>
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<tr>
<td>Research outputs</td>
<td>7,892</td>
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<td>Research income $</td>
<td>58,000,706</td>
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<td>UoEs assessed</td>
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<tr>
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### 0899 Other Information and Computing Sciences

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<th>FTEs</th>
<th>159</th>
<th>Esteem count(s)</th>
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<th>Patent(s)</th>
<th>0</th>
<th>Res. comm. income ($)</th>
<th>0</th>
<th>Average National Rating</th>
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<td>Research outputs</td>
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<td>1,250</td>
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<td></td>
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</tr>
<tr>
<td>Research income $</td>
<td></td>
<td>35,959,010</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>UoEs assessed</td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Research outputs by type

- Book: 22%
- Book chapter: 0%
- Conf. paper: 0%
- Journal article: 0%
- NTRO: 0%

### FoR rating distribution

Insufficient data
ERA 2010 – 10 summary

Mathematical, Information and Computing Sciences

10 Technology

<table>
<thead>
<tr>
<th>Technology</th>
<th>FTEs</th>
<th>Esteem count(s)</th>
<th>Average National Rating</th>
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</thead>
<tbody>
<tr>
<td>% National Unit rated at or above world standard</td>
<td>83%</td>
<td>51</td>
<td>4.0</td>
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<td>4,318</td>
<td>Patent(s)</td>
<td>20</td>
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<td>Research income ($)</td>
<td>74,819,298</td>
<td>Res. comm. income ($)</td>
<td>20,026</td>
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<td>UoE assessed</td>
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</tr>
</tbody>
</table>

Rating: 1 2 3 4 5 Total
Distribution: 0 1 1 1 3 6

Four-digit FoR ratings

Web: arc.gov.au  Email: info@arc.gov.au
### 1005 Communications Technologies

<table>
<thead>
<tr>
<th>% assessed UoEs rated at or above world standard</th>
<th>FTEs</th>
<th>Esteem count(s)</th>
<th>Average National Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>171</td>
<td>28</td>
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<tr>
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<td>1</td>
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<td>2</td>
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#### Research outputs by type

- Book: 57%
- Book chapter: 11%
- Conf. paper: 2%
- Journal article: 5%
- NTRO: 5%

#### FoR rating distribution

- Level 1: 50%
- Level 2: 50%

### 1006 Computer Hardware

<table>
<thead>
<tr>
<th>% assessed UoEs rated at or above world standard</th>
<th>FTEs</th>
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<tr>
<td>n/a</td>
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<td>n/a</td>
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<td>7,659,923</td>
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<tr>
<th>Rating</th>
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<td>0</td>
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</tr>
</tbody>
</table>

#### Research outputs by type

- Book: 100%

#### FoR rating distribution

- Insufficient data
Income coded to ICT in ERA

HERDC category income (ERA)

- Category 1
- Category 2
- Category 3
- Category 4
ERA RCI Income coded to ICT

Research commercialisation income (ERA)

![Bar chart showing research commercialisation income for 2001 and 2006. The income is not specified in the provided data.]
ERA Australian Competitive grant income coded to ICT
ERA staff coded to ICT

Staff by level (ERA)

- 1006
- 1005
- 0899
- 0807
- 0806
- 0805
- 0804
- 0803
- 0802
- 0801

Levels:
- A
- B
- C
- D
- E
- Oth

Web: arc.gov.au  Email: info@arc.gov.au
Where the discipline sits in ERA

Outputs by type (ERA 2010)

Assessed UoEs (ERA 2010)
IT issues from ERA

• Conference publications – peer review or metrics?
• Coding of articles with > 66% in discipline (helps enabling disciplines)
• Comments on ERA 2012 by Aug 1
• Suggestions for ERA RECs – both national and international expertise