

# Analysis of multi-disciplinary research structures within South Africa, and their principle actors

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## Introduction

There is increasing focus on a leading level of performance in inter-disciplinary research areas. This focus influences all participants and levels of science, from national funding bodies to researchers competing for grants.

It is a natural consequence that all of these participants need to be able to demonstrate, with a higher degree of frequency and ease, how they have combined findings from disparate fields to result in novel insights and discoveries.

Inter-disciplinary research, by its very nature usually an emerging field, tends to be scattered across diverse journals rather than concentrated in a central core of titles. Detection of inter-disciplinarity therefore demands analysis at the document, rather than the journal, level. Article-level co-citation analysis is an authoritative basis from which to detect and visualise these hard-to-find and hard-to-demonstrate areas, but we wish to show how these areas can contribute to the research strengths of a country.

In this poster, we will present results showing the areas of strength of South African research output. We will then focus on particularly inter-disciplinary areas and drill down into their details to understand:

- (i) Why these fields emerge as leading for South Africa in the context of global research output;
- (ii) Which researchers at South African institutions drive these novel areas of strength; and

- (iii) How actual or potential collaboration networks enhance the national expertise and contribute to world-class standing.

## Methodology

The SciVal Spotlight tool has been developed from an article co-citation algorithm to highlight national and institutional areas of research strength (Klavans & Boyack, 2009). These areas of competency are identified by looking for leadership in three areas: output, citations, and vitality (Klavans & Boyack, 2008).

Furthermore, SciVal Spotlight displays the degree of inter-disciplinarity of these areas. We will first present results derived from SciVal Spotlight to highlight of global strength within the South African research output. We will also use this tool to select areas of notable inter-disciplinarity for further investigation.

The complementary SciVal Strata tool has been developed to look at individuals, teams, and collaboration networks, and to understand how they compare to various benchmarks. We will present results showing the contributions of particular researchers and teams to the inter-disciplinary areas of strength we have selected.

Finally, we will use a combination of both tools to understand how existing national and international collaborations enable this level of performance. We will also identify as yet “fantasy” collaborations that could further enhance performance and secure a leading position in these areas for South Africa.

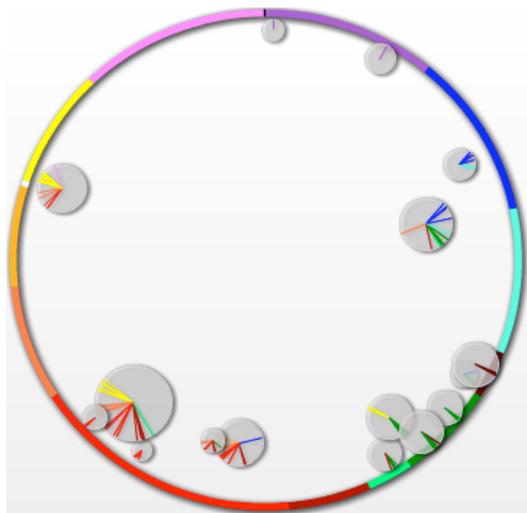
### **Preliminary results**

The country map for South Africa is shown in Figure 1. South Africa has notable areas of global strength in Medical Specialties; Earth Sciences / Biology/ Biotechnology; and Chemistry.

We will focus on a competency in each of these areas to understand why they emerge as leading, and opportunities to further strengthen South Africa's position. The competencies we will focus on are:

- Competency 1 (Figure 2) – HIV / AIDS research.
- Competency 3 (Figure 3) – ecology and plant physiology, due to the nation's unique flora and fauna.
- Competency 4 (Figure 4) – mineralogy, due to the nation's mining strength.

Figure 1. Country map for South Africa



**Subject areas**

- Math & Physics
- Chemistry
- Engineering
- Earth Sciences
- Biology
- Biotechnology
- Infectious Diseases
- Medical Specialities
- Health Sciences
- Brain Research
- Humanities
- Social Sciences
- Computer Science
- Other

Figure 2. Competency 1 shows that South Africa is a world leader in HIV / AIDS research

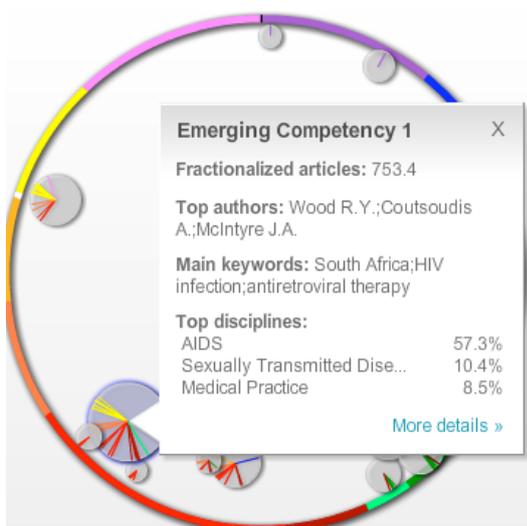
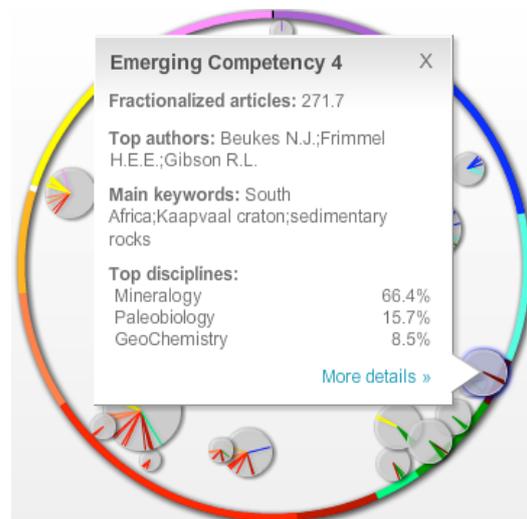


Figure 3. Competency 3 shows that South Africa is a world leader in ecology and plant physiology



Figure 4. Competency 4 shows that South Africa is a world leader in ecology and plant physiology



**References**

Klavans & Boyack (2008), Thought leadership: a new indicator for national and institutional comparison, *Scientometrics*, 75, 239-250

Klavans & Boyack (2009), Towards a consensus map of science, *Journal of the American Society for Information Science and Technology*, 60, 445-476