



# Systematic Literature Review & Peer Review

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# Systematic Literature Review

# Implications of an Incomplete Literature Review...



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# In this lecture

What do you know, what you don't know about literature review?

What is your experience with literature research?

What do you find or expect to be difficult?

What do you want to learn?

# Some hints

- Every research starts:
  - What do we know, what we don't know?
- What has been researched, what has not been researched?
- How has research been executed, how has it not been researched?
- Where has research been executed, where has it not been researched?
- .....

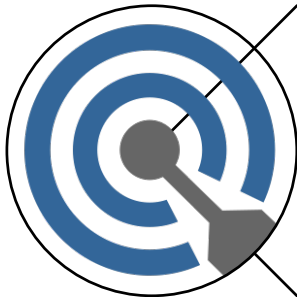
# SLR helps us answer

- Is the problem I wish to solve worthy of research?
- Do I know my stuff sufficiently?
- Is the methodology I chose the best way to solve my problem?

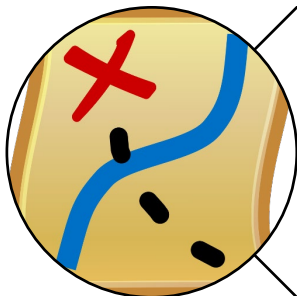
# SLR in a nutshell



Identify, analyze, interpret all available evidence related to a specific research question



Give complete, comprehensive and valid picture of existing evidence (State of the Art)



Three-step process

- Plan
- Conduct
- Report

# Planning the Review

Why?

Identify the need for a review



What?

Specify the research questions



How?

Develop review protocol



# Planning the Review (1/3)

## Why?

Identify the need for a review

- Researcher wants to understand the state-of-the-art in an area
- Practitioners want empirical evidence for decision-making
- Any other SLRs available in the field?
- If yes, are they sufficient for our needs?

# Planning the Review (2/3)

What?

Specify the research  
questions

- Research question sets the focus of the *primary studies*, data extraction
- Must be well thought out of and phrased
- Consider:
  - Which population to include?
  - Which technology, tool is under study?
  - Which outcomes are interesting?
  - ....
- Scope of the review must be limited and clear

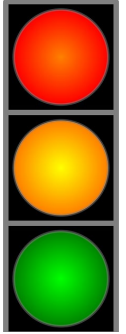
# Planning the Review (3/3)

How?

Develop review protocol

- Procedures to follow
- “Living document”, review log
- Important for practicality & validity
- Elements to consider including:
  - Background and rationale
  - Research question(s)
  - Study selection criteria & procedures
  - Data extraction strategy
  - Data synthesis strategy
  - Dissemination & Timetable (!)
- Preferably reviewed by peers
- Be open to modify

# Check what you learnt



- What search strategies exist for primary studies?
- Why should two researchers conduct the same part(s) of a SLR?
- Which challenges do you expect in conducting your own SLR?



# Hands-on Mini Lab

- Have a look at your literature review printout
- What was the **need** for this review? Why did the authors perform it?
- What is the main **research question**?



# Hands-on Mini Lab

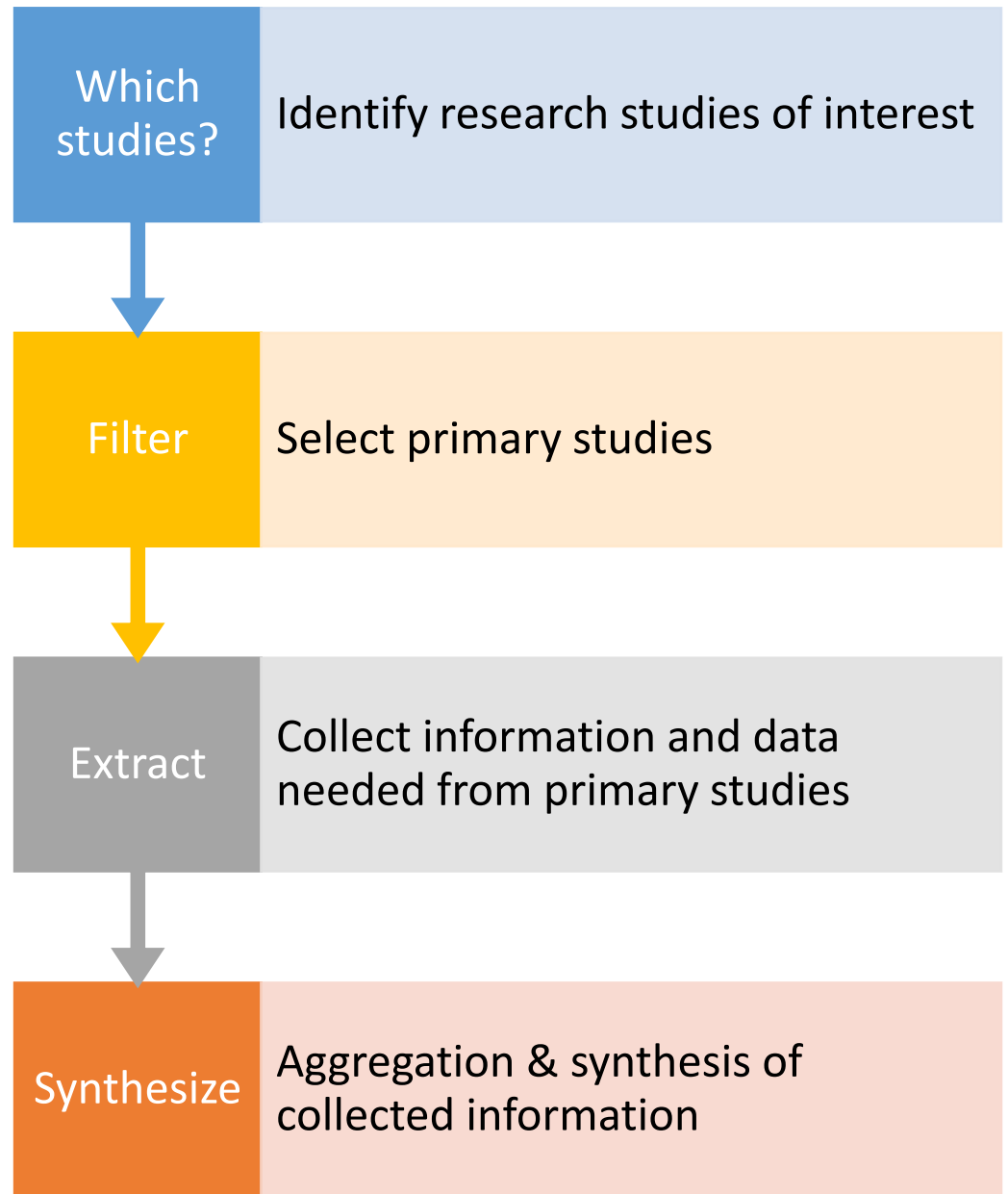
- Have a look at your literature review printout
- What was the **need** for this review? Why did the authors perform it?
  - Considerable interest in the field from academia and industry
  - Several experiments on the effects of pair vs. solo programming but no review
- What is the main **research question**?



# Hands-on Mini Lab

- Have a look at your literature review printout
- What was the **need** for this review? Why did the authors perform it?
  - Considerable interest in the field from academia and industry
  - Several experiments on the effects of pair vs. solo programming but no review
- What is the main **research question**?
  - Are the claims regarding pair programming (benefits and concerns) substantiated by empirical evidence?

# Conducting the Review





# Conducting the Review (1/4)

Which studies?

Identify research studies of interest

## **Scientific literature**

- Journals only, books only, ranked journals/books only
- Databases
  - Google scholar
  - IEEE and AIS library
  - US National Library of Medicine (Pubmed)
  - Web of Science

## **Grey literature**

- To avoid publication bias
- Technical reports, theses, works-in-progress

# Conducting the Review (1/4)

Which  
studies?

Identify research studies of interest

- Snowball method
- Trade-off: Find all relevant studies without overwhelming number of irrelevant ones
- Keywords: use specific and broader terms
- Use a reference management system
  - Mendeley
  - EndNote

# Conducting the Review (2/4)

## Filter

## Select primary studies

- Your basis: **inclusion and exclusion criteria**
- Set beforehand to avoid bias, but adjust if necessary
- For some papers it is sufficient to read title/abstract, others require more thorough analysis
- Selection is partially subjective
  - Best if two researchers select primary studies
  - Check interrater agreement (Cohen's kappa)

# Conducting the Review (2/4)

Filter

Select primary studies

## **Example quality assessment criteria:**

- Does it address my research area & question?
- Is the publication date in or out of scope?
- Is the language “understandable”
- Is the purpose of the study clearly described?
- Can I trust its source?
- Is it peer-reviewed?
- Are the data representative?
- Is the process transparent?
- Is the paper retrievable without (excessive) costs?

# Conducting the Review (3/4)

## Extract

Collect information and data  
needed from primary studies

- Collect data needed based on research questions
- Examples:
  - Number of subjects
  - Experimental conditions
  - Experimental outcomes
  - Result statistics (mean, std, confidence intervals)
  - .....
- Log raw data, date of data extraction, name of person extracting it, publication details
- Count only one instance per study: prefer journal version

# Conducting the Review (4/4)

## Synthesize

Aggregation & synthesis of  
collected information

- If studies are homogeneous
  - Meta-analysis: Apply statistical methods to analyze outcomes of several independent studies
  - Report sample size, mean, effect size in table
  - Compare effect sizes, p-values for synthesized outcome
- If studies are not homogeneous
  - *Thematic analysis*: find patterns or themes in primary studies
  - *Narrative analysis*: tell a story based on primary evidence
  - *Case survey*: Apply a survey instrument to each primary study, then apply statistical analysis on survey data
  - .....



# Hands-on Mini Lab

- Have a look at your literature review printout
- Which approach did it use to **identify primary studies?**
- How did it **filter** the primary studies?



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- Which approach did it use to **identify primary studies?**
  - ACM digital Library, IEEE Xplore etc. (section 2.2.)
- How did it filter the primary studies?



# Hands-on Mini Lab

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- Which approach did it use to identify primary studies?
  - ACM digital Library, IEEE Xplore etc. (section 2.2.)
- How did it **filter** the primary studies?



# Hands-on Mini Lab

- Have a look at your literature review printout
- Which approach did it use to identify primary studies?
  - ACM digital Library, IEEE Xplore etc. (section 2.2.)
- How did it **filter** the primary studies? (section 2.1)
  - Must have quantitative data comparing pair and solo programming
  - Must report on: Quality, Duration or Effort
  - Must be in English

# Reporting the Review

For  
whom?

• Identify target audience

- Practitioner-oriented journals and magazines
- Press releases to popular and specialist press
- Posters
- Web pages
- Direct communication to affected bodies (e.g. patent office)
- Academic audiences
  - Details of procedure critical to assess validity
  - If space constraints: use appendix or supporting technical report

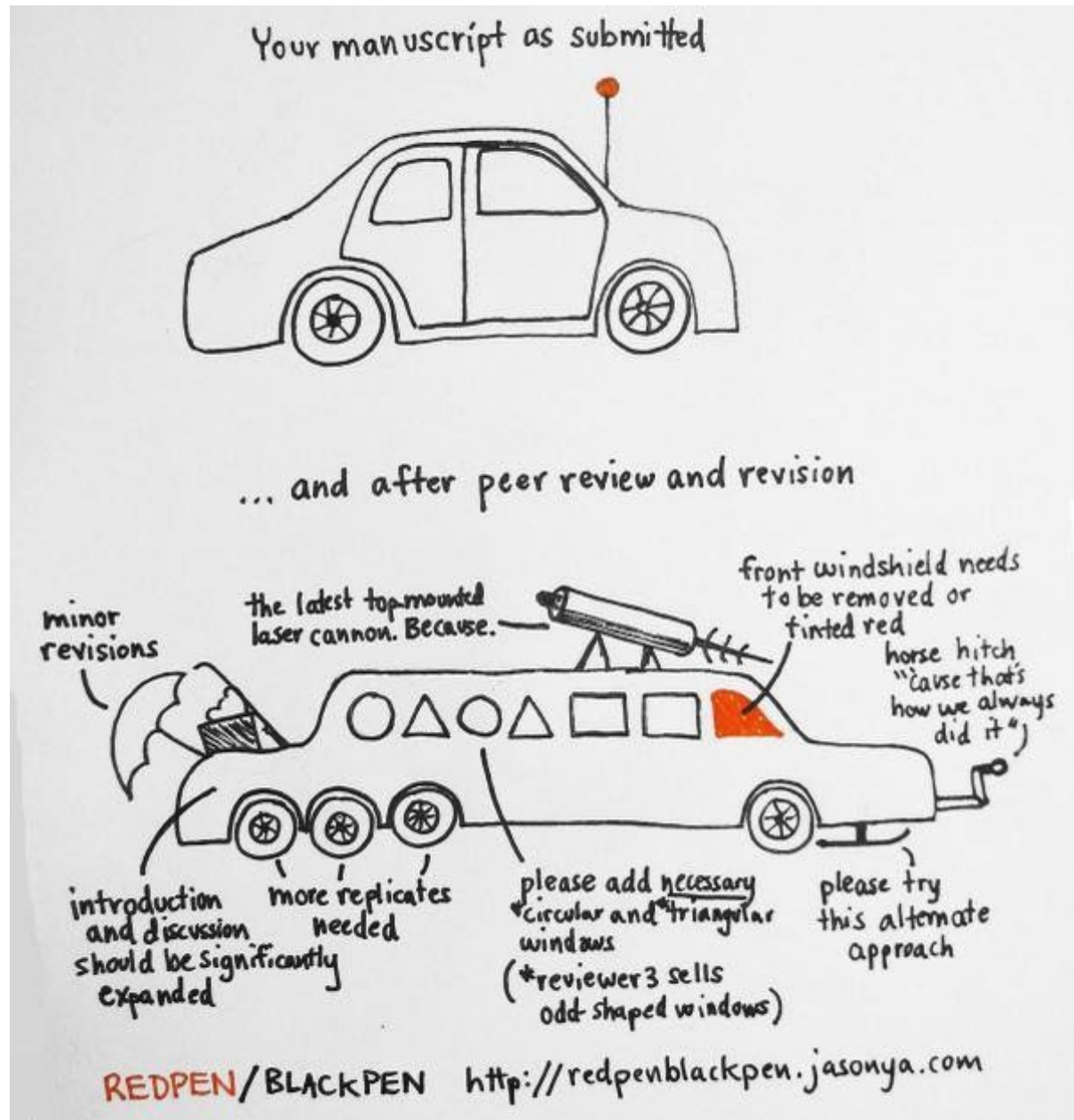
# SLR: Wrapping up

- What is SLR:
  - Identify, analyze, interpret all available evidence related to a specific research question
- What steps a successful SLR includes
  - Planning
  - Conducting
  - Reporting
- Applied the above on an example of an SLR



Peer Review

# Peer review from an author's perspective



# In this lecture

- What is peer review with focus on academic peer review
- Why is it useful
- How to conduct it - Do's and Don'ts
- Ethical Issues related to academic peer review



# What is peer review?

- The process of relying on colleagues to evaluate the quality of one's work
- Used in classroom, at work, in academia
- We will focus on academic peer review

# What is academic peer review?

- The process used to judge the quality of articles submitted for publication to an scientific venue (journal, conference etc.)
- Peer reviewed articles are among the most reliable sources of information you can use



# How does peer review work?



# Who should peer review?



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# Why you should peer review?

- Read latest research on your topic and related ones
- Read examples of good & horrible papers
- Improves your own manuscript writing
- Add manuscript reviewing to your CV
- Moral obligation for those who submit papers

# How to conduct a peer review

- Is the research **novel**?
  - Literature knowledge is necessary
  - Novelty is often a gray area: simultaneous publications of similar results, foreign-language publications etc.
- Is the paper **clear** and **logical**?
  - Enough detail? Too much detail?
  - Research reproducible?
- Is the research **significant**?
  - Important for other researchers? Interesting? Obvious?
- What is the **contribution**?
  - Is it clearly stated?
  - Are the claims supported?



Peer Review  
Hands-On Lab

*Be the peer reviewer*

# Instructions

- Look at the paper in front of you
  - Short paper, published in CSCW 2018
- Split in two
  - Half of you will be the paper's **harsh critic**
  - Half of you will be the paper's **champion**
- Read and Evaluate your short paper – 10 minutes
  - Use evaluation form – Be concise
  - Be on time!
- Round table discussion
  - Learning how to write a review
  - Do's and Don't's
  - The Editor's Role
  - Ethical Issues



# An academic peer reviewer's cookbook

## Identify Values

- What are the best parts?
- Where did you become more interested?
- Which ideas struck you or resonated with you?
- Praising a paper's qualities is not a matter of flattering the author but of identifying shared values

## Describe the paper

- Explain main ideas and organization
- After reading the first page/abstract where did you expect the paper to go?
- At what point were you with the author or against him?
- How did your knowledge change as you read?
- State some related topics that the paper did not include

## Ask questions

- Ask about meaning and wording
- Be explicit about what you see to be problems.
- Ask for more explanations, clarifications, further information

## Suggest points to revise

- Suggest places that need more information, clarity or re-thinking
- Tell what you wish the paper had said, or what it might have said

# Do's & Don'ts: Examples



## Specific Feedback

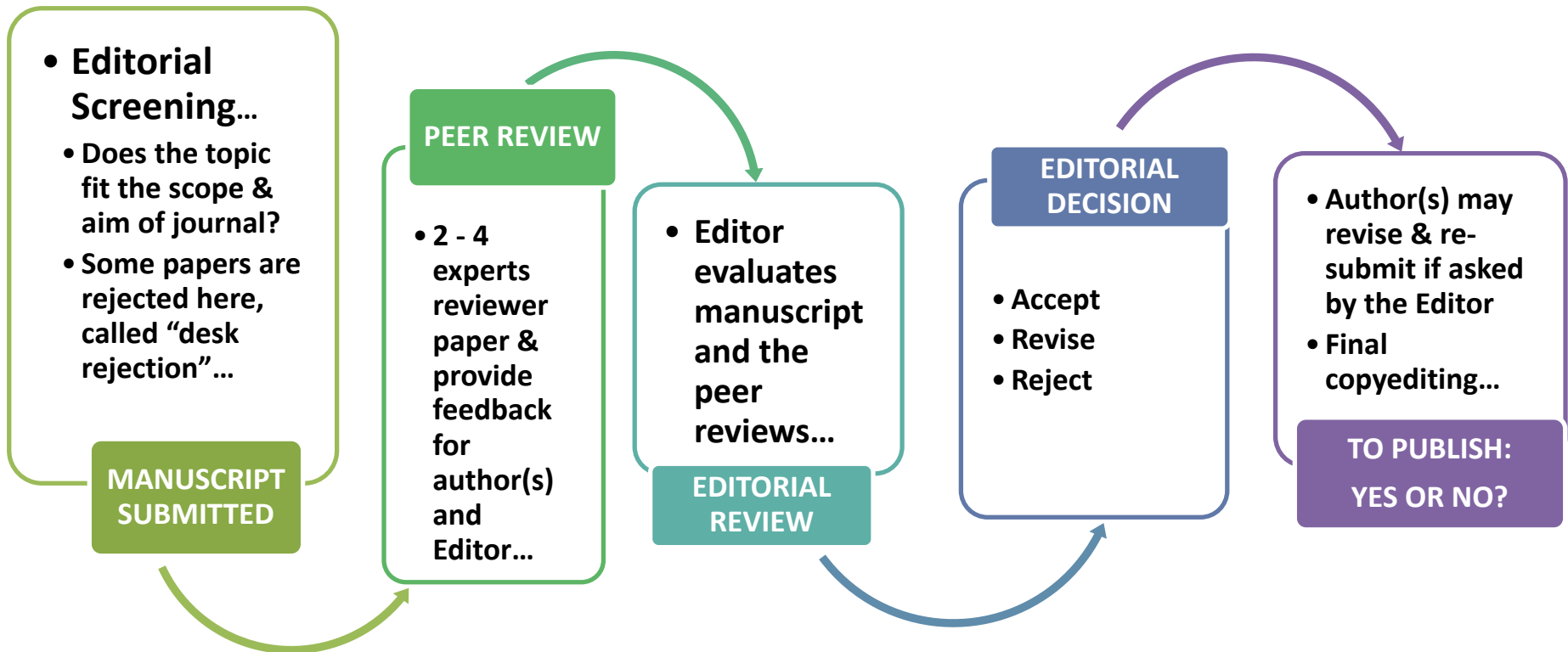
- ⑩ Insufficient data
  - Inappropriate method
  - Old database
  - Over-interpretation of results
  - References old
  - Problems with writing style



## Avoid...

- ⑩ Be negative, demeaning, or sarcastic
  - Include personal comments
  - Include identifying information
  - Try to change the manuscript too much

# The Editor's Role



# Ethical Issues 1: Are you conducting a good review?

A reviewer was incompetent	62%
A reviewer was biased	51%
A reviewer required unnecessary references to his/her publications	23%
Comments from reviewer included personal attacks	18%
A reviewer delayed the review so he could publish an article on the same topic	10%
A reviewer breached confidentiality	7%
A reviewer used your material without your permission	5%

D. Resnik, C. Guterrez-Ford, and S. Peddada, "Perceptions of Ethical Problems with Scientific Journal Peer Review: An Exploratory Study," 2008

# Ethical Issues 2:

## Are you an appropriate reviewer?

- Objectively evaluate your familiarity with the subject
  - Focus area literature
  - Methodology including statistical/qualitative
- Ensure that you have adequate time
- No Conflict of Interest
- Familiar with journal/conference and its readers

# Ethical Issues 3:

## Does peer review stifle ground-breaking ideas?



Both papers were rejected, the first after a half-year delay. By then, in 1977, over a thousand copies of the first preprint had been shipped. This has been my full experience. Papers on established subjects are immediately accepted. Every novel paper of mine, without exception, has been rejected by the refereeing process. The reader can easily gather that I regard this entire process as a false guardian and wastefully dishonest.



*Mitchell Feigenbaum, pioneer of chaos theory*

- Other scientists expressing concerns about peer review process enforcing mainstream science:
  - Stephen Hawking
  - John Bardeen, two-time Nobel prize winner
  - Theodore Maiman, inventor of the laser
  - ...

# Wrapping up

- Peer review is the process where experts on an (academic) field evaluate the quality of a scholarly work submitted for publication to an scientific venue
- Peer review life cycle: From submission to publication
- Best practices and things to avoid
- Ethical Issues