

# The Rainbow over the Greek Departments of Computer Science/Engineering: a Bibliometric Study

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# Outline

- The Rainbow Ranking method (RR-index)
- The Dataset
- The Results



# A Storm of bibliometric Indicators for Researchers (after 2005)

- H-index \*\*2005
- Times Cited (C)
- Citation per Pub (C/P)
- G-index
- R-index
- E-index
- Contemporary h-index
- Trend h-index
- AR-index
- hg-index
- H<sup>2</sup>-index
- Perfectionist Index (PI)
- ...
- Many many



# A Storm of bibliometric Indicators for Journals

- Times Cited
- ISI IF (JIF)
- Scimaco JR
- SNIP
- H-index
- CiteScore (Scopus)



# Which Indicator is the best?

- The answer is:...
  - **None**
- Why:
  - Every index takes into account different aspects and is indicative of different point of view



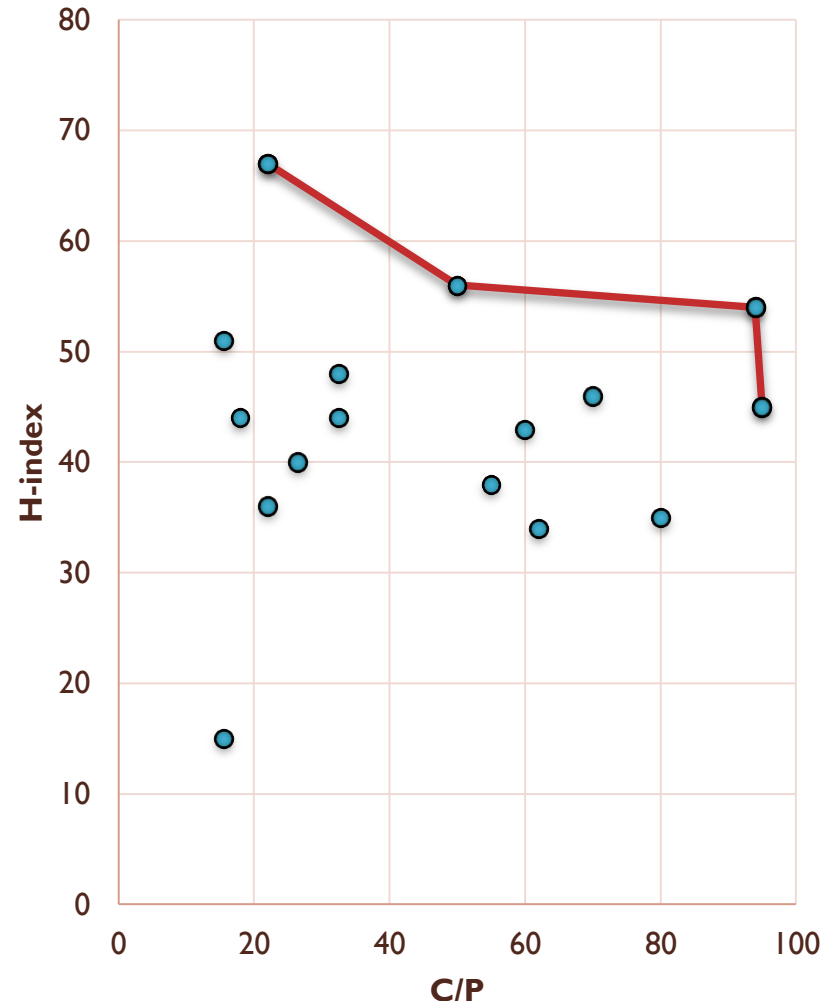
# Is a Global Ranking Feasible?

- Yes – it will be based on specific indices (dimensions) depending the purpose of the ranking.
- Key methods:
  - Skyline Operator
  - Rainbow Ranking



# Skyline Operator

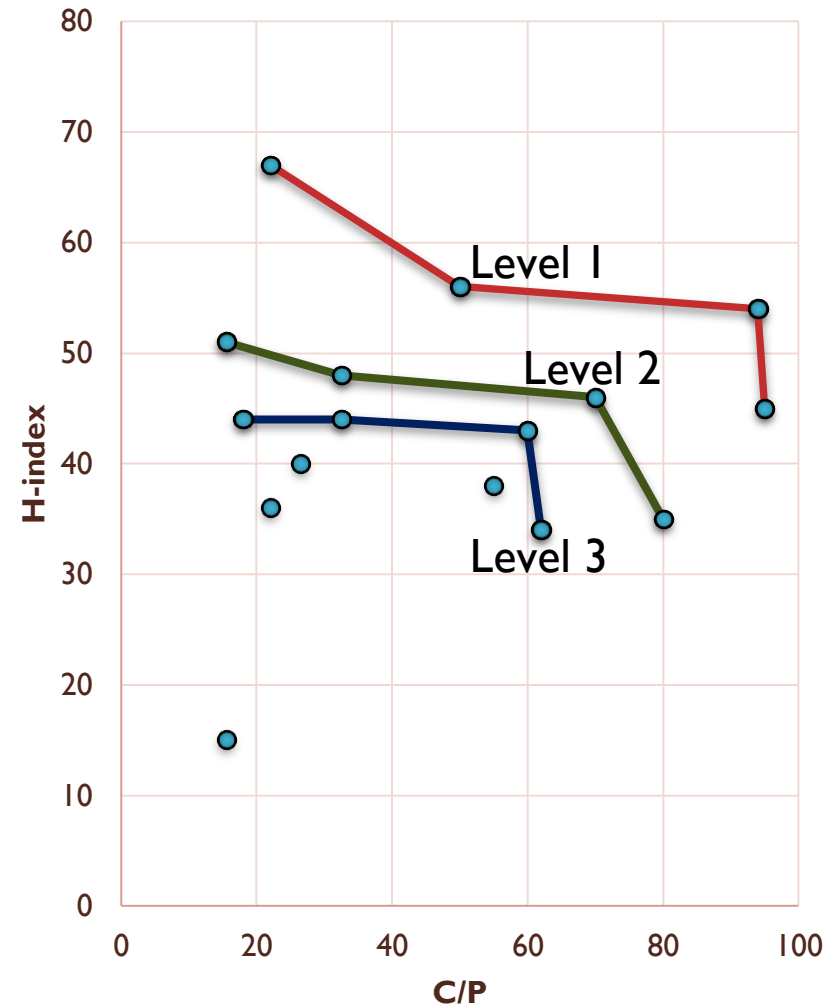
- A set of Researchers
- A set of dimensions (assume 2d: C/p, h-index)
- The Skyline is the set of nodes that for each one there is no other node that is better in all dimensions





# Rainbow Ranking

- Is the repeated application of skyline operator
- Nodes are clustered into levels
- We assign a “number” for each level





# Rainbow Ranking

- $RR(a, dims) = 100 - 100 * \left( \frac{|A_{above}(a, dims)|}{|A|} + \frac{|A_{tie}(a, dims)|}{2 * |A|} \right)$
- $|A|$  is the total number of scientists in our dataset,
- $|A_{above}(\alpha, dims)|$  is the number of scientists who are ranked above scientist  $\alpha$  based on  $dims$ .
- $|A_{tie}(\alpha, dims)|$  is the number of scientists ranked in the same level with scientist  $\alpha$ , not including that scientist  $\alpha$ .
- $RR(a, dims) = 100$  means that author “a” is ranked first and there is no tie in the first place.
- If  $|A|=100$ , and 2 authors in the first place, then they will have  $RR=99,5$



# Dataset

- Acquired from Microsoft Academic Search (2014-2016\*)
- Researchers from Greek CS/EE as during ~2014
- +All their publications ( $P$ )
- +All the citations to  $P$
- - *Poor data after 2013*

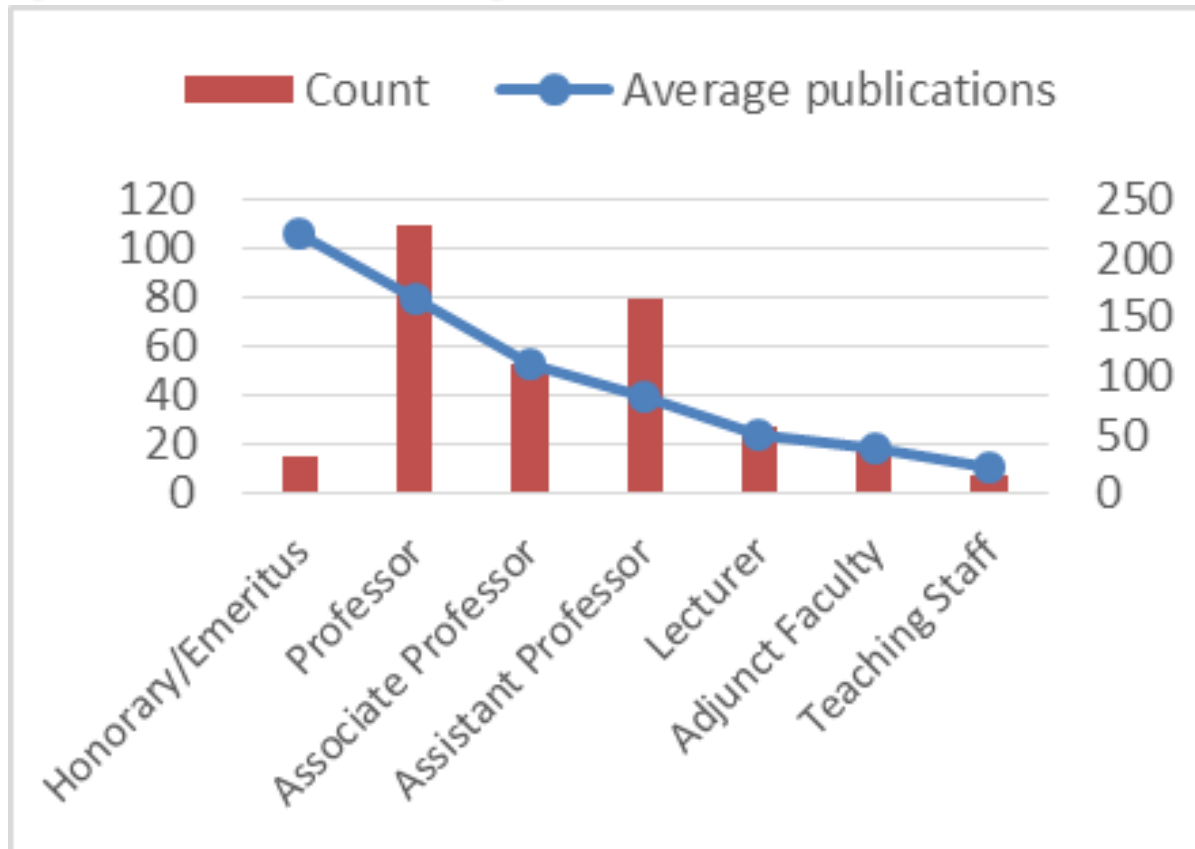
\* 2016 Microsoft discontinued the API

# Database Stats

<b>Number of Authors</b>	<b>659</b>
<b>Number of publications</b>	<b>36451</b>
<b>Average Publications per Author</b>	<b>55,3</b>
<b>Average Citations per Author</b>	<b>380,4</b>
<b>Average Citations per Publication</b>	<b>4,6</b>
<b>Average h-index</b>	<b>7,1</b>
<b>Max h-index</b>	<b>76</b>

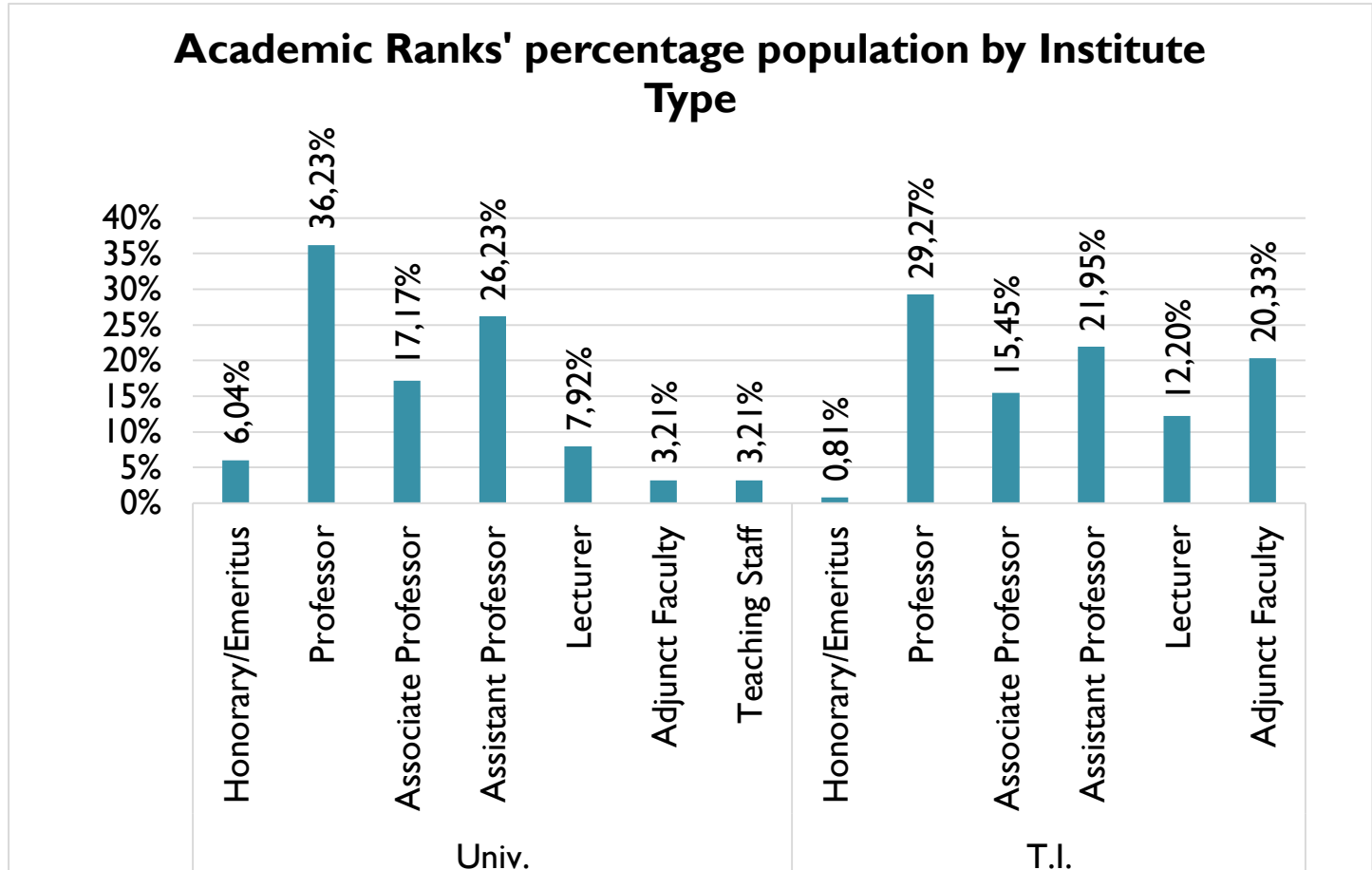


# Count of Professors and their productivity



- Assistant Professors are more than Associate Professors !!!

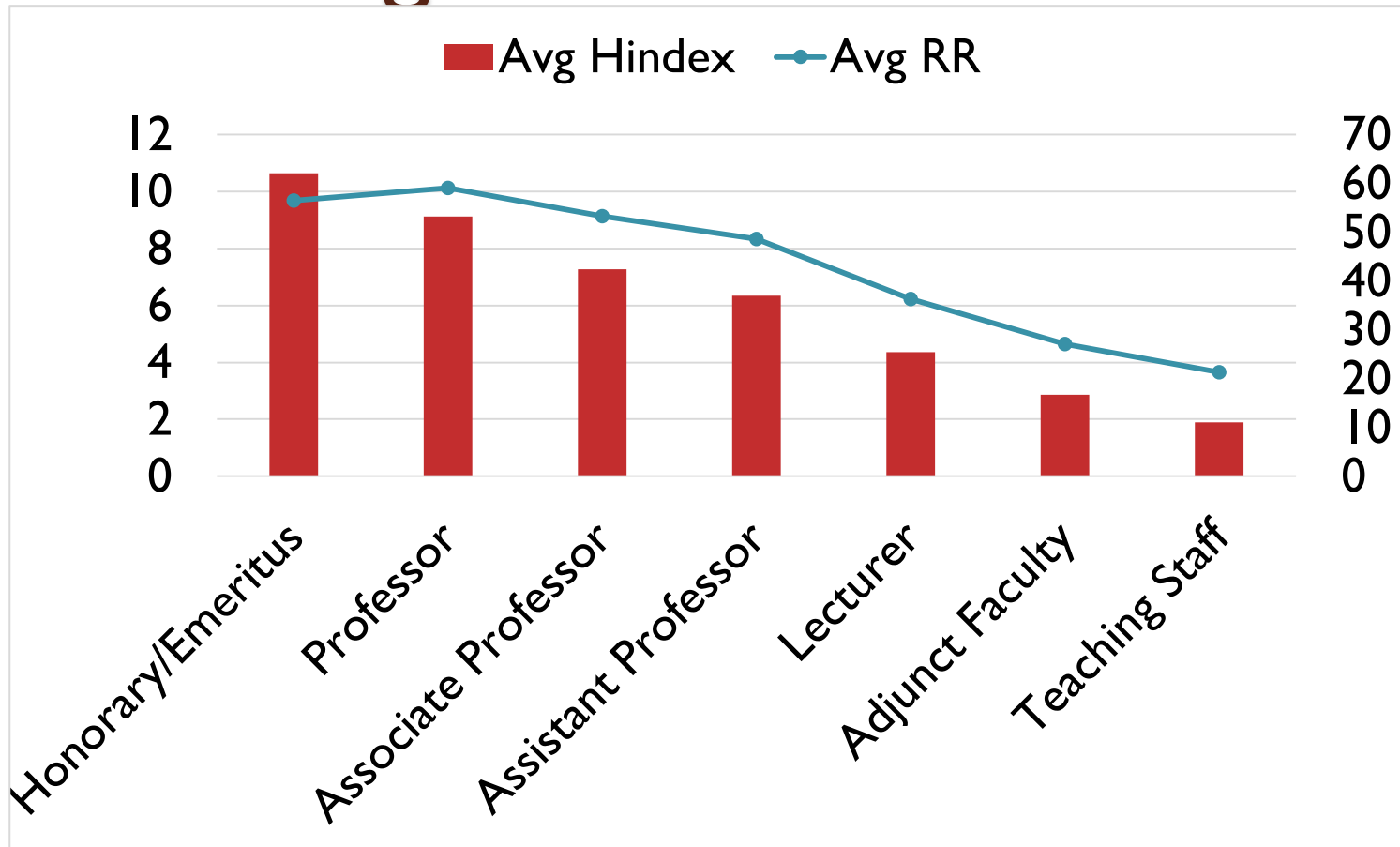
# Count of Professors and their productivity



- Similar view Univ. vs. T.I. (Technological Institutes)
- T.I. have more Adjunct Faculty than Univ.

PCI 2017 No Teaching Staff (ΕΔΙΠ, ΕΤΠ, etc) in T.I or no publications or not found.

# Ranking



- The AVG h-index follows AVG RR – not in the case of Honorary/Emeritus.

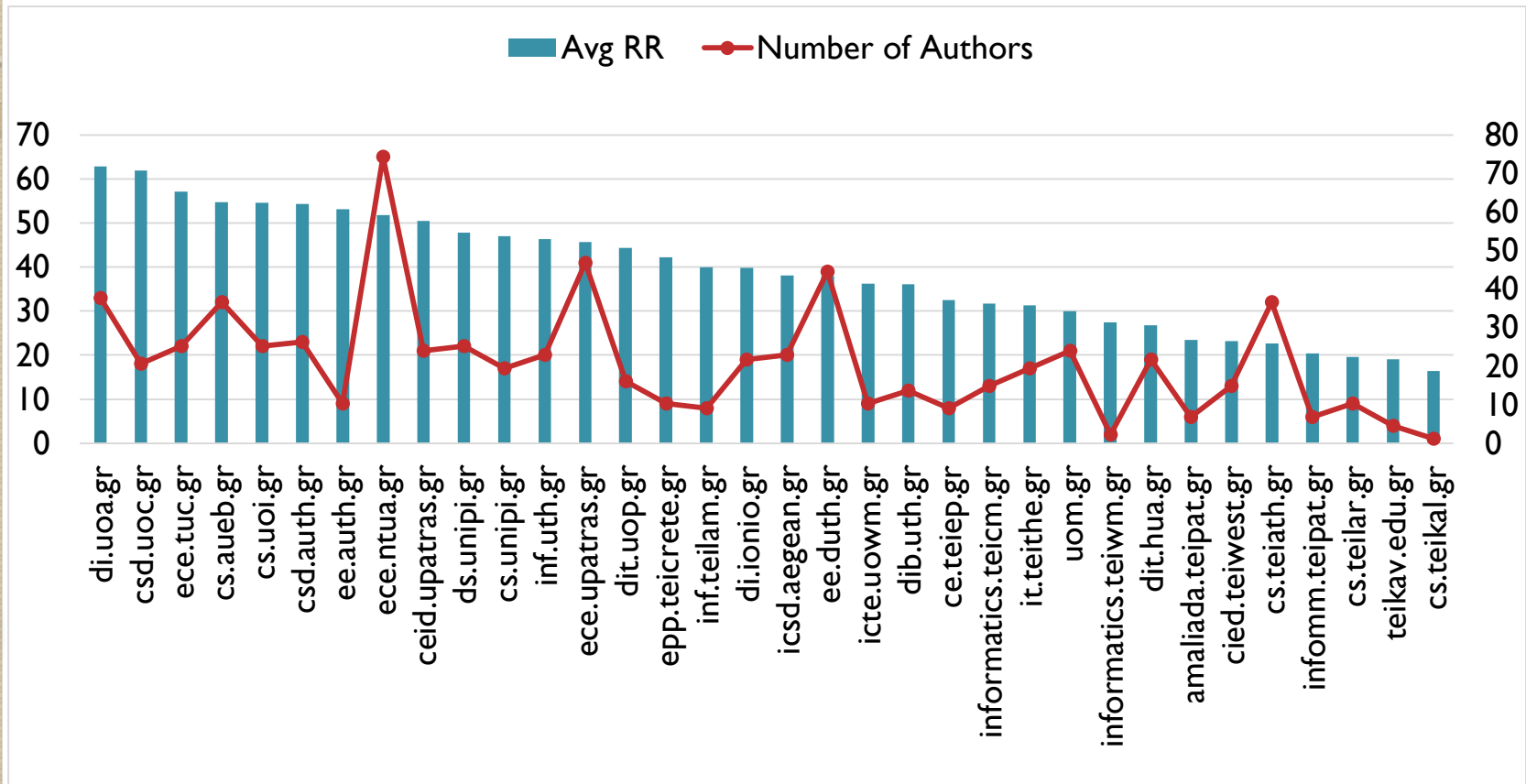
\* RR includes the dimension of contemporary h-index

# The first 5 Skyline Levels

Name	P	C	C/P	h-index	A-index	h <sup>C</sup> -index	skyline	RR
Papadimitriou Christos	601	24951	41.5	76	234.3	30	1	100.0
Faloutsos Christos	460	17374	37.8	64	208.2	31	2	99.8
Tassiulas Leandros	302	7755	25.7	38	163.7	22	3	99.6
Pitas Ioannis	484	6134	12.7	42	88.1	17	3	99.6
Courcoubetis Costas	153	4938	32.3	30	139.8	12	4	99.2
Ioannidis Yannis	199	4420	22.2	38	89.9	16	4	99.2
Gunopulos Dimitrios	192	5359	27.9	36	112.4	19	4	99.2
Theodoridis Sergios	177	2401	13.6	15	138.5	8	5	98.6
Koutsoupas Elias	69	2170	31.4	20	96.0	12	5	98.6
Maragos Petros	221	3065	13.9	27	81.1	11	5	98.6
Vazirgiannis Michalis	147	2661	18.1	24	86.2	13	5	98.6
Tollis Ioannis	157	2467	15.7	21	88.6	8	5	98.6
Garofalakis Minos	153	3702	24.2	35	80.8	18	5	98.6

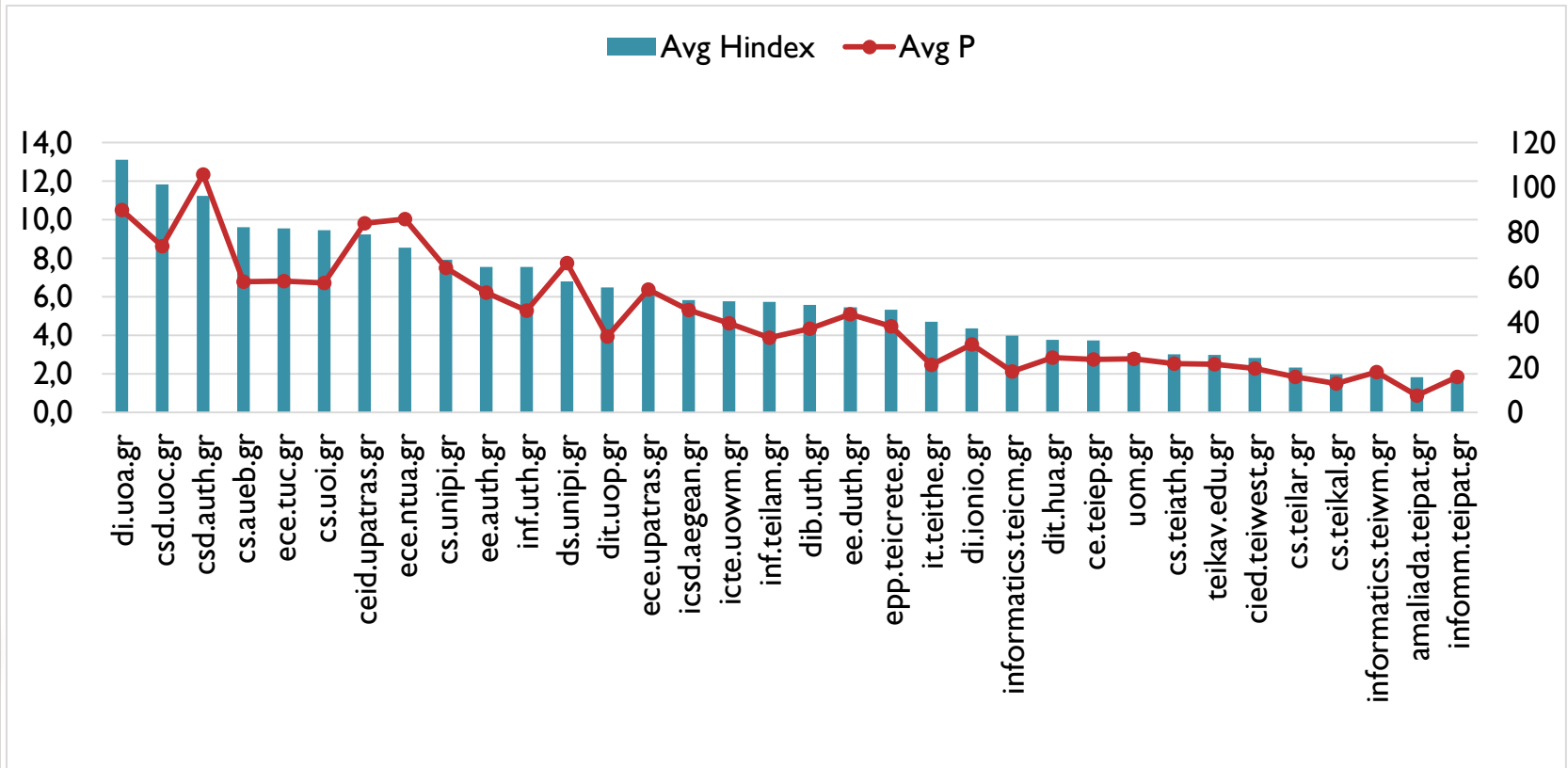


# CS/EE Departments Rank by RR



- UOA and UOC are the leaders
- Some peeks in “Number of Authors” – ntua, upatras, duth, teiath

# CS/EE Departments Rank by h-index



- uoa and uoc are the leaders (h-index)
- auth, upatras, ntua most productive (P)

# Conclusion

- We introduced RR-index: A multi-dimensional ranking method
- The case study with Greek CS/EE Depts. shows:
  - Universities do have much more academic personnel than T.I.
  - Quality/acknowledgment not always follows the productivity
  - T.I. are less productive in research than Universities ( why ? )



# Ongoing and Future work

- Apply RR-index in other datasets
- Apply RR-index for Journals/Conferences
- Find and update the dataset for Greek CS/EE Community – how could we keep it up-to-date and valid?
- ...



# Thank you for your attention

- **Questions ?**
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