

# Ensuring Research Excellence

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# Introduction

- Environment in UK for encouraging research excellence
- How Imperial College responds to this
  - metrics
  - optimisation for assessment purposes
- Development of appropriate research strategies



# Research funding in UK



Funding Councils  
Research Councils  
Charities  
Govt depts  
Private business  
EC  
Overseas

# Peer review

- Basis of all major sources of funding
- Results in concentration of funding (8% in top 2.5%, 14% in top 6%)
- Many sponsors becoming more prescriptive in research they fund
- Increasing need to manage research to adapt to funding and scientific environment



## Research Assessment Exercise (RAE)

- All government block grants for research direct to universities based on the outcome of RAE
- Periodic peer review assessment of all UK university research
- Five since 1986, most recent was **RAE**  
2001
- Other project funding influenced by outcome
- Huge reputational risks for top institutions



## RAE format

- Research split into subject groups 'Units of Assessment' (UoA) eg Physics, Chemistry
- Each institution submits its research into the relevant UoAs
- Peer panels review submissions and award a score for each UoA in each institution - in 2001 on scale of 1 (bottom) to 5\* (top)

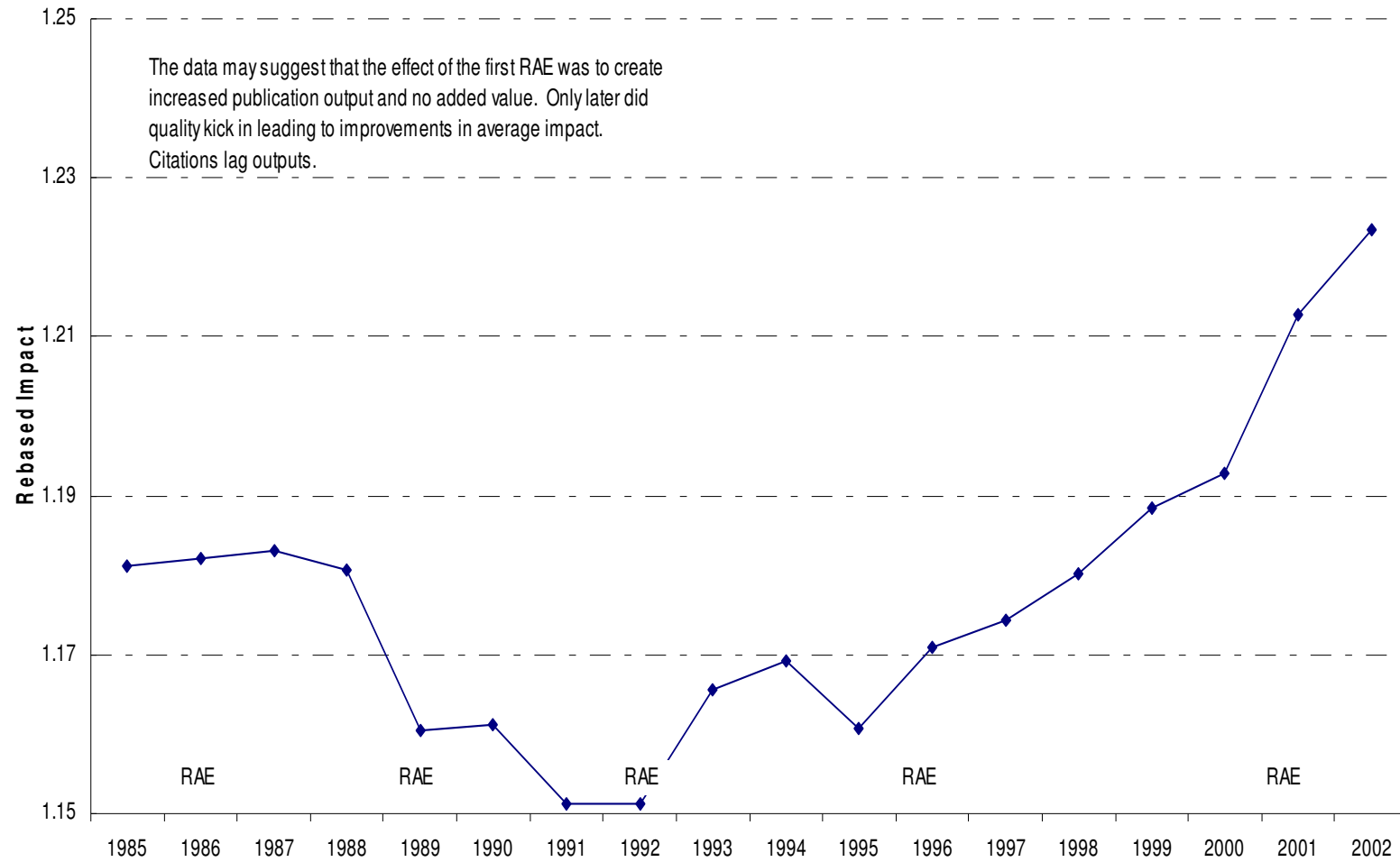
# Has RAE had an effect?

- Some evidence that UK improved its research quality compared with other leading countries

### UK impact, 5-year moving averages rebased against world (= 1.0)

Data cover all subjects, 1985 = average 1981-1985

evidence...





## League table for 2001 RAE results

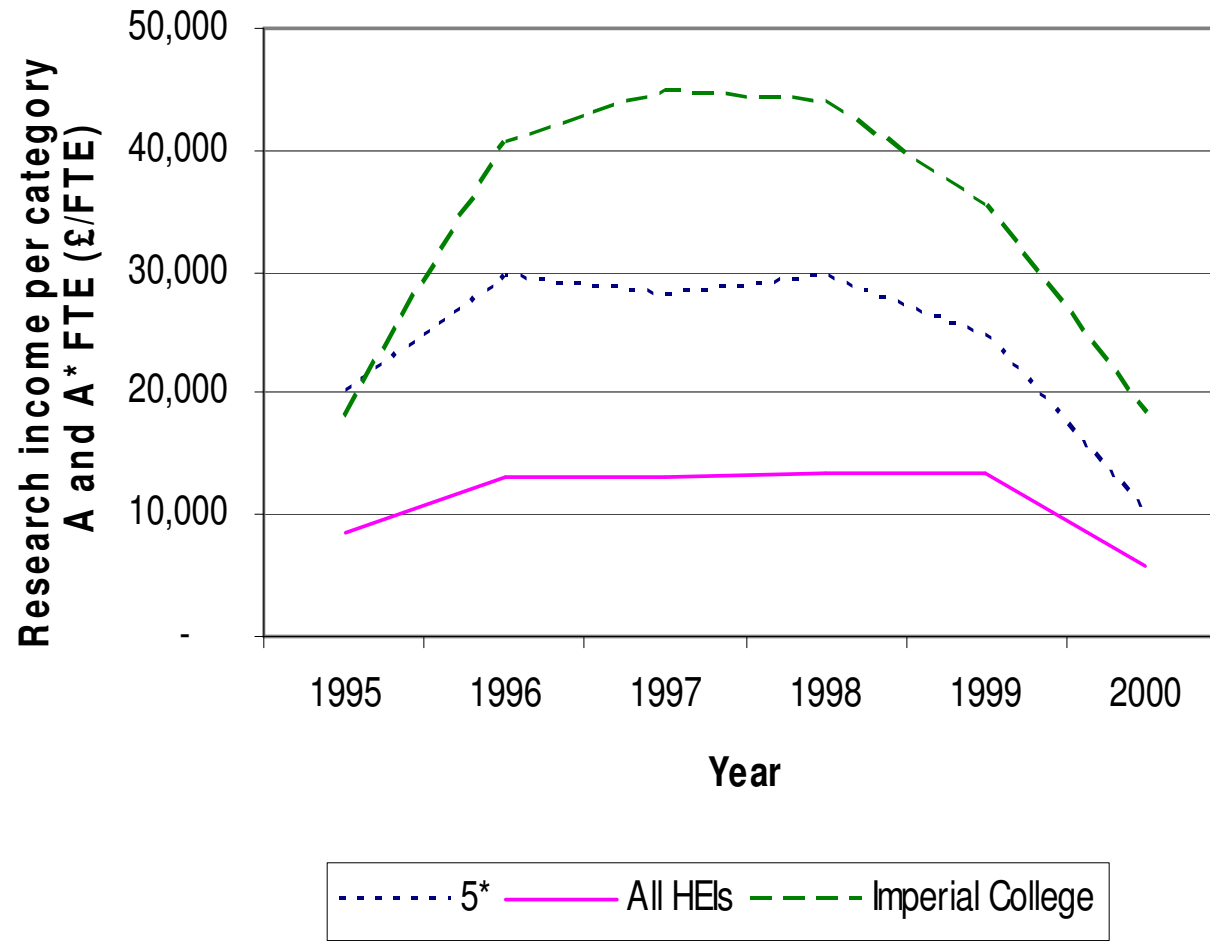
Out of maximum of 7.0; for assessed staff:

Cambridge	6.69
Imperial College	6.68
Oxford	6.58
LSE	6.46
Warwick	6.20
UCL	6.19

# Strategy for maximising score and grant

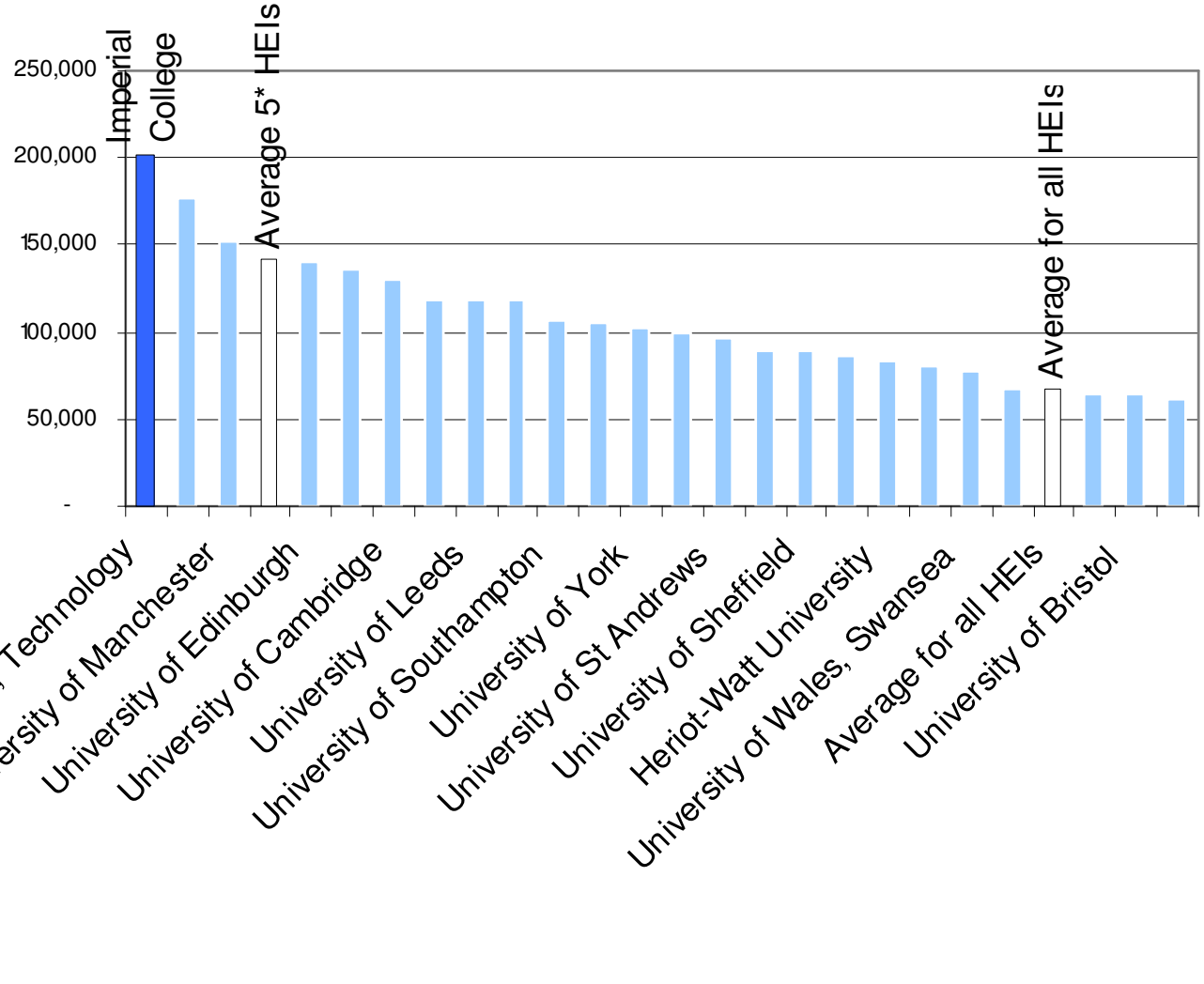
- Consider data for each UoA – income, students, bibliometric
- Develop convincing research strategies
- Present research for RAE in optimum combinations

OST research income per category A and A\* research active FTE(UoA 25)

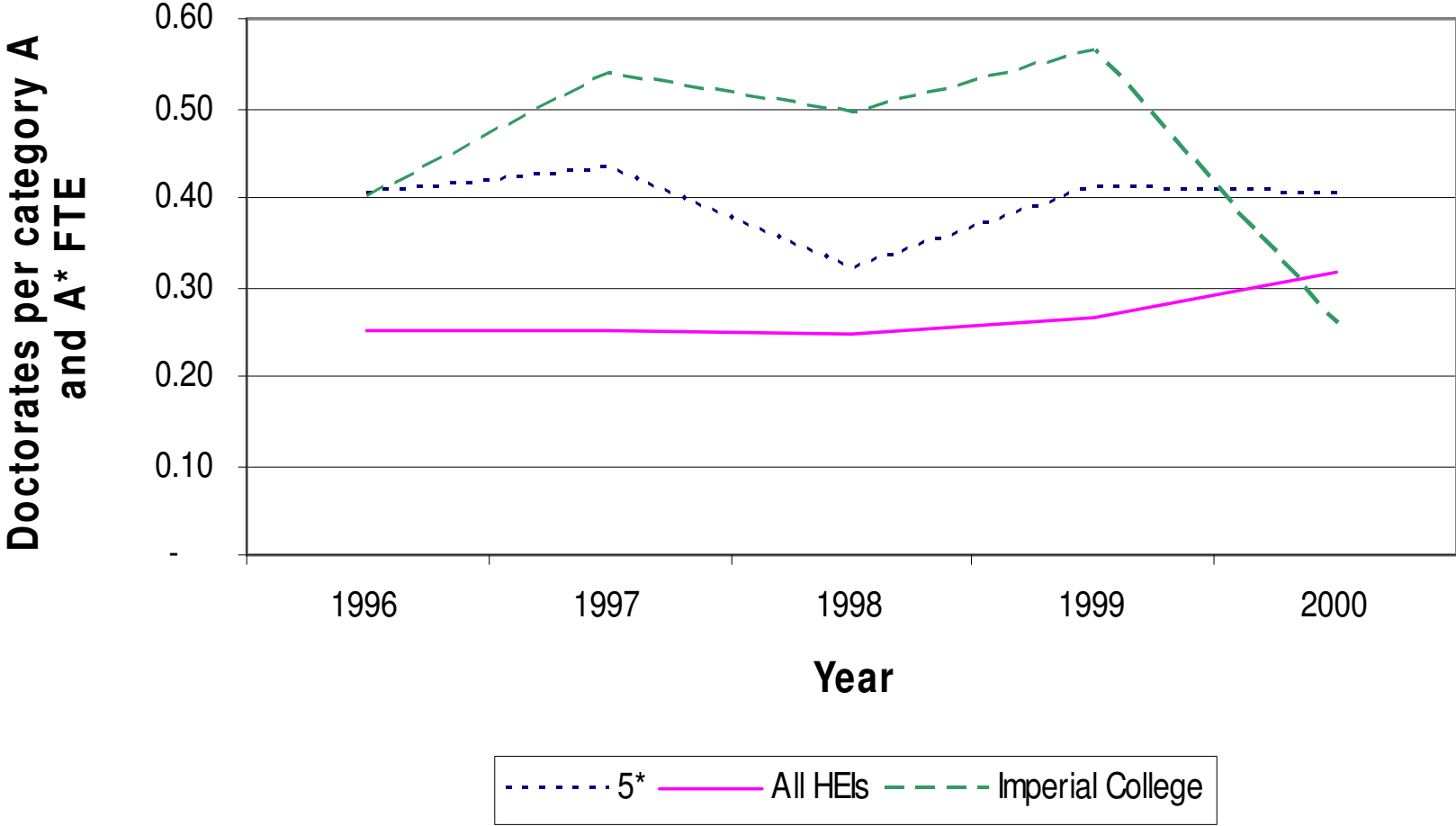


OST research income per category A and A\* FTE (£/FTE)

Total OST research income from 1995 to 2000 per research active category A and A\* FTE (UoA 25)

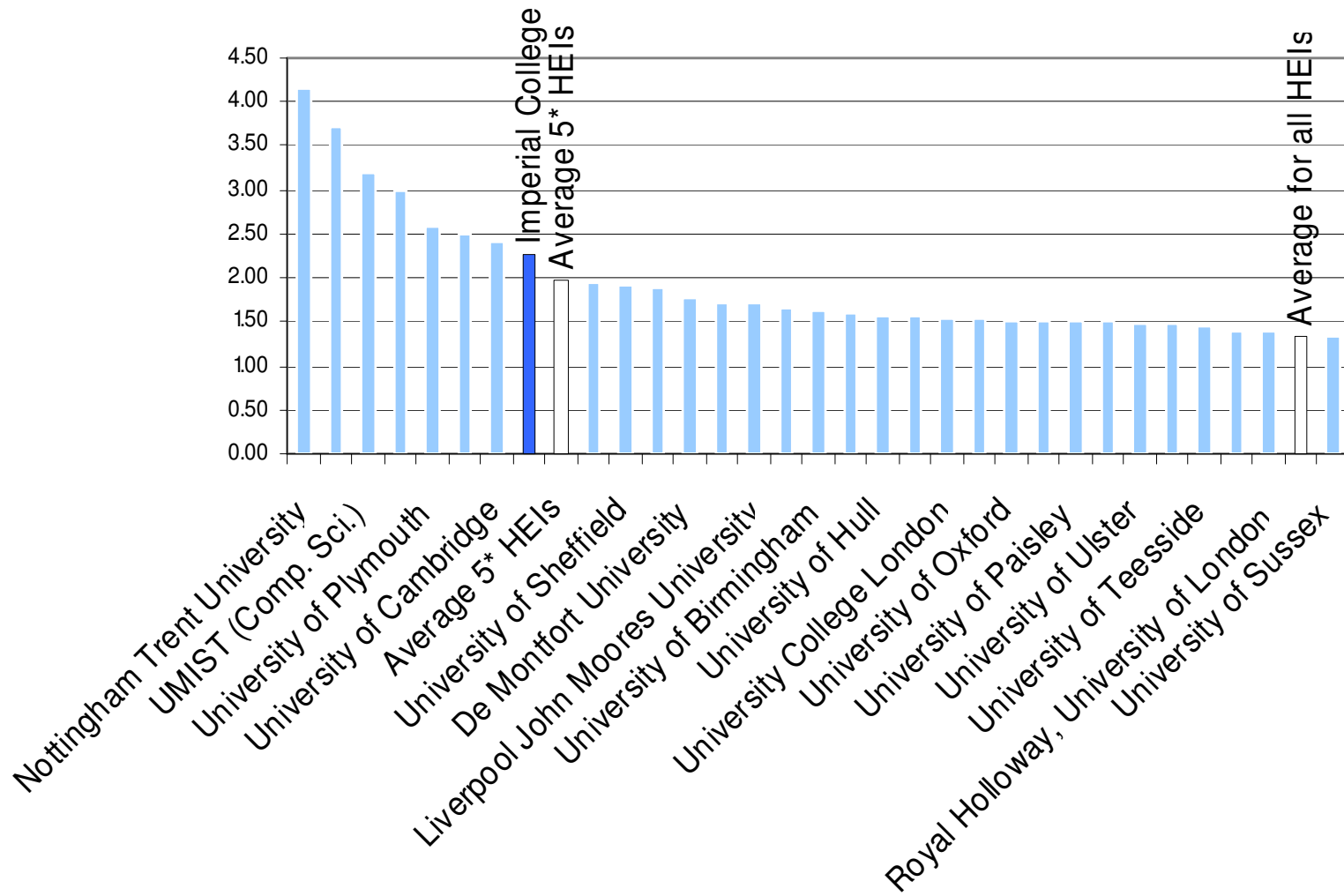


### Doctorates per category A and A\* research active staff FTE (UoA 25)



**Doctorates per category A and A\* FTE**

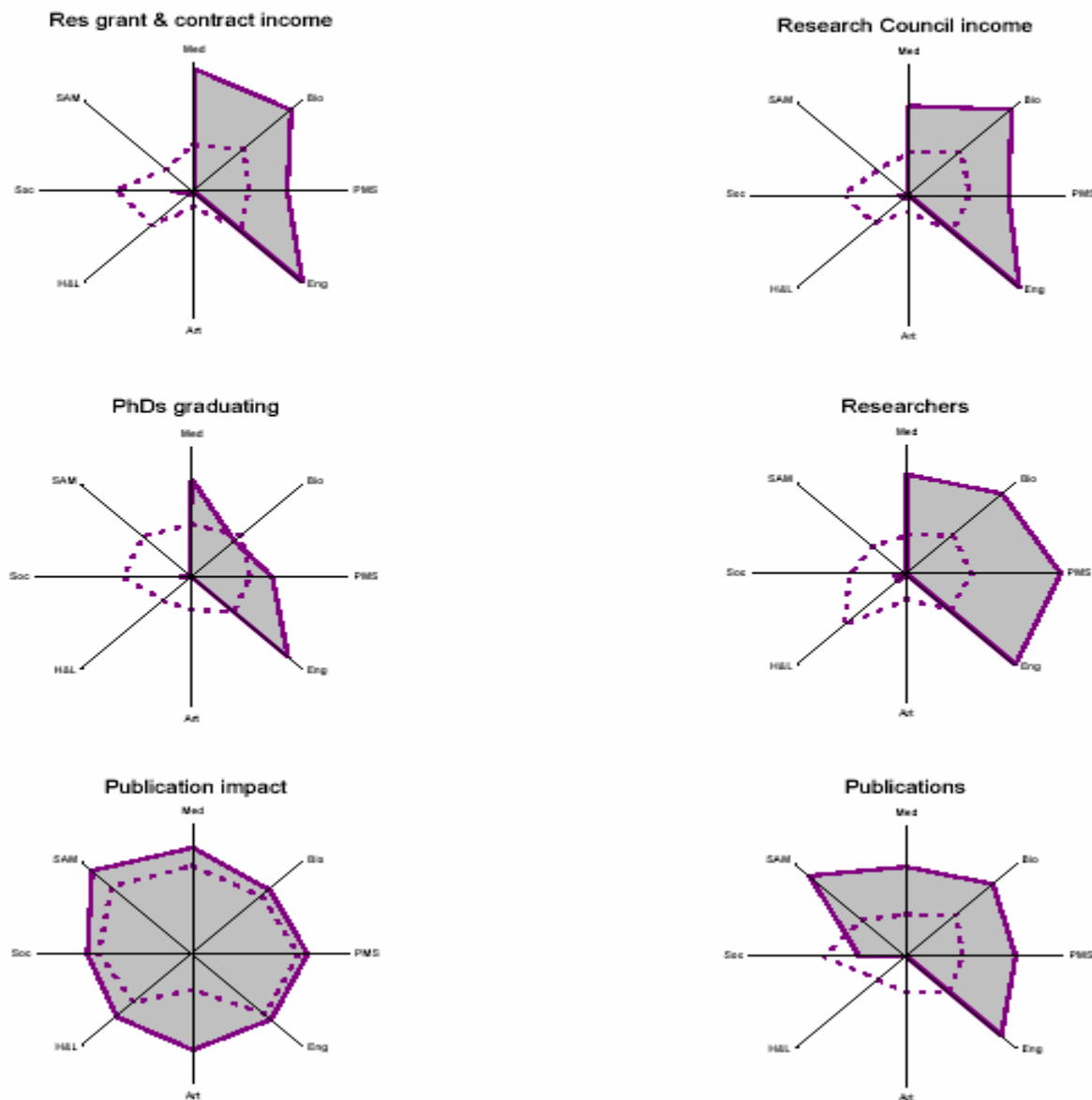
**Total doctorates from 1996 to 2000 per research active category A and A\* FTE (UoA 25)**



Imperial College London is in Evidence sector group 1 (Pre 1960 institutions) which contains 20 institutions. It is also a member of the Russell Group and is in the London region.

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### Evidence Research Footprints™





# Bibliometrics

- Citation impact analysis for each UoA compared with UK competitors, top US institutions, 5\*, 5 and 4 rated depts
- Use database of all college's publications over 10 year period (55K articles) with citations to each
- Can assess impact of individual publications in comparison with average for that journal in that year
- Can compare college's impact in particular field over time with any other UK university

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## **Citations**

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<b><i>UK Institution</i></b>	<b><i>2001</i></b>	<b><i>2002</i></b>	<b><i>2003</i></b>
IMPERIAL COLL LONDON	13531	14037	15155
UNIV CAMBRIDGE	20376	20916	20059
UNIV COLL LONDON	6230	6603	7302
UNIV OXFORD	16808	17693	18027
<b>US Institution</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
CALTECH	15736	15833	16210
HARVARD UNIV	18204	20756	20528
MIT	23418	27570	29391
ROCKEFELLER UNIV	1485	1735	1306
YALE UNIV	14088	16545	11711

## *UoA 18 Chemistry*

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### ***Citations per FTE***

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<b><i>UK Institution</i></b>	<b><i>2001</i></b>	<b><i>2002</i></b>	<b><i>2003</i></b>
IMPERIAL COLL LONDON	322.55	334.61	361.26
UNIV CAMBRIDGE	299.65	307.59	294.99
UNIV COLL LONDON	196.22	207.97	229.98
UNIV OXFORD	240.97	253.66	258.45
<b>UK RAE 2001 Rating</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
4	113.66	119.86	128.73
5	164.75	171.70	179.16
5*	241.78	254.02	262.93

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***Rebased Impact Chemistry UoA 18***

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<b>UK Institution</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
IMPERIAL COLL LONDON	1.46	1.44	1.49
UNIV CAMBRIDGE	1.58	1.56	1.41
UNIV COLL LONDON	1.31	1.27	1.32
UNIV OXFORD	1.51	1.51	1.47

<b>US Institution</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
CALTECH	3.15	3.13	3.09
HARVARD UNIV	3.03	3.28	2.96
MIT	2.43	2.69	2.70
ROCKEFELLER UNIV	3.77	4.25	3.04
YALE UNIV	3.61	4.02	2.70

<b>UK RAE 2001 Rating</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
4	1.09	1.09	1.11
5	1.24	1.22	1.20
5*	1.46	1.45	1.42

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***Rebased Impact UoA 25 Computing***

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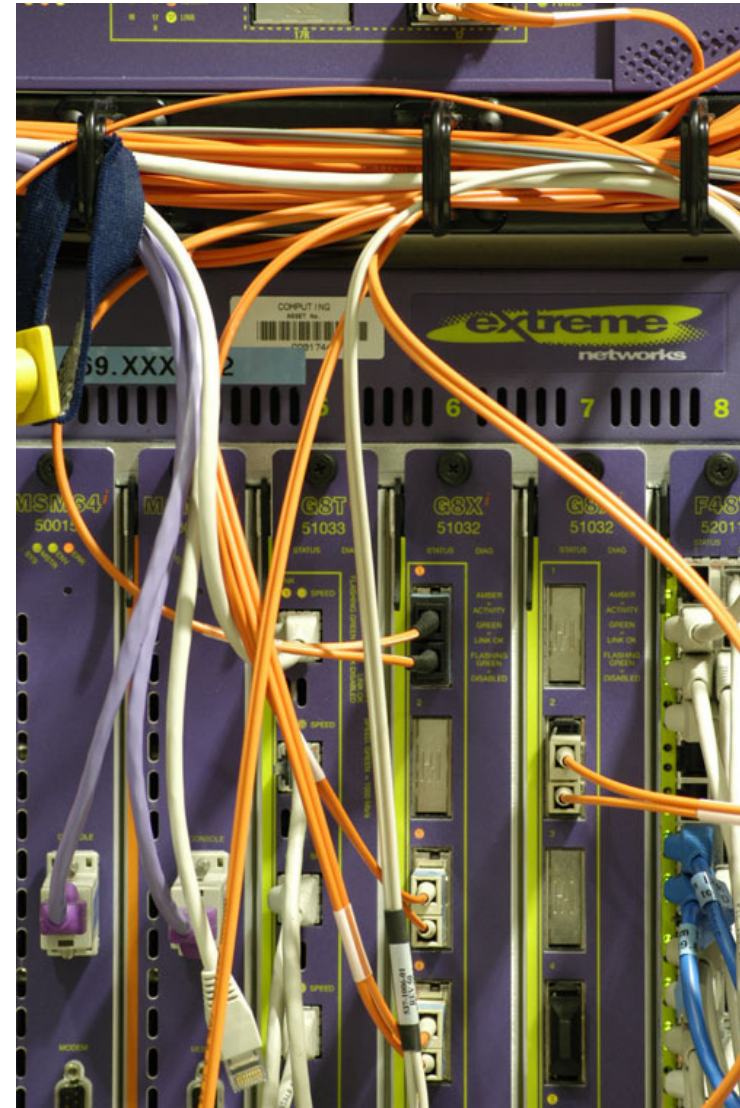
<b>UK Institution</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
IMPERIAL COLL LONDON	1.00	1.26	1.60	1.77	1.57
UNIV CAMBRIDGE	1.77	1.72	1.85	2.13	2.31
UNIV COLL LONDON	1.10	1.41	1.55	1.90	1.74
UNIV OXFORD	1.52	1.40	1.71	1.63	1.76
<b><i>US Institution</i></b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
CALTECH	2.62	2.71	2.39	2.21	2.35
MICHIGAN STATE UNIV	2.36	2.22	1.67	2.00	2.37
PRINCETON UNIV	2.53	2.28	2.97	2.91	2.19
UNIV CALIF BERKELEY	2.20	1.92	1.93	1.93	2.25
YALE UNIV	2.65	3.22	3.00	2.94	3.04
<b>UK RAE 2001 Rating</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
4	0.97	0.95	0.98	0.97	0.95
5	1.10	1.13	1.16	1.23	1.26
5*	1.29	1.18	1.25	1.35	1.51

# RAE Optimisation

- Have flexibility to submit staff to any unit of assessment
- Assess performance of different combinations of staff and estimate likely outcome in RAE score
- Can decide to omit less research active staff
- Have to balance estimate of score and league table position (=reputation) with Funding Council grant for 6 years

# Research strategy

- Required for each faculty and each UoA
- Informs recruitment of academic staff
- Encourage formation of coherent teams rather lone workers
- Resource allocation incentivises income generation, student recruitment and inter-departmental collaboration
- Restructuring of under-performing units is undertaken using appropriate benchmarks to identify activity at risk of not being of Imperial standard





# Research development fund

- Provides capital funds for promising developments
- Encourages and provides seed-funds for large new interdisciplinary groupings eg bio-medical engineering institute, mathematical sciences research institute, bio-informatics centre
- Provides resources to lever sponsors' funds



## Strategic objective for Imperial College

- To maintain our status as an international level player
- Fundamental requirements for management:
  - enough funding with sufficient flexibility to support new ventures as scientific opportunities arise
  - the means to discriminate between different quality of work with only the highest quality being supported
  - ability to construct and lead teams of academics

Thank you