The Role of Research Leaders on the Evolution of Scientific Communities

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Society is Organized in Communities

- There are a lot of kinds of communities

- In a social networks, individuals influence and are influenced by others

- Communities have opinion leaders

A group of leaders or influential members are able to affect the dynamics of the entire community

Our Goal

- Study the dynamics of **scientific communities**

- Identify leaderships within **scientific communities** (Community Core)

- Investigate the properties of a Community Core

Core Score

- Estimates a researcher's importance within a community.

- The core score of a researcher *r* into a community *c* in a period of time *t* is given by:

$$CoreScore_{r,c,t} = h_r \times \#publications_{r,c,t}$$
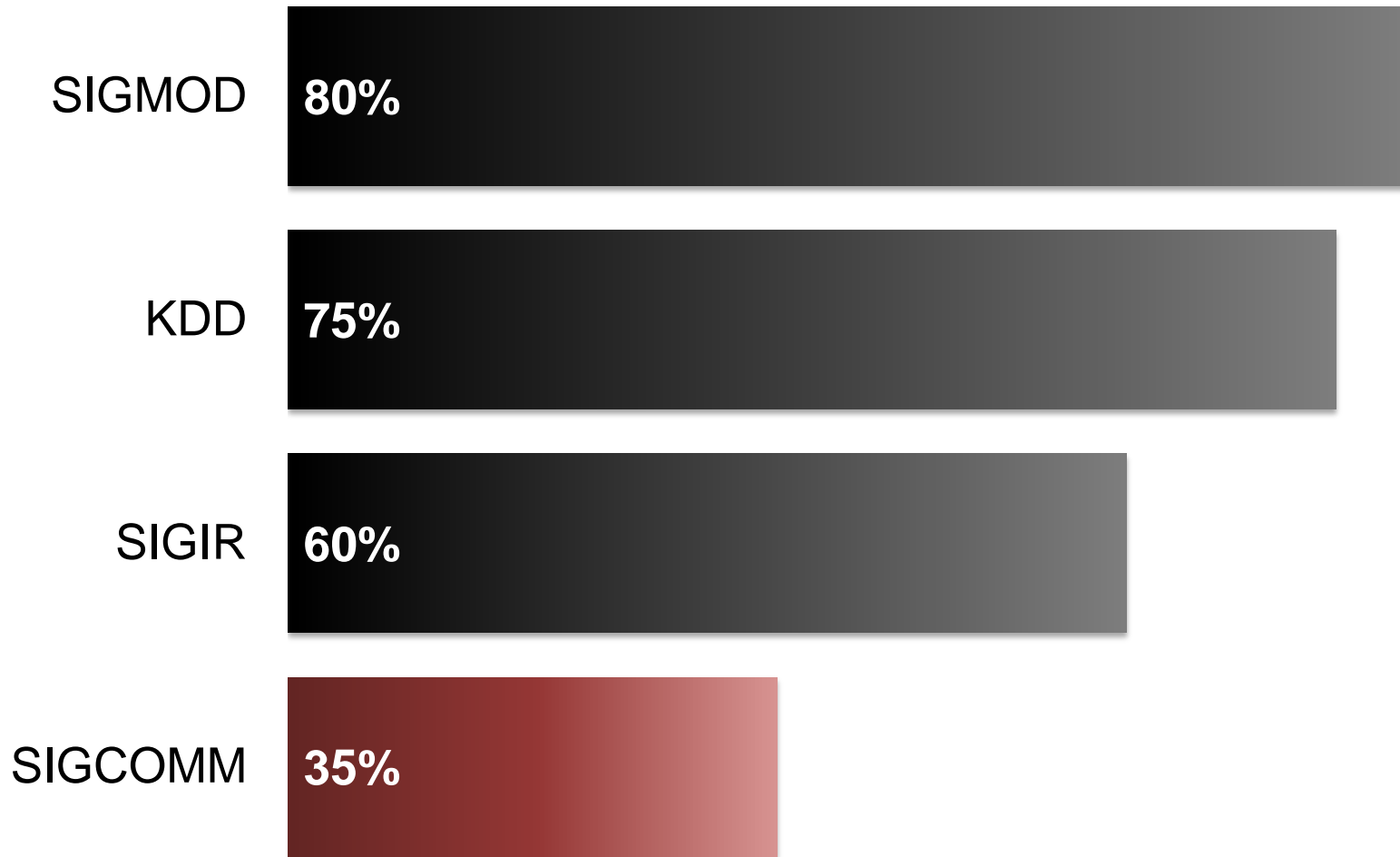
Important Steps

- We used 24 conferences extracted of DBLP

- We estimated the H-Index using Shine project

- We defined two thresholds:
  - Community core size: 10%
  - Temporal Sliding Window Size: 3 years
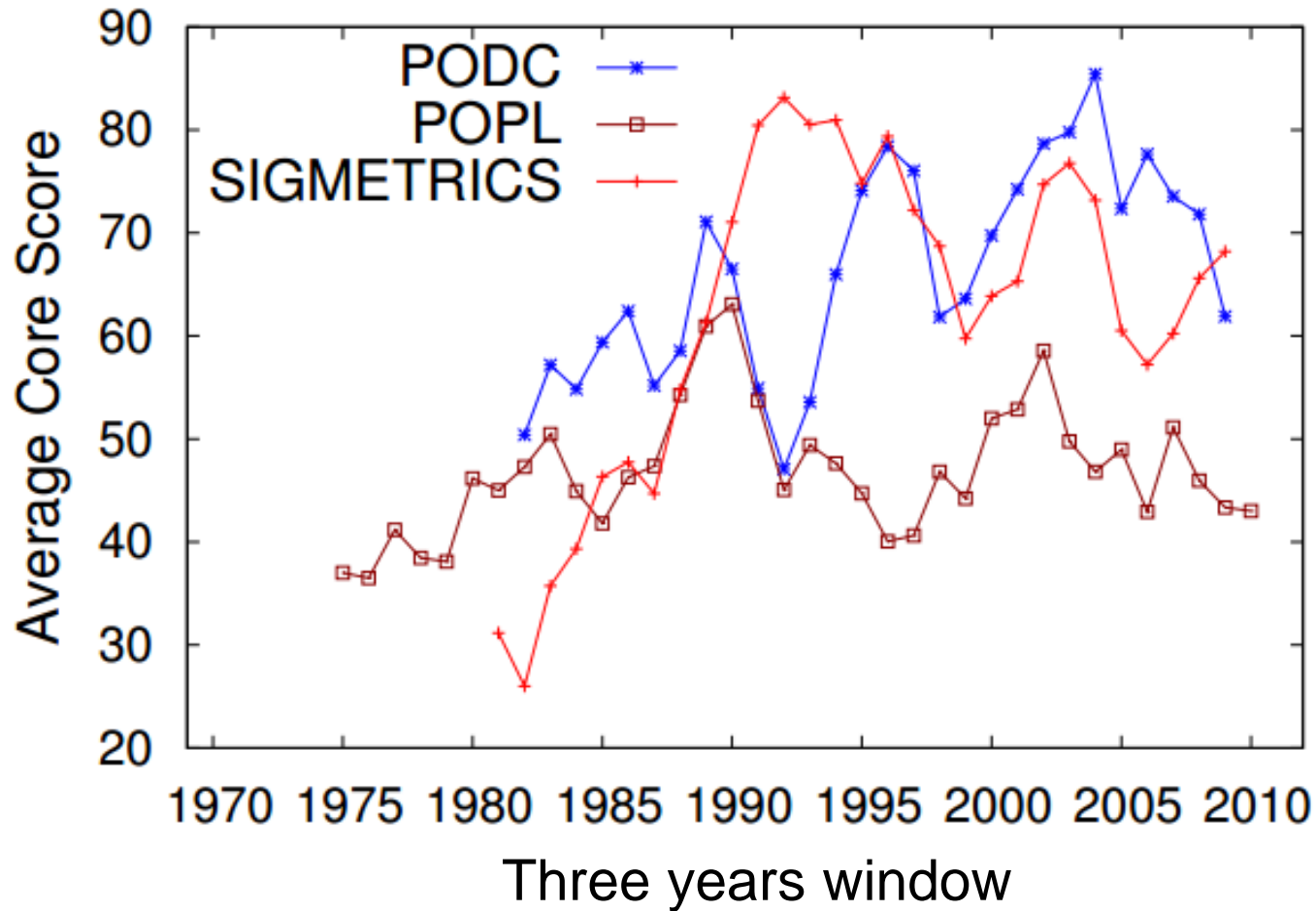
Jon Kleinberg's Communities

Three years window
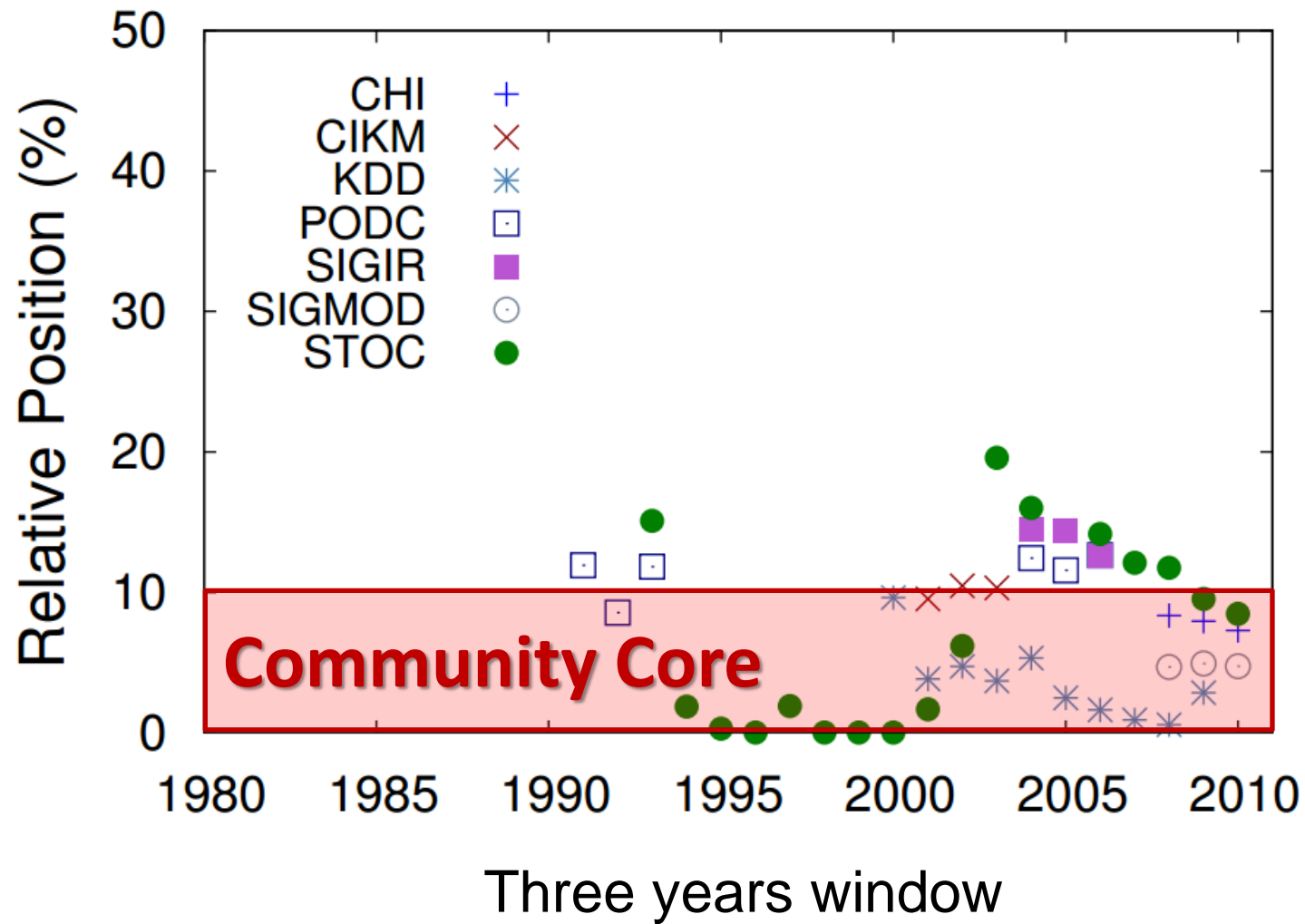
Moving from STOC to KDD

Awarded Researchers

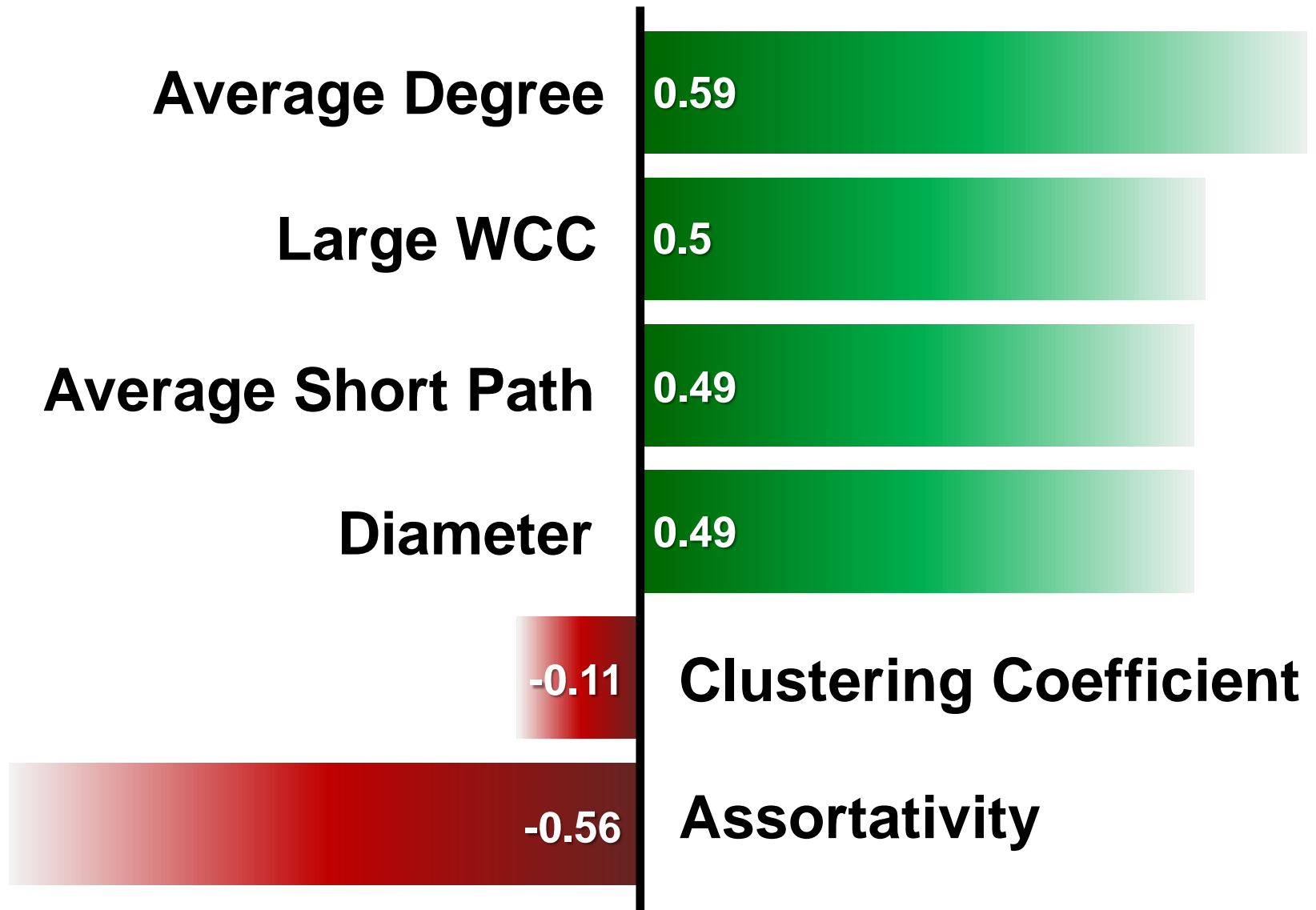|	
SIGMOD	**80%**
KDD	**75%**
SIGIR	**60%**
SIGCOMM	**35%**

Members of the core community awarded

Influence of Core Members

How does it affect the network?

Strong Correlation with Average Core Score

Average Degree — 0.59
Large WCC — 0.5
Average Short Path — 0.49
Diameter — 0.49
Clustering Coefficient — -0.11
Assortativity — -0.56

Conclusions

The core community:

- is strongly correlated with variations on network properties

- works as bridges that connect groups

- increases the average degree

- decreases the assortativeness

Conclusions

Future Work:

- Analysis of other kinds of network such as massive multiplayer games and on-line social networks

- Estimation of the h-index as a function of time

Thank you!

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