



# Green Gown Awards



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## Green Labs – Why, What, How and Next

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[www.greengownawards.org.uk](http://www.greengownawards.org.uk)

# Green Labs – What, Why, How, and Next?



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EAUC Webinar



**KING'S**  
*College*  
**LONDON**

# Quick background

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- Worked as technician in US, and researcher in NL
- Worked as UK's first in situ laboratory sustainability post (UoEdinburgh).
- Won Sustainability Professional Green Gown (2015)
- 2 years at KCL initiating Green Lab programme
- 1 year funding from S-Lab for assistance to London region HE
- Next year will be split between KCL (Research Efficiency Manager) and UCL under my company (Green Lab Associates)



# Quiz Intro

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1) Lab plastic are estimates to contribute ...?..... to the total global plastic waste.

a. 0.001%

b. 0.6%

c. 1.8%

d. 5.3%

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2) X % of health care waste is hazardous according to WHO (a typical lab throws out 70-90%)

a. 5%

b. 15%

c. 35%

d. 55%

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3) A typical new ULT freezer will consume as much electricity in a year as:

(KCL has 300+)

a. An average UK household

b. An average US household

c. An average UK person

d. An average US person

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4) Kings College London spent £ X on electricity last year  
(~28,000 students + staff)

A) £5,000,000

B) £9,500,000

C) £11,500,000

D) £15,000,000

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5) In what year did UK Research Council spending peak (and has yet to return)?

A) 2007

B) 2008

C) 2009

D) 2010

E) 2015



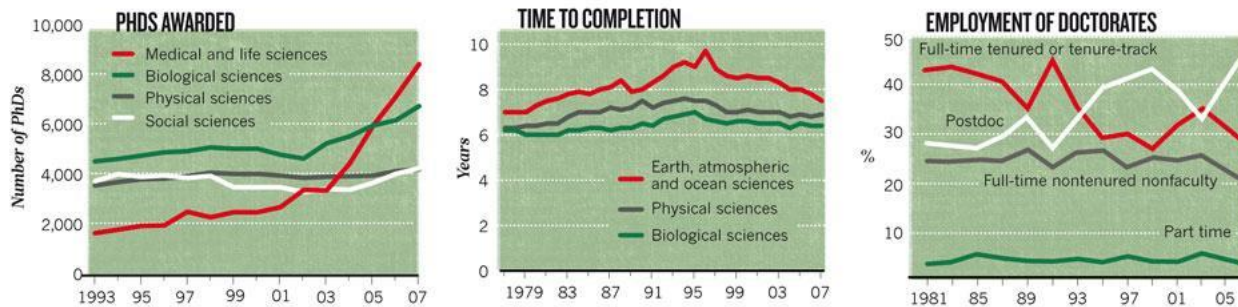
# Current Challenges to Research

## What happens when if we do a PhD?

- “The academic job market has become more and more competitive... nowadays, less than 17% of new PhDs in science, engineering and health-related fields find tenure-track positions within 3 years after graduation.”  
-R. Larson *et. al.*

### United States: What shall we do about all the PhDs?

The annual number of science and engineering doctorates graduating from US universities rose to almost 41,000 in 2007 (left), with the biggest growth in medical and life sciences. It took a median of 7.2 years to complete a science or engineering PhD (middle) — yet the proportion finding full time academic jobs within 1–3 years of graduating is dwindling (right).



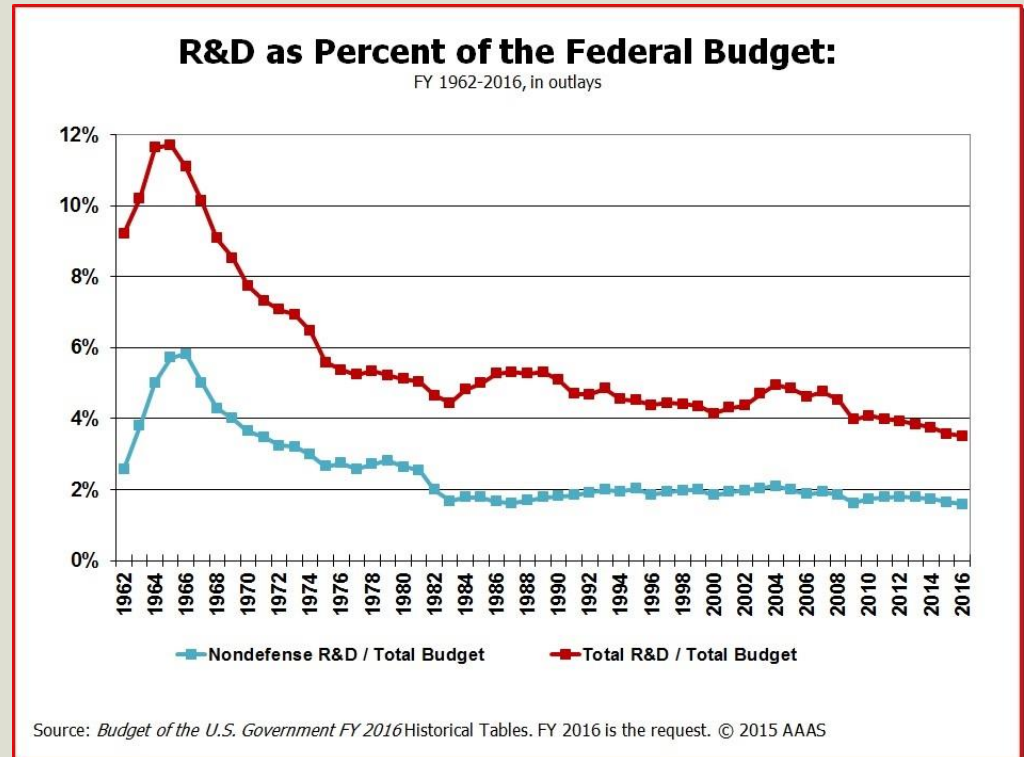
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## UK Science PhDs

- In the UK – ~50% of PhD graduates choose to work outside academia since 2010
- PhD will only earn on average 3% more than a masters (and was even lower in pharmacology!)
- Rising rates of science enrolment across the UK HE

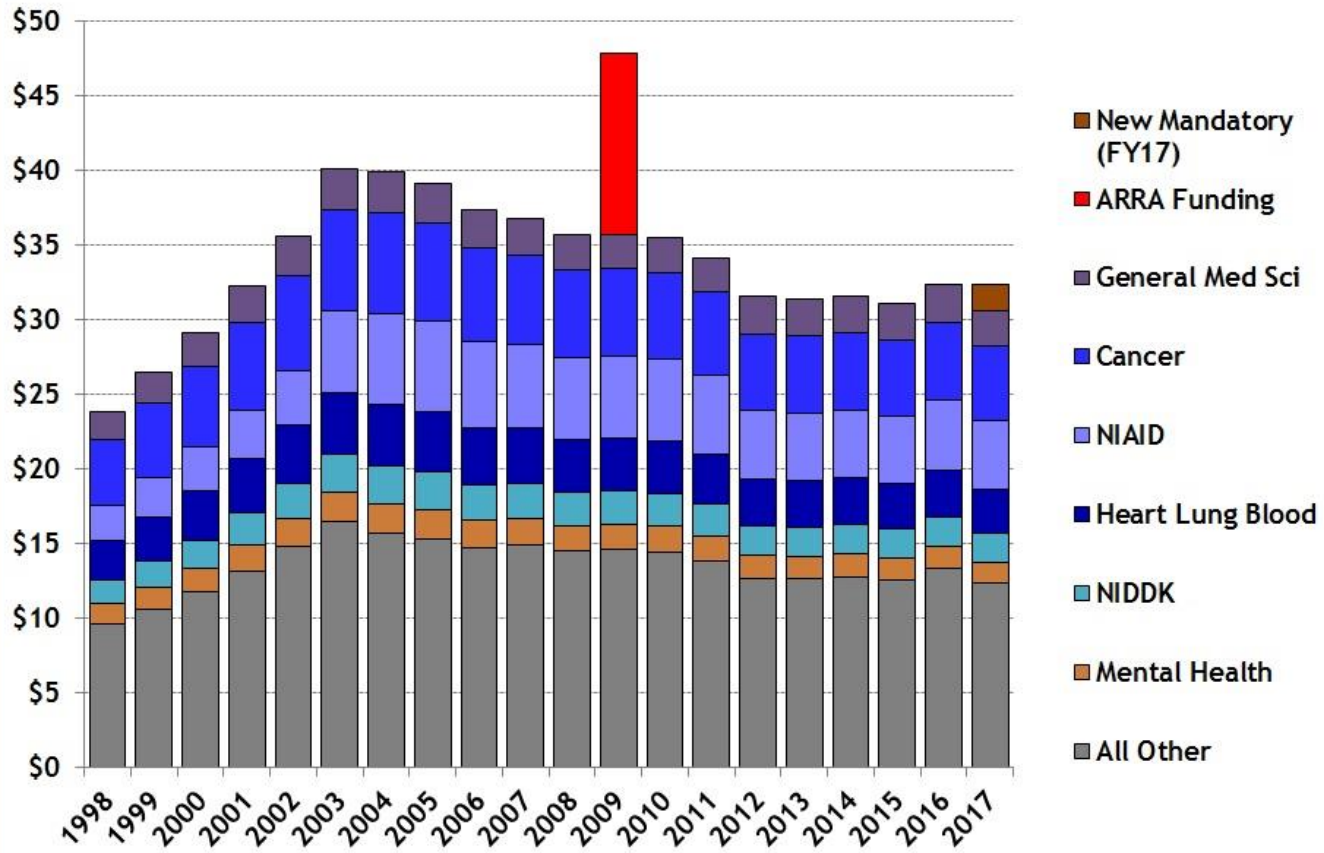
# Current Challenges to Research

- UK rises in funding have been essentially frozen\*\*\*
- Similar in the US



## National Institutes of Health Budget, 1998-2017

budget authority in billions of constant FY 2016 dollars



Source: AAAS data, agency budget documents, and appropriations. Adjusted for biomedical R&D inflation rate (BRDPI). Excludes supplemental FY 2017 Zika proposal and FY 2015 Ebola funding. © 2016 AAAS

# Current Challenges to Research

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## Crisis of reproducibility

- 2016 poll of 1,500 scientists – 70% failed to reproduce another scientist's experiments (50% failed to reproduce their own)
- 2009 anonymous poll – 14% admit to knowing someone who personally falsified results, but only 2% admit to doing it!
- Much more on this (look up Jason Ioannidis for more, particularly on medicine)
- Not the focus of today, but highlights the changing environment, and the issues particularly with current methods/standards

# Current Challenges to Research

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- Plenty to research today –  
Cancer will soon overtake  
cardiovascular disease as #1 killer
- Not less science! (over 20,000  
research institutions exist)
- We can start with looking at  
methods and efficiency and  
sustainability



# Why Research Laboratories?

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- Research spaces consume 3-10 times more energy per square meter than academic spaces
- Typical research institution will have 60-65% of its electricity consumed by research spaces. Construction costs can exceed £2000+/m<sup>2</sup>
- Often unaddressed due to specified nature of research – though some processes are common enough



# How do we improve?

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Policy



People



Projects

Combination of which is determined by each local institution





# How do we achieve this? - Policies

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Several new policies introduced which we're currently integrating with capital projects/maintenance. Crucial due to staff turnover in HE. Need to ensure the policies are consulted!

- Cold Storage
- Ventilation
- Lab design/refurbishment
  
- Procurement? More later, but varied approaches

# How do we achieve this? – Projects



- Waterless condenser purchase
- Fume Cupboard improvements
- Cold storage consolidation – building a freezer room
- Drying cabinet replacement
- Equipment sharing systems
- Timers ...And more (helium, plastics, etc)



# Procurement

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## Education vs. Direction

- Education – studies, information, offers, sharing.
- Purchasing Consortium take 1<sup>st</sup> steps ..  
But more is to be done!
- Direction – Joint KCL/UCL/Bristol venture to purchase efficient cold storage equipment (reduces admin and costs)



# People – KCL Laboratory Awards

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- Need people to be engaged! Crucial compliment to projects and policy success
- Our awards differ in 3 key ways
  1. Reporting
  2. Less evidence (carries over)
  3. Peer audits
- Shares good practices, raises awareness, highlights projects, and formalizes laboratory improvements.
- Newly edited framework (thx Anna Lewis of Bristol + Tytus Murphy KCL)



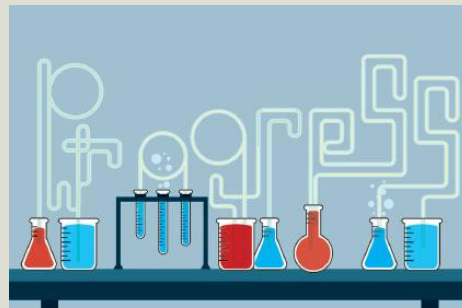
# KCL Awards Ceremony 2016



# What can you do?

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- Payback on these all are fantastic – even if costs you're reducing are hidden!
- Decide what is required, and what is feasible for your institution. Learn as much as possible, from multiple sources (still the wild west of data). Question standards!
- Can you bring someone in? Are they familiar with labs? Larger institutions validate full-time posts, smaller may need to assess what's appropriate



# Funding?

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- Internal - Do you have it?
- Salix
  - 5 year payback
  - Energy only
  - Some admin, though helpful
  - Open to new projects
  - Can include management fees



# Incentives for long-term?

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- Incentives include financial, moral, overall success (ranking etc.)
- As scientists typically don't see overhead costs, and may be under equal pressure to spend as to save, local incentives will vary greatly with individuals and settings
- As student experience grows in value (HEFCE funding reduced to allow direct tuition), this will become a tool for further integration of sustainability into science





# Financial Incentive

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- Much of research is funded by RCUK
- Heavier emphasis on teaching quality coming
- Institutions will receive tuition directly, though overheads of research seem likely to remain hidden
- How do we reward efficiency? Need to be able to assess it
- Currently no means of comparison between laboratories, though we're working on it!



# Student/Worker Incentive – Our challenge!

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- LEAN (laboratory efficiency action network) met to discuss
- While much has been done to save energy and grow profile, we are lacking at integrating this with teaching and ensuring tomorrow's scientists are aware
- We've discussed training and teaching, and are just getting on our way
- Ideas? Want to get involved? Get in touch! We need your help



**Challenge Accepted**

# Contact + Thanks

Martin Farley

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Thank you! To so many. KCL, Edinburgh, UCL, S-Lab, Allen Doyle, Leiden, HEFCE, everyone at LEAN, and everyone in between. And EAUC/Green Gown for the opportunity!

