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The Social Dimension of Information Ranking: Research Challenges and Approaches

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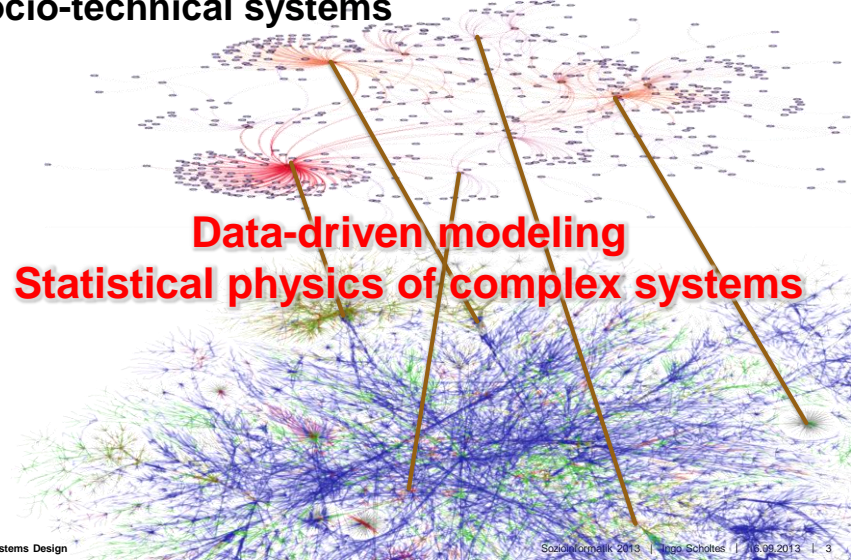
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Socio-technical systems



Data-driven modeling
Statistical physics of complex systems

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Einführung

Soziale Prozesse	IT-Unterstützung
• Meinungsfindungsprozesse	• Media, Blogs, ...
• Wahlen/Entscheidungsfindung	• E-Voting, Wahlomat
• Handeln: Kauf/Verkauf	• E-Business
• Gesetzgebungsprozess	• --
• Strafprozess	• --
• Geschäfts-/Verwaltungsprozess	• Workflow Management
• Partnerfindung/Unifindung/...	• entsprechende Webplattformen
• Wissensorganisation	• Wikipedia, Digital Libraries
• Softwareentwicklungsprozess	• Open Source Plattformen
• Produktionsprozess	• entsprechende Werkzeuge

sofex

And Poetzsch-Heffer

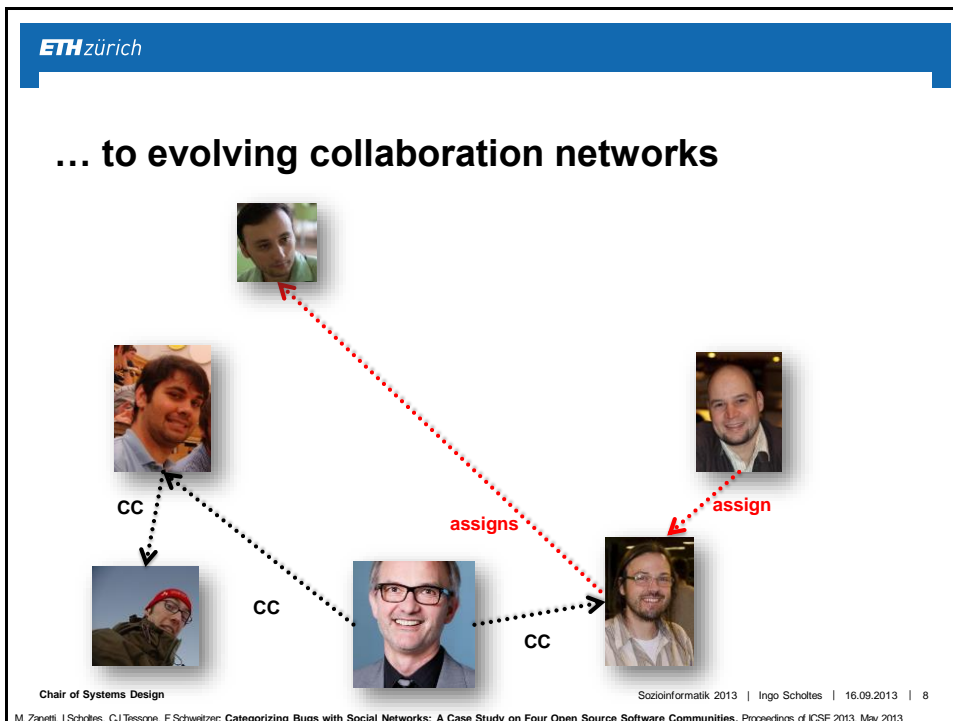
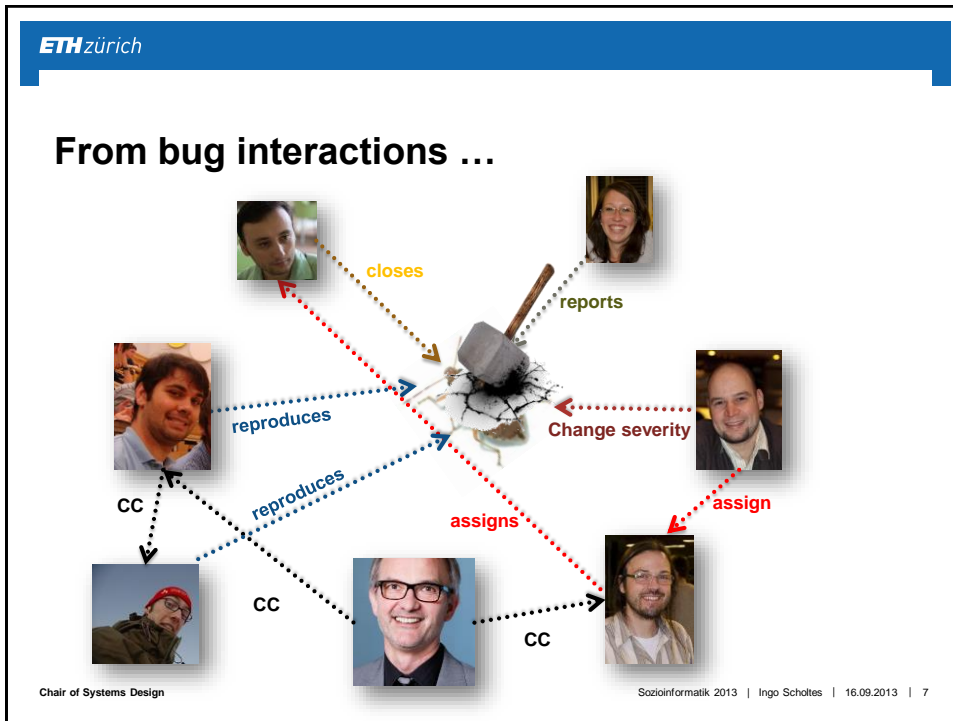
GI-Jahrestagung 2013

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	FIREFOX	THUNDERBIRD	ECLIPSE	NETBEANS	Total
Start date	April 2002	January 2000	October 2001	January 1999	-
Total bug reports	112,968	35,388	356,415	210,921	715,692
Change events	1,068,070	313,957	2,594,385	1,875,878	5,852,290
Changes / report	9.45	8.87	7.28	8.89	8.18
Resolved bugs (resolved/total)	64,088 (0.57)	21,644 (0.61)	158,957 (0.45)	42,851 (0.19)	287,540 (0.40)
FIX (FIX / resolved)	10,856 (0.17)	4,508 (0.21)	103,453 (0.65)	21,442 (0.50)	140,259 (0.49)
DUP (DUP / resolved)	24,263 (0.38)	10,336 (0.48)	28,227 (0.18)	9,328 (0.22)	72,154 (0.25)
INV (INV / resolved)	11,785 (0.18)	2,829 (0.13)	12,601 (0.08)	4,082 (0.10)	31,297 (0.11)
WOF (WOF / resolved)	2,708 (0.04)	581 (0.03)	14,676 (0.09)	5,515 (0.13)	23,480 (0.08)
INC (INC / resolved)	14,476 (0.23)	3,390 (0.16)	-	2484 (0.06)	20,350 (0.07)

Most bug reports are not helpful!



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... to evolving collaboration networks

(a) ECLIPSE (Dec. 2002)
244 nodes, 319 links

(b) NETBEANS (Jun. 2006)
246 nodes, 513 links

(c) FIREFOX (Oct. 2003)
241 nodes, 184 links

(d) THUNDERBIRD (Nov. 2004)
245 nodes, 170 links

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M. Zanetti, I. Scholtes, C.J. Tessone, F. Schweitzer: Categorizing Bugs with Social Networks: A Case Study on Four Open Source Software Communities, Proceedings of ICSE 2013, May 2013

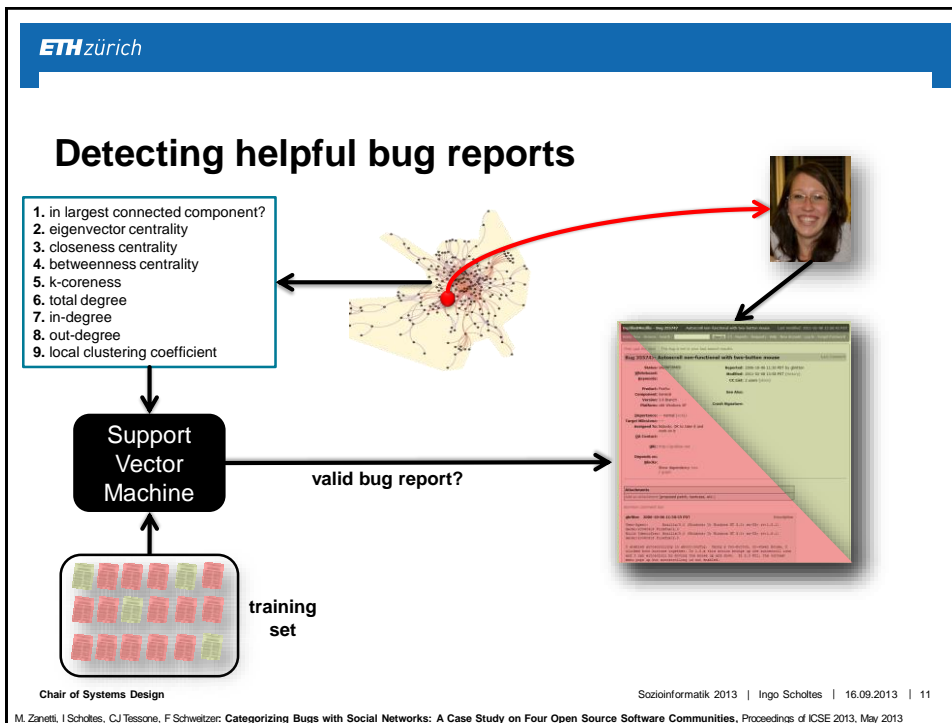
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... to evolving collaboration networks

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Filtering helpful bug reports

PRECISION (p), RECALL (r) AND F -SCORE OF FILTERING VALID BUG REPORTS BASED ONLY ON MEASURES OF SOCIAL EMBEDDEDNESS.

	FIREFOX	THUNDERBIRD	ECLIPSE	NETBEANS
Valid	21.0%	23.3%	74.3%	62.4%
p (LCC)	44.1%	62.1%	76.3%	71.9%
r (LCC)	50.9%	44.5%	62.6%	62.4%
F (LCC)	0.47	0.52	0.69	0.67
p (event)	60.4%	68.6%	76.3%	76.7%
r (event)	30.5%	5.4%	62.6%	38.8%
F (event)	0.41	0.10	0.69	0.52
p (SVM)	82.5%	90.3%	88.7%	78.9%
r (SVM)	44.5%	38.9%	91.0%	87.0%
F (SVM)	0.58	0.54	0.89	0.83

Social network analysis allows to identify helpful bug reports

Social awareness in bug trackers can mitigate information overload

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Information

Image: Marina Noordegraaf, Flickr

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Information


Image: Marina Noordegraaf, Flickr

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STAND BACK



**I'M GOING TO TRY
SCIENCE**

Image credit: xkcd.com

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Does your social position matter?


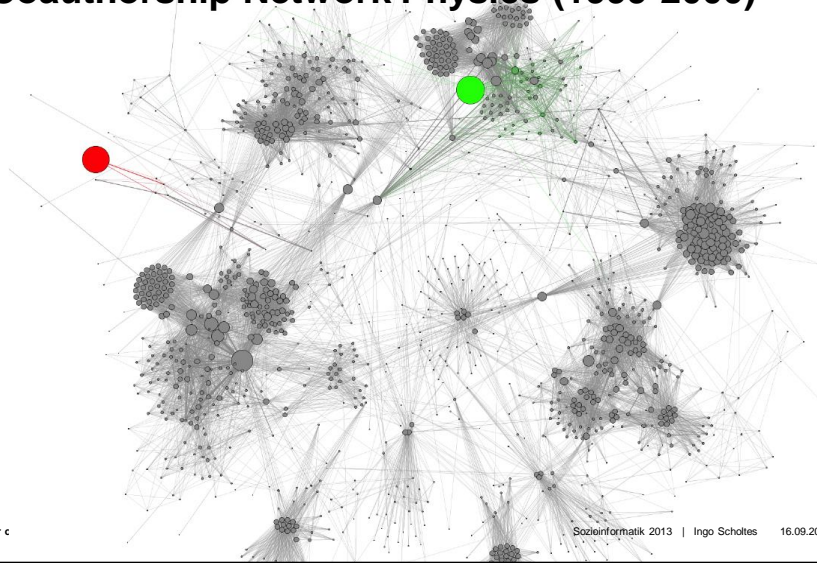


Image credit: ATLAS collaboration, www.atlas.ch

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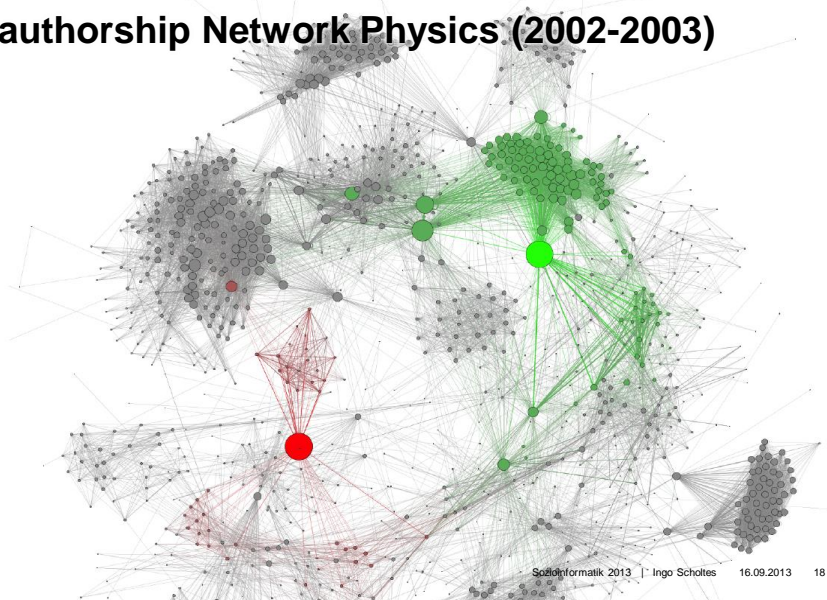
Coauthorship Network Physics (1999-2000)



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Coauthorship Network Physics (2002-2003)



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The social layer

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Top 10 papers?

19 measures of social position of authors

Support Vector Machine

training set

top10 paper?

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E Sarigöl, I Scholtes, A Gans, R Pflizer, F Schweizer: Quantifying Social Influence on Information Filtering and Measured Scientific Success, working paper, 2013

Results

	Nr.Publications	Precision	Recall	F-Score
Chemistry	58129	53.9%	11.9%	0.19%
Computer Science	125061	55.8%	21.2%	0.31%
Biology	59871	60.6%	16.6%	0.26%
Physics	52008	49.0%	8.4%	0.14%

>> 10 %

Results

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There is hope 😊

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Closing the loop

Multiplex modeling?
Objectivity?
Ethical implications?
Systems perspective?

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Thank You!

MS Zanetti, I Scholtes, CJ Tessone, F Schwaltzer: **Categorizing bugs with social networks: a case study on four open source software communities**, Proceedings of ICSE 2013, San Francisco, May 2013
 MS Zanetti, I Scholtes, CJ Tessone, F Schwaltzer: **The Rise and Fall of a Central Contributor: Dynamics of Social Organization and Performance in the Gentoo Community**, Proceedings of ICSE CHASE 2013, May 2013

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