# IEEE Transactions on Medical Imaging

# Instruction to Reviewers

Thank you for volunteering your precious time as a reviewer for IEEE TMI! As a distinguished and highly selective journal, your role as a reviewer is extremely important. Here is some essential information you need to know to be a successful TMI reviewer.

Remember you can always communicate your concerns and questions to the TMI Editorial Office.

# 1. Get Ready

# 1.1 Educate yourself

Familiar yourself with the scope, key acceptance criteria, and review and decision process of TMI.

**Review criteria for Challenge-paper submissions**: 1) Overall impact; 2) Clarity of the evaluation/validation approach, including how gold standards are established; 3) Novelty of the top-ranked methods; 4) Depth and breadth of the discussion for providing insights into methodological development for the community. The paper must include 1) The web link to the

Challenge proceeding, where all the challenge data/instructions can be accessed electronically; and 2) Publicly accessible web links to authors' codes for reproducible research.

## 1.2 Maintain your access to ScholarOne

Contact TMI Editorial Office if you need to retrieve your login information. If you discover you have duplicate accounts in the ScholarOne system, please request the TMI Editorial Office to merge the accounts to a primary account you choose.

## 1.3 Update your profile

Keep your email and expertise keywords up-to-date on ScholarOne. Read the Reviewer's Guide for questions you may have.

## 1.4 Build your reviewer credit

Your endeavor is greatly appreciated and valued. **TMI reviewer credential is an essential criterion for selecting TMI Associate Editors**.

# 2. Respond to a Review Invitation

Once you receive a review invitation, please respond at your earliest convenience even if you cannot review. This will help us the AE to find other reviewers in a timely manner.

# 3. Assess and Recommend

After you accept the invitation, you are expected to assess the paper and make one of the following recommendations:

- **Accept**
- **Accept with Minor Revision**
- **Reject/Resubmit with Major Revision**
- **Reject/Submit to Another Journal**
- **Reject (without further consideration)**

The guideline for each recommendation option is described below.

## 3.1 Reject/Resubmit with Major Revision

This is the rite of passage of nearly all the published TMI papers.

1. When assessing the paper, please consider whether the paper is "exceptional", "excellent", or just "good" and make your recommendation accordingly. Please keep in mind that we

are a selective journal and that there are many "good" papers that we simply cannot accept due to space limitations — so please recommend acceptance or revision for those that are truly exceptional or excellent, and recommend reject/no further consideration for the other ones.

2. Please note also that it is the policy of TMI to only allow one major revision for a paper that was returned with "Reject/Resubmit: major revisions needed and new external review required". In other words, if you receive such a revised manuscript for review, you should make either a recommendation to accept (possibly with a minor revision) or reject with no further consideration. The "Reject/Resubmit" should not be your recommendation unless there is some truly strong reason for allowing a 2nd revision — which you would need to justify in your review. This is motivated by our desire to concentrate on the best papers and not increase the demand on reviewer's time for papers that do not have a high promise to deserve publication in TMI. This should also increase the level of polish of the original and revised manuscripts.

3. Ask the following questions before you recommend Reject/Resubmit, which will encourage a resubmission with revision:
    1. Will the revision turn this paper into a first-ranked manuscript (not just a manuscript with major problems fixed)?
    2. Is the contribution novel and revolutionary enough to warrant publication in TMI?
    3. Is the impact of the paper going to be significant enough to warrant publication in TMI?
    4. If you can answer "yes" to all these questions, by all means please give the authors a chance to revise and resubmit.
    5. If, however, you have doubts about the outcome of a revision, please consider recommending that the paper be rejected with no further consideration. It may actually free up the authors to submit to another journal faster than by going through one more round of TMI reviews — and it will let all of us (Associate Editors and reviewers) concentrate on the best of the best manuscripts and consequently continue increase the quality of TMI and the entire field.

4. If Reject/Resubmit is the right recommendation, please try your best to be constructive and specific on what your expectations are for the resubmission to be accepted. Please avoid any unprofessional language.

5. The responsibility of using correct English rests entirely on the authors. For papers with poor English, you may request the authors to use a professional English editing and proofreading agency and provide copies of the certificate of the service and the credential of the agency.

**Sample Reviewer Comments:**

> *"Phase Contrast CT Imaging" by Author et al. The manuscript presents a combination of dual-energy and phase-contrast imaging to enable a three material decomposition. The work is of high interest due to the current developments in spectral as well as in wave optical x-ray imaging. The manuscript is very well designed and presented. However, before*

*publication in this or a different journal, the script would further improve with some additional work. Major concerns: 1) The theory behind combining the two different signals is well introduced in the method section. However, the experiment's verification has only limited meaning for clinical biomedical imaging. The energies selected are most probably determined though the available gratings. At 50kVp, the challenges with three material decomposition are different compared to 120kVp. At this energy level, x-ray imaging is dominated though the photoelectric effect with the results of a different sensitivity for both signals phase-contrast as well as spectral x-ray imaging. This critical limitation needs to be discussed in-depth in the discussion of the manuscript.*

*2) Addition to 1). At 50 kVp, the authors should compare the experimental results with a triple energy acquisition. K-edge imaging of iodine becomes feasible at 50 kVp. Other investigators have demonstrated how to use a two-bin photon-counting detector for multi-bin imaging.*

*3) Addition to 1). The bias levels for iodine described for iodine quantification are for 120kVp imaging. Please make sure to separate this from results with lower energies. The claim at current clinical sensitive is around 1 mg/ml is correct. However, the latest dual-energy CTs are sensitive down to 0.5 – 0.3. mg/ml. Further, the references are incomplete; over the last 3 or 4 years, multiple papers have been published to demonstrate iodine sensitivity by comparing clinical dual-energy CTs for different clinical applications (abdominal, cardiac, etc.).*

*4) Addition to 3). The dual-energy CT application citations could be significantly improved. A) (16) determines natural iron in the liver. This is not a contrast agent. Iron has many difficulties to be a spectral valuable contrast agent. B) I would suggest extending the iodine sensitive dual-energy applications. As stated by the authors, oncology is one of the top applications, but there many other established use cases. The myocardial perfusion is good and correct but not a current useful clinical applications.*

*5) In the introduction or discussion, the author should extend the discussion on the different noise textures between conventional and*

> *phase-contrast imaging. It would be interesting how those differences in noise can be utilized for such a combination. How does this scale if the energy levels go up to 120 kVp.*
>
> *6) High – energy phase-contrast imaging. Many investigators have published work on the change in phase-contrast sensitivity when scaling to 120 kVp. Please further discuss.*
>
> *7) How would the authors explain the relatively large bias in calcium (fig 6.) compared to iodine?*
>
> *8) An additional suggestion: the readership would highly appreciate adding more discussion on the energy dependence of the darkfield signal (see work from Japan)."*

## 3.2 Reject/Submit to Another Journal

**This is for manuscripts that are out of scope**. We expect all TMI papers to make a contribution to imaging methods (interpreted broadly). However, we receive manuscripts describing instrumentation or clinical results without a broad discussion of the methodology associated with the advance. These papers are out of scope. However, if the issue prompting a decision to reject is about the quality of the contribution, the recommendation should be to REJECT outright.

## 3.3 REJECT

**For manuscripts you don't expect to see a revision.**

## 3.4 Accept with Minor Revision

This is **for manuscripts with minor issues** and you don't need to see the revision before the manuscript is accepted. The AE will check if all the comments are addressed.

**Sample reviewer comments:**

> *"This paper proposes a novel approach towards solving the reconstruction problem of motion corrupted fetal MRI. In contrast to previous, retrospective work, the authors suggest to develop an on-line motion monitoring system using spatio-temporal deep neural networks. The proposed system is able to predict a relative 3D pose from a sequence of acquired images. LSTMs and sequence-to-sequence learning are used to*

model the dynamics of a fetus moving during the scan. The method is evaluated on synthetic experiments, sampling slices from traditionally reconstructed fetal brains and applying observed or altered motion trajectories. Altered trajectories have been achieved though acquisition of 3D head pose tracking data from volunteers moving in a scanner voluntarily, observed by an external tracking system.

Strengths: – this is a well written paper with a strong vision. – the presented work is clearly a step towards integrating automatic pose estimation approaches into real fetal MRI acquisition. – experimentation has been done thoroughly and, despite the method being a novel idea, compared to the most related state-of-the-art in the field. – language and presentation are excellent.

Weaknesses: – II.-A needs to be improved. Are the described transformations relative to a starting slice or are they relative to an atlas coordinate system? How is initiation done if the latter is true? – why doesn't the brain extraction method generate a mask for slices with signal loss? Sometimes signal loss only occurs in part of the slice, thus I would have expected that a pixel-wise segmentation approach would rather produce an unrealistic mask? – In 261 'constrain our parameter space to the slice position z and three rotations': Is the remainder of x,y offset then left for final refinement, e.g. with intensity based registration during reconstruction? – The P-blocks regress the phi parameters directly. It would be interesting to see how these perform with specialised SO(3) geodesic losses. The description of the individual losses in 14 and 15 is incomplete. How are the individual L terms defined/implemented? – In III C it is unclear why the volunteer motion tracking data has been applied to the fetal subjects and why the volunteer MRI scans haven't been used directly. There should be enough public high quality brain data available to learn/simulate motion reconstruction for adults. Has there been volunteer scanning without motion? if yes, this would be the perfect ground truth. – The paper would be more complete if the final experiment would be an actual reconstruction attempt. How would a stack of slices look likes from

*an orthogonal multi-planar reconstruction view before and after motion compensation?*

*– In reality parallel imaging often allows to acquire batches of images that are usually far apart of each other to avoid cross-talk and signal decay artefacts. Wouldn't it make sense to input these batches into the network for more robust transformation predictions of entire batches? – what are the limitations of this method regarding maximally allowable motion offsets? – since this is a learning-based method it is likely to suffer from domain shift problems and reduced applicability for pathological cases, if they haven't been a prominent part of the training set. This limitation should be discussed in IV.*

*Minors: – would it be possible to cite PReLUs and explain the 'dead ReLU phenomena' a little bit? (Fig 3 reference) – In 298 misses an article or plural*

*Overall this is a strong paper, discussing a novel direction for fetal MRI reconstruction. The paper needs some small refinements to clarify certain issues."*

# 4. Submit your review

## 4.1 Complete the review form

- We use both the evaluation ratings and review comments in making the final decision. Please make sure that the review comments are consistent with the ratings. For example, if you choose Fair for Originality or Excellent for Impact, please elaborate on why.
- All your comments to the authors should be entered into the "Comments to the Authors" section, but you do not **state your overall recommendation**. The reason is, in cases when the Editor's recommendation or the final decision does not agree with a reviewer's recommendation, such statements are confusing to some authors. The Editorial Board of TMI may delete such statements should they present.
- TMI uses single-blind peer review, i.e. the identities of the reviewers are not disclosed to the authors. Please don't include your name in your comments and, if your review includes a file attachment, check the information that appears in the file's 'Properties' (on Windows) and 'Get Info' (on Macintosh) to make sure your identity is removed.

## 4.2 About email reminders

Until you submit your review, you will receive reminder emails before and after your due date.
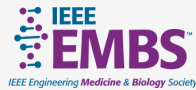
## 4.3 Request an extension

Please let the AE or editorial office know if you need a few more days to finish the review. Extensions of up to two weeks are usually granted, for special cases three weeks is also possible. Remember, the timeliness and quality of your review will be rated by the editorial board.