

Understanding Peer Review in Research

IMT Atlantique , November 14, 2025

Outline of the class

Introduction: Publish in a Journal

The Peer Review Process

Exercise: Peer Review Example

Peer Review in the UE Recherche

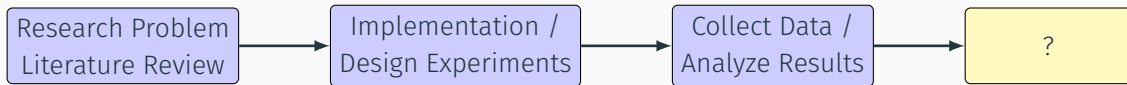
Peer Review Guidelines using EasyChair

Summary and Next Steps

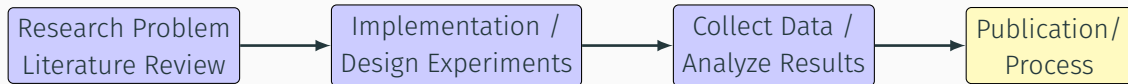
Part of the beamer code was generated by a LLM.

Introduction: Publish in a Journal

From Idea to ?



From Idea to Publication: Sharing Your Research



Purpose of Publication (see previous classes)

- ▣ Spread results to the scientific community.
- ▣ Share knowledge and foster discussion.
- ▣ Receive validation and feedback.
- ▣ Make your work citable and reproducible.

Choosing a Journal: Scope and Audience

- Journals differ by **discipline, audience, and impact**.
- Societies/publishers define **scope and standards**.
- Factors to consider:
 - Topic relevance
 - Target audience
 - Impact factor and reputation

Impact Factor (use with caution)

$$\text{Impact Factor (year N)} = \frac{\text{Citations in year N to papers published in years N-1 and N-2}}{\text{Number of papers published in years N-1 and N-2}}$$



The Peer Review Process

Peer Review: Building Solid Scientific Foundations

- Ensures that **claims are supported by evidence**.
- Detects **errors or missing details**.
- Facilitates **reproducibility and reliability**.
- Strengthens the **credibility** of science.

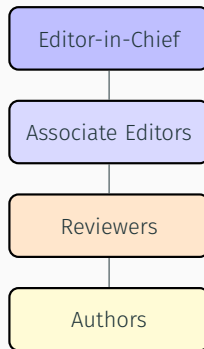


© fran@francartoons.com

Source image: <https://alisonbullinquirylearning.wordpress.com/2014/09/03/peer-feedback/>

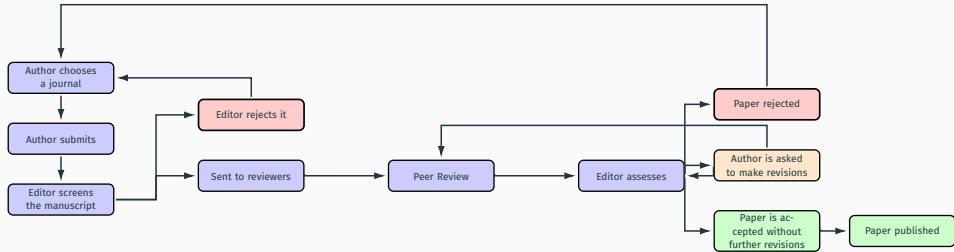
Organization of a Scientific Journal

- ▣ **Editors-in-chief** set the journal's direction (there could be track editors below).
- ▣ **Associate editors** manage submissions and peer review.
- ▣ **Reviewers** provide evaluation and recommendations.
- ▣ Editorial decisions are based on peer reviews.



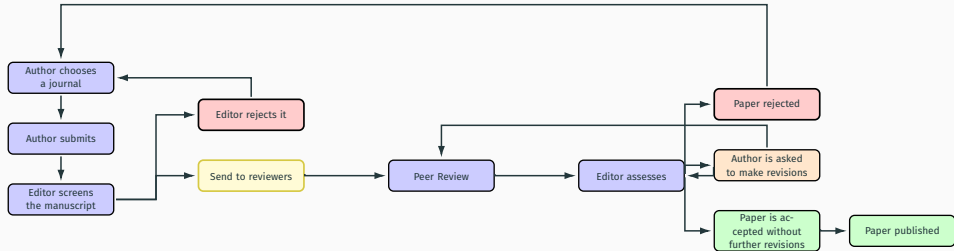
From Submission to Publication: Workflow

- Key steps include: submission, editorial screening, peer review, revisions, and final decision.



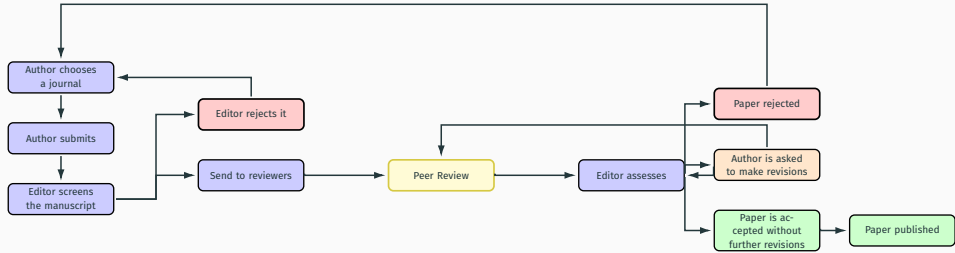
Source: Navigating peer Review, University of Aberdeen

Editor Assigns Reviewers



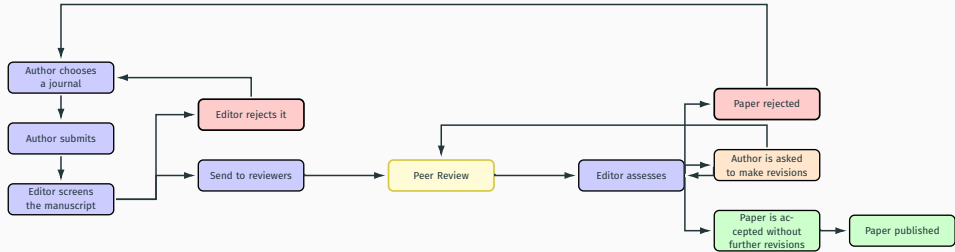
- ❑ After accepting the manuscript, the editor contacts reviewers.
- ❑ Typically, at least **2 reviewers** per paper are assigned.
- ❑ Editors select reviewers with **expertise in the topic or methods** used.
- ❑ Reviewers can accept or decline, and are given a **few weeks** to complete the review.

Peer Review (1/2)



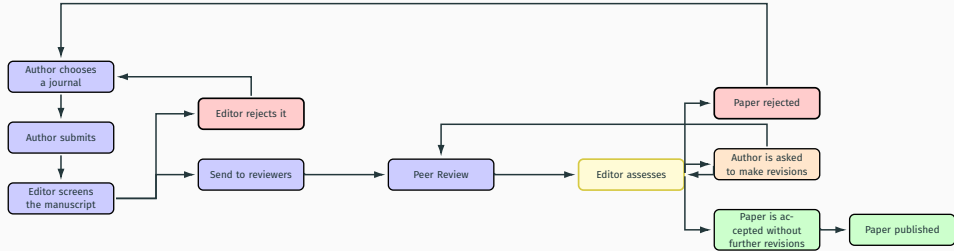
- ▣ Reviewers evaluate:
 - Relevance and novelty of the research.
 - Structure, clarity, and readability.
 - Proper use of sources and methodology.

Types of Peer Review (2/2)



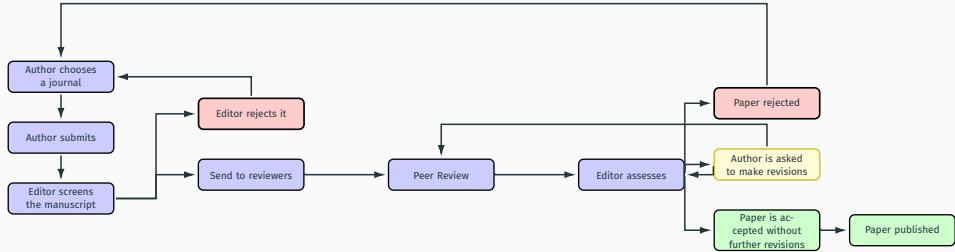
- ❑ **Single-blind:** reviewers know authors, authors don't know reviewers.
- ❑ **Double-blind:** neither authors nor reviewers know each other.
- ❑ **Open review:** identities of authors and reviewers are known (+ open reports, open participation), might be more and more present

Editor Makes a Decision



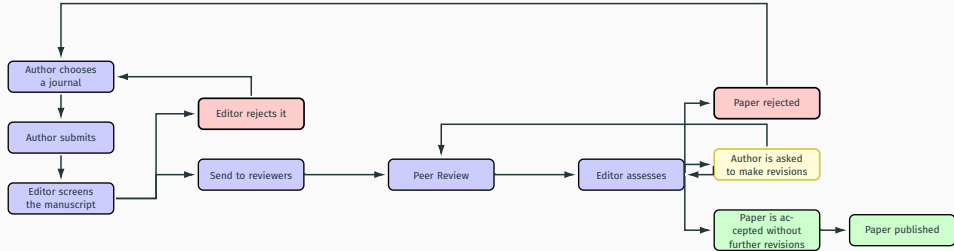
- ❑ The editor considers the reviews and their own evaluation.
- ❑ Possible outcomes:
 - Reject the manuscript.
 - Revise with major revisions.
 - Revise with minor revisions.
 - Accept with no revisions.

Author Revises the Manuscript (1/2)



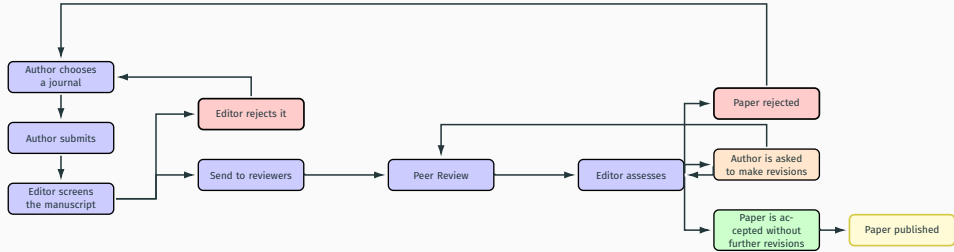
- ▣ Authors revise based on reviewer comments.
- ▣ Major revisions require another round of review.
- ▣ Minor revisions are checked only by the editor (**this depends on the journal**).

Author Revises the Manuscript (2/2)



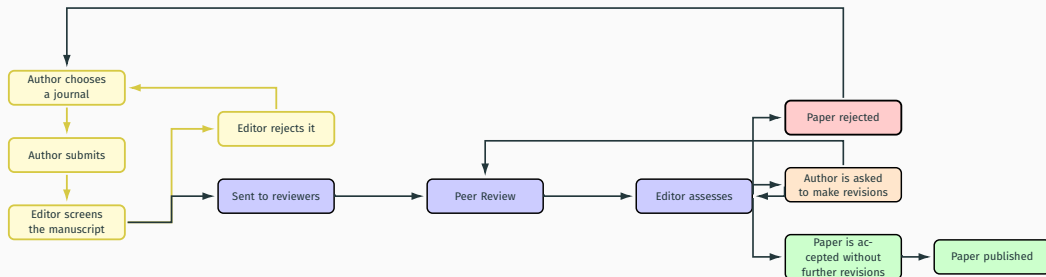
- ❑ Carefully read all reviewer comments and editor feedback.
- ❑ Address each point clearly in your revised manuscript.
- ❑ Indicate changes in a response letter or highlighted manuscript.
- ❑ Maintain a "constructive" tone in your responses.

Publication! :)



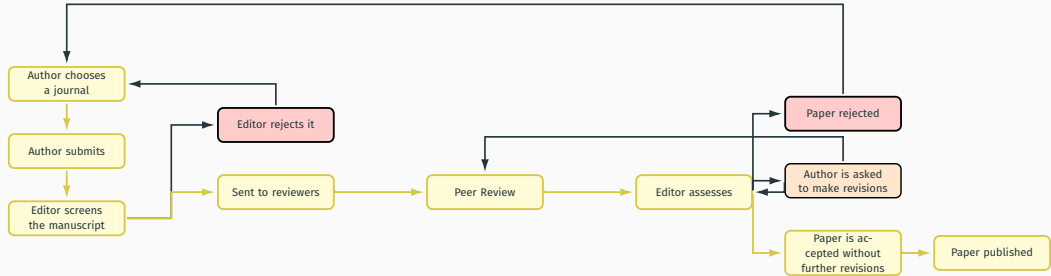
- ❑ The manuscript is finalized and ready for publication.
- ❑ Duration of the whole cycle: **2–6 months typical**, depends on the journal.
- ❑ The paper is edited, proofread, and then published.

From submission to Publication: Direct rejection path :(



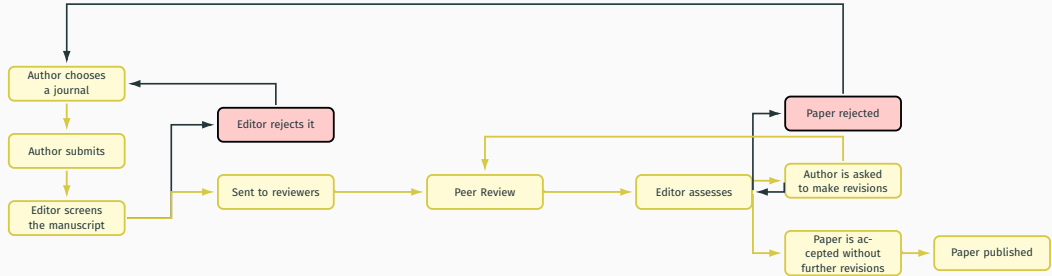
- ❑ Manuscript may be **rejected by the editor**.
- ❑ Common reasons for rejection:
 - Topic **unsuitable** for the journal.
 - **Guidelines not followed**.
 - **Too similar** to existing work.
- ❑ ⇒ Author revises and may submit to a **different journal**.

From submission to Publication: "Perfect" path :)



- ❑ Paper accepted **without any revisions** - rare
- ❑ Usually, reviewers or editors suggest **minor changes**.
- ❑ Even small revisions improve **clarity and quality**.

From submission to Publication: "Standard" path :)



- ❑ Paper accepted **after revisions**.
- ❑ Often involves a **cycle of major and/or minor revisions**.
- ❑ Revisions improve **clarity, completeness, and scientific rigor**.

- ▣ Read the entire paper before writing your review.
- ▣ **Topic:** Is it appropriate for the journal? Does it contribute new knowledge wrt the state of the art?
- ▣ **Sources & Methodology:** Are references relevant? Is the method suitable and well described?
- ▣ **Content & Structure:** Are arguments clear? Do title and abstract reflect content? Are figures/tables relevant? Do results support conclusions?

No need to correct all typos or spelling mistakes, mention them briefly.

- ▣ **Overview:** How do you interpret the paper's points? What are its main strengths and weaknesses? How does it contribute to the field?
- ▣ **Major comments:** Issues affecting understanding of the paper. Be precise, cite examples and suggest improvements if possible.
- ▣ **Minor comments:** Confusing sentences, unclear figures, incorrect references. Specific feedback helps authors revise efficiently.

Keep a constructive and respectful tone.

Exercise: Peer Review Example

Example Extended Abstract (your turn!)

- Please go to the Moodle page and download the sample extended abstract (generated with LLM).
- Review this abstract.

A NOVEL HIGH-ORDER NUMERICAL SCHEME FOR FLUID DYNAMICS

Jane Doe¹, John Smith²

¹*Department of Computational Engineering, Example University, France*

²*Institute of Applied Mathematics, Another University, France*

Abstract

We propose a high-order compact finite difference scheme for the 2D incompressible Navier-Stokes equations with periodic boundary conditions. The method combines forth-order spatial discretization with second-order implicit time integration and a simplified treatment of the nonlinear convective term. Numerical tests show that the proposed scheme consistently achieves lower L_2 velocity errors than the standard FFD method, demonstrating superior accuracy and robustness. These results indicate that our method outperforms existing numerical approaches.

INTRODUCTION

Accurate and efficient numerical solutions of the incompressible Navier-Stokes equations are essential for a wide range of engineering and scientific applications, including aerodynamics simulations, environmental flows, and industrial process modellings [3]. Traditional finite difference methods, such as the Fast Finite Difference (FFD) scheme, are widely used due to their simplicity and computational efficiency.

High-order compact schemes have been proposed to improve spatial accuracy while retaining a compact stencil [1, 2]. Some other approaches, like turbulence modeling in complex geometries, have also been investigated in related contexts [4]. Anyway, we propose a fourth-order compact finite difference scheme in space, combined with a second-order implicit time integration, to solve the 2D incompressible Navier-Stokes equations under periodic boundary conditions. We first describe the numerical method, including the discretization and implementation details, then present the numerical results with error analysis for selected grid resolutions, and finally discuss the performance of the proposed scheme in comparison to standard methods and highlights the main conclusions of the study.

NUMERICAL METHOD

- ❑ Syntax and grammar issues in the text
- ❑ Missing or incorrect citations
- ❑ Problems in text workflow or paragraph transitions
- ❑ Missing proof
- ❑ Conclusions not fully supported by the results

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NUMERICAL METHOD

Review comment of the Abstract

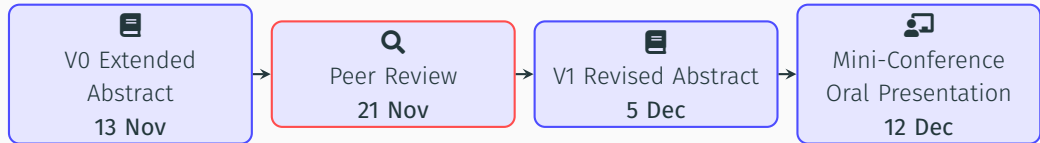
This paper presents a high-order compact finite-difference scheme for the 2D incompressible Navier–Stokes equations... While the approach shows promise, several issues should be addressed:

- ▣ The introduction contains multiple typos and grammatical errors (e.g., “propse” ...). Paragraph transitions are abrupt, especially between the discussion of FFD methods and high-order schemes.
- ▣ Some claims about high-order schemes and turbulence modeling are only partially supported by citations. Statements such as “superior accuracy and robustness” lack references to supporting literature.
- ▣ Equation (4) requires a derivation or additional explanation, as the simplification of the convective term is not clearly justified.
- ▣ The results rely on a single plot comparing the proposed method to FFD. Claims that “our method outperforms existing numerical approaches” are overgeneralized given the limited tests; a more extensive error analysis is recommended.

Peer Review in the UE Recherche

Workflow of the UE Recherche

- ▣ Modeled after a **scientific conference**.
- ▣ Timeline of the UE Recherche:



Participating to a Conference

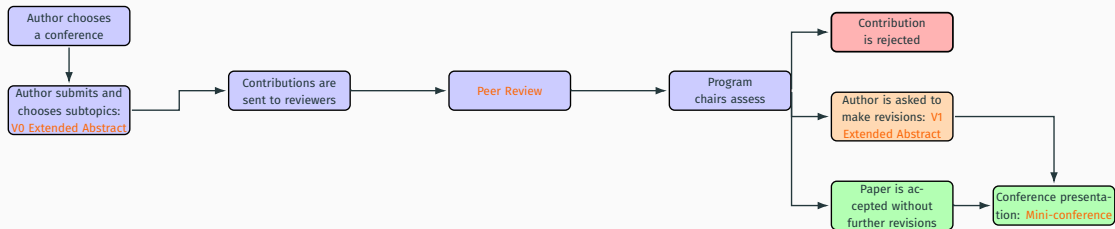
- ❑ Conferences use a **peer-review process similar to journals**.
- ❑ They require **shorter versions of papers** — typically abstracts, extended abstracts, or 2-page papers.
- ❑ They provide a **venue for discussion, feedback, and visibility** before journal publication.
- ❑ They encourage **early sharing of results** and networking within the research community.

Might change depending on the domain



From Submission to the Conference: Workflow

- Key steps include: submission, peer review, revisions, conference presentation.



Your Roles in the Process

▣ Authors (YOU):

- ✓ Write a clear and structured extended abstract: **done!**
- ▣ Respond to reviewers' comments in revision (**second version of the abstract**).
- ▣ Present at the conference

▣ Reviewers (YOU):

- ▣ Read carefully and critically.
- ▣ Provide constructive feedback.
- ▣ Remain respectful and objective.

▣ Program Chairs (US) :

- ▣ Assign submissions to reviewers (**single-blind process here**)
- ▣ Make you Program Committee Members (**NOW!**)
- ✓ Make acceptance/rejection decisions: **all contributions are accepted here ;)**

Peer Review Guidelines using EasyChair



EasyChair is the platform we will use for submitting and reviewing extended abstracts.

- ▣ Submit your extended abstract (**V0**) to the conference.
- ▣ Track the review process and see reviewer comments.
 - **Groups of 2 will receive two reviews**
- ▣ Respond to feedback in the revision (**V1**).
- ▣ Upload your final version.

EasyChair is widely used in conferences to manage submissions, reviews, and communication with authors and reviewers.

Who is reviewing whom: Topics of the mini-conference

Main Topics

- ▣ Deep Learning & Neural Networks: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
- ▣ Optimization & Stochastic Methods: 12, 13, 11, 14, 15, 1
- ▣ Computational Modeling: 16, 17

Application Domains

- ▣ Biomedical & Neuroscience: 5, 6, 16, 17, 4
- ▣ Environmental & Biological Systems: 2, 3, 4
- ▣ Physics & Engineering: 10, 15, 16, 17
- ▣ Cybersecurity & Multi-Agent Systems: 12, 13, 11
- ▣ Hardware / Embedded Systems: 1, 7, 8, 9

Structure of Your Review

Your review should be short, about **200–300 words**.

We ask that you include in your review:

- ▣ **General comment:** Summarize what the study is about.
- ▣ **Strong points:** Highlight what has been achieved.
- ▣ **Weak points:** Suggest what could be improved.
- ▣ **Writing quality:** Comment on clarity of plan, context, problem statement, methods, and discussion.

Please be respectful and constructive. The goal is to be critical and to help improving the abstract of your colleagues. You will be evaluated on this.

Additional Questions for Your Review

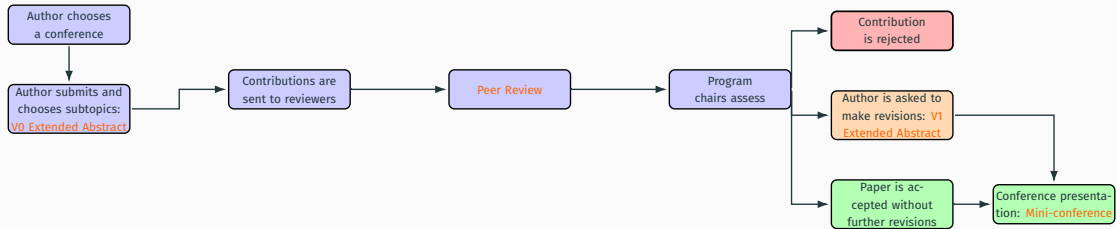
In addition, we will ask you:

- ▣ **Do you think the paper has been written using LLMs?**
 - Not at all
 - Yes, a bit but the usage of LLMs is reasonable
 - Yes, a lot
 - Yes, completely
- ▣ **Do you feel confident in your review?**
 - No, I don't feel comfortable with this topic and/or methods
 - Partly, I may be missing some concepts or elements of the state-of-the-art, but I got the main idea
 - Yes, I have the necessary background to understand and review this study
- ▣ **Optional comment for editors:** You can add a comment visible to the teaching team but not to the author of the extended abstract.

Summary and Next Steps

Summary

- ▣ Peer review = a collaborative process to improve research quality.
- ▣ In UE Recherche: a simulation of the **academic workflow**.
- ▣ **Write a Review for Next Friday**



Next Steps

- ▣ Work on your research topic
- ▣ Revise your abstract following the review(s)
- ▣ Present your work at the end of UE conference

