

# SPIE-AAPM-NCI DAIR Digital Breast Tomosynthesis Lesion Detection Challenge (DBTex) - Phase 1

The DBTex Challenge (<https://spie-aapm-nci-dair.westus2.cloudapp.azure.com/competitions/>) requires submitting algorithms for the detection of biopsy-proven breast lesions on digital breast tomosynthesis (DBT) images. The results of the competition will be announced at the special session of the SPIE Medical Imaging 2021 conference. Participants in the first DBTex Grand Challenge are encouraged to submit their work for peer review to the SPIE's Journal of Medical Imaging.

## Organizers:

This challenge is organized by SPIE (the international society for optics and photonics), The American Association of Physicists in Medicine (AAPM), the National Cancer Institute (NCI), and Duke Center for Artificial Intelligence in Radiology (DAIR).

Data for this study was originally hosted by TCIA as part of the Breast Cancer Screening - Digital Breast Tomosynthesis (BCS-DBT) collection ([Breast Cancer Screening – Digital Breast Tomosynthesis \(BCS-DBT\)](#))

Phase 1: Dec 14, 2020 - Jan 26, 2021 (<https://spie-aapm-nci-dair.westus2.cloudapp.azure.com/competitions/4>)

Phase 2: May 24, 2021 - July 24, 2021 (<https://spie-aapm-nci-dair.westus2.cloudapp.azure.com/competitions/6>)

## Task:

To detect breast lesions that subsequently underwent biopsy and provide the location and size of a bounding box, as well as a confidence score for each detected lesion candidate. The dataset contains DBT exams with breast cancers, biopsy-proven benign lesions, actionable non-biopsied findings, as well as normals (scans without any findings). The task is to detect **biopsy-proven** lesions (masses or architectural distortions) only.

### Definition of a true-positive detection:

A predicted box is going to be counted as a true positive if the distance in pixels in the original image between its center point and the center of a ground truth box is less than half of the ground truth box diagonal or 100 pixels, whichever is larger. In terms of the third dimension, the ground truth bounding box is assumed to span 25% of volume slices before and after the ground truth center slice and the predicted box center slice is required to be included in this range to be considered a true positive. Actionable lesions that did not undergo biopsy do not have annotations (ground truth boxes).

### Performance metric:

The primary performance metric is the average sensitivity for 1, 2, 3, and 4 false-positives per DBT view. The primary performance metric will be determined using *only* views with a biopsied finding. The secondary performance metric is the sensitivity for 2 FP/image for all test views as assessed in <https://arxiv.org/pdf/2011.07995.pdf>. Submissions will be ranked using the primary performance metric and the secondary performance metric will be used as a tie-breaker.