

# PREDICTING SPACE NEEDS FOR STEMM RESEARCH - CURTIN CASE STUDY

Introduced by:

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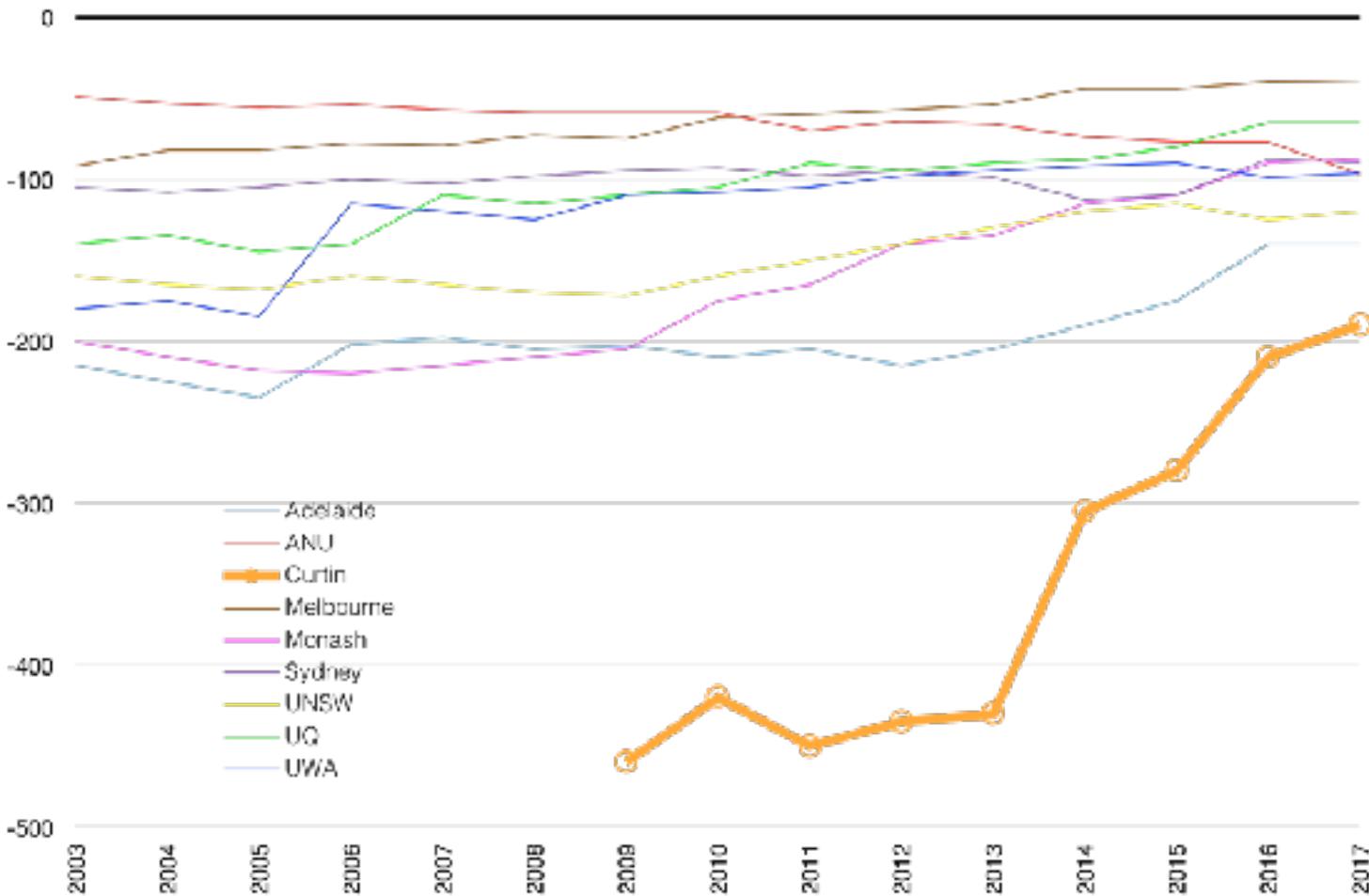
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# SECTION

## 1: RESEARCH at CURTIN

Comparative Performance in ARWU - Go8 plus Curtin



SOURCE: ADAPTED FROM ARWU.

Curtin's growth has been **rapid**, but its progress up the ARWU ranking has been **meteoric**.



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ALOG



# SECTION

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## 2: OUTLINE

### PROBLEM

FORECASTING GROWTH  
IN RESEARCH  
SPACE DEMAND for  
STEMM DISCIPLINES

### POSSIBLE SOLUTION

PREDICT FUTURE SPACE  
DEMAND BASED ON  
CORRELATION with  
PROJECTED HDR EFTSL

### IN PRACTICE

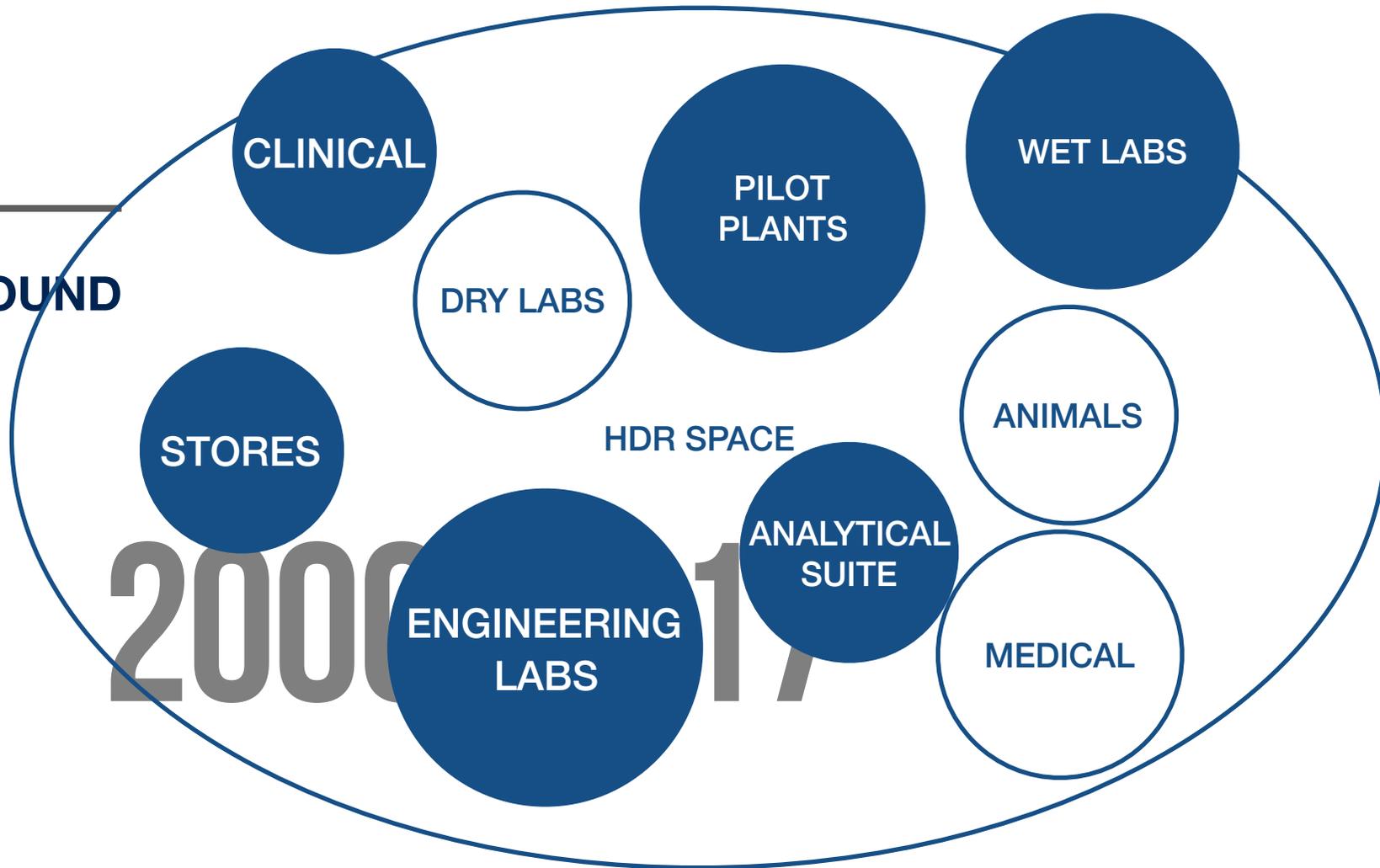
1996-2001 UTS  
UNSW/UNSW Asia 2004-08  
La Trobe 2008-11  
RMIT 2012  
UTas 2014-17  
Curtin 2016-17

### ISSUES

1. METHOD APPEARS TO BE AN EFFECTIVE PREDICTOR FOR A SINGLE UNIVERSITY.
2. DIFFICULT TO IDENTIFY AN ABSOLUTE MEASURE OF SPACE EFFICIENCY.
3. LACK OF EASY COMPARISON FROM UNIVERSITY TO UNIVERSITY.

# SECTION

## 3: BACKGROUND



### **Curtin doubled its research output**

from the year 2000 to 2015, and in 2017 is now ranked just behind the Go8 by the Academic Ranking of World Universities (ARWU).

*NB: ARWU is a university league table focused on research.*



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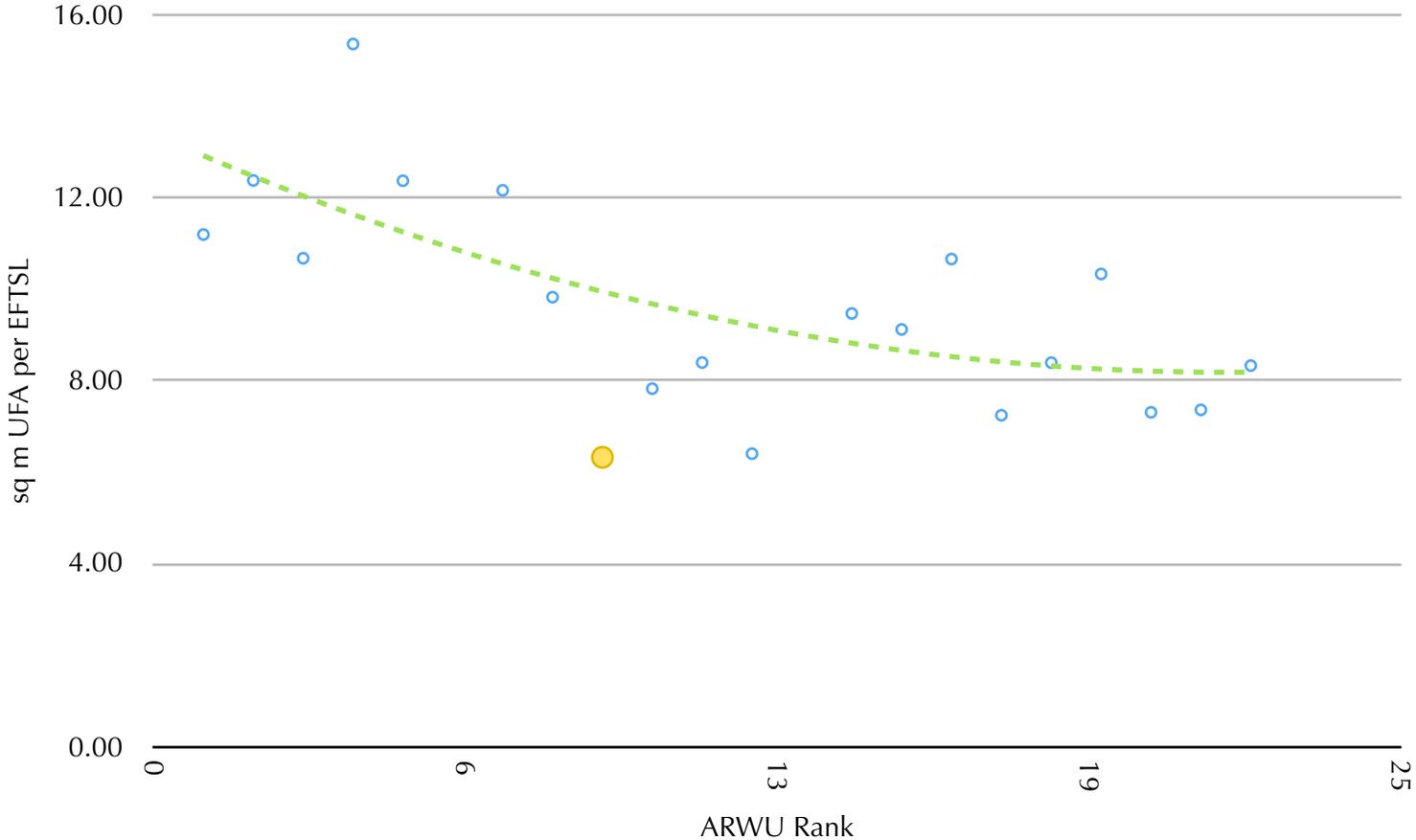
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# SECTION

## 4: ARWU TOP 14 BENCHMARKING

- UFA/EFTSL - Other Universities
- Trendline
- UFA/EFTSL - Curtin University

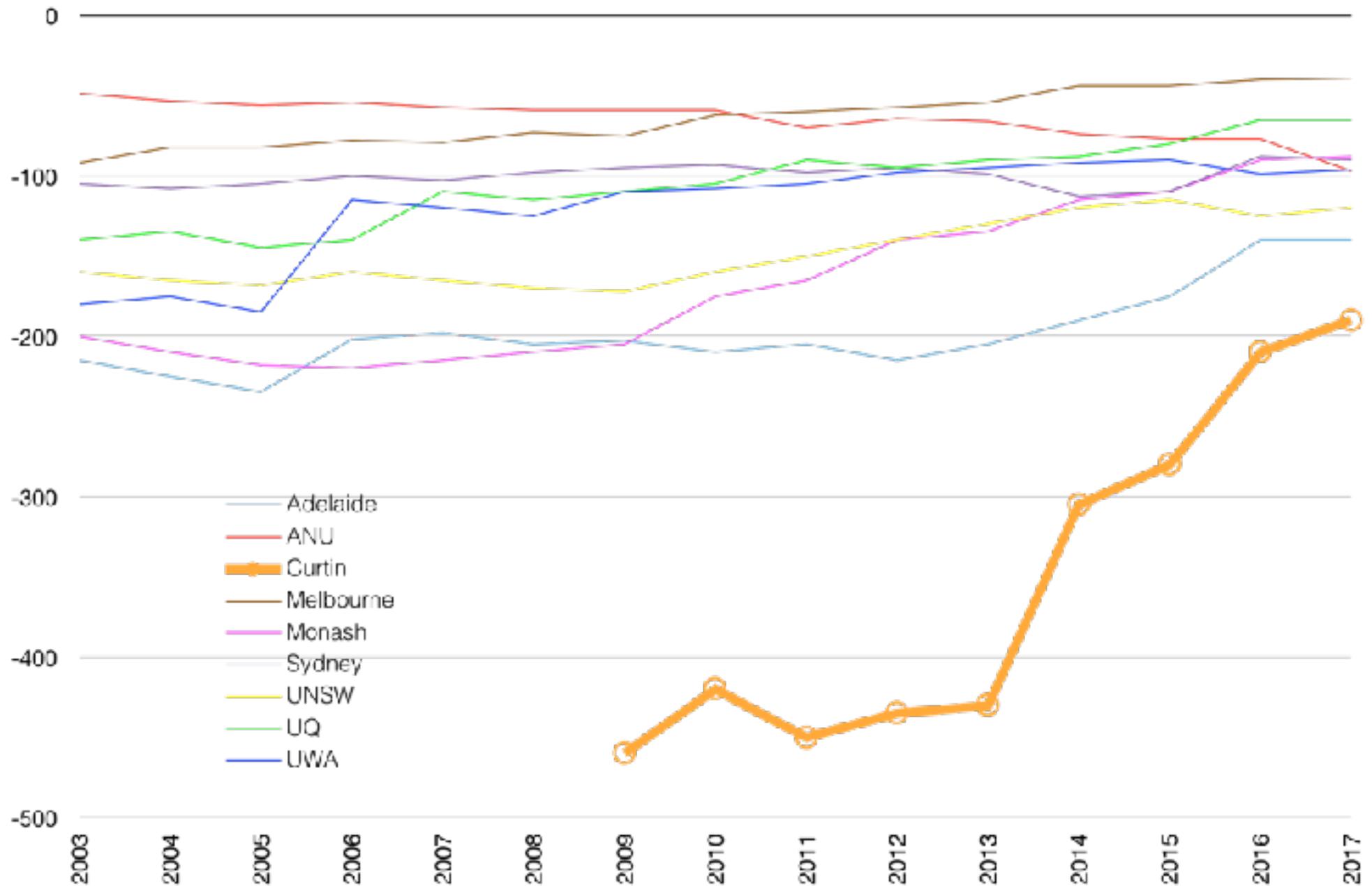
Figure 3a - Scattergraph Relationship: Space Use per EFTSL and ARWU rank of Universities 2017.



SOURCE: (ARWU: 2017, HERDC: 2015, TEFMA: 2015)



## Comparative Performance in ARWU - Go8 plus Curtin



SOURCE: ADAPTED FROM ARWU.



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The cost of facilities generally  
particularly facilities for **research**

**PLAY A SIGNIFICANT ROLE**

in the overall cost base of the university.



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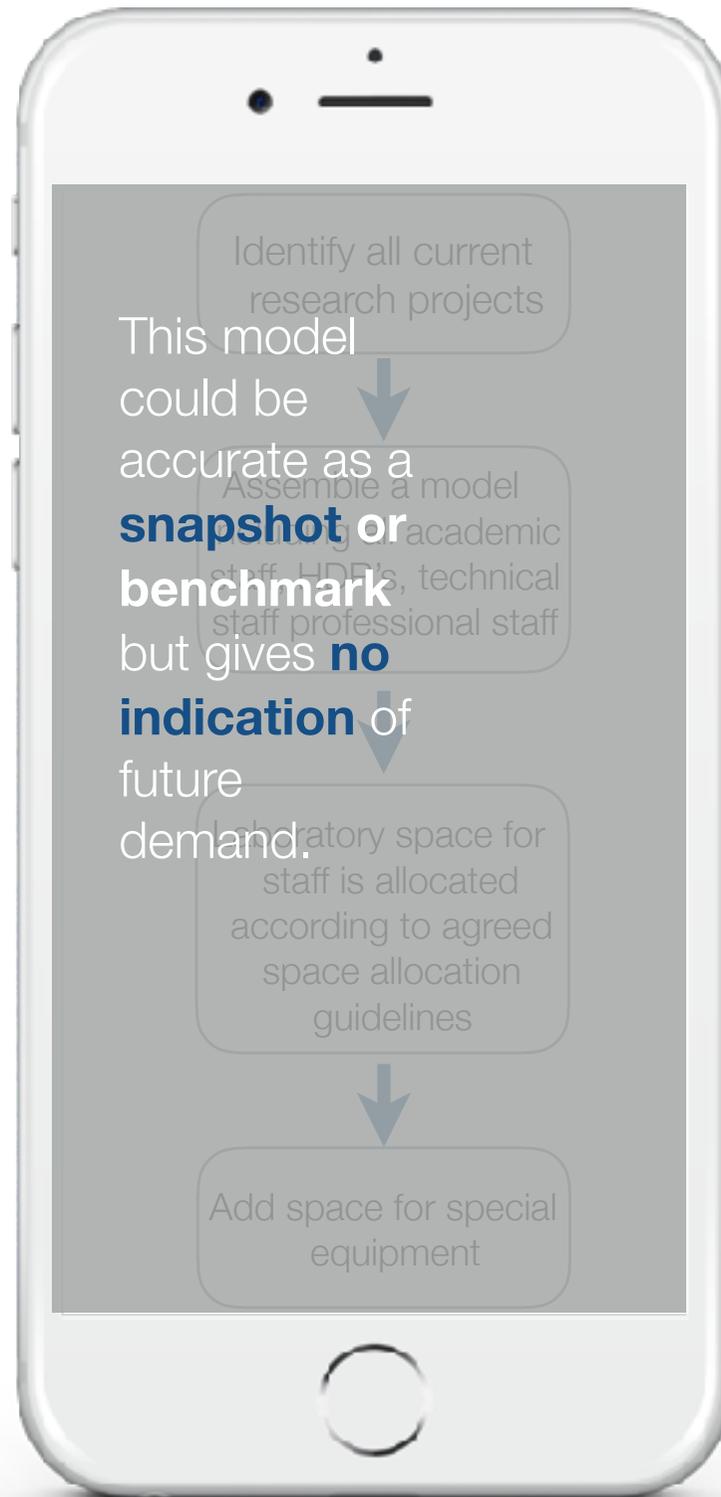
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**Curtin** got to **No. 9** in the ARWU in Australia with the **least space** (per EFTSL or FTE) of any ARWU ranked university in Australia, and well **below** the amount the smoothed curve of space allocation would predict.



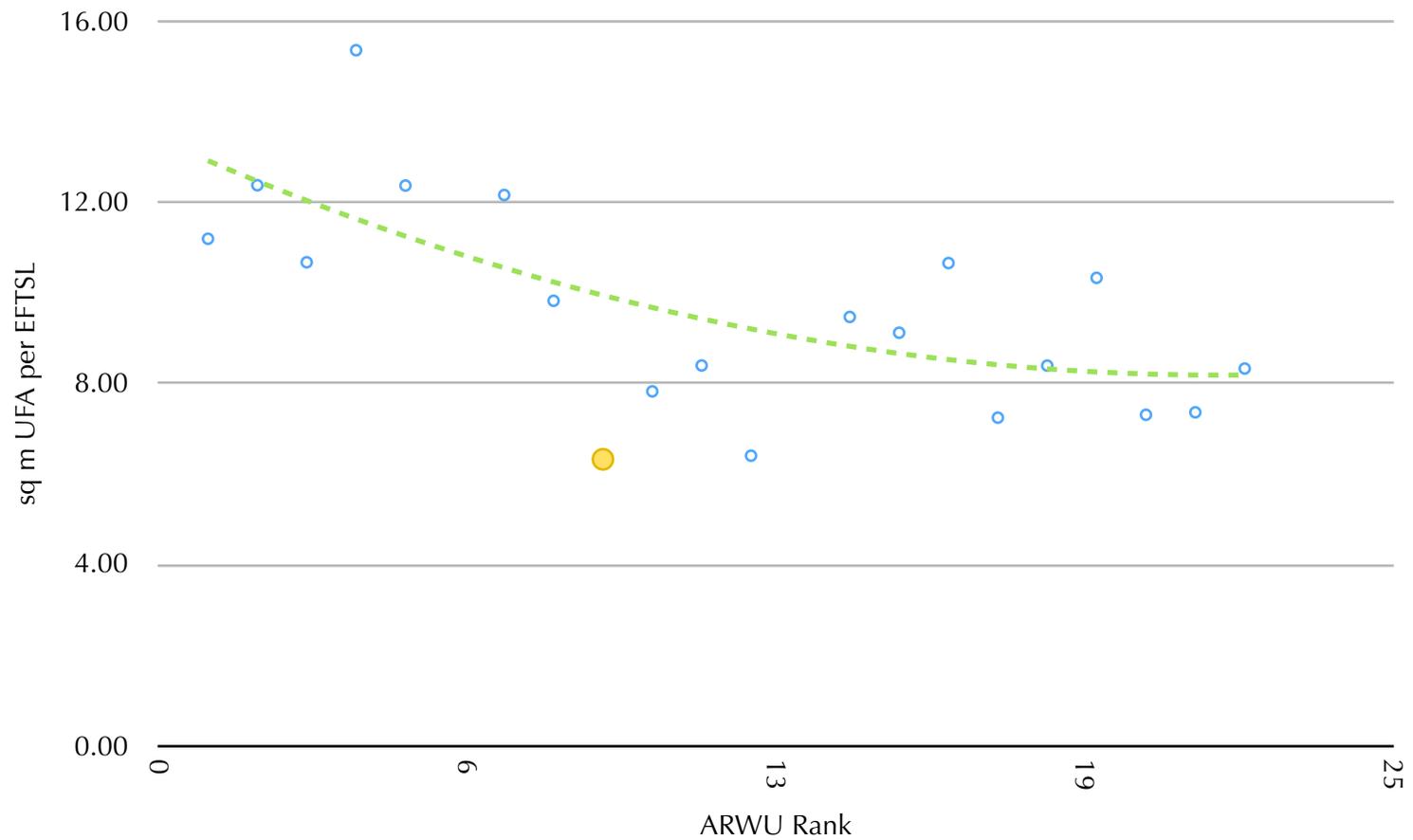
# SECTION

## 5: BUILDING A SPACE MODEL FOR RESEARCH



- UFA/EFTSL - Other Universities
- Trendline
- UFA/EFTSL - Curtin University

Figure 3a - Scattergraph Relationship: Space Use per EFTSL and ARWU rank of Universities 2017.



SOURCE: (ARWU: 2017, HERDC: 2015, TEFMA: 2015)

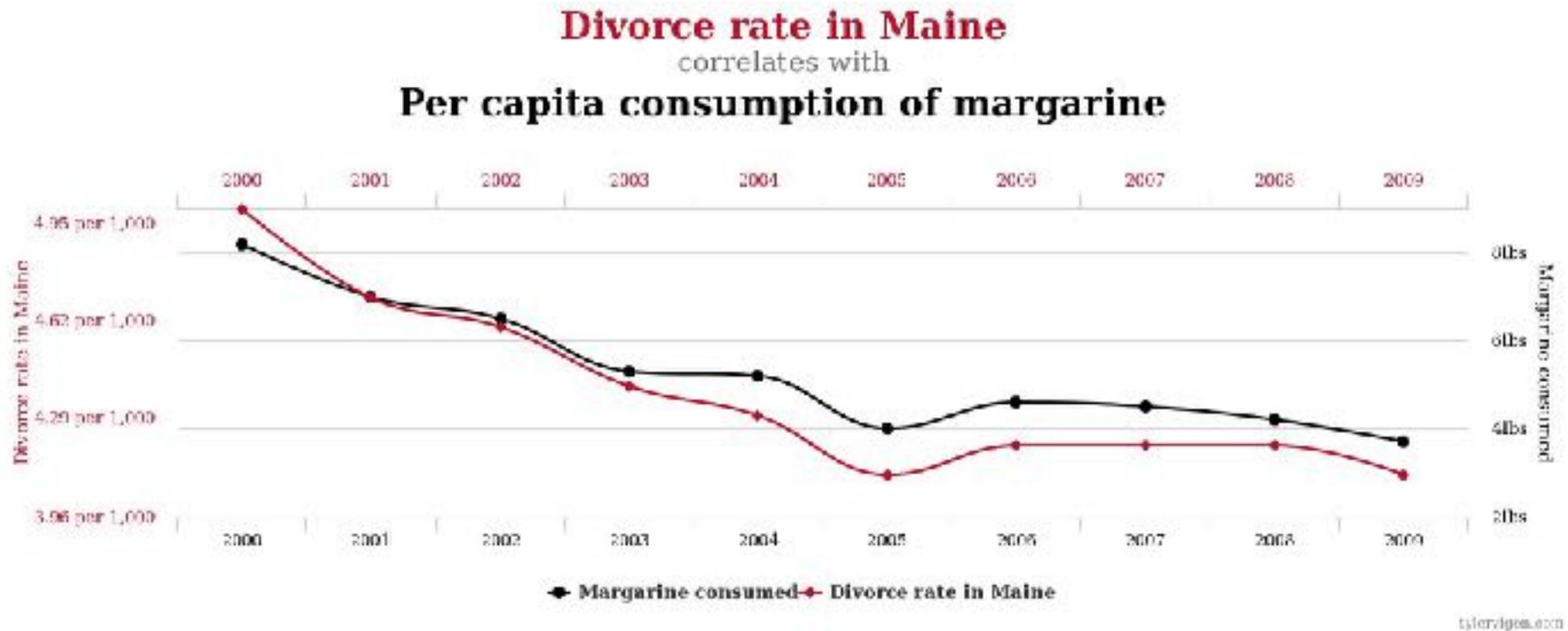


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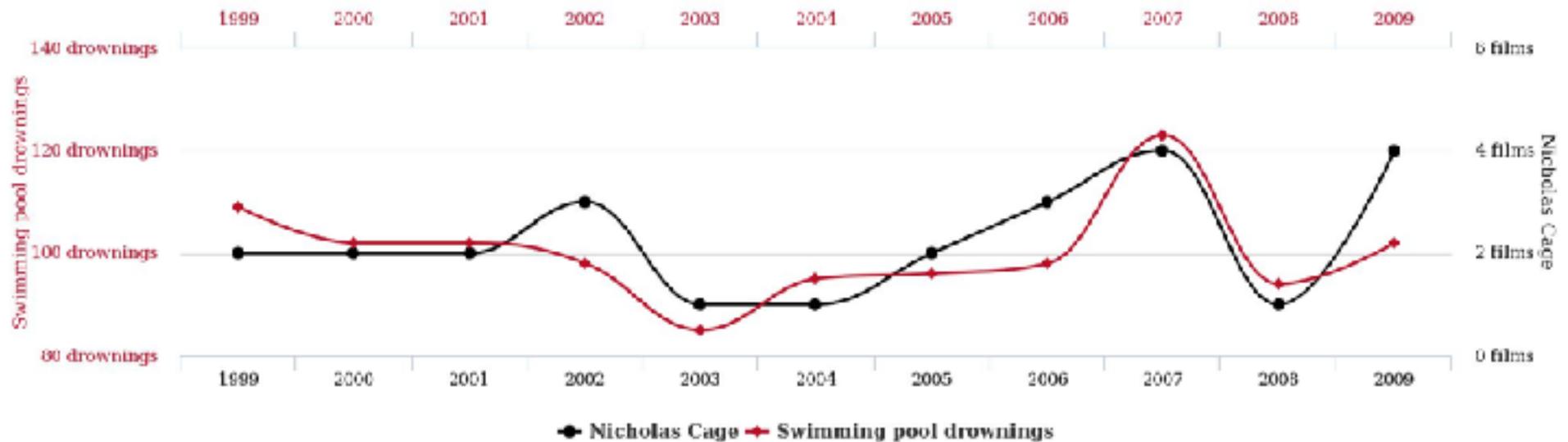
## 5: The DANGERS of USING CORRELATIONS (THANKS TO 'SPURIOUS CORRELATIONS')



# SECTION

## 5: The DANGERS of USING CORRELATIONS

**Number of people who drowned by falling into a pool**  
correlates with  
**Films Nicolas Cage appeared in**



tylervigan.com

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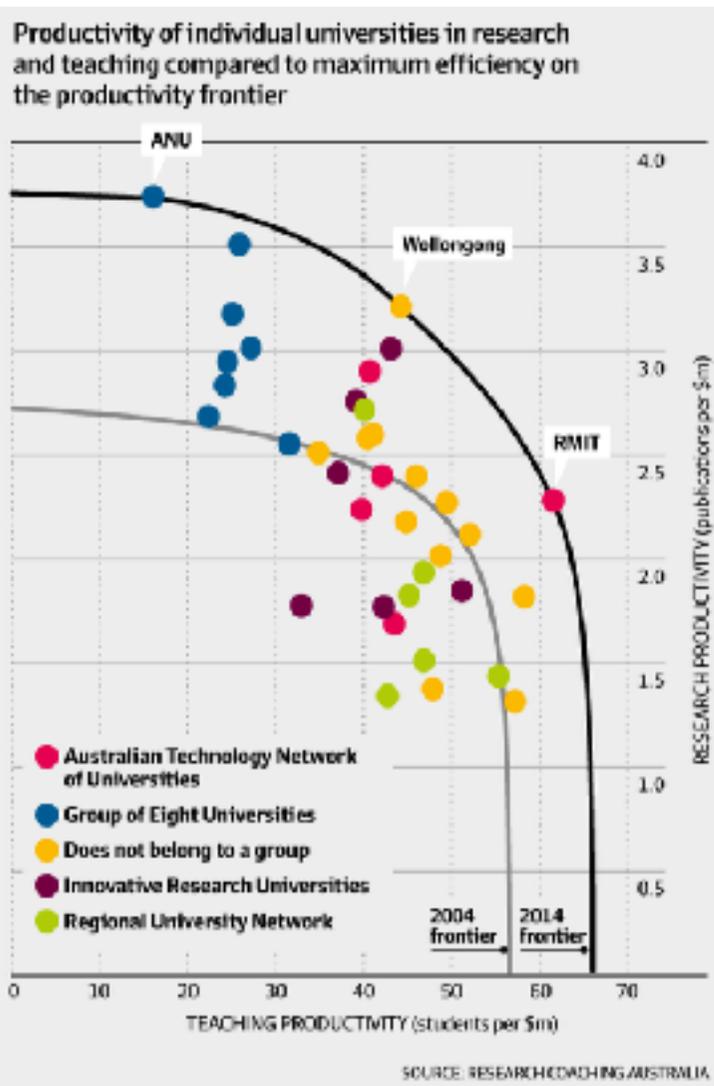


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Method	Advantages	Disadvantages	
1 The amount of space for research correlates with the amount of <b>research income obtained by the university.</b>	Simple idea that everyone can understand. Easy to determine what has happened to research income and provide a regression predicting future income.	There appears to be no reliable correlation between research income and space used; similar universities doing similar research have vastly different amounts of research space.	
2 The amount of space for research correlates with the <b>number of people working in research.</b>	Simple idea that everyone can understand. Easy to determine total number of research only academic staff, HDR's, and technical staff engaged in research; not so easy with staff appointed to teaching and research positions.	Hard to establish how much effort teaching and research appointments are putting into research and how to assess their contribution.  Small changes in the percentage of academic and teaching staff engaged in research can substantially alter predictions, which is an issue for non-Go8 universities growing their research.	
3 The amount of space for research correlates with <b>the total number of EFTSL.</b>	In Australia, the current funding model means that for East Coast universities in the Go8, the aggregate income of the university is closely aligned with EFTSL.	If nothing more sophisticated is available, this is a start.	✓
4 The amount of space for research correlates with the <b>aggregate income of the university.</b>	In Australia, the current funding model means that for East Coast universities in the Go8, the aggregate income of the university is closely aligned with EFTSL.	If nothing more sophisticated is available, this is a reasonable correlation, but there appears to be no close correlation between total income and space used.	✓ ✓
5 The amount of space for research correlates with the <b>HDR EFTSL.</b>	It can be shown to offer good correlation in practice, and it is a quite simple figure to obtain. Regressions of HDR EFTSL can be used to project future growth with reasonable certainty. HDR EFTSL is the only quantity that is directly related to all of research (including unfunded research) that can be established with accuracy.	It is not necessarily immediately apparent to people why the number of HDR's might be a better predictor of space use than research funding or staff counts.	✓ ✓ ✓

# SECTION

## 6: USING HDR NUMBERS as A PREDICTOR of RESEARCH SPACE



### Issues with using HDR EFTSL

Universities are not all as efficient as each other, in fact, some are almost half as efficient as others.

Space use also varies substantially, by over a factor of two.

Predicting absolute space needs for research by using HDR EFTSL alone is fraught with error, but comparing universities with similar characteristics appears to be valid.

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Universities with physical campuses are exploiting an advantage that only physical campuses have; the capacity to generate an opportunity for bright and knowledgeable people to interact IRL, In Real Life. This is sometimes referred to as the ‘sticky campus’.

**It is not possible to have a sticky campus without providing people on campus somewhere to stick.**



**ARINA believe it may be beneficial to concentrate on managing the allocation of research and teaching space. These facilities are significantly more expensive to deliver and operate than workspaces, including HDR workspace.**

# ESTABLISHING A BASE LINE

Curtin's HDR numbers have **doubled** from **2000 to 2015**.  
In approximate terms, space required to support research appears to have doubled.

( Due to the lack of continuous space records over 15 years, this is difficult to establish with absolute certainty, but we have established reasonable certainty. )

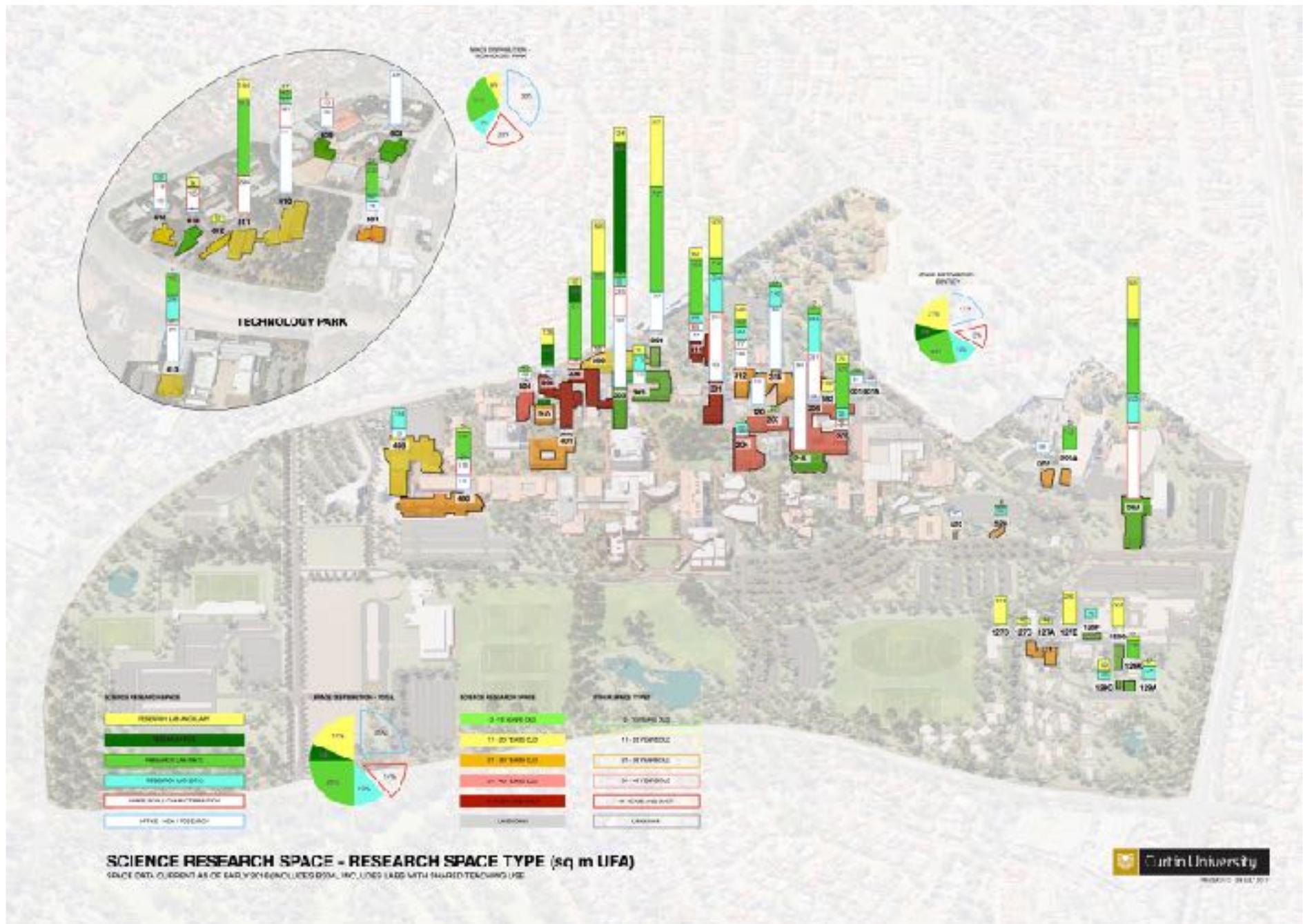
ARINA were asked to forecast how much space would be required for research in **2030**.

The first step in this process is to accurately identify **how much space was being used for research in 2016**.



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# METHODOLOGY OUTLINE

1. Identify the amount of space used for research, including ancillary space.
2. Divide this by the number of HDR EFTSL on the physical campus.
3. Look at this figure and field audit selected spaces to establish veracity.
4. Produce a snapshot space model if required to benchmark.
5. Identify targets to improve space efficiency over time.
6. Project demand for space against the supply of space using projections of HDR numbers, based on regressions and reasonable estimates of future numbers, **not to be confused with targets.**

# THANK YOU



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