

**Doctoral School of Information and Biomedical Technologies Polish Academy of Sciences  
TIB PAN**

**Subject:** Image analysis and machine learning methods applied to the automatic detection of precancerous lesions in gynecological cytology.

**Supervisors, contact, place of research**

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**Project Description**

Cervical cancer is one of the most deadly and common forms of cancer among women in the contemporary world [1]. It is well known that this type of cancer is preventable if effective screening measures are applied. The Pap-test is the most common technique used for early screening and diagnosis of cervical cancer in both types of cytology: the classical one and the liquid based. However, the manual analysis of the Pap-smears is prone to make errors due to analyst's mistakes. Moreover, the process is tedious and time-consuming. Hence, it is beneficial to develop a computer-assisted diagnosis tool to make the Pap-smear test more accurate and reliable [2, 3].

The goal of this study is to propose a tool for automatic detection of precancerous lesions cells (in particular their nuclei) in the Pap-smear and support screening workflow, to reduce the time required by the cytotechnicians to screen a slide by eliminating the obvious normal cases. Hence more time can be put on the suspicious slides, indicated as positive or even ambiguous based on screening tests.

There are available some systems [4, 5], but system developed under this project should perform the segmentation of cells (nuclei and cytoplasm) based on artificial intelligence (AI) as an automated procedure. There are experiences in such approaches in our lab concerning histochemically stained tissue sections from minor salivary gland biopsies [6] and segmentation of fibroblasts [7] from sequences of microscopic images which document cells' behavior in culture.

**Bibliography**

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8. updated: June 13, 2019