

# Collaboration Profiling in UK Higher Education

Tim S Evans<sup>1</sup>, Karen A Gurney<sup>2</sup>, Daniel W Hook<sup>1,3</sup>

1. Department of Physics, Imperial College London, SW7 2AZ, UK

2. Evidence, a Division of ThomsonReuters, 103 Clarendon Road, Leeds, LS2 9DF, UK

3. Symplectic Limited, 412 Coldharbour Lane, London, SW9 8LF, UK

Each year tens of different league and ranking tables of research institutions are published. These rankings, often repeated by subject category, rely on research output in a variety of forms: either grant income; publication production for a period of time etc. However, we believe that while this approach gives a high-level appreciation of productivity, it gives a considerably weaker depth of understanding of the research ethos within the university - the research environment.

Here, we show some preliminary results in a new framework that we are developing to analyse research in a wider context. Rather than limit our view of publications outputs to "number of outputs" or "times cited" we have attempted to quantify "connectedness". This approach raises many questions: Do researchers prefer to work with colleagues who are physically close to them? Do stronger research institutions collaborate with each other in preference? Are the most successful institutions (by standard measures) also the most collaborative institutions?



Each blue strand shows that more than 5 papers have been coauthored between the institutions that are linked.

Each coloured dot is a university - the colour denotes the community in which their collaborative behaviour places them (i.e. all the red dots are grouped together as they work together more closely than they do with other institutions).

The size of each dot shows how strong the institution is within its group.

Interestingly, if we do choose to "rank" on collaboration; we note that the institutions with the highest levels of "collaboration" (i.e. highest percentage of their papers shared with other institutions) are not always those who hold the top spots in traditional rankings.

## Top 5 Universities by percentage of paper co-authorship with other UK HEIs

Royal Holloway, University of London	66.55%
Brunel University	61.04%
Queen Mary, University of London	49.64%
University of Warwick	48.36%
University of Liverpool	46.99%

Network analysis, which has recently become a hot topic in Physics research, was used to determine the community structures shown on map on the left and in the collaboration diagram above. Thomson Reuters Web of Science™ data, disambiguated by Evidence for the 2006 was used for this study. Only UK institutions were included in the analysis.

There are 6 main groups of institutions that we have identified using these network techniques: the left grouping on the wheel above shows that the "golden triangle" universities (based in and around London, Oxford and Cambridge) are considered a community (shown in orange on the map); the Scottish universities form a community (shown between 11 o'clock and 12 o'clock above and highlighted in blue on the map); a surprising clustering of universities is shown in green - showing that collaborations are not necessarily geographically motivated.

## References

- Evans TS, Lambiotte R (2009) Edge Partitions and Overlapping Communities in Complex Networks; Clauset. A (2005). "Finding Local Community Structure in Networks," Physical Review E, 72, 026132.
- Holten D and van Wijk JJ (2009) 11th Eurographics/IEEE-VGTC Symposium on Visualization, pp983-990.
- Adams J, King C, and Hook DW (2010) Global Research Report: Africa, ThomsonReuters. ISBN: 1-904431-25-9.