ETH zürich

The social dimension of citation networks

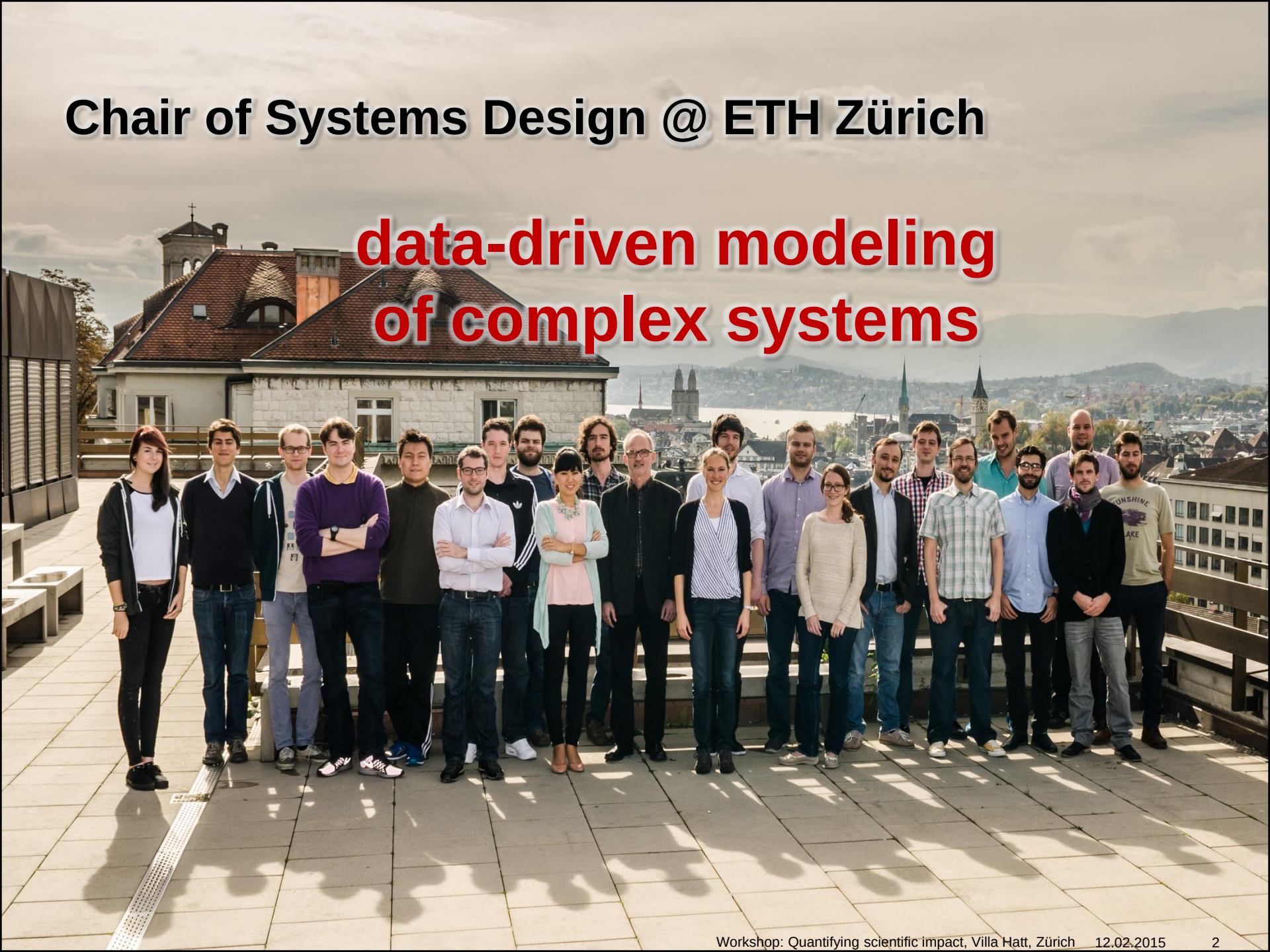
Ingo Scholtes[1]

Chair of Systems Design

ETH Zürich

[1] in collaboration with Emre Sarigöl, René Pfitzner, Antonios Garas and Frank Schweitzer

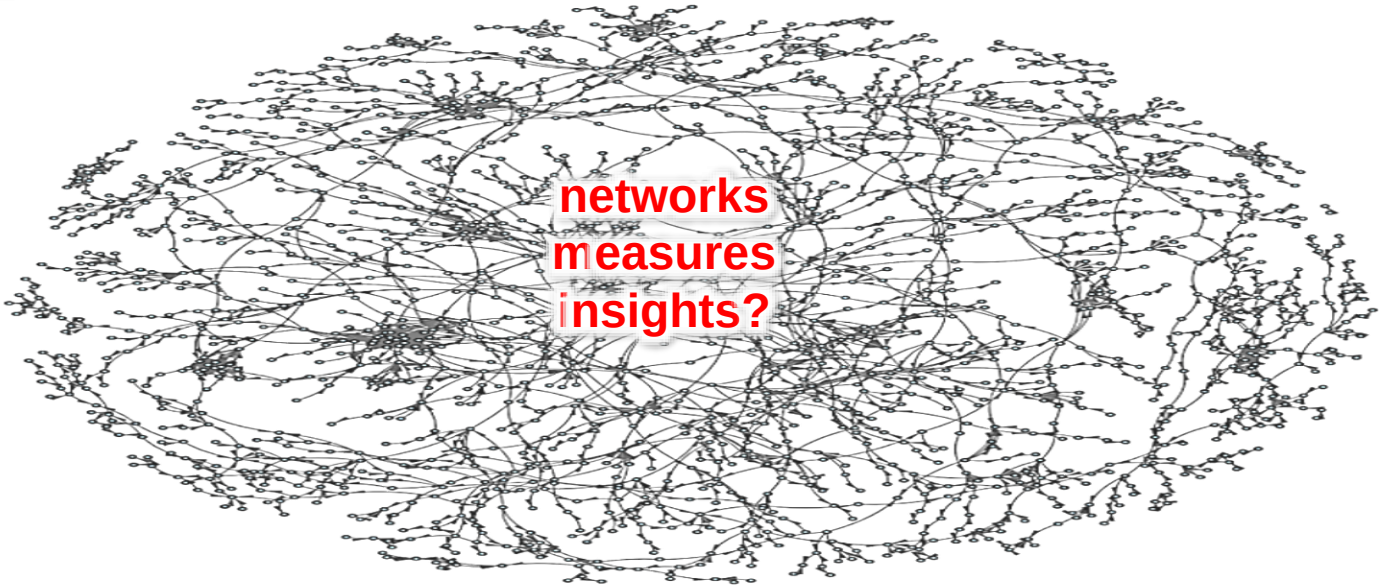
Chair of Systems Design @ ETH Zürich



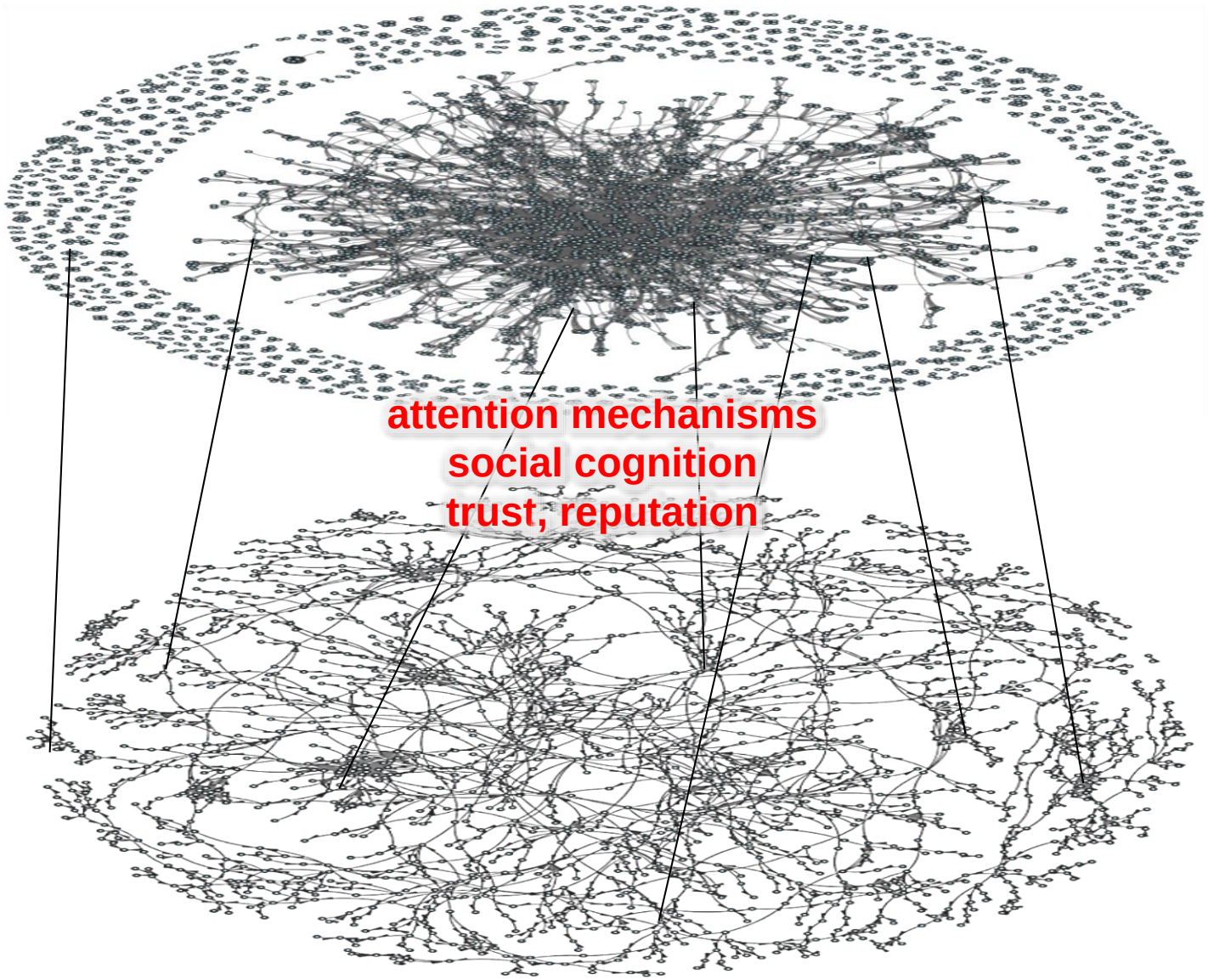
Analysing citation networks

„Science is done by people“ (Heisenberg)

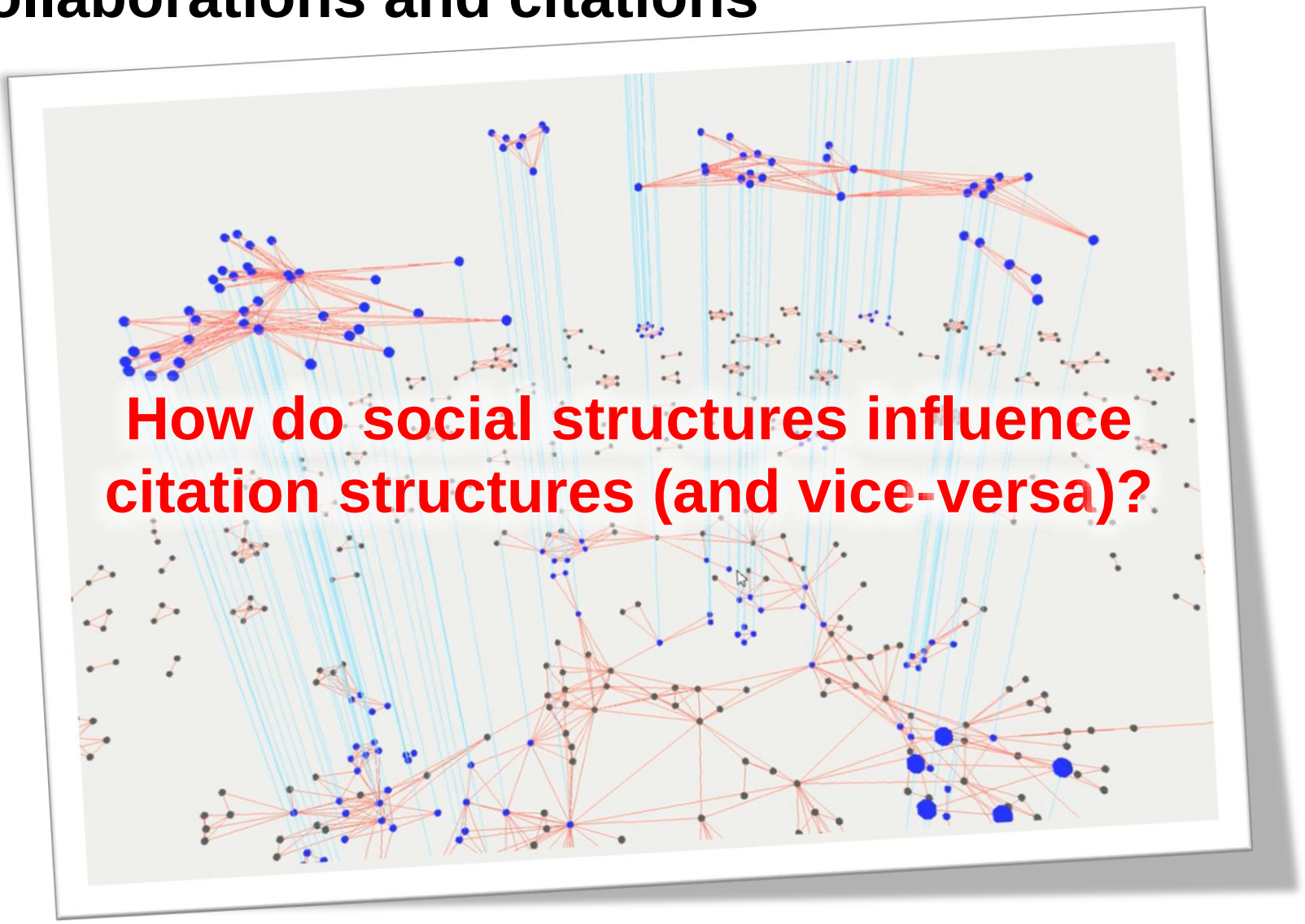
citation network



A systems perspective



Collaborations and citations

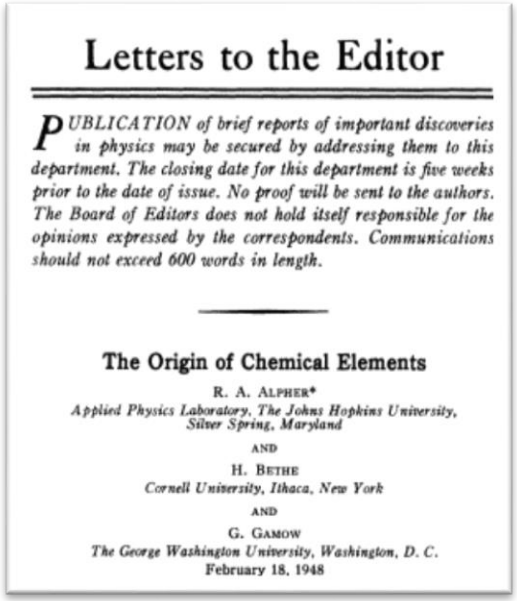


collaborations (top layer) and citations (bottom layer) between authors at a CS conference

Dynamic collaboration networks

α

Ralph **Alpher**



Letters to the Editor

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The Origin of Chemical Elements

R. A. ALPHER*
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AND
H. BETHE
Cornell University, Ithaca, New York
AND
G. GAMOW
The George Washington University, Washington, D. C.
February 18, 1948

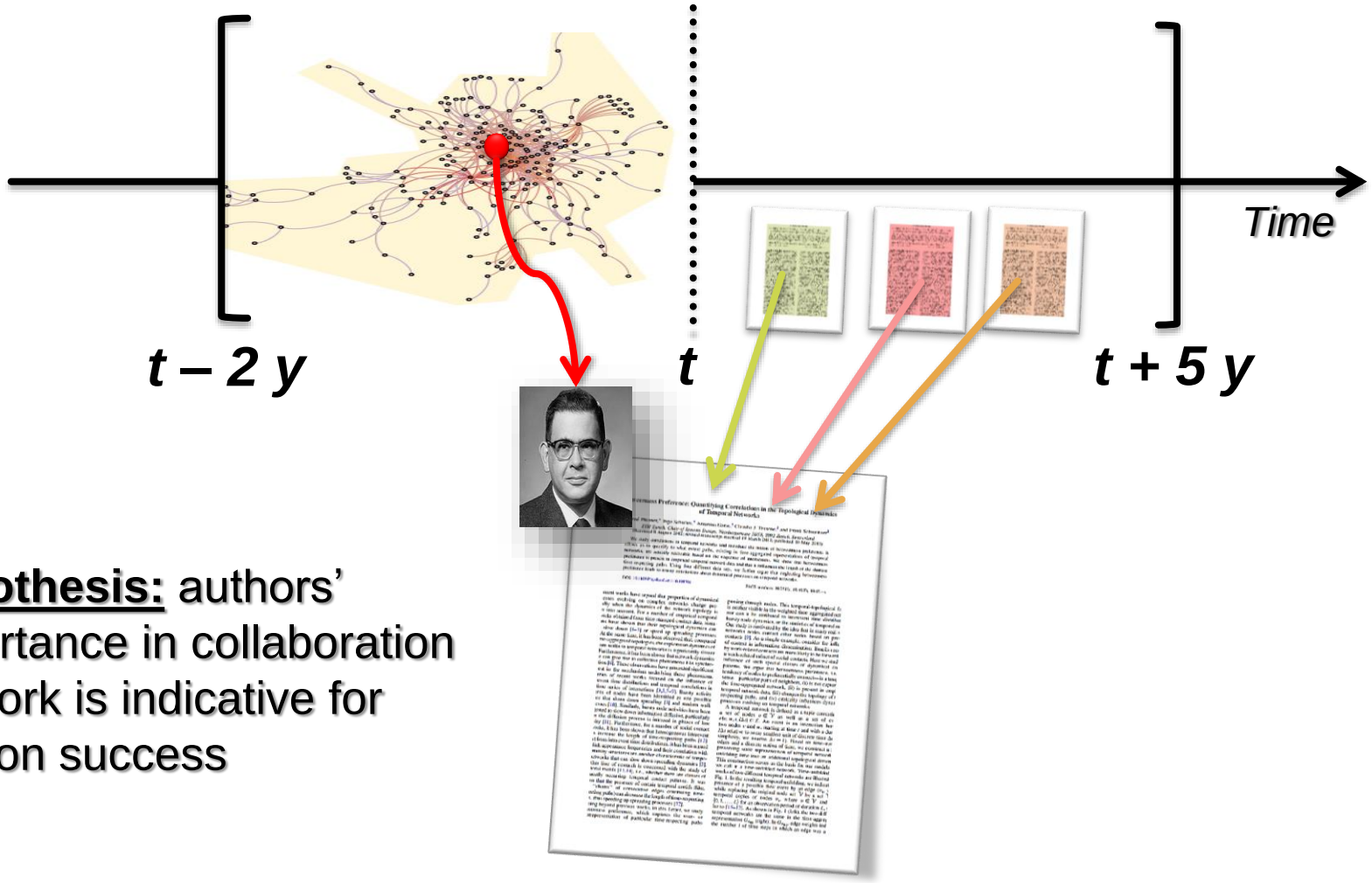
γ

George **Gamow**

β

Hans **Bethe**

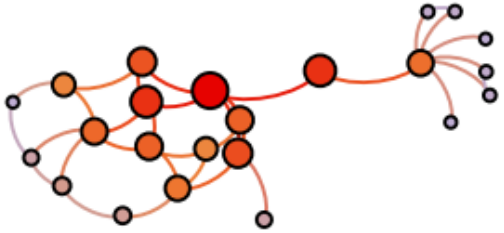
Dynamic collaboration networks



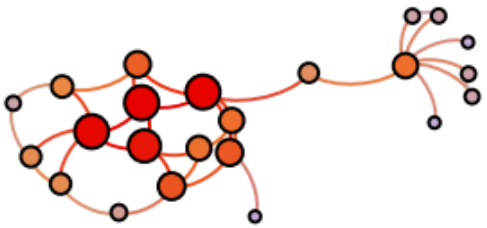
Hypothesis: authors' importance in collaboration network is indicative for citation success

How to quantify importance?

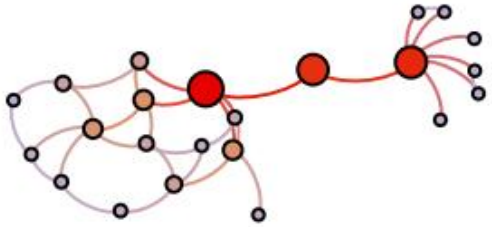
degree centrality



closeness centrality



eigenvector centrality



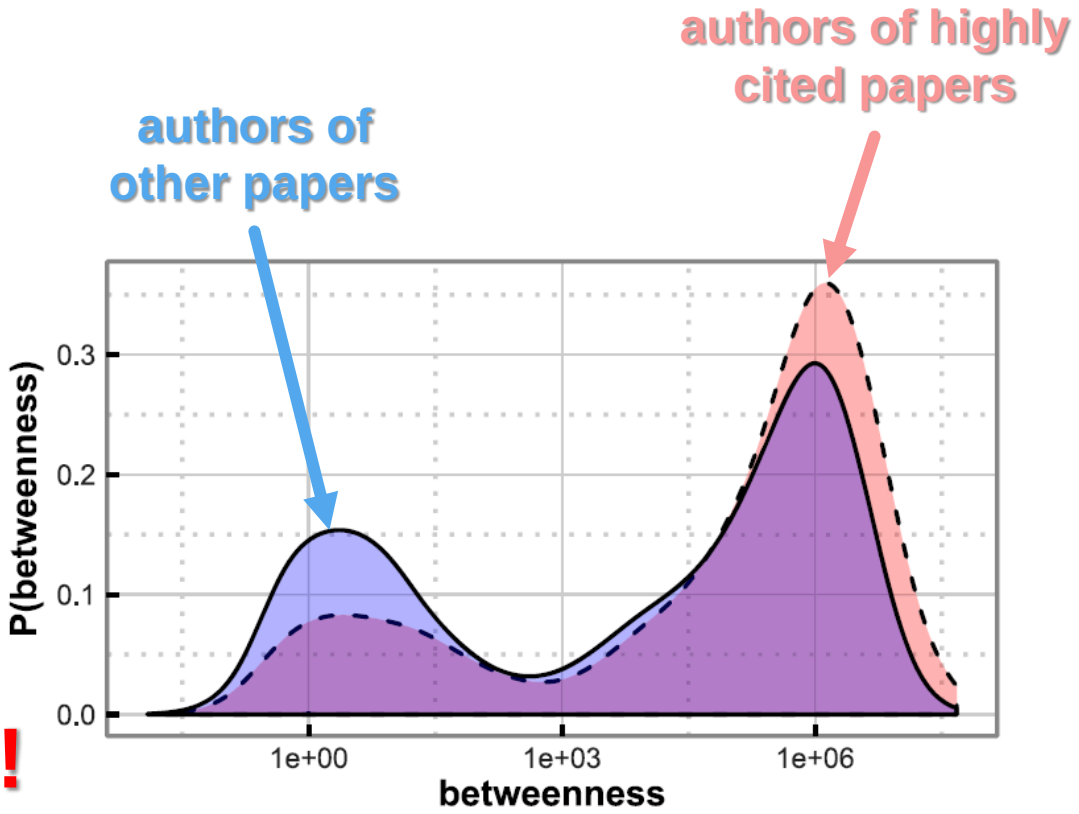
betweeness centrality

Centrality and citation success

data: ~ 108,000 computer science publications (1996-2008) from MS Academic Search

Hypothesis: authors' importance in collaboration network is indicative for citation success

YES, it is!

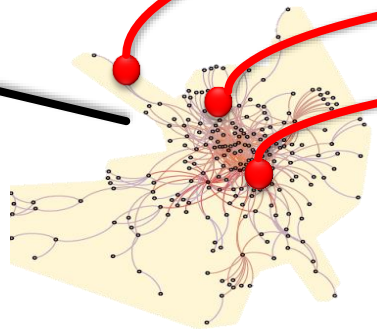


Emre Sarigöl, René Pfitzner, Ingo Scholtes, Antonios Garas and Frank Schweitzer: **Predicting Scientific Success Based on Coauthorship Networks,** EPJ Data Science, Vol. 3, No. 9, September 25 2014

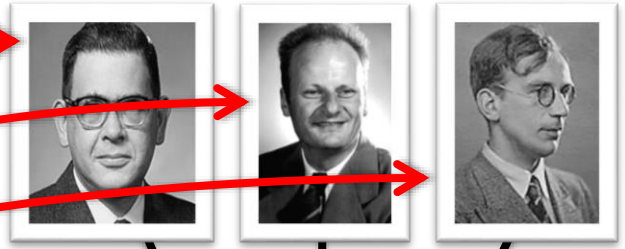
Predicting scientific success

network-based measures capturing importance of authors

max/min eigenvector, betweenness, degree, and k-core centrality

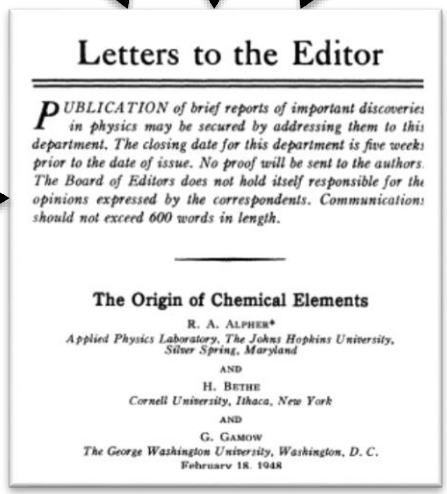


coauthorship network [t-2y, t]



Random Forest Classifier

among 10 % most cited works at t+5y?



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Published in year t

training set

Prediction results

Results (CS)	
Precision	60 %
Recall	18 %
F1-Score	0.28

✓ six times better than random guess

✓ social position of authors alone sufficient to predict citation success of 2,000 out of 10,800 top papers

- ✓ position in collaboration network predicts citation success
- ✓ citation network contains semantic information
- ✓ citation network contains social information

Computer model predicts academic success

Algorithm based on publications finds that first-author articles in leading journals matter most.

Richard Van Noorden

02 June 2014

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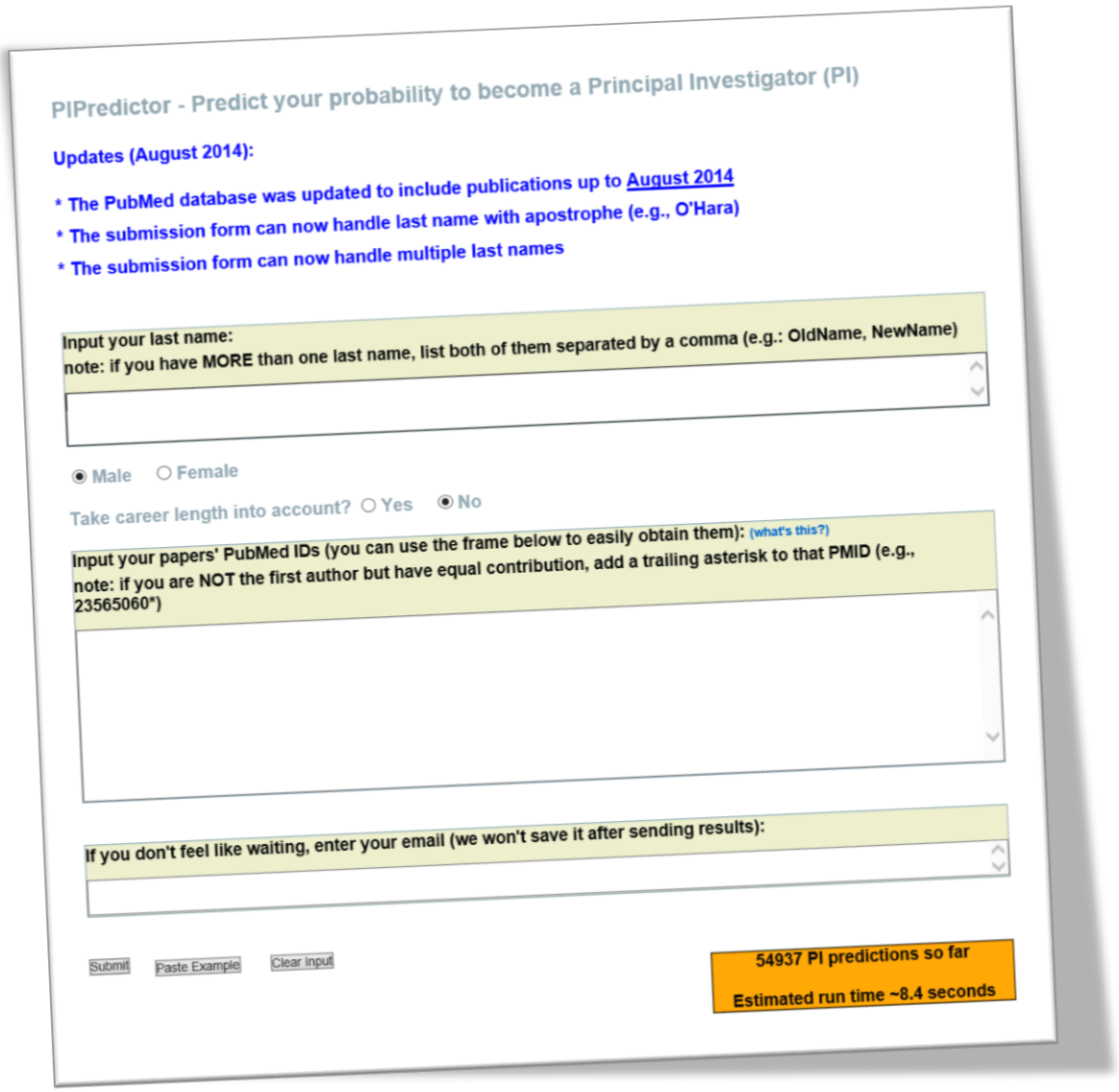
The PIPredictor



was the h-index only the beginning?

a glimpse at the future of hiring comitees?

what is the feedback introduced by such tools?

Feedback?

nature
International weekly journal of science

NATURE | COLUMN: WORLD VIEW

Simona Bednarek

The focus on bibliometrics makes papers less useful

Forcing research to fit the mould of high-impact journals weakens it. Hiring decisions should be based on merit, not impact factor, says Reinhard Werner.

13 January 2015

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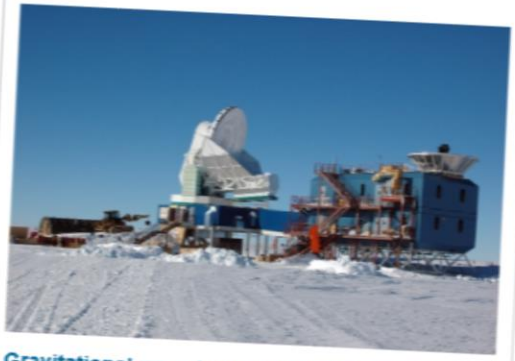
How do we recognize a good scientist? There is an entire industry — bibliometrics — that would have us believe that it is easy: count journal articles, sort them according to the impact factors of the journals, and count all the citations.

Top story

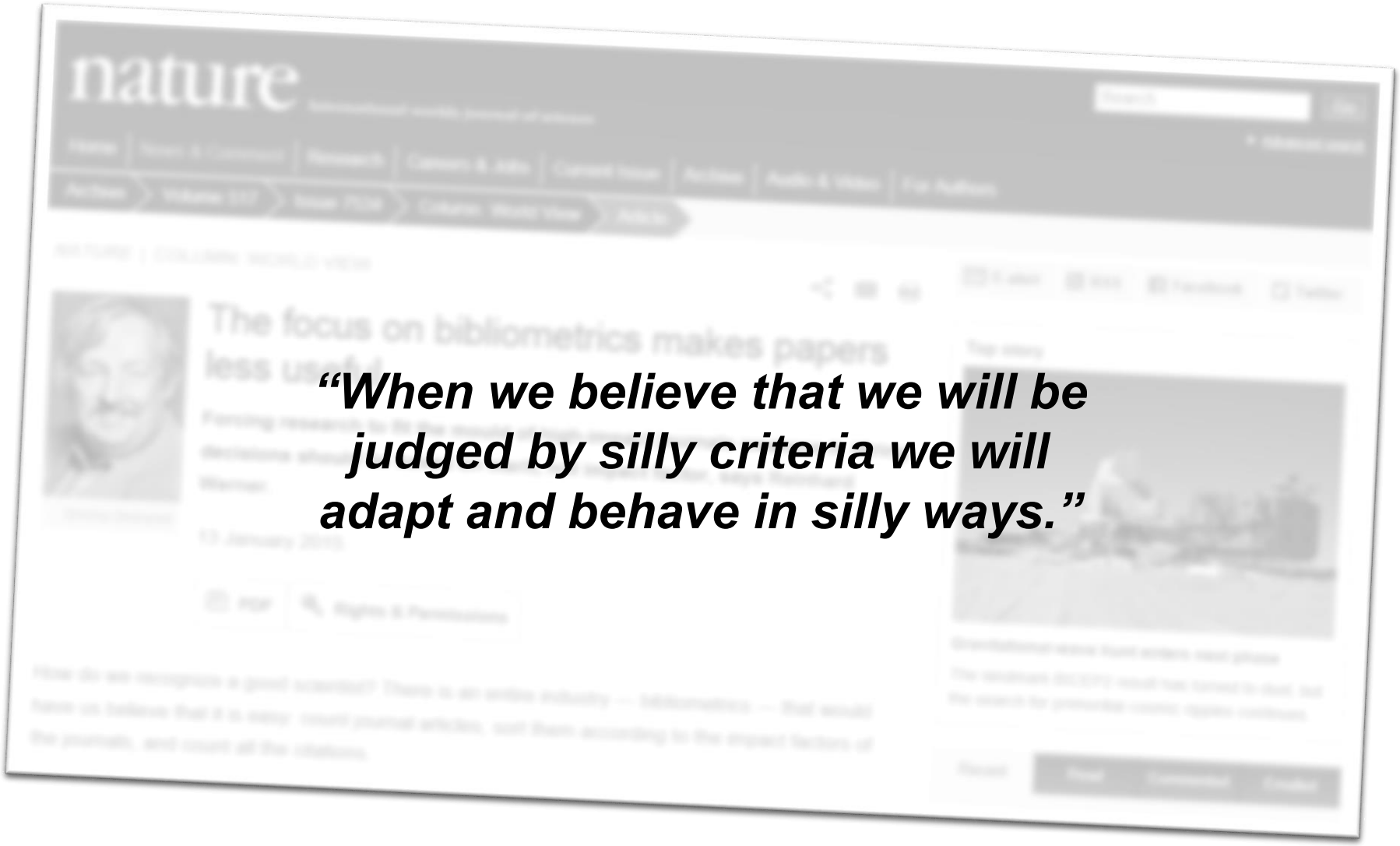


Gravitational-wave hunt enters next phase

The landmark BICEP2 result has turned to dust, but the search for primordial cosmic ripples continues.

Recent | Read | Commented | Emailed

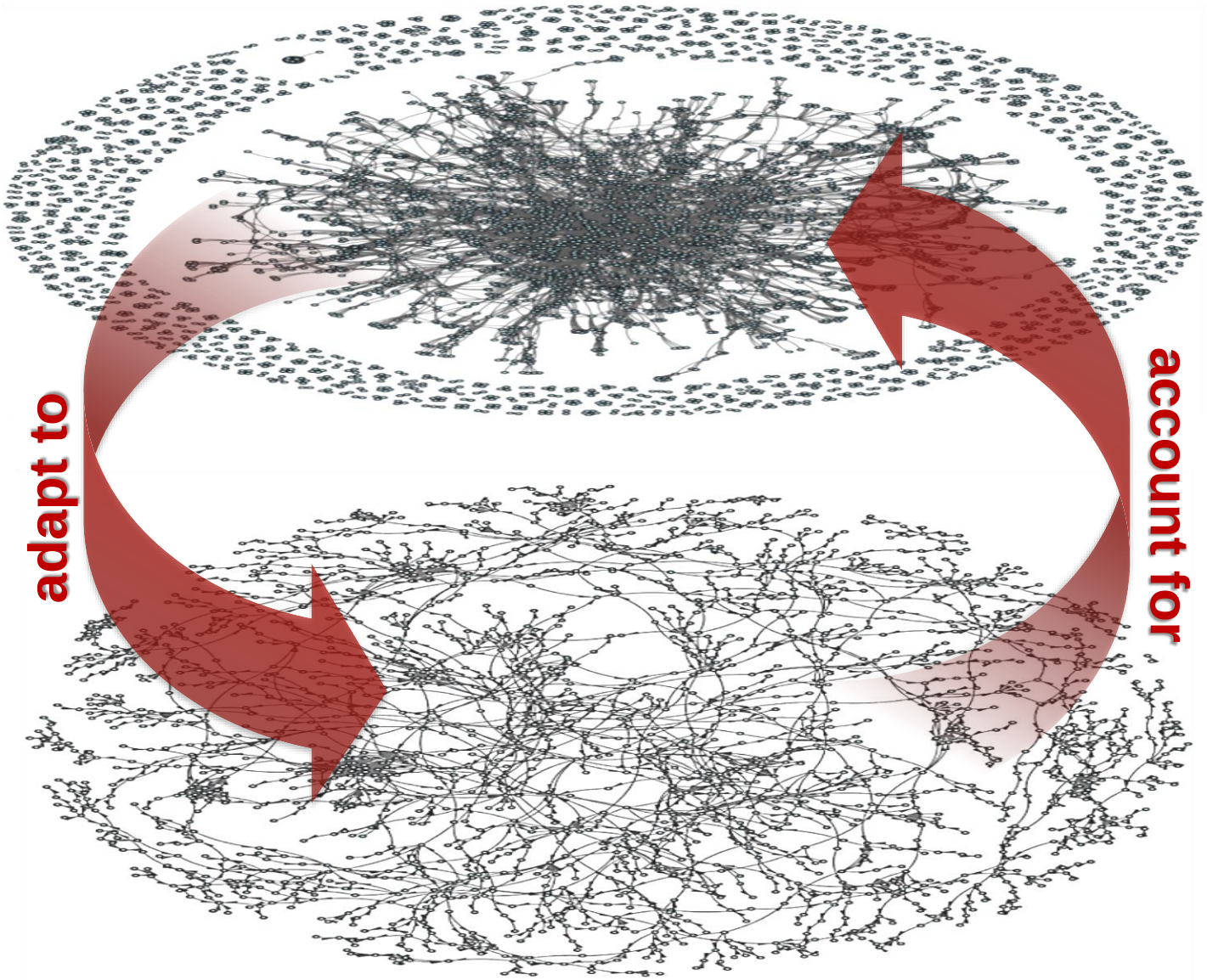
Feedback?



"When we believe that we will be judged by silly criteria we will adapt and behave in silly ways."

Missing: System's perspective

social organisations and processes



(citation-based) impact measures

Thank you!

Ingo Scholtes, René Pfitzner and Frank Schweitzer: **The Social Dimension of Information Ranking: A Discussion of Research Challenges and Approaches,** In ``Social Informatics - The Social Impact of Interactions between Humans and IT'', Springer Proceedings in Complexity, ISBN 978-3319093772, October 2014

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