CWTS Leiden Ranking: An advanced bibliometric approach to university ranking

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Centre for Science and Technology Studies (CWTS), Leiden University

ETH Zurich, International Workshop on Quantifying Scientific Impact: Networks, Measures, Insights?

Zurich, February 12, 2015

Centre for Science and Technology Studies (CWTS)

- Research center at Leiden University focusing on quantitative studies of science (bibliometrics and scientometrics)

- Bibliometric contract research
  - Monitoring & evaluation
  - Advanced analytics
  - Training & education

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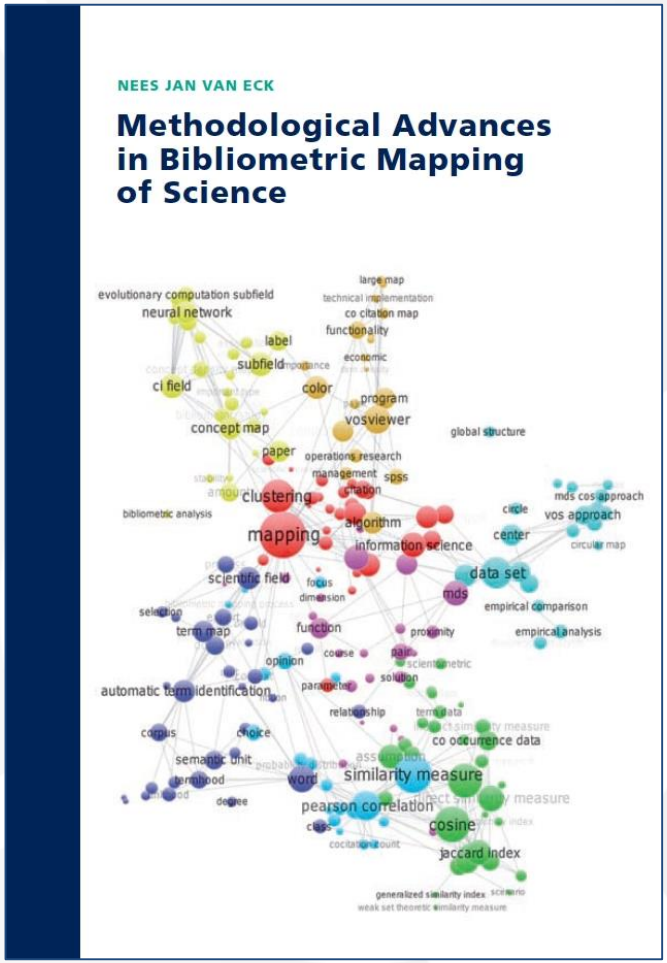
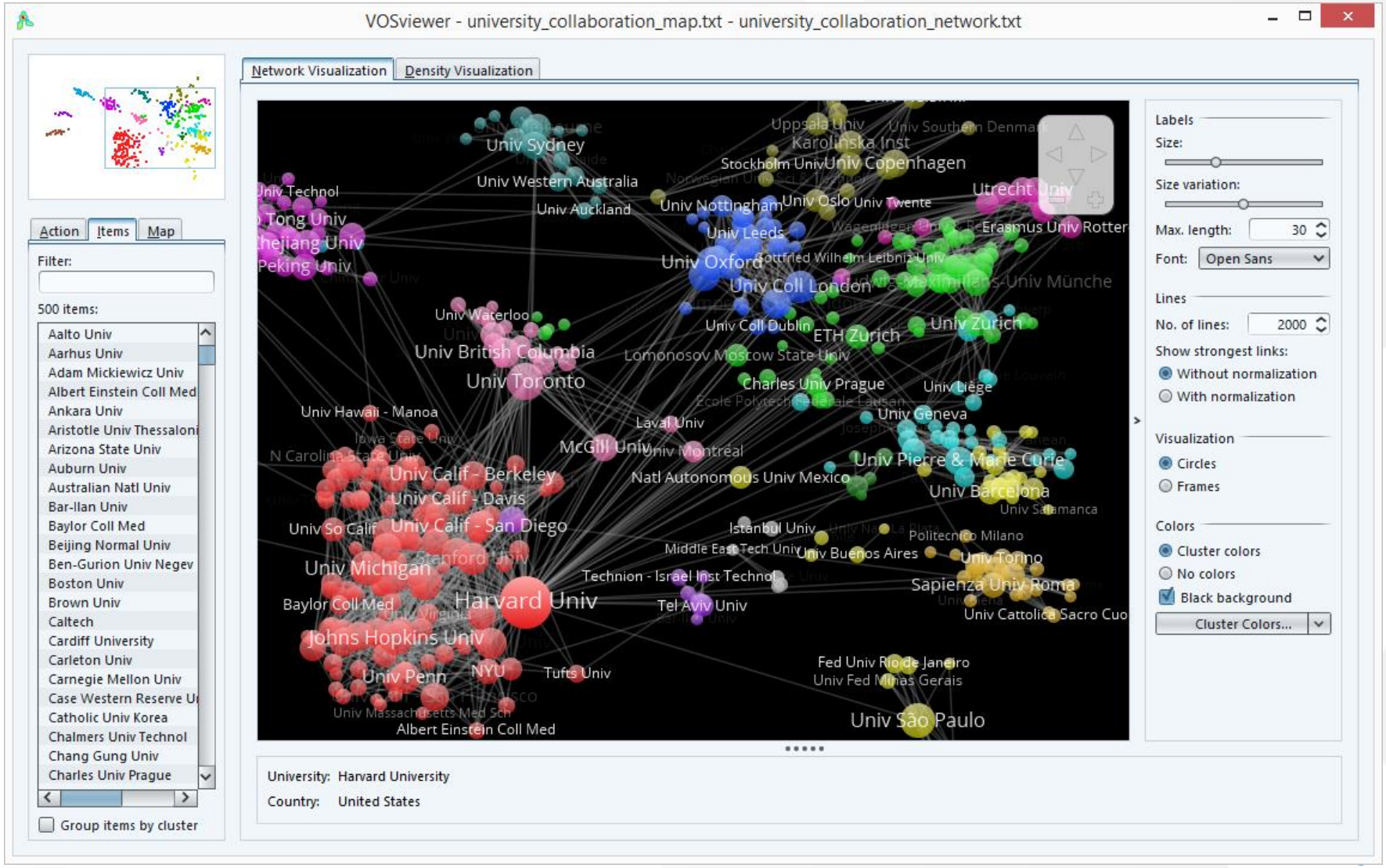
Short bio

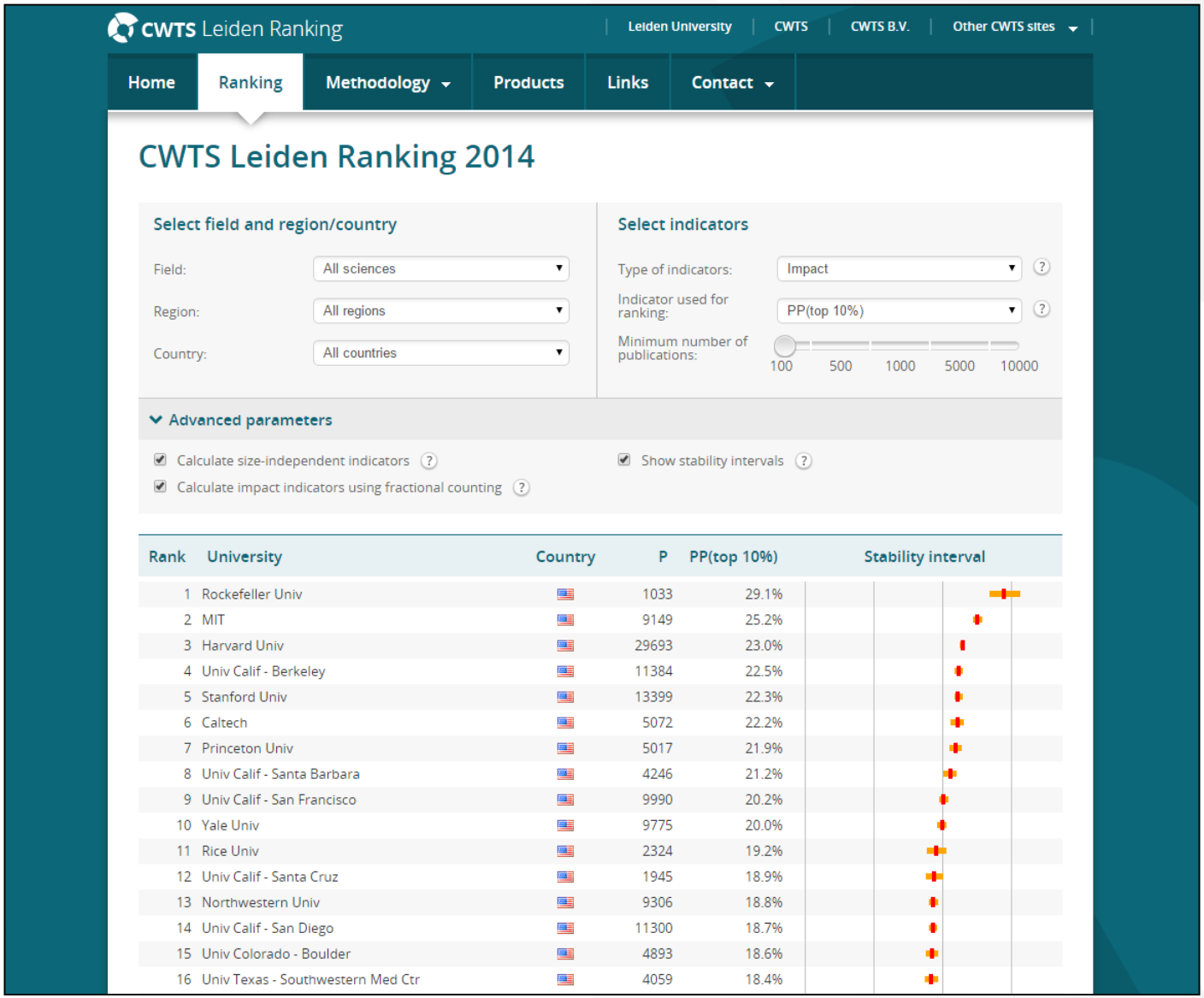
- MSc in computer science
- PhD research on bibliometric network visualization
- Researcher at CWTS (since 2009) focusing on:
  - Bibliometric network analysis
  - Bibliometric indicators of research performance



VOSviewer


VOSviewer - university_collaboration_map.txt - university_collaboration_network.txt
Network Visualization
Density Visualization
Action
Items
Map
Filter:
500 items:
Aalto Univ
Aarhus Univ
Adam Mickiewicz Univ
Albert Einstein Coll Med
Ankara Univ
Aristotle Univ Thessaloni
Arizona State Univ
Auburn Univ
Australian Natl Univ
Bar-Ilan Univ
Baylor Coll Med
Beijing Normal Univ
Ben-Gurion Univ Negev
Boston Univ
Brown Univ
Caltech
Cardiff University
Carleton Univ
Carnegie Mellon Univ
Case Western Reserve U
Catholic Univ Korea
Chalmers Univ Technol
Chang Gung Univ
Charles Univ Prague
Group items by cluster
Univ Sydney
Univ Western Australia
Univ Auckland
Univ Technol
Tong Univ
Zhejiang Univ
Peking Univ
Uppsala Univ
Karolinska Inst
Stockholm Univ
Univ Copenhagen
Univ Nottingham
Univ Oslo
Univ Twente
Utrecht Univ
Univ Leeds
Erasmus Univ Rotter
Univ Oxford
Gottfried Wilhelm Leibniz Univ
Univ Coll London
Univ Waterloo
Univ Coll Dublin
ETH Zurich
Univ Zurich
Univ British Columbia
Univ Toronto
Lomonosov Moscow State Univ
Charles Univ Prague
Univ Liège
Univ Hawaii - Manoa
Univ Geneva
Laval Univ
McGill Univ
Univ Montréal
Univ Pierre & Marie Curie
Univ Calif - Berkeley
Natl Autonomous Univ Mexico
Univ Calif - Davis
Univ Barcelona
Univ So Calif
Univ Calif - San Diego
Istanbul Univ
Politecnico Milano
Middle East Tech Univ
Univ Buenos Aires
Univ Michigan
Univ Torino
Technion - Israel Inst Technol
Sapienza Univ Roma
Baylor Coll Med
Harvard Univ
Tel Aviv Univ
Univ Cattolica Sacro Cuo
Johns Hopkins Univ
Fed Univ Rio de Janeiro
Univ Penn
NYU
Tufts Univ
Univ São Paulo
Albert Einstein Coll Med
University: Harvard University
Country: United States
Labels
Size:
Size variation:
Max. length: 30
Font: Open Sans
Lines
No. of lines: 2000
Show strongest links:
Without normalization
With normalization
Visualization
Circles
Frames
Colors
Cluster colors
No colors
Black background
Cluster Colors...

www.leidenranking.com



CWTS Leiden Ranking

- Provides bibliometric indicators of:
  - Scientific impact
  - Scientific collaboration
- Calculated based on Web of Science data
- Includes the 750 largest universities worldwide in terms of Web of Science publication output

Differences with other university rankings

- No aggregation of different dimensions of university performance (research, teaching, etc.) into a single overall performance indicator
- Exclusive focus on measuring universities' scientific performance
- No dependence on survey data or data provided by universities
- Advanced bibliometric methodology

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Advanced bibliometric methodology

- Percentile-based indicators to properly deal with highly skewed citation distributions
- Exclusion of non-core publications
- Normalization for differences between fields in citation and collaboration practices:
  - Field definitions based on an algorithmically constructed publication-level classification system of science
  - Fractional counting of co-authored publications

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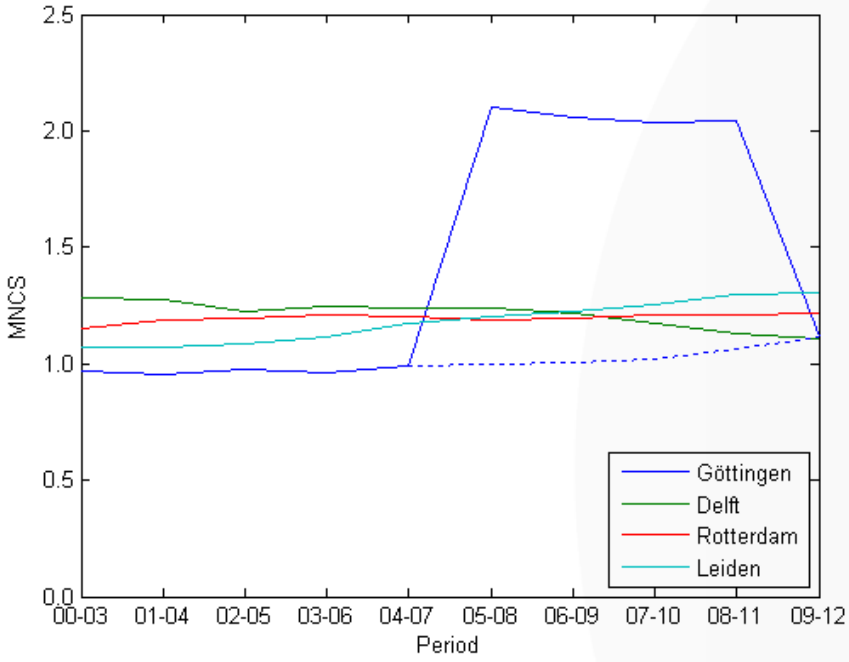
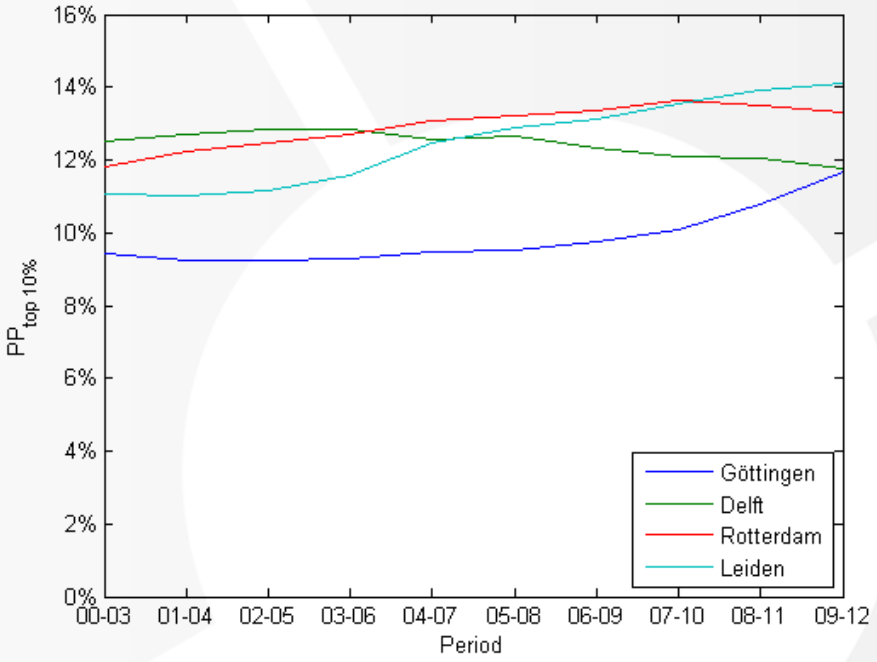
Average-based vs. percentile-based indicators





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Average-based vs. percentile-based indicators

A short history of SHELX

By: Sheldrick, GM (Sheldrick, George M.)[1]

ACTA CRYSTALLOGRAPHICA SECTION A
Volume: 64 **Pages:** 112-122 **Part:** 1
DOI: 10.1107/S0108767307043930
Published: JAN 2008
View Journal Information

Abstract

An account is given of the development of the SHELX system of computer programs from SHELX-76 to the present day. In addition to identifying useful innovations that have come into general use through their implementation in SHELX, a critical analysis is presented of the less-successful features, missed opportunities and desirable improvements for future releases of the software. An attempt is made to understand how a program originally designed for photographic intensity data, punched cards and computers over 10000 times slower than an average modern personal computer has managed to survive for so long. SHELXL is the most widely used program for small-molecule refinement and SHELXS and SHELXD are often employed for structure solution despite the availability of objectively superior programs. SHELXL also finds a niche for the refinement of macromolecules against high-resolution or twinned data; SHELXPRO acts as an interface for macromolecular applications. SHELXC, SHELXD and SHELXE are proving useful for the experimental phasing of macromolecules, especially because they are fast and robust and so are often employed in pipelines for high-throughput phasing. This paper could serve as a general literature citation when one or more of the open-source SHELX programs (and the Bruker AXS version SHELXTL) are employed in the course of a crystal-structure determination.

Keywords

KeyWords Plus: LEAST-SQUARES REFINEMENT; CRYSTAL-STRUCTURE DETERMINATION; PROTEIN STRUCTURES; 1.7 ANGSTROM; RESOLUTION; CRYSTALLOGRAPHY; RESTRAINTS; COMPLEX

Author Information

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Citation Network

37,188 Times Cited
60 Cited References
View Related Records
View Citation Map
Create Citation Alert
(data from Web of Science™ Core Collection)

All Times Cited Counts

37,230 in All Databases
37,188 in Web of Science Core Collection
2,103 in BIOSIS Citation Index
148 in Chinese Science Citation Database
0 in Data Citation Index
26 in SciELO Citation Index

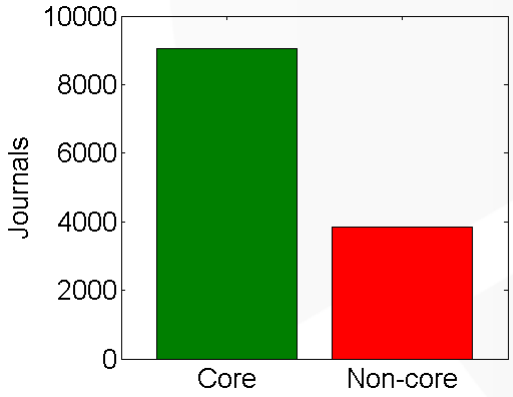
Most Recent Citation

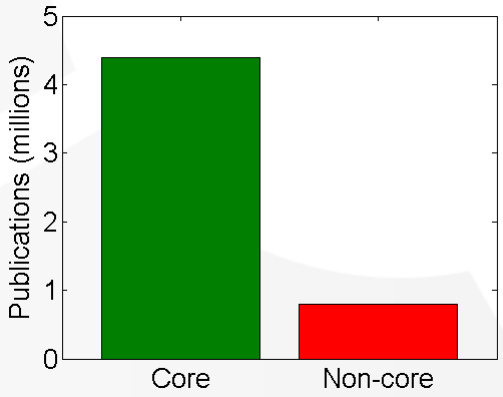
Caglar, Sema. Copper(II) 2-Benzoylbenzoate Complexes Containing 2-Pyridilmethanol and 2-Pyridilethanol: Synthesis, Crystal Structures, Spectroscopic, and Thermal Properties. SYNTHESIS AND

Exclusion of non-core publications

Non-core publications are excluded:

- Non-English publications
- Publications in national scientific journals, trade journals, and popular magazines
- Publications in fields with a low citation density
- Retracted publications





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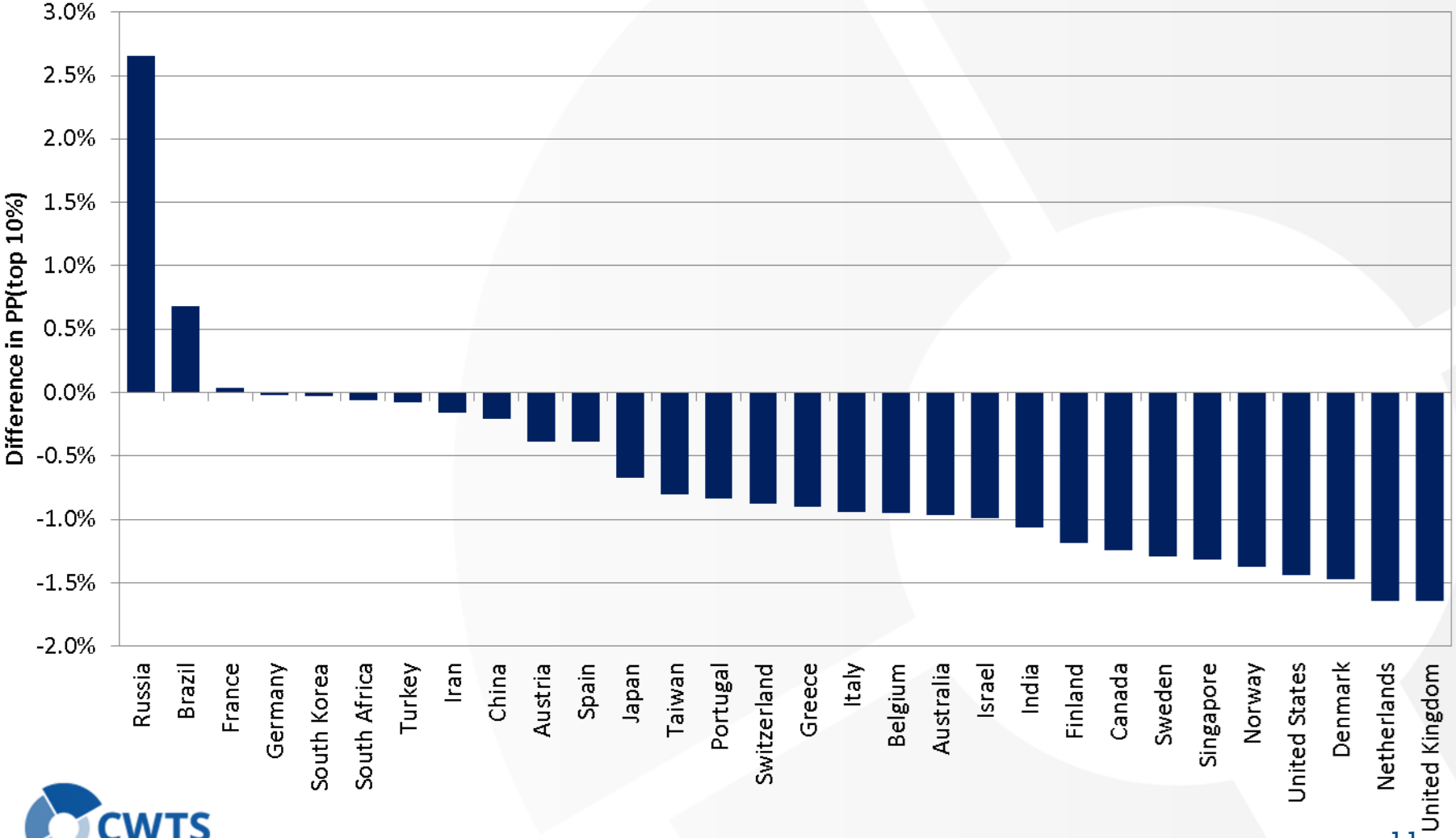
Exclusion of non-core publications and the effect on PP(top 10%)



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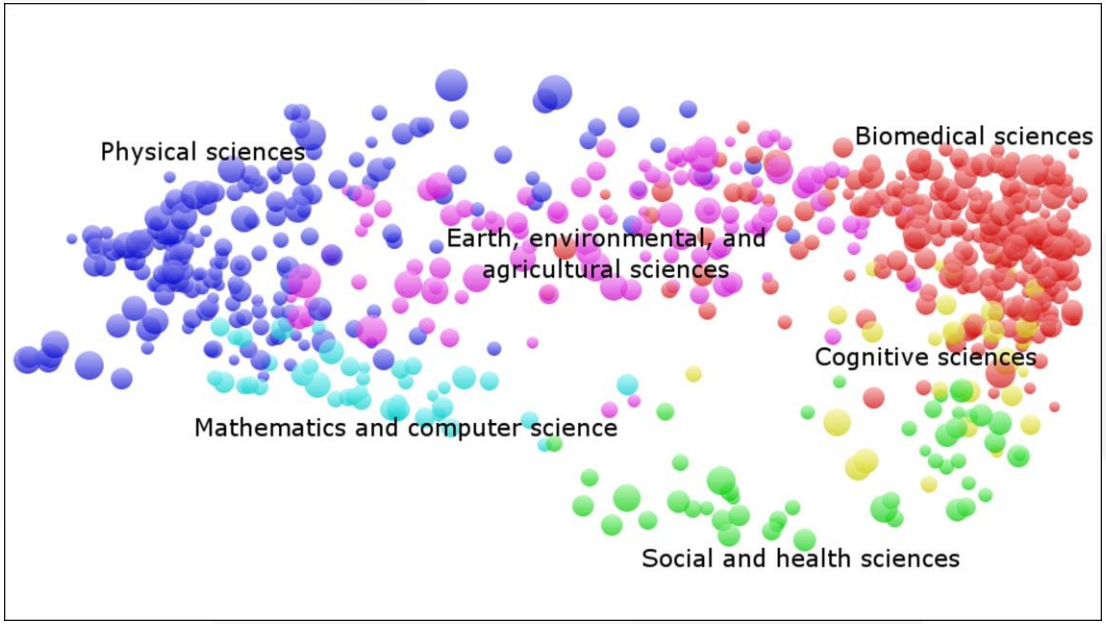
Publication-level classification system of science

- Fields are defined at the level of individual publications rather than journals
- Publications are clustered into ~800 fields based on citation relations
- Smart local moving community detection algorithm



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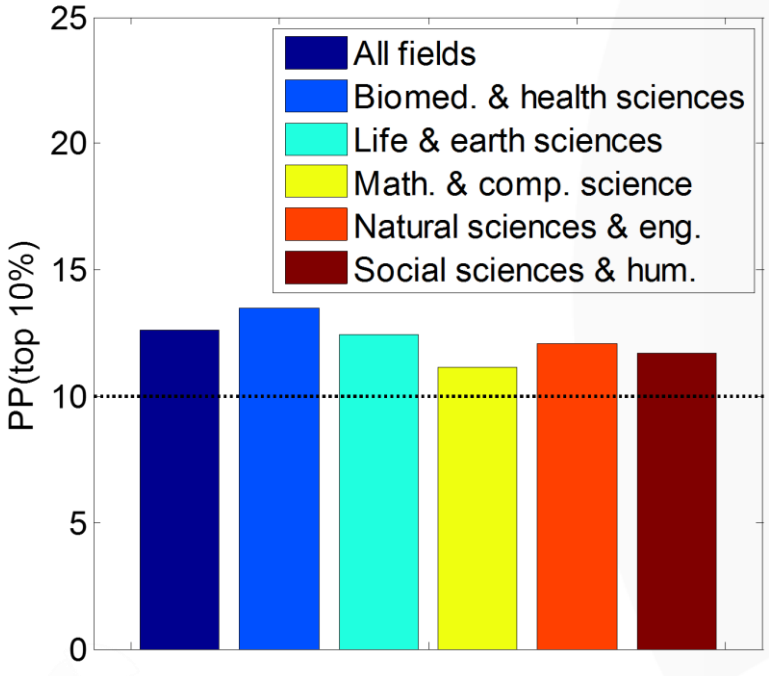
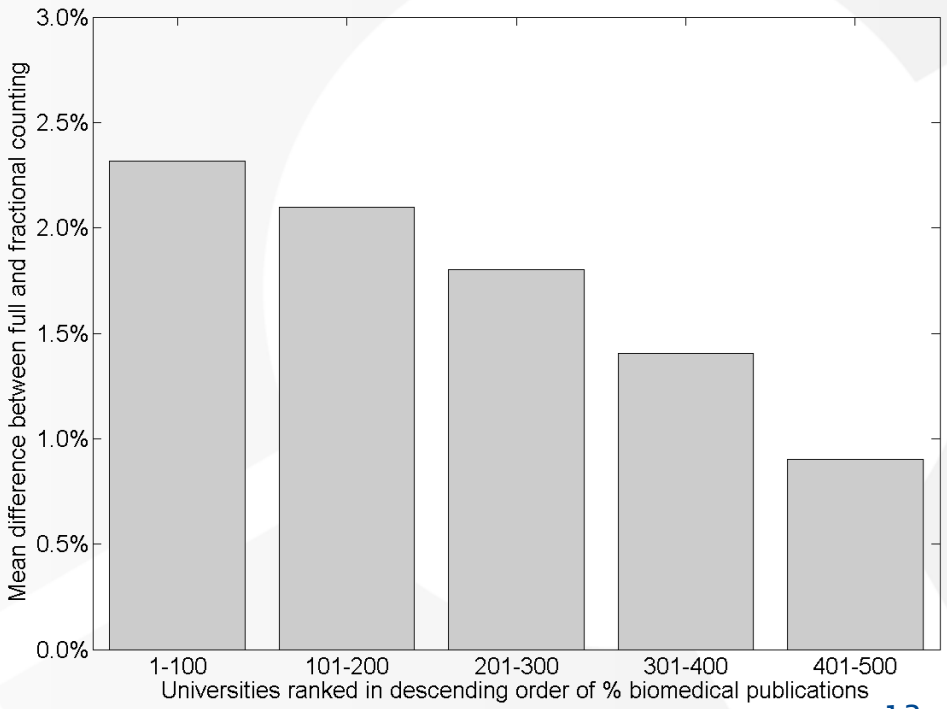
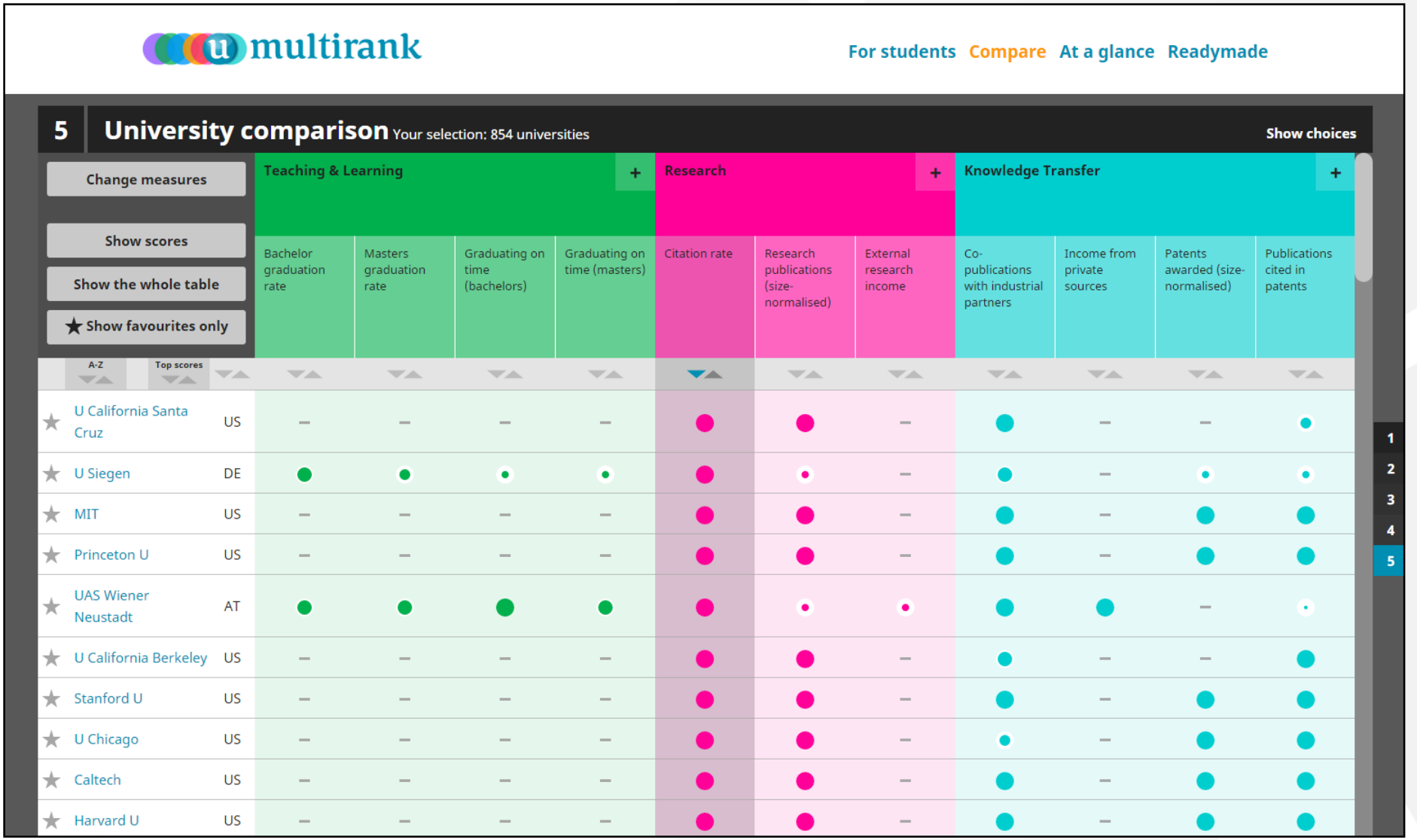
Full vs. fractional counting

Full counting is biased in favor of fields with a lot of collaboration and a strong citation advantage for collaborative publications





U-Multirank


multirank
For students
Compare
At a glance
Readymade
5
University comparison
Your selection: 854 universities
Show choices
Change measures
Show scores
Show the whole table
Show favourites only
Teaching & Learning
Research
Knowledge Transfer
Bachelor graduation rate
Masters graduation rate
Graduating on time (bachelors)
Graduating on time (masters)
Citation rate
Research publications (size-normalised)
External research income
Co-publications with industrial partners
Income from private sources
Patents awarded (size-normalised)
Publications cited in patents
A-Z
Top scores
U California Santa Cruz US
U Siegen DE
MIT US
Princeton U US
UAS Wiener Neustadt AT
U California Berkeley US
Stanford U US
U Chicago US
Caltech US
Harvard U US
1
2
3
4
5

Some conclusions

- There is no such thing as ‘overall university performance’; do not mix up different dimensions of university performance
- Use an appropriate bibliometric methodology:
  - Use percentile-based indicators, not average-based indicators
  - Do not blindly follow the selection of journals made by database producers; exclude non-scientific journals and journals with a national focus
  - Use fractional counting, not full counting

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