Australian Research Council and Chemical Sciences Research
30 September 2014

Professor Brian Yates
Executive Director, Engineering, Mathematics and Information Sciences
Overview

1. ARC
2. Chemistry research
3. Centres of Excellence and Laureate Fellows
Overview

1. ARC
2. Chemistry research
3. Centres of Excellence and Laureate Fellows
Commonwealth Investment in R&D 2013–14

- ARC: 10.23%
- NHMRC: 9.93%
- APA + RTS: 10.93%
- RIBG + JRE + SRE: 8.48%
- Other Higher Ed R&D Support: 3.39%
- Other Innovation Support: 5.00%
- Other health: 1.00%
- Energy and the Environment: 2.39%
- Rural: 3.94%
- CRCs: 1.67%
- Multisector Science Support: 2.44%
- Rural: 3.94%
- Energy and the Environment: 2.39%
- CRCs: 1.67%
- Multisector Science Support: 2.44%
- Industry R&D Tax Measures: 19.44%
- Other Govt R&D: 7.41%

Source: Budget 2013-2014 Industry and Innovation tables
2014–15 Federal Budget

(Treasury omitted)
Trends in Government Investment in R&D $M 2004–14
(source: 2013–14 budget tables)
National Competitive Grants Program

Discovery Programs

- Future Fellowships
- DECRA
- Other Fellowships
- Discovery Projects

Linkage Programs

- Centres of Excellence
- Co-Funded & SRI
- LIEF
- ITRP (growing!)
- Linkage Projects

Area of box represents $$ awarded over the period 2008-2013. N.B. ITRP & DECRA running for less than five years.
Investment in excellence for the longer term

• ARC Centres of Excellence $1–4 m a year for up to seven years
• Industrial Transformation Research Program
  – Hubs $500K to $1m a year for five years
  – Centres $600K to $1m a year for three years
• Co-funded and Special Research Initiatives – various funding and duration
ARC developments

- Recent schemes (DP, IN, DE, LE)
- Current schemes (LP, ITRH, ITRC)
- Revision and harmonisation of funding rules
- Future Fellowships
- Medical Research policy
- New RMS
- ERA 2015
Overview

1. ARC
2. Chemistry research
3. Centres of Excellence and Laureate Fellows
Notes

- Chemical Sciences compared with Physical Sciences and Earth Sciences

- Selected FoR/RFCD codes

<table>
<thead>
<tr>
<th>Classification type</th>
<th>Two-digit level code</th>
<th>Two-digit level code text</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR08</td>
<td>02</td>
<td>Physical Sciences</td>
</tr>
<tr>
<td>FOR08</td>
<td>03</td>
<td>Chemical Sciences</td>
</tr>
<tr>
<td>FOR08</td>
<td>04</td>
<td>Earth Sciences</td>
</tr>
<tr>
<td>RFCD98</td>
<td>24</td>
<td>PHYSICAL SCIENCES</td>
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<tr>
<td>RFCD98</td>
<td>25</td>
<td>CHEMICAL SCIENCES</td>
</tr>
<tr>
<td>RFCD98</td>
<td>26</td>
<td>EARTH SCIENCES</td>
</tr>
</tbody>
</table>
Number of proposals received in Chemical Sciences compared to Physical Sciences and Earth Sciences in all ARC schemes (by submit year)

Peak in 2011 is due to DECRA
Number of proposals received in Chemical Sciences, by scheme and submit year

- **Discovery - Projects**
- **Linkage - Projects**
- **All other schemes**

Mainly DECRA
Number of non-Chemical Sciences proposals involving Chemical Sciences component in DP (by submit year)

<table>
<thead>
<tr>
<th>Two digit FoR/RFCD code</th>
<th>Non-Chem proposals with chem component</th>
<th>Chem proposals with non-chem secondary component</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGINEERING AND TECHNOLOGY</td>
<td>671</td>
<td>168</td>
</tr>
<tr>
<td>PHYSICAL SCIENCES</td>
<td>325</td>
<td>168</td>
</tr>
<tr>
<td>BIOLOGICAL SCIENCES</td>
<td>288</td>
<td>130</td>
</tr>
<tr>
<td>EARTH SCIENCES</td>
<td>100</td>
<td>26</td>
</tr>
<tr>
<td>MEDICAL AND HEALTH SCIENCES</td>
<td>73</td>
<td>48</td>
</tr>
<tr>
<td>AGRICULTURAL, VETERINARY AND ENVIRON. SCI.</td>
<td>47</td>
<td>27</td>
</tr>
<tr>
<td>MATHEMATICAL SCIENCES</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>INFORMATION, COMPUTING AND COMM.</td>
<td>16</td>
<td>6</td>
</tr>
</tbody>
</table>
Success rate (%) of Discovery Projects proposals (by submit year)

- CHEMICAL SCIENCES
- EARTH SCIENCES
- PHYSICAL SCIENCES
Overall success rate (%) of Discovery Projects proposals, average funding and total funding (by submit year)

- Success rate
- AvgFunding

- $0
- $50,000
- $100,000
- $150,000
- $200,000
- $250,000
- $300,000
- $350,000
- $400,000

- Millions
- Total DP funding

- DECRA split

Year:
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
Discovery Projects proposals received and funding available (by submit year)
Success rate (%) of DECRA proposals

<table>
<thead>
<tr>
<th>Proposals received (submit year)</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEMICAL SCIENCES</td>
<td>121</td>
<td>62</td>
<td>70</td>
</tr>
<tr>
<td>EARTH SCIENCES</td>
<td>69</td>
<td>57</td>
<td>84</td>
</tr>
<tr>
<td>PHYSICAL SCIENCES</td>
<td>134</td>
<td>78</td>
<td>86</td>
</tr>
</tbody>
</table>
Success rate (%) of Future Fellowships proposals (by scheme)

Future Fellow proposals received

<table>
<thead>
<tr>
<th>Start year / Round</th>
<th>FT09</th>
<th>FT10</th>
<th>FT11</th>
<th>FT12</th>
<th>FT13</th>
<th>FT14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Sciences</td>
<td>69</td>
<td>48</td>
<td>42</td>
<td>36</td>
<td>84</td>
<td>47</td>
</tr>
<tr>
<td>Earth Sciences</td>
<td>41</td>
<td>28</td>
<td>33</td>
<td>25</td>
<td>54</td>
<td>41</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>72</td>
<td>61</td>
<td>54</td>
<td>59</td>
<td>97</td>
<td>91</td>
</tr>
<tr>
<td>ARC total</td>
<td>975</td>
<td>759</td>
<td>661</td>
<td>603</td>
<td>1234</td>
<td>830</td>
</tr>
</tbody>
</table>
Centre of Excellences funded since 2001, by 2-digit level code for research disciplines

<table>
<thead>
<tr>
<th>Two-digit level code (FoR)</th>
<th>Number</th>
<th>% of total number</th>
<th>Total Funding</th>
<th>% of total funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences</td>
<td>10</td>
<td>19%</td>
<td>$155,008,370</td>
<td>16.5%</td>
</tr>
<tr>
<td>Chemical Sciences</td>
<td>4</td>
<td>8%</td>
<td>$73,806,885</td>
<td>7.9%</td>
</tr>
<tr>
<td>Earth Sciences</td>
<td>3</td>
<td>6%</td>
<td>$58,250,000</td>
<td>6.2%</td>
</tr>
<tr>
<td>Economics</td>
<td>1</td>
<td>2%</td>
<td>$12,700,000</td>
<td>1.4%</td>
</tr>
<tr>
<td>Engineering</td>
<td>7</td>
<td>13%</td>
<td>$100,412,135</td>
<td>10.7%</td>
</tr>
<tr>
<td>Environmental Sciences</td>
<td>3</td>
<td>6%</td>
<td>$61,700,000</td>
<td>6.6%</td>
</tr>
<tr>
<td>Information and Computing Sciences</td>
<td>3</td>
<td>6%</td>
<td>$29,833,460</td>
<td>3.2%</td>
</tr>
<tr>
<td>Language, Communication and Culture</td>
<td>2</td>
<td>4%</td>
<td>$52,250,000</td>
<td>5.6%</td>
</tr>
<tr>
<td>Mathematical Sciences</td>
<td>3</td>
<td>6%</td>
<td>$59,961,051</td>
<td>6.4%</td>
</tr>
<tr>
<td>Medical and Health Sciences</td>
<td>2</td>
<td>4%</td>
<td>$36,250,000</td>
<td>3.9%</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>9</td>
<td>17%</td>
<td>$190,749,996</td>
<td>20.3%</td>
</tr>
<tr>
<td>Psychology and Cognitive Sciences</td>
<td>1</td>
<td>2%</td>
<td>$21,000,000</td>
<td>2.2%</td>
</tr>
<tr>
<td>Studies in Human Society</td>
<td>1</td>
<td>2%</td>
<td>$20,000,000</td>
<td>2.1%</td>
</tr>
<tr>
<td>Technology</td>
<td>3</td>
<td>6%</td>
<td>$68,013,850</td>
<td>7.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>52</strong></td>
<td><strong>100%</strong></td>
<td><strong>$939,935,747</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>
Proportion of funding in all ARC funding (by submit year)

- % Chemical Sciences
- % Earth Sciences
- % Physical Sciences
ARC funding for Chemical Sciences (commencement years 2007 to 2014)

- Discovery - Projects
- ARC Future Fellowships
- Linkage - Projects
- Linkage - Infrastructure Equipment...
- Centres of Excellence
- Australian Laureate Fellowships
- Discovery Early Career Researcher...
- Industrial Transformation Training...
- Federation Fellowship
- Linkage - International
- Super Science Fellowships

~ $394 million in total (8 years)
### Share of ARC funding for Chemical Sciences by schemes (2007–2014 commencement year)

<table>
<thead>
<tr>
<th>Primary Four-digit Code (FoR or RFCID converted)</th>
<th>DP funding (2007-14) - millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICAL CHEMISTRY (INCL. STRUCTURAL)</td>
<td>$ 38.66</td>
</tr>
<tr>
<td>MACROMOLECULAR AND MATERIALS CHEMISTRY</td>
<td>$ 35.91</td>
</tr>
<tr>
<td>INORGANIC CHEMISTRY</td>
<td>$ 33.61</td>
</tr>
<tr>
<td>ORGANIC CHEMISTRY</td>
<td>$ 24.11</td>
</tr>
<tr>
<td>MEDICINAL AND BIOMOLECULAR CHEMISTRY</td>
<td>$ 22.51</td>
</tr>
<tr>
<td>THEORETICAL AND COMPUTATIONAL CHEMISTRY</td>
<td>$ 13.76</td>
</tr>
<tr>
<td>ANALYTICAL CHEMISTRY</td>
<td>$ 9.99</td>
</tr>
<tr>
<td>OTHER CHEMICAL SCIENCES</td>
<td>$ 8.34</td>
</tr>
</tbody>
</table>
Distribution of funding (2007–2014 commencement years)—Chemical Sciences, by scheme and primary FoR
Total funding (2007–2014 commencement year) for each Chemistry discipline (4-digit FoR)—major schemes
Proportion of funding (2007–2014 commencement year) from major schemes in each Chemistry discipline (4-digit FoR)
Number of named female researchers (not Partner Investigators) on funded Discovery Projects grants each year
Number of proposals received and success rate in Laureate Fellowship scheme (2009 to 2014)

<table>
<thead>
<tr>
<th>Start Year</th>
<th>BSB</th>
<th>EMI</th>
<th>HCA</th>
<th>PCE</th>
<th>SBE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>35</td>
<td>40</td>
<td>16</td>
<td>34</td>
<td>23</td>
</tr>
<tr>
<td>2010</td>
<td>21</td>
<td>22</td>
<td>13</td>
<td>30</td>
<td>11</td>
</tr>
<tr>
<td>2011</td>
<td>27</td>
<td>27</td>
<td>18</td>
<td>44</td>
<td>23</td>
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<tr>
<td>2012</td>
<td>25</td>
<td>18</td>
<td>16</td>
<td>36</td>
<td>13</td>
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<tr>
<td>2013</td>
<td>22</td>
<td>21</td>
<td>23</td>
<td>34</td>
<td>12</td>
</tr>
<tr>
<td>2014</td>
<td>19</td>
<td>18</td>
<td>10</td>
<td>29</td>
<td>14</td>
</tr>
</tbody>
</table>
Total number of proposals received and overall success rate across all ARC schemes
Chemistry research

- Total number of proposals—steady
- Number of cross-discipline proposals—steady
- Success rates—slight decrease
- Number of female participants—steady
- Average career age of participants—slight decrease
- Number of sole CI proposals—steady
Summaries of successful DP14 Proposals in Chemistry
Summaries of successful LP14 Proposals in Chemistry
Chemistry research

- see 'Funding Outcomes' on ARC website
Overview

1. ARC
2. Chemistry research
3. Centres of Excellence and Laureate Fellows
ARC Centres of Excellence—Objectives

a. highly innovative and potentially transformational research
b. interdisciplinary, collaborative approaches
c. develop relationships and build new networks
d. build Australia’s human capacity
e. postgraduate and postdoctoral training
f. large-scale problems over longer periods
g. points of interaction between unis, business, government, private sector
What the Centres need to look like

• The Centres are the largest investments of the ARC Grants Program
• Centres foster frontier interdisciplinary research—with innovative and highly integrated Research Programs
• Centres are critical for the next generation of researchers—capacity building
• Leading the way—international reputation
• Building on important collaborations
• Public benefits and research impact
Key lessons learned from previous selection rounds—the best of the best

• Do:
  – The whole must be greater than the sum of the parts
  – Address a big question (or series of problems), not just a theme
  – If a re-bid, need to look forward not backward
  – Have all the right partners, and no obvious ones missing
  – Expect CIs to commit more than one day a week, i.e. >0.2 FTE
  – Allow plenty of time to prepare grant applications, organising reviews, and developing strategic and operational plans.
  – Aim to address all objectives of the scheme – workshop these with your senior team—vision is important—KPIs to support this
  – Think about and address all selection criteria. Focus on the end game as competition is fierce
  – Mentor your key staff as an inspiration to others
Key lessons learned from previous selection rounds—the best of the best

• Do (continued)
  – Know your competitors and collaborate as much as possible. Existing and new networks are highly valuable for future research
  – Address good governance to enhance the business of your Centre – resource and support your business and operational staff
  – Think about a diverse centre and how to communicate and manage it effectively
  – Ensure the whole interview team is across the bid
  – Ask for feedback from the ARC
  – Acknowledge that Centre Directors are the superstars of the research community—we have high expectations of them being an inspiration as highly visible research leaders
Key lessons learned from previous selection rounds—the best of the best

• Don’t:
  – Don’t rely on past success
  – Don't assemble bids that appear to be a series of smaller projects with minimal integration fail
  – At interview, don't leave the Centre Director to answer everything nor to delegate everything
Centres of Excellence 2014
Success by discipline

*BSB = Biological Sciences and Biotechnology; EMI = Engineering, Mathematics and Informatics; HCA = Humanities and Creative Arts; PCE = Physics, Chemistry and Earth Sciences; SBE = Social, Behavioural and Economics Sciences

Source: 2014 Selection Report Table 1
Key features of a Centre Director

- Have a big vision
- Be outward looking
- Have a compelling research question
- Be able to explain this to a broad audience (get mock panels from broad disciplines to evaluate the proposal)
- Propose topical and practical research, but also blue sky with unexpected outcomes
- Be a mentor and a leader at the cutting edge of your field, able to take the research to an internationally outstanding level
- It is not about what you have done, but what you are going to do
- Teamwork is important: have the ability to pull together all the right people, in an effective manner
- Be a centre builder
- Not be at the end of your career; what is the legacy this proposal will leave to the next generation in terms of project outcomes and resources?
- If at regional university, demonstrate strong research commitment
Key features of a Laureate Fellow

• Have a big vision
• Be outward looking
• Have a compelling research question
• Be able to explain this to a broad audience (get mock panels from broad disciplines to evaluate the proposal)
• Propose topical and practical research, but also blue sky with unexpected outcomes
• Be a mentor and a leader at the cutting edge of your field, able to take the research to an internationally outstanding level
• It is not about what you have done, but what you are going to do
• Teamwork is important: have the ability to pull together all the right people, in an effective manner
• Be a centre builder
• Not be at the end of your career; what is the legacy this proposal will leave to the next generation in terms of project outcomes and resources?
• If at regional university, demonstrate strong research commitment
ARC Laureate Fellows—Objectives

a. support outstanding researchers and research leaders
b. strengthen Australia's international research standing
c. provide excellent research training environment and exemplary ECR mentorship
d. support ground-breaking, internationally competitive research
e. forge strong links among researchers, international research community, and/or industry
f. economic, environmental, social and cultural benefits to Australia
Laureate Fellows 2014
Success by discipline

*BSB = Biological Sciences and Biotechnology; EMI = Engineering, Mathematics and Informatics; HCA = Humanities and Creative Arts; PCE = Physics, Chemistry and Earth Sciences; SBE = Social, Behavioural and Economics Sciences

Source: 2014 Selection Report Table 5
Australian Government
Australian Research Council

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