

Peer Review

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What is a peer?

Merriam Webster

- a member of the British nobility, i.e., a member of one of the five ranks (as duke, marquess, earl, viscount, or baron) of the British peerage



- a person who belongs to the same age group or social group as someone else

What is a peer?

Online etymology dictionary:

- c.1300, "an equal in rank or status" (early 13c. in Anglo-Latin), from Anglo-French *peir*, Old French *per* (10c.), from Latin *par* "equal" (see *par* (n.)).
- Sense of "a noble" (late 14c.) is from Charlemagne's Twelve Peers in the old romances, who, like the Arthurian knights of the Round Table, originally were so called because all were equal.
- Sociological sense of "one of the same age group or social set" is from 1944.
- **Peer review** attested by 1970.
- **Peer pressure** is first recorded 1971.

Peer review in academia

Peers decide about

- which **papers** are published (editorial peer review)
- which **project proposals** are funded (funding review)
- (*hiring as a researcher, professor, ...
the higher the rank, the more peerish the decision*)

How does editorial peer review work?

Two models

- Conference Reviewing
- Journal Reviewing

Conference Reviewing

- Program committee (PC)
 - program **chairs** (appointed by organizing committee of the conference series)
 - PC chairs invite **area chairs** and other **PC members**
 - PC members may introduce **additional reviewers**
- Strict deadlines, **short time** for reviewing (4-6 weeks)
- Papers are **divided among PC**
- **5-10 papers** per PC member (batch reviewing)
- Decision (in most cases): **accept/reject**

Journal Reviewing

- Editorial board
 - editor(s) in chief and editorial board members
 - one editor takes care of a submitted paper
 - editor asks ~3 experts for reviews
- Reviewer has 4-6 weeks time for a review (can be extended)
- Decision:
 - accept as is (rare)
 - accept with minor revision (also rare)
 - revision and resubmission
 - reject

Blind vs. Double-blind Reviewing

Blind vs. double-blind reviewing

- reviewers are unknown: *blind* or *single-blind*
- authors are unknown, too: double blind

Double-blind reviewing means: authors must make any reasonable effort to anonymize the paper. i.e.,

- no author names
- no reference to own work

instead of, “we have shown in [RN11]”,
say “Razniewski and Nutt have shown in [RN11]”

R. Snodgrass has summarized research on single vs. double-blind reviewing. “Single-Versus Double-Blind Reviewing: An Analysis of the Literature”, SIGMOD Record, 2006

Paper bidding

PC members bid for paper assignment, based on

- title
- abstract
- *(keywords, areas)*
- *(authors and their affiliation)*

PC members express degrees of preference for paper:

- e.g., high, medium, low in EasyChair
- assignment based on preferences and possibly area match

Reviewing proper

PC members

- produce a report
 - write report themselves, or
 - give the task to an auxiliary reviewer (colleague, PhD student, postdoc)
- summarize the report in a (provisional) judgment with grades (e.g., strong accept, accept, weak accept, borderline, weak reject, reject)
- view other reports after having submitted their own
- discuss their reviews and possibly adjust their judgment and review
 - if asked by PC chairs or area chairs (= meta-reviewers) to do so in case the judgments vary (significantly)
- PC/area chairs finally decide about acceptance or rejection

Rebuttal phase

May be inserted between

- first judgment of reviewers and
- final judgment of reviewers
- Authors respond to reviews
 - in short period, e.g., 4 days
 - with limited space, e.g., 500 words
- Reviewers may revise their reviews (and grades) based on other reviews and author rebuttal
- Meta-reviewers report to PC chairs
- PC chairs decide

Revision phase

Recently introduced in some conferences (VLDB, SIGMOD)

(not together with rebuttal)

- Reviewers not only decide about acceptance/rejection, but may also request a revision
- PC chairs/meta-reviewers decide about acceptance, rejection, or revision
- Authors have limited period (approx. 4 weeks) to revise the paper according to comments of reviewers
- Reviewers comment on the outcome of the revision and discuss
- PC chairs/meta-reviewers come up with final decision

Conference Management Systems

- Conference management has typical workflows
- Conference management systems allow organizers
 - to define the specific workflow of for their conference
 - invite a PC
 - receive submissions
 - organize paper bidding and allocation
 - collect of reviews
 - organize discussions
 - let participants of the reviewing process communicate
 - etc.
- Frequently used
 - EasyChair (<http://www.easychair.org>)
 - Microsoft CMT (<https://cmt.research.microsoft.com/cmt/default.html>)
(see also <https://cmt.research.microsoft.com/cmt/userroles.html>)

Let's look at examples

- VLDB 2011
 - 3 reviews, acceptance
- KR 2014
 - 3 reviews
 - rebuttal
 - rejection
- SIGMOD 2015
 - 3 reviews
 - revision
 - acceptance

Dynamics of reviewer discussions

- Who is likely to start?
 - The reviewer with the positive review?
 - Or the one with a negative review?

*Hint: Which reviews are usually longer?
The positive or the negative ones?*
- What is the most probable outcome of a discussion and an adjustment?

Journal Reviewing

In my experience, typically, single-blind

Differences with conference reviewing

- one paper, no batch
- possibility to have a look at the paper before agreeing to review
- possibility to decline a request
- wider range of judgments: accept, minor revision, revision, reject
- interaction with authors: authors explain how they took the reviewers' comments into account for the revision
- iteration: up to 2 revisions possible
- no discussion among reviewers,
co-reviewers do not reveal their identity

Open reviewing models

- Submissions and reviews are visible to the world, reviewers are anonymous
 - e.g., peerj.com (<https://peerj.com>) (in life sciences and psychology)
Example paper by Daniel Graziotin et al.
(<https://peerj.com/articles/289/>)
- Submissions and reviews are visible to the world, reviewers identify themselves (but may remain anonymous), other researchers may contribute reviews, all contributing reviewers are acknowledged in the end
 - e.g., [Semantic Web Journal](#)

Structure of a review

- Summary of the paper
- Character of the work, relevance for outlet
- Contribution of the paper, relationship to state of the art
 - originality
 - depth
- Strengths
- Weaknesses
- Writing
- Explanation of judgment
- Detailed comments

See also Allen S. Lee “Reviewing a Manuscript for Publication”
(<http://www.people.vcu.edu/~aslee/referee.htm>)

Review Structure CIKM, DB Track

- Overall Rating
 - Strong Accept, Accept, Neutral, Reject, Strong Reject
- Top 3 Strengths
- Top 3 Weaknesses
- Detailed Comments
- Author feedback needed?
- What specific feedback do you like the authors to provide
- Comments to Program Chair

Review Structure IJCAI

- **Summary:** Describe the paper in 2-3 sentences
- **Relevance:** Is the work relevant to AI?
- **Originality:** Does the paper clearly point out differences from related research? Are the problems or approaches new?
- **Significance:** Is the work important? Does the paper make a valuable contribution to knowledge and understanding in the AI area? Does it advance the state of the art? Does the paper add to our understanding of some aspect of agent systems? Does the paper stimulate discussion of important issues or alternative points of view? Does the paper carefully evaluate the strengths and limitations of its contributions, and draw lessons for future work?
- **Technical Quality:** Is there a careful evaluation of the proposed method and the results? Is the paper technically sound, with compelling arguments?
- **Readability and Organization:** Is the paper clearly written? Does the paper motivate the research? Are results clearly described and evaluated? Is the paper well organized?

Review Structure VLDB

- Overall Recommendation: Accept, Revise, Reject
- Summary: what is proposed? in what context? brief justification of recommendation
- 3 strong points
- 3 weak points
- Relevance
- Novelty
- Significance
- Technical Depth, quality of content
- Presentation
- Would you champion acceptance?
- Detailed comments

We organize BZMC 2016

... the 3rd UNIBZ PhD Student Mock Conference 2016

with EasyChair

Review structure for BZMC 16

- Summary
- Strengths
- Weaknesses
- Presentation
- Novelty
- Technical Depth
- Explanation of judgment
- Detailed comments

Peer Review for Research Funding

Funding bodies/agencies base decisions on peer reviews, e.g.,

- South Tyrol:
 - internal projects of UNIBZ, evaluated by Univ. Research Committee 1mio/yr
 - calls by province for research and innovation projects ~2-3 mio/yr
- Italy:
 - PRIN ~100 mio/yr, FIRB (no funding for both in the last few years)
- Austria:
 - FWF (= Fonds zur Förderung der wissenschaftlichen Forschung) 180 mio/yr
 - also FFG, AWS, ...
- Germany:
 - DFG (= Deutsche Forschungsgemeinschaft) 2.6 billion EUR/year
22,000 reviews/yr
 - BMBF (= Bundesministerium für Bildung und Forschung)

Peer Review for Research Funding/2

Funding bodies/agencies base decisions on peer reviews, e.g.,

- UK: Research Councils
 - EPSRC (= Engineering and Physical Sciences Res. C.) 800 mio GBP/yr
2000 proposals/yr
 - BBSRC (= Biotechnology and Biological Sciences Res. C.) 450 mio GBP/yr
 - all councils: combined budget 3.5 bio GBP/yr, out which 1 bio for grants
- France:
 - ANR (Agence Nationale de la Recherche) 1 billion EUR
- Belgium:
 - NFSR (National Fund for Scientific Research)
- USA:
 - NSF, DARPA, NIH, ...
- EU:

Structure of a Grant Proposal

- Problem to be solved, background, related work
- Significance
- Research outcomes, e.g., theorems, prototypes, emp. study
- Impact on research community, economy, society
- Approach, work programme
 - Work packages: tasks, deliverable, milestones responsibilities, how measure success
- Resources: how much money for what?
- Investigators (PI, col) team: competence, track record
- Management: coordination, risk management

Workflow

- Applicant submits project proposal
- Agency nominates reviewers
 - proposed by staff
 - approved by academic on boards
- Panel of researchers ranks proposals
 - 1 rapporteur for proposal reports on reviews
 - top ranked proposals are funded

Funding Rates

Percentage of proposals accepted

- UNIBZ internal projects: ~30%
- Province: ~30%
- DFG: ~30%
- FWF: ~30%
- ANR: ~25%
- EPSRC: ~34% (highest among all research councils)

Review Criteria EPSRC

- Quality: Comment on
 - The novelty, relationship to the context, and timeliness
 - The ambition, adventure, and transformative aspects identified
 - The appropriateness of the proposed methodology.
- National importance
- Impact: Comment on
 - the pathway to impact identified for this work
 - Applicant
- Applicant
 - Comment on the applicant's ability to deliver the proposed project
- Resources and Management
- Overall Assessment

EPSRC Assessment Grades

- 1) This proposal is scientifically or technically flawed
- 2) This proposal does not meet one or more of the assessment criteria
- 3) This proposal meets all assessment criteria but with clear weaknesses
- 4) This is a good proposal that meets all assessment criteria but with minor weaknesses
- 5) This is a strong proposal that broadly meets all assessment criteria
- 6) This is a very strong proposal that fully meets all assessment criteria

ANR Criteria

- Technical and scientific quality
- Methodology, quality of project construction and coordination
- Overall impact of the project
- Quality of the consortium or of the team association
- Appropriateness of project resources/Project feasibility
- General opinion
 - Strong points
 - Weak points
 - Recommendations

Horizon 2020 (EU) Criteria

- Excellence
 - Clarity and pertinence of the objectives;
 - Credibility of the proposed approach;
 - Soundness of the concept, including trans-disciplinary considerations, where relevant;
 - Extent that proposed work is ambitious, has innovation potential, and is beyond the state of the art (e.g. ground-breaking objectives, novel concepts and approaches).
- Impact
 - The expected impacts listed in the work programme under the relevant topic;
 - ...
- Quality and efficiency of the implementation
 - Coherence and effectiveness of the work plan, including appropriateness of the allocation of tasks and resources;

Horizon 2020 Scores (for each criterion)

- **0** — The **proposal fails to address the criterion** or cannot be assessed due to missing or incomplete information.
- **1 — Poor.** The criterion is inadequately addressed, or there are serious inherent weaknesses.
- **2 — Fair.** The proposal broadly addresses the criterion, but there are significant weaknesses.
- **3 — Good.** The proposal addresses the criterion well, but a number of shortcomings are present.
- **4 — Very Good.** The proposal addresses the criterion very well, but a small number of shortcomings are present.
- **5 — Excellent.** The proposal successfully addresses all relevant aspects of the criterion. Any shortcomings are minor.

How would you proceed when writing a review?

- Discussion

How can one's writing influence the decision about acceptance/rejection?

- Discussion