MICCAI Reviewer Tutorial

March 13, 2025

Program Chairs:

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Daniel Alexander, University College London
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Submission Platform Manager: Kitty Wong, The MICCAI Society

Thank you very much for reviewing for MICCAI!

REALLY

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WARNING

Wordy slides!

(by design; we will share them later!)

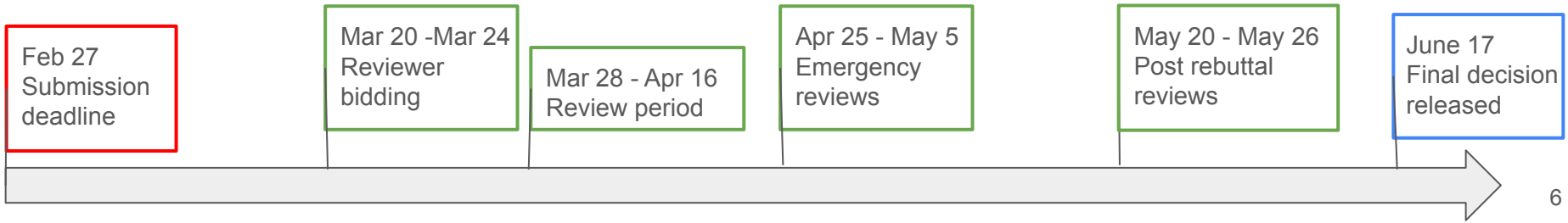
MICCAI 2025 STATISTICS

- **5245** intent to submit, **3669** full paper submissions (about **28**% increase vs **2876** on 2024)
- Papers were screened for anonymity, page length, template issues. ~**150** were desk rejected
- **188** ACs
- ~**2585** reviewers

MICCAI 2025 Review Process At a Glance

- Reviews **made public**
  - For accepted paper on the MICCAI website
  - Along with rebuttal, and meta-reviews
  - **Without** reviewer/meta-reviewer names

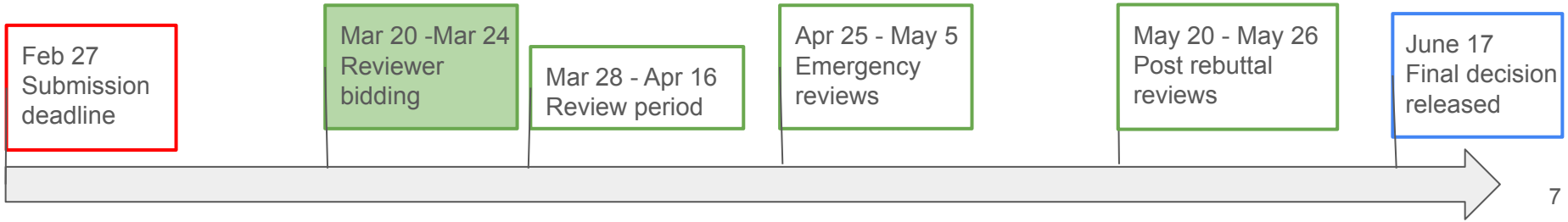
- Reviewers finalise their decision (accept vs reject) and justify it after rebuttal
  - **May 20 – May 26**
  - Note There is no reviewer discussion period



Review Bidding & Assignment (March 20th - March 28th)

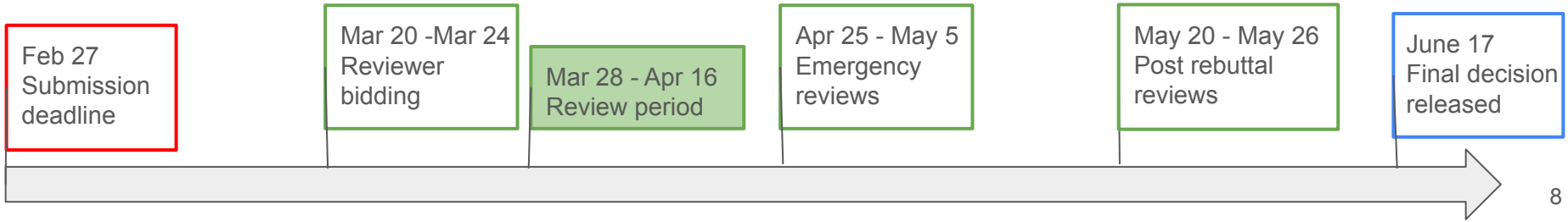
- **March 20-24:** Reviewers bid on papers
  - **Please do bid** so that your assigned papers are a good match for your expertise
  - Assignment based on bid and matching of expertise areas for papers

- **March 28:** Papers released to reviewers (~5)
  - Notify the Meta-reviewer (Area Chair) of the submission immediately in case of a major issue, e.g., a conflict of interest.
    - Reassignment requests should be directed to the corresponding Area Chair.
  - You may also be contacted by the Area Chair for assigning a new paper to you, if that paper receives a reassignment request by another reviewer (this is unusual).



Primary Review (March 28th - April 16th): Review Form

- Agreement with respect to review process and reviewer guidelines
  - Confidentiality - **forbidden to show paper to an LLM**
  - Destruction of all copies after review process
  - Agreement for reviews to be made public if paper is accepted
- Assignment to main categories
  - MIC / CAI / Clinical translation / Solution to Pan-Asian challenges
  - Important for program construction
  - More than one category possible



Primary Review (March 28th - April 16th): Review Form

- Describe the contributions of the paper
  - A brief summary of what the authors have done and what the findings are
  - For the authors: verify that you have understood the paper
  - For the AC: quick note of what the paper is about

- Lists of major strengths
  - Provide **details**, e.g, why the paper is significant or novel

- Lists of major weaknesses
  - Provide **details**. For example, if the novelty is limited, provide citations to prior work

- Rate clarity of presentation

Primary Review (March 28th - April 16th): Review Form

- Assessment of reproducibility
  - Authors encouraged to use open data or to make their data and code available
  - Not always possible: clear description of algorithm/parameters/datasets/evaluation then crucial
  - May be used for program definition

- Additional comments - optional
  - Suggest areas of improvements to help the authors write a rebuttal and improve the paper
  - Make it clear what you want to see in authors' rebuttals (avoid unrealistic expectations; see below)
  - Back up comments by **detailed arguments**

- Comments on experiments
  - **Reviewers should not ask for additional experiments in rebuttal**
  - **A rebuttal is not a revision (this is not a journal) - but rather an opportunity to explain.**
    - E.g., **"**why did the authors not explore metho X" vs "Please provide results for method X"
  - Your Area Chair may contact you if they spot such requirement in your comments

Primary Review (March 28th - April 16th): Review Form

- Your recommendation/rating
  - **Rate the paper on a scale of 0-6**
  - **Spreading the score** helps create a distribution for helping ACs/PCs make decisions
  - Details
    - 6: strong accept — must be accepted due to excellence
    - 5: accept — should be accepted, independent of rebuttal
    - 4: weak accept — could be accepted, dependent on rebuttal
    - 3: weak reject — could be rejected, dependent on rebuttal
    - 2: reject — should be rejected, independent of rebuttal
    - 1: strong reject — must be rejected due to major flaws
    - 0: out of scope - does not fit the MICCAI remit
- Justifications
  - What were the main factors in your rating? How did you weigh the strengths vs weaknesses?
  - Reasons to recommend accept or reject need to be clear to the area chairs *and* authors

Primary Review (Marc 28th - April 16th): Review Form

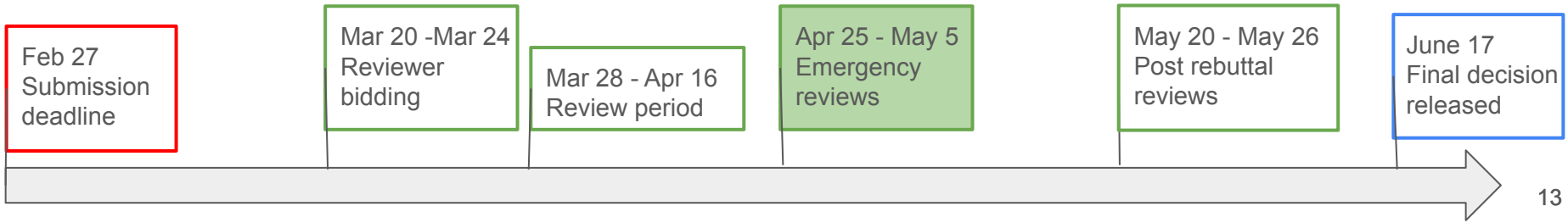
- Reviewer confidence
  - If your expertise is limited to a particular aspect, bring it to the attention of the AC

- Recommendation for special highlight in the programme
  - Indicate whether you would like to see the paper promoted through oral presentation, special issue in a journal, and/or award
  - If you want to commend a paper, do justify your reasons.

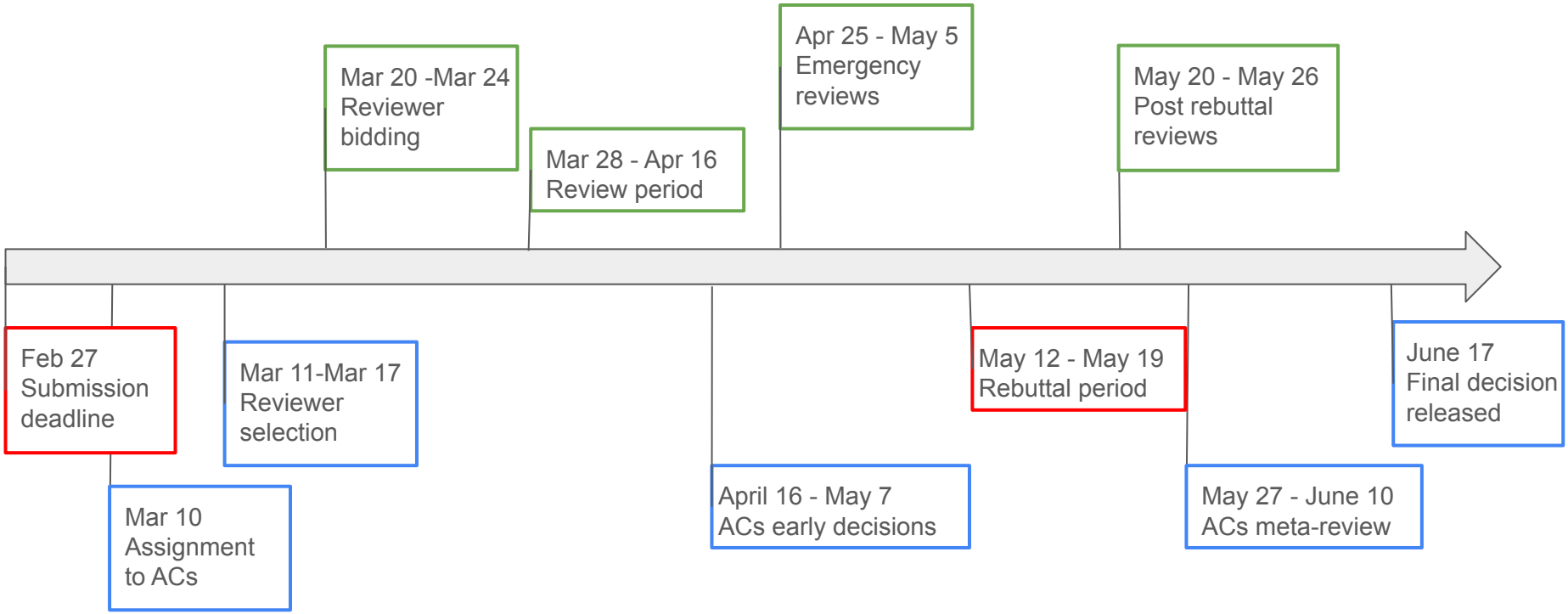
- Confidential comment
  - Use this section to inform the Area Chairs about any potential concerns or issues

Emergency reviews (25 April - 5 May)

- To be used as sparingly as possible to cover for missing reviews
- Contacted by Kitty Wong via CMT around review deadline to sign up:
  - Indicate whether you are available
  - How many papers you would be able to review within a week
- Sent an email detailing whether new papers have been assigned to you
  - Check your CMT portal to see new papers assigned
- Provide high quality reviews on time so we don't need emergency reviews!

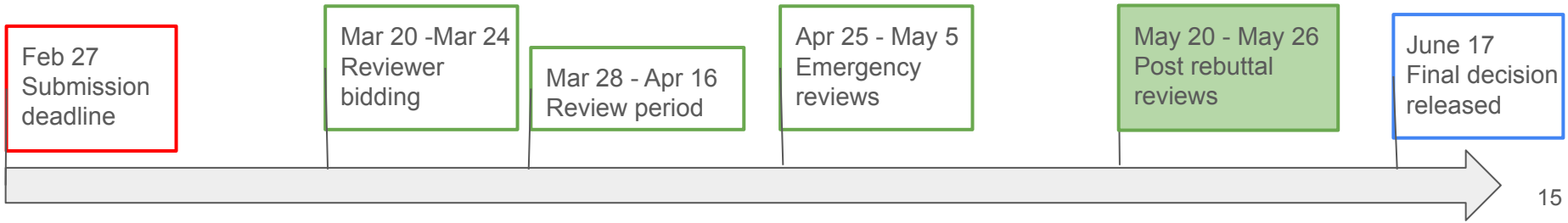


MICCAI 2025 Overall Review Process



Post-Rebuttal Review (May 20th - 26th): Review Form

- Provide a final decision - Accept or reject
- Justifications for the decision
  - Provide concrete, specific justifications of why you have or have not changed your mind after reading the authors' rebuttal.
- Confidential comment
  - Inform the Area Chairs about any potential concerns or issues
- There is no reviewer discussion period



Review Ethics

- Review a paper based on its contents.
  - If you suspect a violation (e.g., formatting), flag the paper to the Program Chairs (not the Area Chair)

- Avoid conflicts of interest and respect confidentiality
  - The MICCAI review process is confidential
  - Do not discuss the paper, or (meta-)reviews, with others (and do not upload to LLMs)
  - Do not disclose names of authors / other reviewers / area chairs

- Plan your review time
  - Reviewing is time consuming - particularly when the paper is not 100% in your area of expertise
  - But it is worth the effort! You are helping members of your community
    - Someone is reviewing your submission, right?

- Be fair and transparent
  - Ask yourself how you would feel, as an author, if you received the review you are writing
  - Will you be feel comfortable once your review becomes public?

The Conflicted Review

Conflicted reject:

- You are currently working on the same idea and **don't** want the paper to be published
- You identify the author somehow and decide that this person does not **deserve** yet another (MICCAI) paper
- You are **angry** because the authors did not cite your papers but references are still appropriate (arXiv papers do not count)
- You think that the **field** of research is a waste of time
- You identify the authors institution/affiliation and base your decision on it

The Conflicted Review

Conflicted accept:

- You identify the author somehow **and**
  - you are at the same **institution** or have been at the same institution in the past 3 years,
  - you **co-authored** together in the past 3 years,
  - you hold or have applied for a **grant** together also in the past 3 years,
  - you currently **collaborate** or plan to collaborate,
  - you have a **business** partnership,
  - you are **relatives** or have a close personal relationship.

Use of LLMs

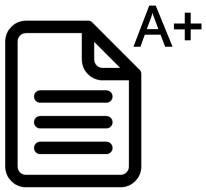
- The use of LLMs (such as ChatGPT) is allowed as a general-purpose writing assistance tool.
- Reviewers should understand that they take full responsibility for the contents of their reviews, including content generated by LLMs that could be construed as scientific misconduct or plainly false (e.g., incorrect summaries of the paper content).
- You may use an LLM to polish the wording of your review (e.g. to correct grammar) once you have written it. But you may not show a paper or any part of a paper to an LLM. The PCs interpret showing a paper to an LLM as a deliberate violation of confidentiality.
- You must vouch for, and be responsible for, the accuracy of your review.

What is a Good Paper

- Is the topic of interest to the MICCAI community?
- Does it present innovative ideas, new insights, or relevant impact?
- Is the evaluation sound? But remember: it is a **conference** paper.
- Is the paper reproducible (ideally)?

Community

Reproducible



Idea

Evaluation

Weighting between these 4 points can be difficult.

Application *vs.* Methodological Studies

- See MICCAI 2025 submission guidelines (call for papers section)
- **Methodological studies**
  - Demonstrate clear innovations and contributions over the state of the art methodologies.
  - Evaluation and performance assessment is potentially limited to proof of concepts or small-size validation studies.

- **Application studies including clinical translation**
  - Demonstrate clear clinical value of existing techniques, or adoption of state-of-the-art methods to a new problem or context, with appropriate and rigorous evaluation design
  - Do not necessarily need to involve fundamental methodological innovations

CAI *vs.* MIC Papers

- Experimental evaluations of CAI works are typically much more challenging (than MIC studies)
- **Significance/Innovation** of CAI works can include:

1. Presentation of a device or technology that has potential clinical significance.
2. Demonstration of clinical feasibility, even on a single subject/animal/phantom.
3. Demonstration of robust system integration and validation.
4. Novel MIC approach to solving an unmet CAI need.
5. Proposal of a cost-effective (frugal technology) approach to implementing an otherwise expensive CAI solution.
6. Description of a system or device that is robustly validated against appropriate performance metrics.
7. Human factors evaluation of CAI systems.

Clinical Translation Papers

- Translation of methodology with impact on clinical workflow and evaluation
- Novel insights into clinical challenges

- **Significance/Innovation** of Clinical Translation works can include:

1. Barriers and challenges in translation, and how to overcome these
2. Robustness and reliability evaluation of algorithms
3. Insights into usability of MIC methods and CAI systems
4. User interaction, adoption and acceptance
5. Performance monitoring and clinical deployment

Pan Asian Challenges Papers

- New methods and applications that are attuned to specific challenges encountered in the Pan-Asian region

Why Make a Good Review?

- For the area chairs: to make a good/informed decision
- For the authors: to obtain fair evaluation + constructive feedback
- For the MICCAI community: to listen to and learn from an interesting program
- For your own reputation

- After a poor review
  - AC/PC will remember it (similarly if the review is late!)
  - It impacts your likelihood to be considered as AC or reviewer in the future
  - Authors may feel unfairly treated or unwelcome
  - Attendees may waste their time

- If you expect a good review for your own paper, write good reviews too!

What Makes A Good Review?

- A review should judge the paper objectively
  - Be aware of bias (eg. if you know this field particularly well)
  - Read the literature if needed (learn from the paper)
  - Keep an open mind as many kinds of paper exist (basic proof of concept; experimental results…)
  - Assess paper as is (minor errors can be fixed, but major changes are not possible, no 2nd review)
- A review should be specific
  - Judgements should be backed by arguments. Critiques should be backed up with details
  - Strong supporting arguments are also needed for a paper for which you recommend acceptance
- A review should be polite and professional
  - No rude and sarcastic comments
  - Avoid using “you”: can be perceived as confrontational. Use “the authors”, “the paper” instead

Example of a Good Review (part 1)

- Summary: “Authors propose X, a new semantic and fully-convolutional segmentation architecture. X essentially is a U-Net with bi-directional recurrent skip connections. Compared to other recurrent U-Net architectures with gated RNN blocks, X uses existing layers and concat blocks and does not require any extra parameters. Authors validate the method on two segmentation tasks and one super-resolution task, outperforming baseline methods from literature and simpler architectures.”
- Strength: “- Simplicity: X's main strength is that no extra parameters are required, since the recurrence is realized directly on the layers - Extendability: The method can be applied to already existing U-Net segmentation problems with minor changes to the model architecture. Even though this is not investigated in this work, an extension to 3D segmentation should be straightforward, as no extra parameters are required. The high number of network parameters in 3D makes the incorporation of additional gated RNN architectures (GRU LSTM) particularly "costly", while X would keep the model complexity constant.”
- Weaknesses: “- Limited novelty: the proposed network appears like a special case of the previously proposed R-U-Net (Wang et al.), with l=0, without gates, and with a concat merging of the hidden layers/states. - Limited discussion of recurrence: in principle, authors realize a vanilla RNN directly on the hidden representations in the U-Net. Hence, training requires an unrolling of the X and backpropagation-through-time (BPTT) on the recurrence time steps, which may cause vanishing gradients (as in vanilla RNNs). Authors use very few timesteps (in this work, t=1/2/3). Larger temporal context, in combination with gating of units (as in GRU/LSTM) could further improve results, but to what degree this could be necessary/helpful, is not discussed here. - Limited comparison to state-of-the-art: Authors compare to R2-U-Net, but not to Wang et al. (R-U-Net) - No statistical evaluation of results: paired tests would give statistical weight to the argument of "superiority" of the proposed method. ”

Example of a Good Review (part 2)

- Comments:
  “ Lack of clarity: - Better explanation of the training stage: it would help to have a clear separation of the training and test stage. The training stage should explain unrolling of the network architecture through time (ideally accompanied by a figure), and how training is performed. - #params: Authors claim that no extra parameters are required compared to a vanilla U-Net, however, the concatenation of decode features from the previous iteration with the current iteration's encode features (i.e. the reverse direction) causes larger feature maps, which require deeper convolutional filters (i.e. more channels in each filter) and hence more parameters. This increase may be negligible in a network with 15.0M parameters, but a brief clarification would be helpful (maybe I am still misunderstanding sth). [...]

  For future work, I would recommend:
  - Extension to 3D: the simplicity and compactness makes this approach particularly attractive for 3D segmentation.
  - Explore performance on many more problems: X could be universally applicable, but here it is used on only a few tasks. I would strongly recommend to apply X to the medical image segmentation decathlon (http://medicaldecathlon.com/). I would not expect X to end up leading the board, but it would be interesting to see whether X can actually scale to a wide variety of tasks, and especially in higher dimension (i.e. perform at least as good as an equivalent 3D U-Net on all tasks). If so, this could become an attractive alternative architecture next to U-Net in future. [...] “
- Recommendation: “accept”

Example of an Unhelpful Review (#1)

- Summary: “This work proposed a [...] with [...] for extracting both the structural and functional connectivities from fmri data, it is very interesting work since a few works has been working on both the structural and functional connectivities patterns on this field. However, I would like to see the discussion of this work on how to expand to dynamic brain network on both the structural and functional patterns.”
- Strength: “as above”
- Weaknesses: “as above”

- Recommendation: “accept”

- AC cannot use the review and make any decision without reading the paper

Example of an Unhelpful Review (#2)

- Summary: “This paper proposes a [...] to combine generic keypoint and CNN information into a single, highly efficient memory-based model for indexing and classifying generic 3D medical image data.”
- Strength: “none”
- Weaknesses: “- no novelty according to a conference as MICCAI - no well written, so many English errors - only 1 expert on each dataset”

- Recommendation: “reject”

- Judgements are not supported by any arguments

Anonymity and Formatting

- MICCAI manuscript guidelines
  - Anonymized for **double blind review process**
  - Page limit: 8 pages main text +2 pages bibliography
  - Template: LNCS style
- We have removed papers with major issues, but may have missed some
- As a reviewer
  - Immediately notify your AC of any anonymity and formatting issues
  - But provide your review based on the **content and scientific merits** of the paper.
- Authors are allowed to upload their submitted papers on preprint servers (e.g., arXiv)
  - Do not search for the paper on the internet
  - If you find out who the authors are, try not to let that influence you
    - And, if you are conflicted, please notify the Area Chair as soon as possible.

General remarks

- **Reviews and meta-reviews of accepted papers will be public**
- **Reviewers will be back in the loop after rebuttal**
- Reserve time for the two phases: **Mar 20 - May 5 (include bidding, review and emergency review)** and **May 20-26 (post-rebuttal review)**
- CMT emails can be flagged as spam.
- Throughout the process
  - Please check the MICCAI Review Process (website)
  - For questions on CMT, ask Kitty Wong submissions@miccai.org
  - Contact Program Chairs at program_chairs@miccai2025.org (or via CMT)

Thank you for your important contribution to MICCAI 2025!