
Medical Image Assisted Biomarker Discovery (MIABID2022)

Call for Papers

You are kindly invited to submit your full paper to the [MIABID](#) workshop in [MICCAI 2022](#).

The MICCAI 2022 workshop on Medical Image Assisted Biomarker Discovery (MIABID2022) will be a live event and will be held as part of MICCAI 2022 on September 18th, 2022.

In recent years, AI solutions have shown to be capable of assisting radiologists, clinicians, and even clinical trials' organizers in detecting, grading and staging diseases, assessing severity, automatically localizing and quantifying disease features, predicting responses or even treatment effectiveness. Imaging and image-extracted clinical biomarkers are a key enabler of targeted therapy and personalized treatment, and there has been substantial interest and early success in the application of AI-based medical image computing (MIC) technologies as a new avenue for biomarker discovery. Examples of how medical imaging AI-powered biomarkers can bring clinical value include:

- **Automation of existing imaging biomarker workflows:** Machine learning tools have the capability to streamline the quantification and assessment of established imaging biomarkers. Deep learning-based strategies have been shown to vastly improve performance and reduce subjectivity in image-based disease diagnosis and grading. Similarly, these tools can automate other clinical tasks such tissue staining quantification, identifying tumor infiltrating lymphocytes on whole slides images, or measurement of tumor burden radiology exams.
- **Image-based prediction of non-imaging biomarkers:** An active area of research development has been the prediction of established non-imaging biomarkers from imaging alone. The disciplines of "radiogenomics" and "histogenomics" attempt to predict genotypic information from standard of care radiology or H&E digital pathology images, respectively. These techniques could enable targeted therapies for a greater portion of patients globally by increasing access to corresponding companion diagnostics.
- **Novel image-based biomarker discovery:** A rapidly growing body of research has sought to leverage advances in medical image analysis to discover a new category of novel, quantitative imaging biomarkers. Such techniques might leverage hand-crafted computational imaging features (e.g. image texture, shape features, cellular graphs) - commonly referred to as "radiomics" and "pathomics" - to predict patient outcomes. Others have leveraged deep learning tools towards this end, for instance training convolutional neural network-based classifiers to predict response to treatment or estimate a patient's survival following a treatment from standard of care medical images.
- **Multimodal integration of imaging and non-imaging biomarkers:** As has been demonstrated, there is orthogonal information present in various data modalities - molecular data, clinical data, Histopathology slides and Radiology images - that can be effectively combined to create more poignant treatment response predictors and survival estimators. Future such examples can lay the foundation for a broad, generalizable framework that can translate across cancer types and clinical endpoints.

Such techniques have the potential to address considerable gaps in existing clinical biomarkers and guide treatments currently lacking reliable companion diagnostics. However, they necessitate

innovation to overcome issues that are common in medical imaging but exacerbated in the context of biomarker discovery: for instance, extremely limited training data and error-prone, biased labels.

The objective of this workshop is to better understand the work needed to reach the standards of AI-based MIC-assisted biomarker discovery in clinical practice. The aim is to fortify and make its role stronger, more effective, and wider adopted, particularly, as the underlying requirements increase, and the problem becomes more complex. The sensitivity of this clinical use heightens the importance of numerous technologies, from interpretability to uncertainty quantification. Elegant solutions to these obstacles will be essential to realizing the potential of AI-based MIC-derived biomarkers to inform and guide patient care.

In this workshop we aim to enable multidisciplinary experts to share the latest trends in AI-based MIC-technologies for biomarker discovery and discuss their effectiveness, adoption, and potential areas to steer further research.

The workshop will include the following three sections, two polls and a panel:

Session 1:

What are the latest technologies and trends in radiographic medical image analysis for biomarkers discovery? What is the role and acceptance in clinical practice? What are remaining obstacles and how to address them?

Session 2:

What are the latest technologies and trends in histology medical image analysis for biomarkers discovery? What is the role and acceptance in clinical practice? What are remaining obstacles and how to address them?

Session 3:

What is the role of combining biomarkers from multiple modalities? What multimodal data integration technologies work and under what conditions? What value can we gain from analysis of multi-modal data?

Polls:

Polls, designed to collect information from attendees regarding their perspective on the questions defining the 3 sessions, and in particular aiming at sharing trends, limitations and best practices, will be performed before and after the Sessions.

Panel:

A panel, with highly selected invited experts, at the end of the day, will address the most debatable topics and the most complex dilemmas.

We invite computational and domain experts to submit one of three types of submissions:

- (1) An innovative technological solution
- (2) A Meta-analysis
- (3) A perspective

Papers will consist of a maximum of 7 pages (text, figures and tables) + up to 2 pages for references only. They should be submitted electronically in LNCS style, to the CMT system. Submission

guidelines are similar to the MICCAI main conference. The submission should be blinded. Accepted papers will be published in the MICCAI Proceedings in the Springer LNCS Series. All workshop submissions must be original and cannot already be published or considered for publication elsewhere (with the explicit exception of arXiv.org as a form of prepublication of MICCAI contributions).

Looking forward to your submission,

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