Putting together a MICCAI scientific program
A guide to the reviewing process and program organization for MICCAI 2020
Anne Martel, Sunnybrook Research Institute, Toronto

GENERAL CHAIRS
Daniel Racoceanu, Leo Joskowicz

PROGRAM CHAIRS
Purang Abolmaesumi, Anne Martel
Diana Mateus, Danail Stoyanov, S. Kevin Zhou, Maria A. Zuluaga

SUBMISSION PLATFORM MANAGER
Kitty Wong
Hackathon questions:

• Is MICCAI Diverse enough?
  • Diversity in review team
  • Diversity in authors
  • Diversity in science

• How can we improve the process?
  • Paper matching
  • Review quality
  • Rebuttal process

• What defines a good paper?

Overview of talk:

• Selecting the team

• Reviewing the papers

• Selecting the papers

• Creating a virtual conference
Selecting the team

2016: Bid to MICCAI board: core team identified
2019: Program committee expanded
Nov 2019: Call for Area Chairs and Reviewers
Jan 2020: Invitations to Acs
Feb 2020: Invitations to reviewers
A MICCAI conference starts with a bid to the board

• **Diversity is a key element of bids:**
  
  • **Geographic Diversity:**
    • Rotation between Americas/Europe & Africa/Asia & Oceania
    • Now also expect geographical diversity in team
  
  • **Gender Diversity:**
    • Expectation is that the senior team (general/program/workshop co-chairs) will be gender balanced
  
  • **Scientific Diversity:**
    • Balance between MIC and CAI

• Vision is also important – MICCAI 2020 was planned as first Latin American conference with goal of growing community.
A MICCAI conference starts with a bid to the board

- Diversity is a key element of bids:
  - **Geographic Diversity:**
    - Rotation between Americas/Europe & Africa/Asia & Oceania
    - Now also expect geographical diversity in team
  - **Gender Diversity:**
    - Expectation is that the senior team (general/program/workshop co-chairs) will be gender balanced
  - **Scientific Diversity:**
    - Balance between MIC and CAI

- Vision is also important – MICCAI 2020 was planned as first Latin American conference with goal of growing community.

2020 PROGRAM CHAIRS
Purang Abolmaesumi, Anne Martel
Diana Mateus, Danail Stoyanov, S. Kevin Zhou, Maria A. Zuluaga
Selection of Area Chairs

• Should be senior members of the MICCAI community
• Have a strong influence on the review process
• Important to have sufficient scientific expertise in diverse range of topics submitted to conference
• Also have an influence in guiding the “culture” of the conference – using their experience to differentiate between impactful and incremental research
Application form for AC selection

• Your name, institutional/company email address, and institutional affiliation.
• Your role in your institution
• * Number of MICCAI conferences attended (ideally be at least 3).
• Years served as a MICCAI area chair member already
• Identify yourself as MIC, CAI or MICCAI.
• * List of MICCAI papers for which you were an author. You should normally be first or last author on at least 3. Do not include MICCAI workshop papers.
• List one to three topics that best represent the focus of your research and expertise.
• List relevant conferences where you have been a member of the Program Committee.

* If you are new to the MICCAI community but have been involved in the organisation of high quality MIC and/or CAI events, particularly in underrepresented geographical regions, please provide the relevant information about these alternative events. We strongly encourage applications from women and other underrepresented communities and regions.
Composition of program committee

- 82 area chairs
- Reached out to female, Latin American and CAI candidates

**Area Chairs – Gender**
- Male, 74%
- Female, 26%

**Area chairs - Geographical Area**
- North America: 47%
- Europe: 29%
- Latin America: 5%
- Asia: 18%
- Australia: 1%
- Other: 5%
Reviewer Selection

• 1,426+ invited reviewers
• 6 Program Chairs reviewed all applications – main criteria was experience
• Needed to manually check information as data from applicants unreliable
• No attempt to balance representation
• Statistics from initial batch of 750 reviewers:
  • 20% of applicants female, 26.5% of accepted reviewers were female
  • 10.7% applicants were CAI, 14.4% of accepted reviewers were CAI
Assigning ACs and Reviewers

Reviewers and ACs upload TPMS data

Reviewers specify # papers willing to review

Reviewers and ACs upload keywords and web links to CMT

Allocation of papers to ACs made with TPMS

ACs use TPMS and Relevance scores to select > 9 reviewers per paper

Reviewers bid on papers they want to review

Complex optimization process follows!

• CMT handles domain conflicts
Assigning the Reviewers

• ACs were asked to select and rank > 9 reviewers per paper
• By default, reviewers shown in TPMS rank order
• ACs could reorder based on relevance score
• Links to google scholar or web page were available
• ACs could also see how many papers a reviewer had been nominated for
• Reviewers were then asked to bid on papers
Assigning the Reviewers

• CMT optimizes allocation of papers to reviewers using a cost function

• Weights of following can be adjusted (weights used are shown)
  • Bids – 70
  • AC rank - 10
  • Subject area relevance -10
  • TPMS score -10

• Takes into account domain conflicts and quotas
Assigning the Reviewers

- Many reviewers declined papers with high TPMS scores
- >4000 assignments went to reviewers who were willing or eager (2,3)
- Manually reassigned papers with unwilling reviewers
- For papers where reviewer did not bid – checked if TPMS rank > 1000 and relevance <0.8
Assigning the Reviewers

Areas for improvement:

- No easy way of ensuring a distribution of expertise amongst reviewers
- No check on diversity of reviewers (could end up with two from same group)
- Doesn’t allow user to prevent papers being allocated to unwilling reviewers
- Relies heavily on reviewers uploading TPMS information
- A lot of tuning of parameters was needed
- TPMS scores correlate poorly with willingness of reviewers
Reviewing the papers

Initial quality control carried out by PC chairs

• Rejected papers with gross violations of anonymity (ie authors names and affiliations at top of paper)
• Also rejected papers with gross violations of formatting
• Used ithenticate to check for duplicate submissions

This is a rather subjective and time consuming process

• Could be revisited in light of
  • Acceptance of papers with preprints in arxiv
  • Move to electronic proceedings may remove some publishing constraints in future
Reviewing the papers

- Detailed instructions to reviewers posted online: https://www.miccai2020.org/en/INFORMATION-FOR-REVIEWERS-AND-AREA-CHAIRS.html

- General guide to good reviewing practices

- Specific guidelines for MIC and CAI papers

- For MIC want to know:
  - whether the proposed methods are innovative or
  - whether the application is innovative

- For CAI, demonstration of system integration, and phantom or clinical validation are important as is clinical significance
Reviewing the papers

- The scoring scale is always an area of debate/controversy
- Separate questions for scientific innovation and contribution to clinical translation
- For overall score, we elected to use a scale adapted from Neurips. Descriptive terms and 10 point scale led to well calibrated scores but some complaints about wording need to be addressed

- Truly ground-breaking work. I will consider not reviewing for MICCAI again if this submission is rejected. (10)
- An excellent submission; a strong accept. I will fight for accepting this submission. (9)
- A very good submission; a clear accept. I vote and argue for accepting this submission. (8)
- A good submission; an accept. I vote for accepting this submission, although I would not be upset if it were rejected. (7)
- Marginally above the acceptance threshold. I tend to vote for accepting this submission, but rejecting it would not be that bad. (6)
- Marginally below the acceptance threshold. I tend to vote for rejecting this submission, but accepting it would not be that bad. (5)
- An okay submission, but not good enough; a reject. I vote for rejecting this submission, although I would not be upset if it were accepted. (4)
- A clear reject. I vote and argue for rejecting submission. (3)
- I am surprised this work was submitted to MICCAI; a strong reject. I will fight for rejecting this submission. (2)
- Trivial, wrong, already known or out of scope. I will consider not reviewing for MICCAI again if this submission is accepted. (1)
Reviewing the papers

• ACs monitor the reviews and contact reviewers if standard is poor
• After reviews are in, ACs read all reviews and score as
  • Early Reject
  • Early Accept
  • Rebuttal
• A meta-review is also required from the AC
Reviewing the papers

• Aimed for 15% early accept / 50% early reject / 35% rebuttal
• The PCs carried out a quality control check on meta reviews
• Asked ACs to expand on metareviews if insufficient detail was provided
• PCs also reviewed decisions on outliers – papers with wide variance in scores or with average scores that were discordant with Ac's decision
• After rebuttal, 2 secondary ACs recruited – final decision made by majority vote of 3 ACs
Review Process

- 2953 NOI
- 1876 Submissions
- 1809 Reviewed
- 242 (13%) Early Accept
- 736 (41%) Rebuttal
- 828 (46%) Early Reject
- 301 (41%) Accept after Rebuttal
- 542 Total Accept
- 67 Desk Rejected
- 3 Withdrawn
- 3 Withdrawn
### Accepted Papers

#### Subject

<table>
<thead>
<tr>
<th>Subject</th>
<th># Accepted</th>
<th>% Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine Learning Theory</td>
<td>51</td>
<td>29%</td>
</tr>
<tr>
<td>CAD</td>
<td>125</td>
<td>30%</td>
</tr>
<tr>
<td>Image Reconstruction</td>
<td>46</td>
<td>27%</td>
</tr>
<tr>
<td>Segmentation</td>
<td>138</td>
<td>28%</td>
</tr>
<tr>
<td>Image-Guided Interventions &amp; Surgery</td>
<td>58</td>
<td>38%</td>
</tr>
<tr>
<td>Other</td>
<td>23</td>
<td>26%</td>
</tr>
<tr>
<td>Microscopy</td>
<td>28</td>
<td>34%</td>
</tr>
<tr>
<td>Neuro Imaging</td>
<td>49</td>
<td>35%</td>
</tr>
<tr>
<td>Registration</td>
<td>24</td>
<td>27%</td>
</tr>
<tr>
<td><strong>All papers</strong></td>
<td><strong>542</strong></td>
<td><strong>30%</strong></td>
</tr>
</tbody>
</table>

#### Accepted Papers

<table>
<thead>
<tr>
<th># Accepted</th>
<th>% Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAI</td>
<td>38</td>
</tr>
<tr>
<td>MIC</td>
<td>344</td>
</tr>
<tr>
<td>MIC and CAI</td>
<td>160</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>542</strong></td>
</tr>
</tbody>
</table>
Author Gender Distribution

All Papers (N=1876)
- Male: 53%
- Female: 19%
- Prefer not to say: 28%

Accepted (N=542)
- Male: 52%
- Female: 19%
- Prefer not to say: 29%
Author Demographics

**All Papers (N=1876)**
- Africa: 1%
- Asia: 34%
- Australasia: 2%
- Central/South America: 2%
- Europe: 19%
- North America: 17%
- Prefer not to say: 25%

**Accepted (N=542)**
- Africa: 1%
- Asia: 29%
- Australasia: 2%
- Central/South America: 2%
- Europe: 20%
- North America: 19%
- Prefer not to say: 28%

Prefer not to say: 25%
Student Survey

All Papers (N=1876)
- Ph.D. student: 46%
- Master student: 15%
- Undergraduate student: 3%
- Not a student: 27%
- Prefer not to say: 9%

Accepted (N=542)
- Ph.D. student: 51%
- Master student: 13%
- Undergraduate student: 2%
- Not a student: 26%
- Prefer not to say: 8%
A virtual conference

Observations from other virtual conferences:
• Essential to have uploaded talks and asynchronous chat
• Poster zoom sessions are variable
  • Some authors have a lot of traffic & find experience very beneficial
  • BUT others have little traffic
  • Attendees may be intimidated by 1-1 meeting
• Limited Q&A time for after oral presentations not always useful (keynotes excepted)
• Moderated panel discussions seem to be more successful
A virtual conference

- Instead of a small number of “oral” sessions have a large number of mini-oral sessions
- Papers grouped into thematic clusters
- Used NLP to generate feature vectors for each abstract
- Applied hierarchical clustering to group similar papers
- Did a lot of manual corrections to make sessions approximately same size
- Also needed to cluster by time zone
- Recruited 2 co-chairs per session to moderate
- Hope is that mini-orals will function as panel discussions
Acknowledgements

Special thanks to Purang Abolmaesumi and Kitty Wong

*the program co-chairs:*
  Diana Mateus, Danail Stoyanov, S. Kevin Zhou, Maria A. Zuluaga

*the general chairs:*
  Daniel Racoceanu, Leo Joskowicz

The 82 area chairs, 1426 reviewers and thousands of submitting authors

Dekon, PCO

And to all of the preceding program chairs who have refined the reviewing process over the years, particularly Maxime Descoteaux, Julia Schnabel and Terry Peters