Scientific Literature (@ TUM)

Dr. Benedikt Hauptmann

Dr. Henning Femmer

With material from

Dr. Florian Deißenböck, and

Prof. Dr. Stefan Wagner

Goals and Content

1. Methodology: Searching for literature in a scientific field
2. Evaluation: Indicators for quality of scientific papers
3. Technical Aspects (@TUM): Getting a paper for a citation

Two parts:

1. What are scientific publications?
2. Literature search

Why literature reviews?

- Part of your job.

Goals of literature reviews:

- Understand the state of science
- Identify currently open questions
- Show relevance
- Define commonalities and differences with other work (and explain why)
- Place your work in the area of research
- Give evidence for your assumptions
- ...

Scientific Publications

(a tiny introduction)

What kind of paper/articles/… exist?

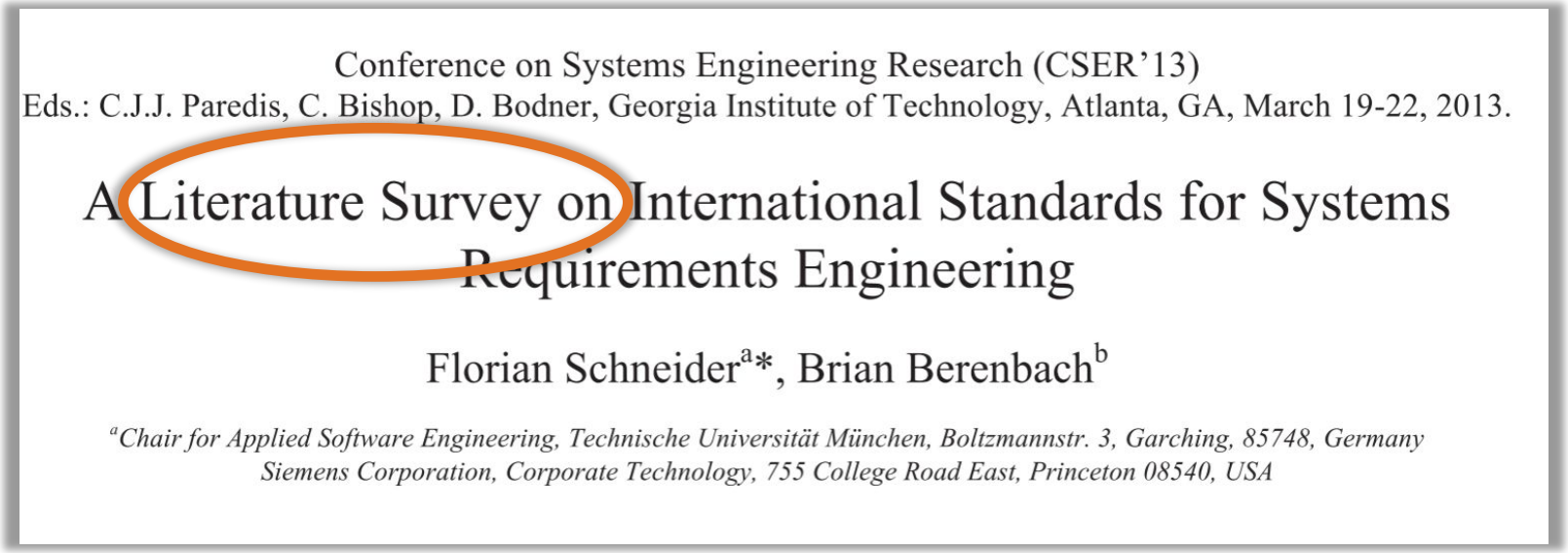
Research type facets [Wieringa2005]

- Exploratory
- Solution
- Validation / Evaluation
- Experience
- Philosophical / Opinion

[Wieringa2005] R. Wieringa, N. Maiden, N. Mead, and C. Rolland, "*Requirements engineering paper classification and evaluation criteria: a proposal and a discussion*", Req. Eng., 2005.

What kind of paper/articles/… exist?

Jackpot: Meta publications / Research Surveys



Conference on Systems Engineering Research (CSER'13)
Eds.: C.J.J. Paredis, C. Bishop, D. Bodner, Georgia Institute of Technology, Atlanta, GA, March 19-22, 2013.

A Literature Survey on International Standards for Systems Requirements Engineering

Florian Schneider[a]*, Brian Berenbach[b]

[a]*Chair for Applied Software Engineering, Technische Universität München, Boltzmannstr. 3, Garching, 85748, Germany*
Siemens Corporation, Corporate Technology, 755 College Road East, Princeton 08540, USA

Which formats?

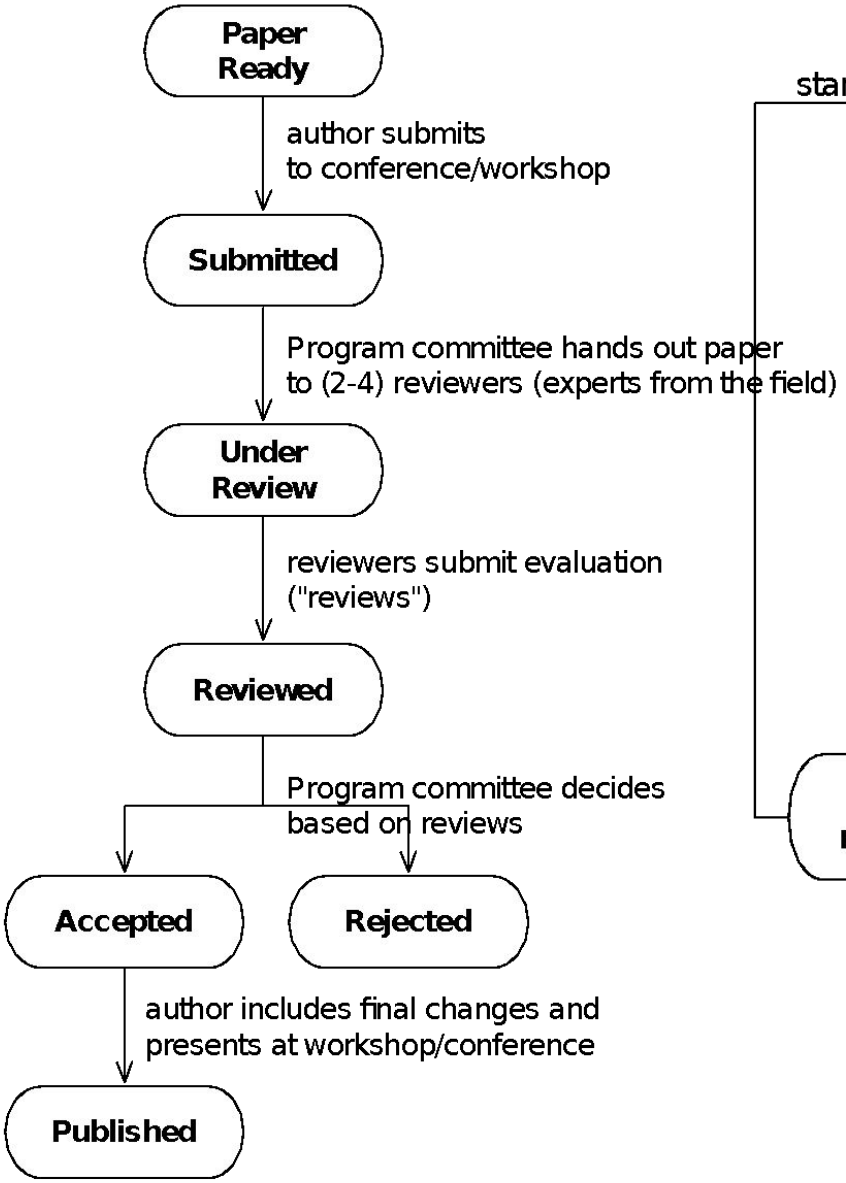
Different Formats -> Different Quality

It's all about the peer review

- **Book**
  - Usually single-author
  - 100 – 1000 pages
- **Book chapter**
  - 20 – 50 pages
- **Journal article/paper**
  - 10 – 30 pages
- **Proceedings article/paper (conference)**
  - 3 – 15 pages
- **Workshop article/paper**
  - 3 – 15 pages
- **Technical reports**
- **Thesis (Dissertation/Master's Thesis/Bachelor's Thesis)**
- **Blogs**
- **Tweets**
- **...**

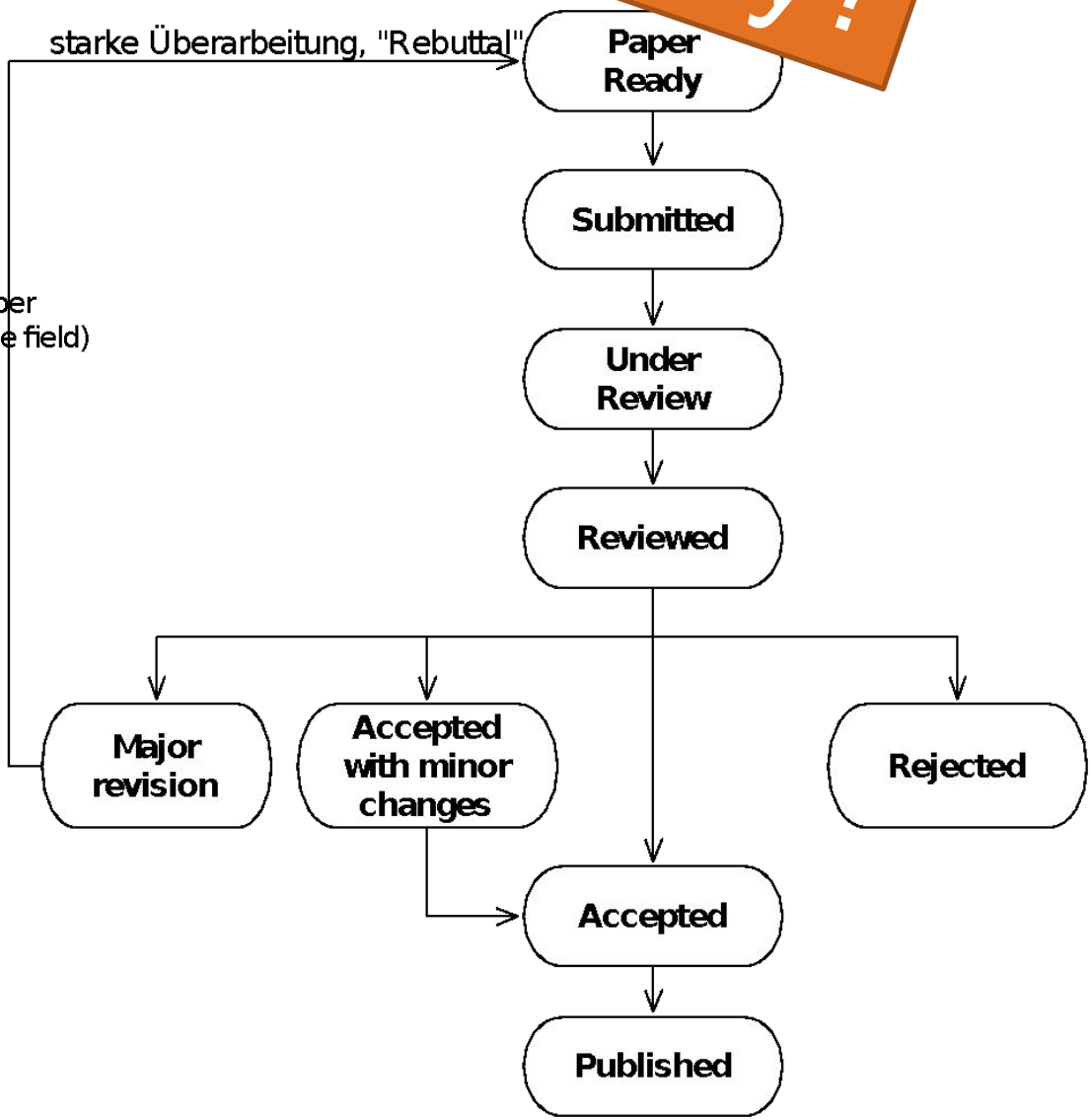
The Peer Review System

e.g. for conferences



e.g. for journal papers

Why?



Example: Reviews for a workshop

---------- REVIEW 2 ----------
PAPER: 4
TITLE: Who is the Advocate? Stakeholders for Sustainability
AUTHORS: Birgit Penzenstadler, Henning Femmer and Debra Richardson

---------- REVIEW ----------
The paper attempts to devise a systematic process for identifying advocates of sustainability. The process leverages on well-established/classical requirements engineering processes for stakeholders identification.

+ The paper is well-written and presented. The examples are useful.
+ The use of the requirements techniques to identifying sustainability stakeholders looks to be plausible.

- Combining/contrasting the outcomes the four techniques look to be an expensive exercise. Furthermore, sustainability analysis may also require the identification of an equally important slice of stakeholders, who are the devils' advocates for sustainability. This could be important for promoting behavioral change, analyzing obstacles for the sustainability agenda, understanding their incentives, quantifying the risks to adoption and working on solutions for promoting acceptance.

- I would also expect more justification of the exercise in terms of long term benefits and influences on various software artifacts. The motivation is bit weak to justify the effort.

---------- REVIEW 1 ----------
PAPER: 8
TITLE: Detecting Inconsistencies in Wrappers - A Case Study
AUTHORS: Henning Femmer, Dharmalingam Ganesan, Mika

---------- REVIEW ----
= Paper overview =

The paper addresses
in software abstractio
underlying implement

The authors propose
equivalence of severa
and modification of pa
neither complete nor

The solution propose
learning. The static a
given implementation
extractors" driving the
differences in return c
produce some false n
case study). These w
the solution also integ
phase. Finally, the ma
information of the stat
to keep the "best" dat

The methodology is t
code composed of 10
revealed 84 issues, o
failures. Each type of
the industrial team is given.

= Detailed feedback =

- abstract - typo: "instead of to the" -> "instead of the"

- p2 - typo: "an SAL" -> "a SAL"

- p3 - typo: "an analysts" -> "an analyst"

- p3: "The tool detects differences in the function pair and highlights the important ones to the user." -> at this stage we don't understand how the "important ones" are defined. It is also unclear at this stage that the training set starts empty (all functions unclassified) and is incrementally defined/increased. I would suggest to be more explicit when describing step (1) and (3).

- p3 - fig 2: the "very light-red background" is very hard to see; I would strongly recommend to find a better way to highlight.

- p3 - fig 2: why are "uint32" and "free" highlighted although they are identical in both implementations?

- p5: "304 pairwise comparisons": can't thing be optimized here? Eg: if f1 and f2 are equivalent and f2 and f3 too, we don't really need to check for f1 and f3, do we?

- p7- fig 6: I would suggest to repeat (at least in the label) which OS which side corresponds to (as in "VxWorks on the left and RTEMS on the right")

= Overall opinion =

It's a pleasure to read such a self-contained paper that answers
ers raises while reading. It's
ck and provides both detailed
g theory and insightful

easant to read, with
s clearly stated
nts, assumptions and
commented,
tail, with very
es used, and

f 2 technologies; it
grated, and
f false positives

dustrial team,
om using the tools
hodology is applied
, with promising

e target language is
of the methodology
ch could it be applied
to another language?

Exampl

Reviewer: 1

Recommendation

Comments:

First some genera
Sorry to be hard c
not want to demot
To me, it looks to
categories to clas
I wound it confusi
I would evaluate i
might be my fault
I. Your aim is to re
Mine, too, I consic
Therefore, the cor
When I think back
paper. Then I rem
the contribution of

It should be more
If one keeps in mi
the paper is easie
evaluating the qua
It might still be int
distracting/annoyi
that the classificat

One more genera
Is green software
I have the feeling

p1 l58
4 dimensions vs. views
Btw., why is the technical dimension important? For me it is simply a subset of the economic 'dimension'. Keeping a system sustainable from a technical perspective makes it more profitable from the economic point of view. If it is not 'technically sustainable', it is also not in the economically way.

p1 l 44
example of green software code are mobile apps
Why are they green?

#It is esse

p2 l4
conflicts b ts.
?- Are rebo
?- Arent th

How do th as as quality requirements for
Software?

p2 l10
What is th y? How does it help to account for this in
GSW?
I think the sentence should be reformulated to avoid misunderstandings.

+ 4 more pages
+ "please see the attached file for more detailed notes"

----Sidebar section

Sec 2 Related Work and its Quality

p2 l22
Attention in SW Engineering only recently.
- depends on whether SW E is something different than the production of software
SW that is now classifiyd as greening (Green by) has been produced since many years in environmental sciences, and there has been environmental informatics for a while. There is the conference series of EnviroInfo (Environmental Informatics) (27th this year). I had a lectures how to design environmental software in 1994. Early (german) names are e.g. R Grützner, B Page, V. Wohlgemuth. At least since 2003 there is a Journal on Environmental Informatics (methodologies, applications, and policy considerations, the needs for environmental systems analysis, the challenges of environmental systems modeling, and the impacts of environmental informatics are discussed etc., btw., IF 3.619, not that I like Impact Factors).

Publication types and peer reviewing

- **Book**
  - *Mostly single author, no peer review*
- **Book chapter**
  - *Peer review (several round trips)*
- **Journal article**
  - *Peer review (several round trips)*
- **Proceedings article/paper (conference)**
  - *Peer review*
- **Workshop article/paper**
  - *Peer review*
- **Technical Reports**
  - *No peer review*
- **Thesis (Dissertation/Master's Thesis/Bachelor's Thesis)**
  - *?*
- **Web pages / blogs**
  - *No peer review*
- ***Tweets***
  - *???*
- *…*

How *good* is a scientific publication?

Quality of scientific publications has several aspects:

- Relevance
- Novelty
- Validity
- Rigor
- …

How *good* is a scientific publication?

Easier to judge:

Use with care…

1. **Where was it published (venue)?**
   - Peer-reviewed venue
   - Impact factor of venue
   - Acceptance rate of venue

2. **How was it received in literature?**
   - Number of citations

S…ineering venues*

Guess: Acceptance Rate

Top General SE Conferences	ICSE	FSE/ESEC	ASE	SPLASH/ OOPSLA	ECOOP	ISSTA	FASE
2013	85/461(18%)	51/251(20%)	?	?	?	32/124(26%)	26/112(23%)
2012	87/408(21%)	34/201(17%)	?	?	?	31/108(29%)	33/134(25%)
2011	62/441(14%)	34/203(17%)	37/252(15%)	61/166(37%)	?	35/121(29%)	29/99(29%)
2010	52/380(14%)	34/169(20%)	34+31/191(18%)	?(28%)	?(23%)	24/105(23%)	24/96(25%)
2009	50/405(12%)	32+7/217(15%)	38+33/222(17%)	25/144(17%)	25/117(21%)	25/93(27%)	30/124(24%)

- Jour…
- Wiley Journal o…
- Springer Empirical Softwa…

Conferences (Proceedings)

- International Conference on Software Engineering (ICS…
- Foundations of Software Engineering (FSE)
- International Conference on Automated Software Engineering (ASE)
- OO Programming, Systems, Languages and Applications (OOPSLA)
- International Symposium on Software Testing and Analysis (ISSTA)
- International Conference on Software Maintenance (ICSM)

- https://taoxie.cs.illinois.edu/seconferences.htm
-

*in no particular order

Hands-on:
Literature reviews

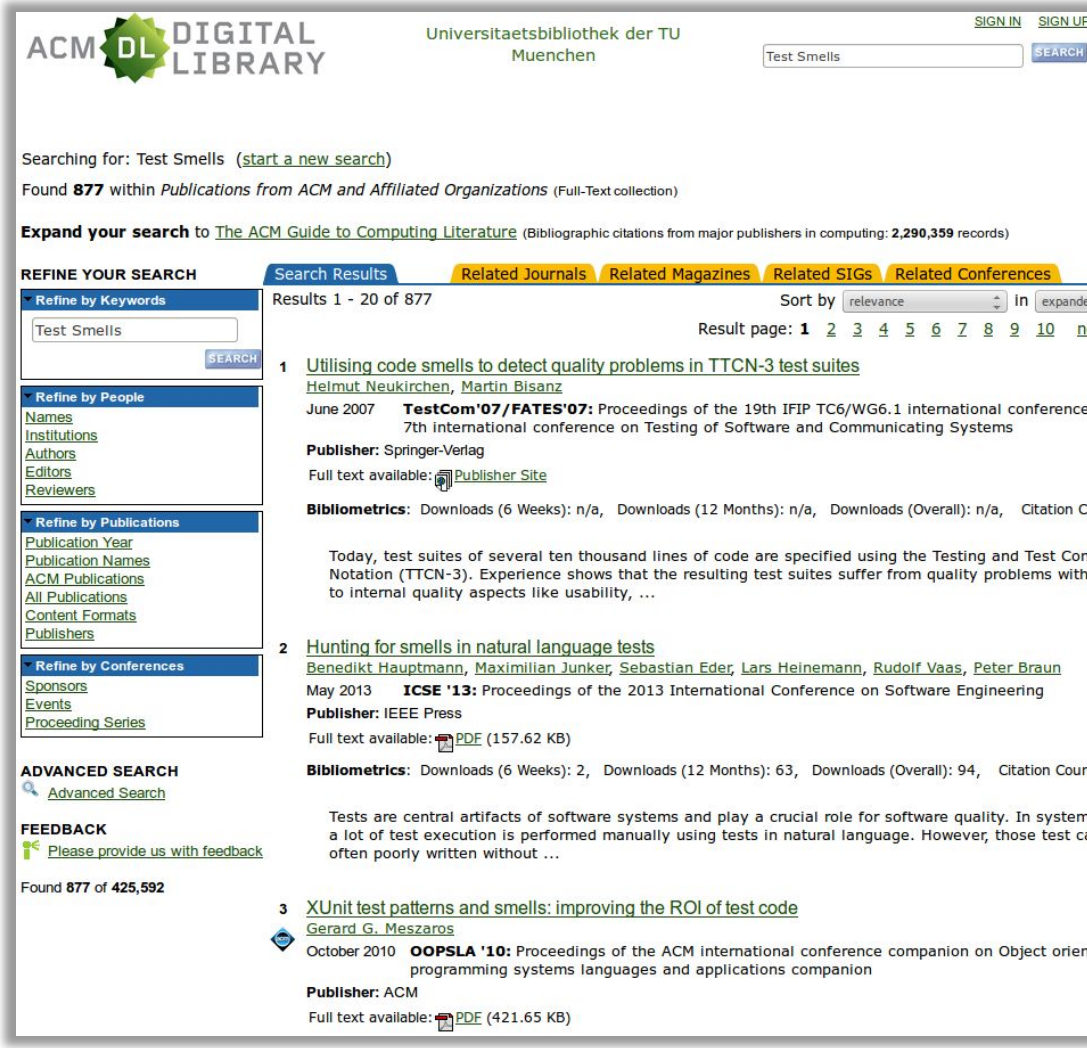
Where can we find papers?

Publishers:
- ACM Digital Library
- IEEE Xplore
- Springer Link
- Elsevier
- TUM library
- ...

Direct sources
- Authors homepages

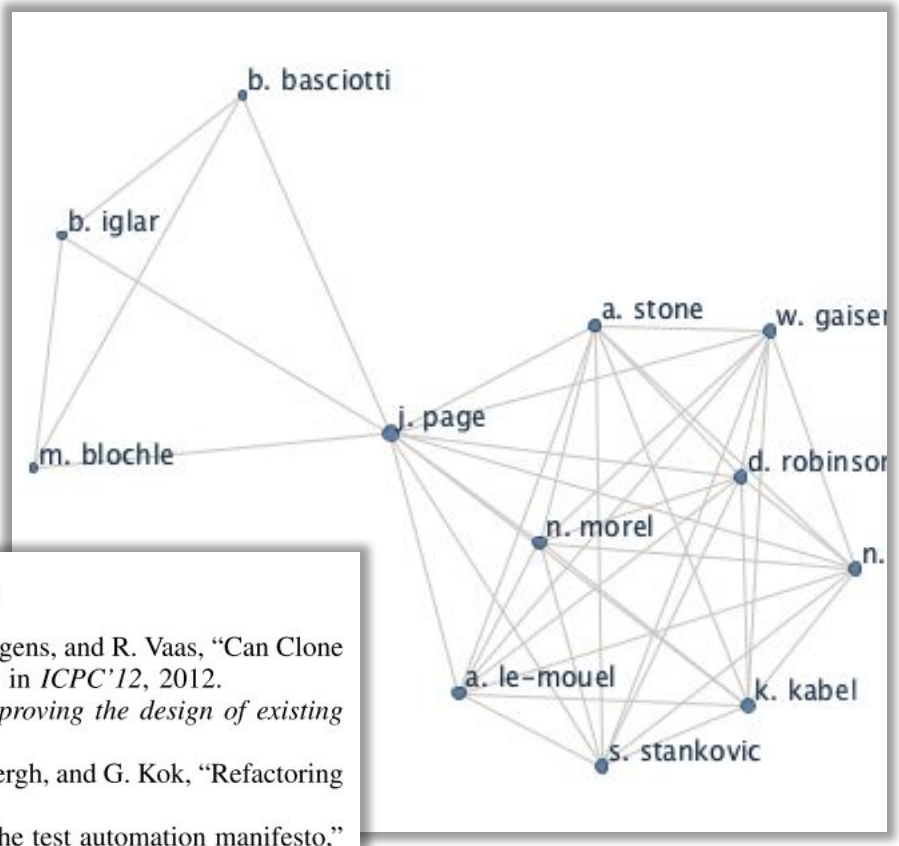
Meta sources
- scholar.google.com
- Research Gate

We use mostly Google Scholar!
- Pro
  - All results in one place
  - Direct meta-information (citations)
  - Sometimes direct link to PDF
  - Author graphs
- Con
  - No quality filter
  - Few search filter options



Search strategies

1. Manually searching for keywords
2. Searching through author's pages
3. Literature Snowballing
4. Systematic strategies
   - Systematic Mapping Studies
   - Systematic Literature Reviews



REFERENCES

[1] B. Hauptmann, M. Junker, S. Eder, E. Juergens, and R. Vaas, "Can Clone Detection Support Test Comprehension?" in *ICPC'12*, 2012.

[2] M. Fowler and K. Beck, *Refactoring: improving the design of existing code*. Addison-Wesley, 1999.

[3] A. van Deursen, L. Moonen, A. van den Bergh, and G. Kok, "Refactoring Test Code," in *XP'01*, 2001.

[4] G. Meszaros, S. Smith, and J. Andrea, "The test automation manifesto," in *XP'03*, 2003.

[5] G. Meszaros, *xUnit Test Patterns: Refactoring Test Code*. Addison-Wesley, 2007.

[6] M. Abbes, F. Khomh, Y.-G. Gue andhe andneuc, and G. Antoniol, "An empirical study of the impact of two antipatterns, blob and spaghetti code, on program comprehension," in *CSMR'11*, 2011.

[7] F. Khomh, M. Di Penta, and Y.-G. Gueheneuc, "An exploratory study of the impact of code smells on software change-proneness," in *WCRE'09*, 2009.

[8] A. van Deursen and M. Leon, "The video store revisited thoughts on

I know a paper. How do I get the pdf?

- Papers are licensed by the publishers (ACM, IEEE, Springer, Elsevier, …)
- TUM has bought *most* of the licenses

How do you get access?

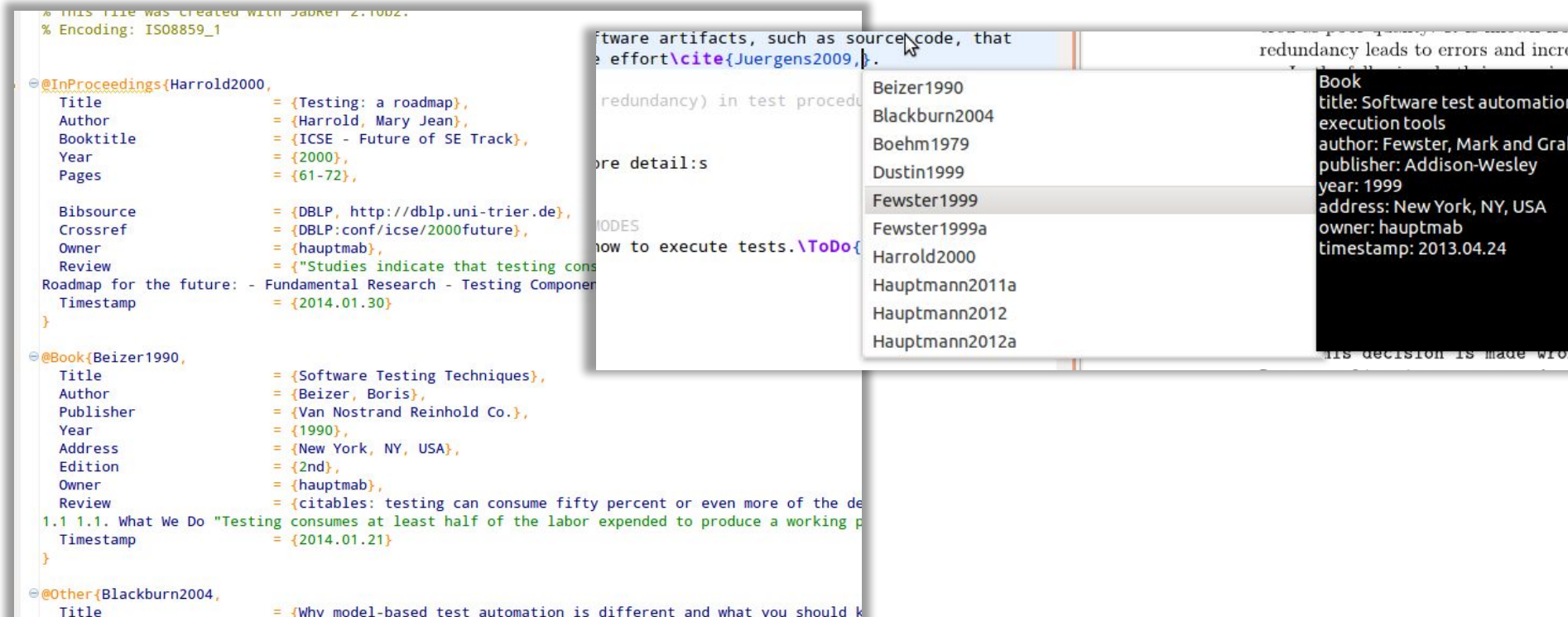
- Library computers
- https://EACCESS.ub.tum.de and search for venue/journal
- VPN + Proxy server

Details can be found here:

https://www.lrz.de/services/netzdienste/proxy/journals-access/

Reference management

- BibTeX (+LaTeX)
  - Classical, useful format for LaTeX
  - Most sources offer information in bibtex format
  - Use proper types: `@article,...`



Reference management

- BibTeX (+LaTeX)
  - Classical, useful format for LaTeX
  - Most sources offer information in bibtex format
  - Use proper types: `@article,…`
- JabRef
  - Plattform independant
  - Uses BibTeX as data format
  - Link to pdf
  - Group
- Mendeley
  - Modern, “in the cloud”
  - Cooperative references
  - Notes, highlighting, etc
  - Bibtex export
- Papers (Mac only)
- …

Goals and Content

1. Methodology: Searching for literature in a scientific field
2. Evaluation: Indicators for quality of scientific papers
3. Technical Aspects (@TUM): Getting a paper for a citation

Two parts:

1. What are scientific publications?
2. Literature search

More details

- B. Kitchenham and S. Charters, “Guidelines for performing Systematic Literature Reviews in Software Engineering,” 2007.
- S. Keshav, “How to Read a Paper”, 2013
  http://blizzard.cs.uwaterloo.ca/keshav/home/Papers/data/07/paper-reading.pdf
- Kent Beck: How to get a paper accepted at OOPSLA:
  http://plg.uwaterloo.ca/~migod/research/beckOOPSLA.html
- A. Zeller and T. Zimmermann, “Failure is a Four-Letter Word – A Parody in Empirical Research”
  and the corresponding presentation:
  https://www.youtube.com/watch?v=NM3CIIbuVoM
- Zugang zu Wissenschaftlichen Publikationen für Mitarbeiter und Studierende der TUM
  https://www.lrz.de/services/netzdienste/proxy/zeitschriftenzugang/
- Paper-Verwaltung:
  http://www.mendeley.com
  http://jabref.sourceforge.net
  …