ERA: Excellence in Research for Australia
Process, Outcomes, Issues, Future

ASSAAD MASRI : ERA COORDINATOR
RESEARCH PORTFOLIO
BACKGROUND

› ERA is a quality-based evaluation of research at all Australian higher education institutions.
› It is a federal government initiative, developed by the ARC in cooperation with the NHMRC.
› It replaced the previous RQF.
› A pilot and a trial were carried out, but the first full ERA was submitted in July 2010, and results released in January 2011.
› No funding dependant on ERA outcomes yet, but participation in ERA 2010 was required to obtain SRE funding in 2011.
› It is likely that future SRE allocations will be dependant on ERA outcomes and Minister Carr indicated it will be used in other block funding schemes, specifically mentioning RTS.
› The model for calculating future funding is being determined by the Compacts arrangements which incorporate ERA outcomes.
ERA ORGANISATION AT SYDNEY

› ERA at the University of Sydney is governed by:

› Prof Jill Trewhella – DVC-R
› Prof Assaad Masri – ERA Coordinator (formerly Prof Trevor Hambley)
› Merril Bouckley – Director, Research Analytics and Data Strategy
› Jenny Waern – ERA Project Manager
› Jacqui Hunt – ERA Professional Officer and Creative Works Specialist

› Cluster leaders
› 2-digit FoR group leaders
1. PROCESS
   - What the results are based on, how ERA was carried out, FoR codes

2. OUTCOMES
   - Our results, strengths, weaknesses, national and Go8 comparison

3. ISSUES
   - Problems with the process and why care should be taken when analysing results

4. FUTURE
   - The next round of ERA, strategic planning to maximise outcomes
PROCESS
Each cluster generally contains multiple 2-digit Fields of Research.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Fields of Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Physical, Chemical and Earth Sciences</td>
</tr>
<tr>
<td>2</td>
<td>Humanities and Creative Arts</td>
</tr>
<tr>
<td>3</td>
<td>Engineering and Environmental Sciences</td>
</tr>
<tr>
<td>4</td>
<td>Social, Behavioural, and Economic Sciences</td>
</tr>
<tr>
<td>5</td>
<td>Mathematics, Information, and Communication Sciences</td>
</tr>
<tr>
<td>6</td>
<td>Biological Sciences and Biotechnology</td>
</tr>
<tr>
<td>7</td>
<td>Biomedical and Clinical Research</td>
</tr>
<tr>
<td>8</td>
<td>Public and Allied Health and Health Sciences</td>
</tr>
</tbody>
</table>
ERA evaluation was carried out at the 4-digit level and also the 2-digit level. (6-digit level was not used for the ERA).

There is a score for each 4-digit and 2-digit code where threshold met.
ERA DATA INCLUDE:

<table>
<thead>
<tr>
<th>Data</th>
<th>Includes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researcher information</td>
<td>FTE, academic level, teaching and research / research only, FoR codes etc.</td>
</tr>
<tr>
<td>Research outputs</td>
<td>Books, chapters, journal articles, creative works etc.</td>
</tr>
<tr>
<td>Research income</td>
<td>By category: ACGs, industry income, CRC income etc.</td>
</tr>
<tr>
<td>Applied and esteem measures</td>
<td>Patents, commercialisation income, fellowship of academies etc.</td>
</tr>
</tbody>
</table>
INDICATORS OF RESEARCH OUTPUT QUALITY

› Journal rankings
  - All journals were ranked according to quality
  - A*, A, B, C
  - These were developed in consultation with experts

› Citation data
  - Only used where appropriate
  - Discipline and year-specific benchmarks set
  - A very important determinant of quality

› Peer review
  - Used where citation analysis was not appropriate

› All outputs had to be submitted.
ELIGIBILITY

› Eligibility of a staff member for ERA is based on a census date.

› If a staff member was employed by the university on the census date (31 March 2009) then they are eligible.

› If a staff member is eligible, then ALL their publications are eligible, even if they were published before the staff member came to Sydney.

› For honorary (and other affiliated) staff as determined by the Faculties, only those outputs with a publication association were eligible.

Heat release rate as represented by [OH] x [CH2O] and its role in autoignition

Robert L. Gordon, a* Assaad R. Masri a and Epaminondas Mastorakos b

a School of Aerospace, Mechanical and Mechatronic Engineering, The University of Sydney, NSW 2006, Australia; b Department of Engineering, University of Cambridge, Cambridge, UK
FoR codes with a low volume of outputs were not evaluated.

### Minimum Threshold for Evaluation

<table>
<thead>
<tr>
<th>Research area</th>
<th>Citation analysis</th>
<th>Peer review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predominantly sciences, engineering, medicine &amp; health</td>
<td>50 indexed journal articles</td>
<td>Predominantly humanities, social sciences, creative arts</td>
</tr>
<tr>
<td>Predominantly humanities, social sciences, creative arts</td>
<td>30 outputs in total</td>
<td></td>
</tr>
</tbody>
</table>

- *Indexed* means that the article is contained in Scopus, the database chosen for citation analysis.

If a threshold wasn’t met at the 4-digit level, the data was rolled up and evaluated at the 2-digit level.
FIELD OF RESEARCH (FoR) CODES

› Each item of data was assigned one (or more) 4-digit FoR code.
  - Including researchers, outputs, income, esteem etc
› For most items, the choice of FoR code was unlimited.
› For journal articles, the FoR code was limited by the code(s) assigned to that journal on the ranked list.
› All data was then evaluated in the FoR code assigned to it.
› There was no requirement that a researcher be evaluated in the same FoR as their outputs or income.
We had the largest submission in Australia.

Our outputs accounted for over 10% of the national total.

We submitted:
- 36,500 publications
- 39,800 publication FoR codes
- 5,650 grants (totalling $974m)
- 4,850 researchers
ALL ERA DATA WAS EVALUATED BY RECs

› Each cluster had a Research Evaluation Committee (REC) comprised of discipline experts.
› They were presented with all the data and discipline-specific benchmarks.
› There was no formula for weighting the different indicators.
› Indication is that citation and peer review were most important.
› Each 2- and 4-digit FoR code will receive a score out of 5.

<table>
<thead>
<tr>
<th>Score</th>
<th>Significance</th>
</tr>
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<tbody>
<tr>
<td>5</td>
<td>well above world standard</td>
</tr>
<tr>
<td>4</td>
<td>above world standard</td>
</tr>
<tr>
<td>3</td>
<td>at world standard</td>
</tr>
<tr>
<td>2</td>
<td>below world standard</td>
</tr>
<tr>
<td>1</td>
<td>well below world standard</td>
</tr>
</tbody>
</table>
OUTCOMES
2-DIGIT FOR CODE LEVEL

› Sydney was evaluated in 24 out of 25 2-digit Field of Research codes.

› Rated the maximum score of 5 in five fields (5 = well above world class).
  - Mathematical Sciences
  - Physical Sciences
  - Biomedical and Clinical Health Sciences
  - History and Archaeology
  - Philosophy and Religious Studies
OUTCOMES

2-DIGIT FOR CODE LEVEL

› Rated 4 (above world class) in a further 10 fields:

- Earth sciences
- Environmental sciences
- Information and computing sciences
- Engineering
- Public and allied health sciences
- Commerce, management, tourism & services
- Psychology & cognitive sciences
- Law and legal studies
- Studies in creative arts and writing
- Language, communication and culture

› In the remaining 9 fields we were rated 3 (at world class).
OUTCOMES

4-DIGIT FOR CODE LEVEL

› We were evaluated in 102 out of 157 fields.
› Only Melbourne was evaluated in more fields (103).
› We scored:
   • 21 fives
   • 38 fours
   • 35 threes
   • 6 twos
   • 2 ones

› 58% of our research was rated at above world class (4 or above)
› 92% of our fields was rated at least world class (3 or above)
Go8 COMPARISON – 4-DIGIT FOR CODES

Number of fields evaluated in

Number of each score

ANU  Univ Melb  UWA  Adelaide  UNSW  UQ  Monash  Univ Sydney

number of 5  number of 4  number of 3

number of 2  number of 1  number of assessable fields
4-DIGIT FOR CODE LEVEL

We received the maximum score of 5 in the following fields:

- Mathematical physics
- Optical physics
- Quantum physics
- Macromolecular and materials chemistry
- Theoretical chemistry
- Soil sciences
- Plant biology
- Crop and pasture production
- Aerospace engineering
- Cardiovascular medicine
- Clinical sciences
- Oncology
- Ophthalmology
- Nutrition
- Economic theory
- Accounting
- Cultural studies
- Literary studies
- Historical studies
- History and philosophy of specific fields
- Philosophical studies
OUTCOMES

BELOW THE AUSTRALIAN AVERAGE

› In three 2-digit fields we scored below the Australian average:
  - Chemical sciences
  - Biological sciences
  - Agricultural and veterinary sciences

› In each of these fields, we scored at least one 5, indicating that there is excellence there.

<table>
<thead>
<tr>
<th>Chemical sciences</th>
<th>Biological sciences</th>
<th>Agricultural and veterinary sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>3</td>
<td>Overall</td>
</tr>
<tr>
<td>Macromolecular &amp; materials chemistry</td>
<td>5</td>
<td>Plant biology</td>
</tr>
<tr>
<td>Theoretical &amp; comput. chemistry</td>
<td>5</td>
<td>Crop &amp; pasture production</td>
</tr>
</tbody>
</table>
SENSITIVE TO SIZE AND FOCUS OF THE INSTITUTION

› The ERA methodology essentially looks at averages across fields.

› A very large field containing a hub of research excellence can therefore be diluted by a tail of average research activity.

› Similarly, a very strong sub-field can be diluted by weaker sub-fields contributing to the one field.

› E.g. Disciplines that are distributed in pockets in multiple schools and faculties can show aberrant scores due to uneven performance.

› A university that is large and comprehensive risks having its hubs of excellence diluted.
ISSUES

INTERDISCIPLINARITY

› There is no scope for interdisciplinarity to be captured or evaluated in ERA.

› If an item was assigned multiple FoR codes (e.g. Oncology and medicinal chemistry for a paper on a chemotherapy drug) it was evaluated completely separately as half an item in each code.

› However, often an article couldn’t be assigned those two codes (due to the limits on FoR codes by the journal).

› Therefore an author in this field is likely to have some papers in oncology, some in chemistry, probably some in biology, possibly many other fields.

› This is also the case for departments, schools and faculties.
ISSUES

SPREAD OF FACULTIES AND FORs

- E.g. Faculty of Pharmacy had articles in:
  - pharmacology & Pharmaceutical sciences
  - chemical engineering
  - organic chemistry
  - biochemistry & cell biology
  - public health
  - and another 45 FoR codes in 7 clusters!

- It is therefore impossible to say that a result in an FoR code or cluster ‘belongs to’ a faculty or department.

Every single faculty contributed to multiple clusters.
Every single 2-digit FoR code was contributed to by multiple faculties.
ERA IS BACKWARD-LOOKING

› Research outputs are from up to eight years ago.
› The research in these outputs was conducted ten years or even longer ago (delay in publishing).
› Appointments after March 2009 completely ignored.
› ERA gives an indication of our past performance, not our current or future research performance.
ISSUES

RANKED JOURNAL AND CONFERENCE LIST

› The ranked list was very contentious: Significant disagreements about both rankings and FoR code assignments.

› Rankings have been hotly disputed by leading experts in the fields.

› Some research sub-disciplines or particular schools of thought in certain fields may be disadvantaged with respect to others.

› Contentious FoR codes on journals meant that research was not always classed correctly and therefore not measured against appropriate benchmarks, nor contributed to score in appropriate field.
  - FOR codes were sometimes appropriate, sometimes too limited and sometimes completely wrong.
  - Many journals are quite broad in scope (interdisciplinarity and multidisciplinarity). Defining a whole journal to just one (or a few) FoR codes is problematic.
FUTURE
NEXT ROUND: ERA 2012

› ERA 2012 has already been announced by the Government.
› ERA 2012 will be based on a census date of 31\textsuperscript{st} March 2011.
› ERA 2012 will include outputs from 2005 to 2010.
  - i.e. It is too late to improve these outputs.
› The ARC have indicated that the ERA 2012 methodology will not significantly change from ERA 2010.
› They will be revising the ranked journal and conference lists in consultation with sector – it is important that we participate.
› Applied measures (patents, commercialisation income etc) will also be reviewed.
› Study the results from the previous submission including submission and learn to optimise.
The review of the lists has just opened.
- [https://roci.arc.gov.au/](https://roci.arc.gov.au/)

Rankings and FoR codes are under review.

New journals and conferences can be proposed.

Justification of your ‘qualification’ to comment must be given.
- E.g. You have published in the journal

Justification for your comment must be given.

### Deadlines

<table>
<thead>
<tr>
<th></th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>New journals and conferences</td>
<td>8 am, 21 March 2011</td>
</tr>
<tr>
<td>Comments on rankings and FoR codes</td>
<td>8 am, 4 April 2011</td>
</tr>
</tbody>
</table>
WHAT CAN BE DONE TO IMPROVE ERA OUTCOMES LONG-TERM?

› Focus on quality rather than quantity.
› Encourage researchers to publish top-quality research in top-quality journals and outlets.
› Promotion process could focus on quality rather than volume.
› Consider ERA when recruiting research staff.
› Invest strategically in line with research strategic plan.
  - ERA provides us with rich data that reports on the performance of disciplines.
  - This data will be incorporated into the Faculty Research Performance Data Reports being produced by RADS.
› Internal ERA webpage:
   - www.sydney.edu.au/research_support/performance/era

› ARC ERA webpage:
   - www.arc.gov.au/era

› ERA questions:
   - Jenny Waern, x 78169, jenny.waern@sydney.edu.au