Monash University ARC Information Session
6 December 2012

Professor Aidan Byrne
CEO, Australian Research Council
Research Sector Changes and Challenges

- ARC
- Current landscape
  » Programs
  » ERA
Government Investment in R&D 2011-12

- Business & Innovation: 24%
- Universities: 21%
- ARC: 9%
- NHMRC: 8%
- CRCs: 2%
- Other Health: 6%
- Rural: 2%
- Energy and the Environment: 5%
- Other Science: 4%
- CSIRO: 8%
- Other Government: 11%
ARC funding awarded by program – last 5 years

Futures ...

- Discovery - Projects: 41%
- Linkage - Projects: 18%
- ARC Future Fellowships: 16%
- Centres of Excellence: 7%
- Australian Laureate/Fed Fellowships: 5%
- Linkage - Infrastructure Equipment and Facilities: 4%
- Discovery Early Career Researcher Award: 3%
- Other: 2%
- Special Research Initiatives: 4%
Total number of proposals received by the ARC by (expected) commencement year

- Technology
- Studies in Human Society
- Studies in Creative Arts and Writing
- Psychology and Cognitive Sciences
- Physical Sciences
- Philosophy and Religious Studies
- Medical and Health Sciences
- Law and Legal Studies
- Language, Communication and Culture
- Information and Computing Sciences
- History and Archaeology
- Environmental Sciences
- Engineering
- Education
- Economics
- Earth Sciences
- Commerce, Management, Tourism and Services
- Chemical Sciences
- Built Environment and Design
- Biological Sciences
- Agricultural and Veterinary Sciences
NCGP 2-Digit Trend Data 2002-2012 ($ awarded)
What are the Programs?

**Discovery**
- Australian Laureate Fellowships
- Discovery Early Career Researcher Award (DECRA)
- Discovery Indigenous
- Discovery Projects (includes DORAs)
- Future Fellowships

**Centres**
- ARC Centres of Excellence
- Co-funded Centres

**Linkage**
- Linkage Infrastructure, Equipment and Facilities (LIEF)
- Linkage Learned Academies Special Projects
- Linkage Projects
- Industrial Transformation Research Program

**Special Research Initiatives**
- e.g. Science of Learning
National Competitive Grants Program

**Discovery Projects**
- Australian Laureate Fellowships
- Future Fellowships
- Discovery Indigenous
- Discovery Early Career Researcher Award

**Linkage Projects**
- Centres of Excellence
- Co-funded Centres and Special Research Initiatives
- Industrial Transformation Research Hubs
- Industrial Transformation Training Centres
National Competitive Grants Program

Making applications easier

- Success rates vs grant size
- Grant duration
- Panels
- DECRA
- DORAs
Near-Long term issues

- Open Access
- Health & medical research
- Evaluating Impact
- Defence Trade Control Bill
- International linkages (Asian White Paper)
- Budgets & Politics
  » timelines
ERA 2012

Excellence in Research for Australia 2012
National Report

Web: arc.gov.au  Email: info@arc.gov.au
2012 Outcomes and Future Directions

- Why ERA?
- What’s changed?
  - Growth in the system
  - Quality improvement
- The Richness of ERA data
  - Information beyond volume and quality
- The future of ERA
ERA Objectives

- 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;

- Allow for **comparison** of Australia’s research nationally and **internationally** for all discipline areas;

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

- Identify **excellence** across the full spectrum of research performance.
2010 to 2012: Growth

Bigger and more productive

↑ research publications/outputs (413,477, up 24%)
↑ researchers and related staff (60,668, up 9%)
↑ patents (781, up 16%) and esteem measures (4485, up 11%)
↑ Competitive grant ($3.75 billion, up 18%) and other public sector income ($2.39 billion, up 25%)
Growth in outputs

Difference in number of outputs by type: ERA 2012 compared to ERA 2010

- Recorded or Rendered Work
- Original Creative Work
- Live Performance
- Curated or Exhibited Event
- Conference Publication
- Book Chapter
- Book
- Journal Article

* Actual NTROs % increased, but are included in Portfolio.
Growth in outputs

% change in number of outputs by type: ERA 2012 compared to ERA 2010

- Recorded or Rendered Work
- Original Creative Work
- Live Performance
- Conference Publication
- Curated or Exhibited Event
- Journal Article
- Book Chapter
- Book
- Portfolio of Non-Traditional Research Outputs*

* Actual NTROs % increased, but are included in Portfolio.

web: arc.gov.au  Email: info@arc.gov.au
Growth apparent across a wide range of fields

<table>
<thead>
<tr>
<th>FoR</th>
<th>Trend 2005-2010</th>
<th>Total Outputs*</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 Built Environment and Design</td>
<td></td>
<td>7847</td>
<td>10%</td>
</tr>
<tr>
<td>05 Environmental Sciences</td>
<td></td>
<td>7549</td>
<td>8%</td>
</tr>
<tr>
<td>17 Psychology and Cognitive Sciences</td>
<td></td>
<td>14951</td>
<td>7%</td>
</tr>
<tr>
<td>22 Philosophy and Religious Studies</td>
<td></td>
<td>5724</td>
<td>6%</td>
</tr>
<tr>
<td>11 Medical and Health Sciences</td>
<td></td>
<td>91860</td>
<td>6%</td>
</tr>
<tr>
<td>20 Language, Communication and Culture</td>
<td></td>
<td>12176</td>
<td>5%</td>
</tr>
<tr>
<td>09 Engineering</td>
<td></td>
<td>48367</td>
<td>5%</td>
</tr>
<tr>
<td>19 Studies in Creative Arts and Writing</td>
<td></td>
<td>11888</td>
<td>5%</td>
</tr>
<tr>
<td>21 History and Archaeology</td>
<td></td>
<td>6941</td>
<td>5%</td>
</tr>
<tr>
<td>13 Education</td>
<td></td>
<td>18702</td>
<td>5%</td>
</tr>
<tr>
<td>16 Studies in Human Society</td>
<td></td>
<td>20495</td>
<td>5%</td>
</tr>
<tr>
<td>18 Law and Legal Studies</td>
<td></td>
<td>9176</td>
<td>4%</td>
</tr>
<tr>
<td>07 Agricultural and Veterinary Sciences</td>
<td></td>
<td>11032</td>
<td>3%</td>
</tr>
<tr>
<td>14 Economics</td>
<td></td>
<td>7629</td>
<td>3%</td>
</tr>
<tr>
<td>15 Commerce, Management, Tourism and Services</td>
<td></td>
<td>24641</td>
<td>3%</td>
</tr>
<tr>
<td>04 Earth Sciences</td>
<td></td>
<td>10198</td>
<td>3%</td>
</tr>
<tr>
<td>06 Biological Sciences</td>
<td></td>
<td>30867</td>
<td>3%</td>
</tr>
<tr>
<td>03 Chemical Sciences</td>
<td></td>
<td>16124</td>
<td>2%</td>
</tr>
<tr>
<td>01 Mathematical Sciences</td>
<td></td>
<td>10234</td>
<td>1%</td>
</tr>
<tr>
<td>02 Physical Sciences</td>
<td></td>
<td>16273</td>
<td>1%</td>
</tr>
<tr>
<td>08 Information and Computing Sciences</td>
<td></td>
<td>24165</td>
<td>1%</td>
</tr>
<tr>
<td>10 Technology</td>
<td></td>
<td>6055</td>
<td>0%</td>
</tr>
</tbody>
</table>

* Does not include patents.
Two period growth rate – Top 20 four-digit FoR (applied focus)

<table>
<thead>
<tr>
<th>FoR Code</th>
<th>FoR Name</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Total</th>
<th>Two Period Growth Rate</th>
<th>Growth Index (Aust. Av)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1104</td>
<td>Complementary and Alternative Medicine</td>
<td>90.2</td>
<td>116.1</td>
<td>122.5</td>
<td>159.8</td>
<td>163.3</td>
<td>162.6</td>
<td>814.5</td>
<td>48%</td>
<td>1.3</td>
</tr>
<tr>
<td>1205</td>
<td>Urban and Regional Planning</td>
<td>223.5</td>
<td>224.7</td>
<td>328.3</td>
<td>302.6</td>
<td>366.9</td>
<td>461.7</td>
<td>1907.7</td>
<td>46%</td>
<td>1.3</td>
</tr>
<tr>
<td>1111</td>
<td>Nutrition and Dietetics</td>
<td>148.5</td>
<td>202.3</td>
<td>222.6</td>
<td>240.6</td>
<td>274.1</td>
<td>304.4</td>
<td>1392.5</td>
<td>43%</td>
<td>1.3</td>
</tr>
<tr>
<td>1199</td>
<td>Other Medical and Health Sciences</td>
<td>250.2</td>
<td>253</td>
<td>295.6</td>
<td>348.5</td>
<td>366.6</td>
<td>389.8</td>
<td>1903.7</td>
<td>38%</td>
<td>1.2</td>
</tr>
<tr>
<td>1702</td>
<td>Cognitive Science</td>
<td>300.1</td>
<td>357.4</td>
<td>329.4</td>
<td>388.4</td>
<td>449.5</td>
<td>511.9</td>
<td>2336.7</td>
<td>37%</td>
<td>1.2</td>
</tr>
<tr>
<td>2001</td>
<td>Communication and Media Studies</td>
<td>262.4</td>
<td>285</td>
<td>351.5</td>
<td>402.6</td>
<td>410.3</td>
<td>413.4</td>
<td>2125.2</td>
<td>36%</td>
<td>1.2</td>
</tr>
<tr>
<td>1301</td>
<td>Education Systems</td>
<td>448.8</td>
<td>397.1</td>
<td>469.1</td>
<td>527.7</td>
<td>625.4</td>
<td>589.9</td>
<td>3058</td>
<td>33%</td>
<td>1.2</td>
</tr>
<tr>
<td>1601</td>
<td>Anthropology</td>
<td>200</td>
<td>232.4</td>
<td>223.7</td>
<td>285.6</td>
<td>281</td>
<td>292.2</td>
<td>1514.9</td>
<td>31%</td>
<td>1.2</td>
</tr>
<tr>
<td>1399</td>
<td>Other Education</td>
<td>156.8</td>
<td>149</td>
<td>194.5</td>
<td>209.6</td>
<td>222.5</td>
<td>222.7</td>
<td>1155.1</td>
<td>31%</td>
<td>1.2</td>
</tr>
<tr>
<td>1106</td>
<td>Human Movement and Sports Science</td>
<td>699.8</td>
<td>808.6</td>
<td>899.5</td>
<td>982</td>
<td>1004.1</td>
<td>1118.6</td>
<td>5512.6</td>
<td>29%</td>
<td>1.1</td>
</tr>
<tr>
<td>0503</td>
<td>Soil Sciences</td>
<td>155.5</td>
<td>178.7</td>
<td>172.9</td>
<td>174.8</td>
<td>193.3</td>
<td>285.5</td>
<td>1160.7</td>
<td>29%</td>
<td>1.1</td>
</tr>
<tr>
<td>1117</td>
<td>Public Health and Health Services</td>
<td>2302.5</td>
<td>2513.2</td>
<td>2747.1</td>
<td>3060.3</td>
<td>3159.4</td>
<td>3421.3</td>
<td>17203.8</td>
<td>27%</td>
<td>1.1</td>
</tr>
<tr>
<td>2201</td>
<td>Applied Ethics</td>
<td>127</td>
<td>126.8</td>
<td>121.9</td>
<td>137.3</td>
<td>181</td>
<td>159.2</td>
<td>853.2</td>
<td>27%</td>
<td>1.1</td>
</tr>
<tr>
<td>1602</td>
<td>Criminology</td>
<td>185.8</td>
<td>224.9</td>
<td>208.2</td>
<td>265.2</td>
<td>264.3</td>
<td>252.5</td>
<td>1400.9</td>
<td>26%</td>
<td>1.1</td>
</tr>
<tr>
<td>1302</td>
<td>Curriculum and Pedagogy</td>
<td>840.4</td>
<td>919</td>
<td>965.9</td>
<td>1090.2</td>
<td>1176.3</td>
<td>1173.2</td>
<td>6165</td>
<td>26%</td>
<td>1.1</td>
</tr>
<tr>
<td>1112</td>
<td>Oncology and Carcinogenesis</td>
<td>532.2</td>
<td>606.5</td>
<td>553.6</td>
<td>672.1</td>
<td>671.1</td>
<td>792.7</td>
<td>3828.2</td>
<td>26%</td>
<td>1.1</td>
</tr>
<tr>
<td>1501</td>
<td>Accounting, Auditing and Accountability</td>
<td>388.4</td>
<td>408.2</td>
<td>478.3</td>
<td>544.9</td>
<td>508.5</td>
<td>551.8</td>
<td>2880.1</td>
<td>26%</td>
<td>1.1</td>
</tr>
<tr>
<td>0501</td>
<td>Ecological Applications</td>
<td>148.9</td>
<td>178.1</td>
<td>209.1</td>
<td>197</td>
<td>235.3</td>
<td>240.6</td>
<td>1209</td>
<td>26%</td>
<td>1.1</td>
</tr>
</tbody>
</table>
Quality: ERA 2010 Ratings

ERA ratings (4-digit)

170
389
547
393
239

2010 (1738 UoEs)
Quality: ERA 2012 Ratings

ERA ratings (4-digit)

- 1: 67
- 2: 266
- 3: 583
- 4: 457
- 5: 308

2012 (1681 UoEs)
Income and quality

HERDC income Cat 1-3 by rating - 2010
Income and quality

HERDC income Cat 1-3 by rating - 2012
ERA 2012: All Broad Fields of Research (Two Digit FoR codes)
Number of Universities Rated at World Standard or Higher

<table>
<thead>
<tr>
<th>FoR Code</th>
<th>At World Standard</th>
<th>Above World Standard</th>
<th>Well Above World Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of Australian Universities
<table>
<thead>
<tr>
<th>No of UoE</th>
<th>Cohort</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>220</td>
<td>ATN</td>
<td>-75%</td>
<td>-57%</td>
<td>7%</td>
<td>113%</td>
<td>44%</td>
</tr>
<tr>
<td>662</td>
<td>Go8</td>
<td>-91%</td>
<td>-79%</td>
<td>-15%</td>
<td>6%</td>
<td>13%</td>
</tr>
<tr>
<td>298</td>
<td>IRU</td>
<td>-56%</td>
<td>-24%</td>
<td>12%</td>
<td>-2%</td>
<td>110%</td>
</tr>
<tr>
<td>83</td>
<td>RUN</td>
<td>-40%</td>
<td>6%</td>
<td>90%</td>
<td>50%</td>
<td>600%</td>
</tr>
<tr>
<td>418</td>
<td>Unaligned</td>
<td>-63%</td>
<td>-14%</td>
<td>29%</td>
<td>26%</td>
<td>56%</td>
</tr>
</tbody>
</table>
Institutional age and ERA 2012 ratings

ERA 2012 Number of UoEs - 4-digit

% 3, 4 and 5

Age

- 21
- 25-49 years
- 50-100 years
- >100 years

Web: arc.gov.au  |  Email: info@arc.gov.au
### Mathematical Studies (01) and Language, Communication and Culture (20)

#### Number of Universities Rated at World Standard or Higher

<table>
<thead>
<tr>
<th>Classification</th>
<th>Year</th>
<th>At World Standard</th>
<th>Above World Standard</th>
<th>Well Above World Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>0101-Pure Mathematics</td>
<td>2012</td>
<td>6</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>0102-Applied Mathematics</td>
<td>2012</td>
<td>7</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>0103-Numerical and Computational Mathematics</td>
<td>2012</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0104-Statistics</td>
<td>2012</td>
<td>2</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>0105-Mathematical Physics</td>
<td>2012</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2001-Communication and Media Studies</td>
<td>2012</td>
<td>5</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>2002-Cultural Studies</td>
<td>2012</td>
<td>10</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>2003-Language Studies</td>
<td>2012</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2004-Linguistics</td>
<td>2012</td>
<td>7</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>2005-Literary Studies</td>
<td>2012</td>
<td>9</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>
Variation at Four-digit Level: Pure v Applied

**Mathematical Sciences (01) and Information and Computing Sciences (08)**

**Number of Universities Rated at World Standard or Higher**

- **0101-Pure Mathematics - 2012**
  - At World Standard: 6
  - Above World Standard: 6
  - Well Above World Standard: 2
- **0102-Applied Mathematics - 2012**
  - At World Standard: 7
  - Above World Standard: 11
  - Well Above World Standard: 2
- **0103-Numerical and Computational Mathematics - 2012**
  - At World Standard: 3
  - Above World Standard: 1
  - Well Above World Standard: 1
- **0104-Statistics - 2012**
  - At World Standard: 2
  - Above World Standard: 6
  - Well Above World Standard: 1
- **0105-Mathematical Physics - 2012**
  - At World Standard: 3
  - Above World Standard: 3
  - Well Above World Standard: 2

---

**0801-Artificial Intelligence and Image Processing - 2012**
- At World Standard: 5
- Above World Standard: 13
- Well Above World Standard: 7
- Total: 25

**0802-Computation Theory and Mathematics - 2012**
- At World Standard: 5
- Above World Standard: 2
- Total: 7

**0803-Computer Software - 2012**
- At World Standard: 3
- Above World Standard: 2
- Well Above World Standard: 1
- Total: 6

**0805-Distributed Computing - 2012**
- At World Standard: 5
- Above World Standard: 5
- Total: 10

**0806-Information Systems - 2012**
- At World Standard: 6
- Above World Standard: 4
- Well Above World Standard: 2
- Total: 12

**0807-Library and Information Studies - 2012**
- At World Standard: 3
- Total: 3

---

**Number of Australian Universities**

0 5 10 15 20 25
National Strengths* in ERA 2012

- 0201-Astronomical and Space Sciences
- 0303-Macromolecular and Materials Chemistry
- 0403-Geology
- 0502-Environmental Science and Management
- 0602-Ecology
- 0603-Evolutionary Biology
- 0607-Plant Biology
- 0906-Electrical and Electronic Engineering
- 0912-Materials Engineering
- 1103-Clinical Sciences
- 1106-Human Movement and Sports Science
- 1107-Immunology
- 1108-Medical Microbiology
- 1110-Nursing
- 1115-Pharmacology and Pharmaceutical Sciences
- 1116-Medical Physiology
- 1701-Psychology
- 1801-Law
- 2002-Cultural Studies
- 2103-Historical Studies

Blue = new for 2012

*Four-digit FoRs in which ten or more universities were rated at above world standard (4 or 5), and four or more universities were rated at well above world standard (5).
Emerging research areas
Environmental Sciences, 2010 and 2012

Less Specialised ← World Average → More Specialised
Normalised Specialisation Index

Web: arc.gov.au  |  Email: info@arc.gov.au
Additional information...

- Emerging areas of research
- Types of research output by discipline
- Staffing profile by discipline
- HERDC income sources by discipline
- Share of patents by discipline
- Interdisciplinary activity
- Patterns of co-authorship by discipline
- Inter-institutional collaboration
## Interdisciplinary activity

<table>
<thead>
<tr>
<th>Category</th>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
<th>05</th>
<th>06</th>
<th>07</th>
<th>08</th>
<th>09</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematical Sciences</td>
<td>11.5</td>
<td>1.1</td>
<td>2.8</td>
<td>2.6</td>
<td>6.1</td>
<td>2.6</td>
<td>21.5</td>
<td>34.4</td>
<td>1.6</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>10.5</td>
<td>22.8</td>
<td>3.9</td>
<td>0.0</td>
<td>1.6</td>
<td>0.1</td>
<td>1.0</td>
<td>47.6</td>
<td>8.9</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>Chemical Sciences</td>
<td>0.5</td>
<td>12.3</td>
<td>1.2</td>
<td>4.6</td>
<td>20.9</td>
<td>0.8</td>
<td>0.3</td>
<td>41.1</td>
<td>4.8</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>Earth Sciences</td>
<td>4.0</td>
<td>7.9</td>
<td>3.4</td>
<td>21.6</td>
<td>20.8</td>
<td>4.4</td>
<td>1.1</td>
<td>23.1</td>
<td>0.3</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Environmental Sciences</td>
<td>1.0</td>
<td>0.0</td>
<td>4.4</td>
<td>5.9</td>
<td>51.9</td>
<td>17.6</td>
<td>0.6</td>
<td>5.5</td>
<td>1.2</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>0.9</td>
<td>0.3</td>
<td>7.9</td>
<td>2.6</td>
<td>22.5</td>
<td>14.3</td>
<td>1.9</td>
<td>1.6</td>
<td>1.8</td>
<td>44.3</td>
<td></td>
</tr>
<tr>
<td>Agricultural and Veterinary Sciences</td>
<td>1.4</td>
<td>0.0</td>
<td>1.2</td>
<td>2.0</td>
<td>47.6</td>
<td>0.9</td>
<td>6.3</td>
<td>3.1</td>
<td>8.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information and Computing Sciences</td>
<td>12.3</td>
<td>0.8</td>
<td>0.3</td>
<td>0.4</td>
<td>0.9</td>
<td>6.0</td>
<td>1.0</td>
<td>20.2</td>
<td>8.1</td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>9.3</td>
<td>15.2</td>
<td>22.6</td>
<td>4.4</td>
<td>3.7</td>
<td>2.5</td>
<td>3.0</td>
<td>10.8</td>
<td>15.2</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>1.8</td>
<td>7.6</td>
<td>9.3</td>
<td>0.2</td>
<td>2.3</td>
<td>9.6</td>
<td>4.8</td>
<td>12.1</td>
<td>42.7</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>Medical and Health Sciences</td>
<td>0.9</td>
<td>0.4</td>
<td>4.0</td>
<td>0.0</td>
<td>0.8</td>
<td>35.2</td>
<td>1.9</td>
<td>2.7</td>
<td>4.4</td>
<td>1.1</td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- 20-29%  
- 30-39%  
- > 40%
Outputs & Staff by Employment Levels

<table>
<thead>
<tr>
<th>Subject</th>
<th>% Staff</th>
<th>Level E</th>
<th>Level D</th>
<th>Level C</th>
<th>Level B</th>
<th>Level A</th>
<th>Other FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 Mathematical Sciences</td>
<td></td>
<td>16</td>
<td>15</td>
<td>22</td>
<td>30</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>% Outputs</td>
<td></td>
<td>38</td>
<td></td>
<td>17</td>
<td>16</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>02 Creative Arts and Writing</td>
<td></td>
<td>8</td>
<td>9</td>
<td>29</td>
<td>39</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>% Outputs</td>
<td></td>
<td>14</td>
<td>12</td>
<td>26</td>
<td>27</td>
<td>6</td>
<td>15</td>
</tr>
</tbody>
</table>
Monash University Ratings ERA 2010-2012
Monash University ERA 2012 Ratings - 2 and 4-digit

Engineering and Environmental Sciences (EE) Ratings
- Rating 4: n=4
- Rating 5: n=9

Humanities and Creative Arts (HCA) Ratings
- Rating 3: n=5
- Rating 5: n=6

Medical and Health Sciences (MHS) Ratings
- Rating 3: n=6
- Rating 5: n=6

Physical, Chemical and Earth Sciences (PCE) Ratings
- Rating 3: n=6
- Rating 4: n=7

Economics and Commerce (EC) Ratings
- Rating 3: n=1
- Rating 5: n=3

Biological and Biotechnological Sciences (BB) Ratings
- Rating 3: n=3
- Rating 5: n=2

Education and Human Society (EHS) Ratings
- Rating 2: n=1
- Rating 4: n=5

Mathematics, Information and Computing Sciences (MIC) Ratings
- Rating 3: n=7
- Rating 4: n=4
Future directions...

- Expand ERA metrics: research application, knowledge exchange and collaboration
- Expand eligible research outputs to include a greater range of applied outputs
- Focus on pathways to impact
- As with existing ‘quality’ indicators, approaches must be tailored to fit the field of research concerned
- Consultation with the sector and its stakeholders will be critical
Near-Long term issues

- Open Access
- Health & medical research
- Evaluating Impact
- Defence Trade Control Bill
- International linkages (Asian White Paper)
- Budgets & Politics
  » timelines
Monash University ARC Information Session
6 December 2012

Professor Aidan Byrne
CEO, Australian Research Council