

## Preface

The fourth edition of the IAPR endorsed Workshop on Reproducible Research in Pattern Recognition was held in Montreal on August 21, 2022, as a satellite workshop at ICPR. Following the three previous editions, this event covered advances on reproducibility platforms, on new reproducible research results, and on ICPR companion short papers. Taking advantage of the end of the pandemic, the workshop was able to propose a full in-person event, with just a few remote presentations.

As in previous editions, four ICPR companion papers were accepted for oral presentation and the program was completed with a total of seven presentations, including talks focused on concepts or experience feedback of reproducibility. 81% were authors who had never published at RRPR before. This rate is quite stable with respect to the two previous editions (85% and 89%). To address the absence of contributions for the Reproducible Research framework, a new “Lightweight” presentation type was proposed. This mode facilitates author participation by submitting a single abstract first and then allowing authors with more time to prepare their contribution to the post proceedings. Each submitted paper was reviewed by three to four reviewers and by two reviewers for the lightweight presentation-based papers. The audience averaged 20 attendees, including authors presenting online.

For this edition, the event was extended beyond the workshop in two ways. First, RRPR continued after the in-person ICPR conference with a new open poster presentation track at the second edition of the IAPR international conference Discrete Geometry and Mathematical Morphology (DGMM) that was held two months after RRPR in Strasbourg on 24-27 Oct 2022. Two new contributions were accepted in this event and are included in the proceedings. The topic of these papers are related to the DGMM scope with a special focus on reproducibility. This new initiative was a further step towards improving awareness of the RRPR events and also towards cross-fertilizing the topic of “reproducible research” across a wide range of IAPR activities, since it applies everywhere. In fact, this was the initial goal of embedding the RRPR workshop within ICPR. Additionally, we were pleased to extend the workshop interaction beyond the workshop itself by including two focus groups initiated during the event. The first group discussed the efforts to integrate reproducible research in international conferences and the second one was oriented to motivate reproducible research and to measure the balance between impact versus investment. These discussion groups were extended during six months after the workshop and the resulting discussion report was integrated inside a paper reviewed by an editorial board member. In the end, 9 papers were reviewed and 5 full papers were accepted after revision, thanks to the post-proceedings process and 4 short companion papers were also accepted.

The proceeding contents was organized into three main categories. The first axis is on reproducible research framework with one paper resulting from the lightweight presentation mode focused on efforts for reproducible research, updating a platform survey published in the second edition of RRPR. A second

category, on reproducible research results, includes one paper dealing with the extraction of document information using graph neural networks. A third group included ICPR companion papers describing implementation and details that are absolute requirements for reproducibility. Several topics were addressed from these papers such as continual learning, log clustering, anomaly detection and video classification with multispectral imaging. The fourth group results from the new special reproducibility track of the DGMM event and includes a paper focusing on segmentation from CNN combined with max-tree methods and another contribution on the forest road extraction. Finally, the last part of the proceedings includes the discussion report mentioned above.

Finally, as usual, we would like to thank all researchers who submitted contributions to RRPR and also the reviewers of the scientific committee. We also address a special thank to the IAPR organizers, who have given their support once again to RRPR with the official IAPR's endorsement. The edition of these post-proceedings was also made easier with the *EasyChair* platform and the reactivity from the editorial director team with Ronan Nugent and Anna Kramer at Springer-Nature. Finally, we also warmly thank again Audrey Bichet from the MMI department of the IUT of Saint-Dié-des-Vosges who made the nice poster of this fourth RRPR edition.

June 2023

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## Lightweight Presentation Abstract

### The Fuzzy Boundaries of Reproducibility

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**Abstract.** Issues that arise in applying current reproducibility practices to pattern recognition include contradictory definitions of “reproducibility” versus “replicability,” the missing connections between these notions and the arguably more useful concept of “generalizability,” the distinction between assessing an experiment and assessing the evaluation of an experiment, and the lack of a formal framing that would allow us to agree with mathematical certainty that a particular result is indeed reproducible / replicable / generalizable.

In this short talk designed to prompt debate, we will draw from a few recent papers that advance the notion of reproducibility. The challenges go well beyond what can be accomplished by simply sharing source code. We will then sketch some alternatives for relating generalizability to reproducibility, experiments that could be instructive as we advance in this direction, and suggestions for how we might start to formalize such notions so that we can write with precision and confidence about them in the future.

**Keywords:** Reproducibility, pattern recognition, performance evaluation, research communities.