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# Medical Image Computing and Computer Assisted Intervention – MICCAI 2020

23rd International Conference  
Lima, Peru, October 4–8, 2020  
Proceedings, Part I

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# Preface

The 23rd International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI 2020) was held this year under the most unusual circumstances, due to the COVID-19 pandemic disrupting our lives in ways that were unimaginable at the start of the new decade. MICCAI 2020 was scheduled to be held in Lima, Peru, and would have been the first MICCAI meeting in Latin America. However, with the pandemic, the conference and its program had to be redesigned to deal with realities of the “new normal”, where virtual presence rather than physical interactions among attendees, was necessary to comply with global transmission control measures. The conference was held through a virtual conference management platform, consisting of the main scientific program in addition to featuring 25 workshops, 8 tutorials, and 24 challenges during October 4–8, 2020. In order to keep a part of the original spirit of MICCAI 2020, SIPAIM 2020 was held as an adjacent LatAm conference dedicated to medical information management and imaging, held during October 3–4, 2020.

The proceedings of MICCAI 2020 showcase papers contributed by the authors to the main conference, which are organized in seven volumes of *Lecture Notes in Computer Science* (LNCS) books. These papers were selected after a thorough double-blind peer-review process. We followed the example set by past MICCAI meetings, using Microsoft’s Conference Managing Toolkit (CMT) for paper submission and peer reviews, with support from the Toronto Paper Matching System (TPMS) to partially automate paper assignment to area chairs and reviewers.

The conference submission deadline had to be extended by two weeks to account for the disruption COVID-19 caused on the worldwide scientific community. From 2,953 original intentions to submit, 1,876 full submissions were received, which were reduced to 1,809 submissions following an initial quality check by the program chairs. Of those, 61% were self-declared by authors as Medical Image Computing (MIC), 6% as Computer Assisted Intervention (CAI), and 32% as both MIC and CAI. Following a broad call to the community for self-nomination of volunteers and a thorough review by the program chairs, considering criteria such as balance across research areas, geographical distribution, and gender, the MICCAI 2020 Program Committee comprised 82 area chairs, with 46% from North America, 28% from Europe, 19% from Asia/Pacific/Middle East, 4% from Latin America, and 1% from Australia. We invested significant effort in recruiting more women to the Program Committee, following the conference’s emphasis on equity, inclusion, and diversity. This resulted in 26% female area chairs. Each area chair was assigned about 23 manuscripts, with suggested potential reviewers using TPMS scoring and self-declared research areas, while domain conflicts were automatically considered by CMT. Following a final revision and prioritization of reviewers by area chairs in terms of their expertise related to each paper,

over 1,426 invited reviewers were asked to bid for the papers for which they had been suggested. Final reviewer allocations via CMT took account of reviewer bidding, prioritization of area chairs, and TPMS scores, leading to allocating about 4 papers per reviewer. Following an initial double-blind review phase by reviewers, area chairs provided a meta-review summarizing key points of reviews and a recommendation for each paper. The program chairs then evaluated the reviews and their scores, along with the recommendation from the area chairs, to directly accept 241 papers (13%) and reject 828 papers (46%); the remainder of the papers were sent for rebuttal by the authors. During the rebuttal phase, two additional area chairs were assigned to each paper using the CMT and TPMS scores while accounting for domain conflicts. The three area chairs then independently scored each paper to accept or reject, based on the reviews, rebuttal, and manuscript, resulting in clear paper decisions using majority voting. This process resulted in the acceptance of a further 301 papers for an overall acceptance rate of 30%. A virtual Program Committee meeting was held on July 10, 2020, to confirm the final results and collect feedback of the peer-review process.

For the MICCAI 2020 proceedings, 542 accepted papers have been organized into seven volumes as follows:

- Part I, LNCS Volume 12261: Machine Learning Methodologies
- Part II, LNCS Volume 12262: Image Reconstruction and Machine Learning
- Part III, LNCS Volume 12263: Computer Aided Intervention, Ultrasound and Image Registration
- Part IV, LNCS Volume 12264: Segmentation and Shape Analysis
- Part V, LNCS Volume 12265: Biological, Optical and Microscopic Image Analysis
- Part VI, LNCS Volume 12266: Clinical Applications
- Part VII, LNCS Volume 12267: Neurological Imaging and PET

For the main conference, the traditional emphasis on poster presentations was maintained; each author uploaded a brief pre-recorded presentation and a graphical abstract onto a web platform and was allocated a personal virtual live session in which they talked directly to the attendees. It was also possible to post questions online allowing asynchronous conversations – essential to overcome the challenges of a global conference spanning many time zones. The traditional oral sessions, which typically included a small proportion of the papers, were replaced with 90 “mini” sessions where all of the authors were clustered into groups of 5 to 7 related papers; a live virtual session allowed the authors and attendees to discuss the papers in a panel format.

We would like to sincerely thank everyone who contributed to the success of MICCAI 2020 and the quality of its proceedings under the most unusual circumstances of a global pandemic. First and foremost, we thank all authors for submitting and presenting their high-quality work that made MICCAI 2020 a greatly enjoyable and successful scientific meeting. We are also especially grateful to all members of the Program Committee and reviewers for their dedicated effort and insightful feedback throughout the entire paper selection process. We would like to particularly thank the MICCAI society for support, insightful comments, and continuous engagement with organizing the conference. Special thanks go to Kitty Wong, who oversaw the entire

process of paper submission, reviews, and preparation of conference proceedings. Without her, we would have not functioned effectively. Given the “new normal”, none of the workshops, tutorials, and challenges would have been feasible without the true leadership of the satellite events organizing team led by Mauricio Reyes: Erik Meijering (workshops), Carlos Alberola-López (tutorials), and Lena Maier-Hein (challenges). Behind the scenes, MICCAI secretarial personnel, Janette Wallace and Johanne Langford, kept a close eye on logistics and budgets, while Mehmet Eldegez and his team at Dekon Congress and Tourism led the professional conference organization, working tightly with the virtual platform team. We also thank our sponsors for financial support and engagement with conference attendees through the virtual platform. Special thanks goes to Veronika Cheplygina for continuous engagement with various social media platforms before and throughout the conference to publicize the conference. We would also like to express our gratitude to Shelley Wallace for helping us in Marketing MICCAI 2020, especially during the last phase of the virtual conference organization.

The selection process for Young Investigator Awards was managed by a team of senior MICCAI investigators, led by Julia Schnabel. In addition, MICCAI 2020 offered free registration to the top 50 ranked papers at the conference whose primary authors were students. Priority was given to low-income regions and Latin American students. Further support was provided by the National Institutes of Health (support granted for MICCAI 2020) and the National Science Foundation (support granted to MICCAI 2019 and continued for MICCAI 2020) which sponsored another 52 awards for USA-based students to attend the conference. We would like to thank Marius Linguraru and Antonion Porras, for their leadership in regards to the NIH sponsorship for 2020, and Dinggang Shen and Tianming Liu, MICCAI 2019 general chairs, for keeping an active bridge and engagement with MICCAI 2020.

Marius Linguraru and Antonion Porras were also leading the young investigators early career development program, including a very active mentorship which we do hope, will significantly catalize young and brilliant careers of future leaders of our scientific community. In link with SIPAIM (thanks to Jorge Brieva, Marius Linguraru, and Natasha Lepore for their support), we also initiated a Startup Village initiative, which, we hope, will be able to bring in promising private initiatives in the areas of MICCAI. As a part of SIPAIM 2020, we note also the presence of a workshop for Peruvian clinicians. We would like to thank Benjamín Castañeda and Renato Gandolfi for this initiative.

MICCAI 2020 invested significant efforts to tightly engage the industry stakeholders in our field throughout its planning and organization. These efforts were led by Parvin Mousavi, and ensured that all sponsoring industry partners could connect with the conference attendees through the conference’s virtual platform before and during the meeting. We would like to thank the sponsorship team and the contributions

of Gustavo Carneiro, Benjamín Castañeda, Ignacio Larrabide, Marius Linguraru, Yanwu Xu, and Kevin Zhou.

We look forward to seeing you at MICCAI 2021.

October 2020

Anne L. Martel  
Purang Abolmaesumi  
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