



TIA Centre
TISSUE IMAGE ANALYTICS

Newsletter - Summer 2025

Welcome to the latest Newsletter of the TIA Centre at the University of Warwick. This newsletter provides updates on the Centre's recent activities and offers insights into our work over the past few months. Additionally, it includes details of upcoming events and initiatives for the months ahead.

Since our last newsletter in Autumn 2024, members of the TIA Centre have been actively engaged in numerous research initiatives, contributing to the development of several notable publications. We would like to take this opportunity to highlight a selection of the research papers that have been published:

[Large multimodal model-based standardisation of pathology reports with confidence and its prognostic significance](#) E Alzaid et al, The Journal of Pathology: Clinical Research

A practical approach for automatically extracting information from unstructured pathology reports or scanned paper reports utilising a large multimodal model. This framework uses context-aware prompting strategies to extract values of individual fields, such as grade, size, etc. from pathology reports. A unique feature of the proposed approach is that it assigns a confidence value indicating the correctness of the model's extraction for each field and generates a structured report in line with national pathology guidelines in human and machine-readable formats.

[Characterization of Breast Cancer Intra-Tumor Heterogeneity Using Artificial Intelligence](#) N Wahab et al, MDPI, Journal: Cancers

This study aimed to develop an AI-based algorithm to measure and quantify features that represent intra-tumor heterogeneity in breast cancer and present them as an index. In the study, 162 features were extracted and quantified from whole slide images. These features showed a significant association with patient outcomes. When an overall heterogeneity score was used, it stratified luminal breast cancer patients into low- and high-risk groups, which can help in personalized therapy.

[Dual attention model with reinforcement learning for classification of histology whole-slide images](#) M Raza et al, Journal of Computerized Medical Imaging and Graphics

This study proposed a novel dual attention approach, consisting of two main components, both inspired by the visual examination process of a pathologist: The first soft attention model processes a low magnification view of the WSI to identify relevant regions of interest (ROIs), followed by a custom sampling method to extract diverse and spatially distinct image tiles from the selected ROIs. The second component, the hard attention classification model further extracts a sequence of multi-resolution glimpses from each tile for classification. Since hard attention is non-differentiable, we train this component using reinforcement learning to predict the location of the glimpses. This approach allows the model to focus on essential regions instead of processing the entire tile, thereby aligning with a pathologist's way of diagnosis.

[A novel AI-based score for assessing the prognostic value of intra-epithelial lymphocytes in oral epithelial dysplasia](#) A Shephard et al, British Journal of Cancer
Head and neck cancer encompasses a diverse group of malignancies originating from the upper aerodigestive tract, including the oral cavity, nasal cavity, pharynx, larynx, salivary glands and sinuses. This study proposed a novel artificial intelligence (AI) based IEL score from Haematoxylin and Eosin (H&E) stained Whole Slide Images (WSIs) of OED tissue slides. The researchers determined the prognostic value of our IEL score on a digital dataset of 219 OED WSIs (acquired using three different scanners), compared to pathologist-led clinical grading.

[Deep learning for predicting prognostic consensus molecular subtypes in cervical cancer from histology images](#), R Wang et al, npj Precision Oncology
Cervical cancer remains the fourth most common cancer among women worldwide. This study proposed an end-to-end deep learning framework to predict consensus molecular subtypes (CMS) in HPV-positive cervical squamous cell carcinoma (CSCC) from H&E-stained histology slides.

[Domain Generalization in Computational Pathology: Survey and Guidelines](#) M Jahanifar et al, ACM Computing Surveys
Deep learning models have exhibited exceptional effectiveness in Computational Pathology (CPath) for various tasks on multi-gigapixel histology images. Nevertheless, the presence of out-of-distribution data (stemming from different sources such as disparate imaging devices) can cause domain shift (DS). DS decreases the generalization of trained models to unseen datasets with slightly different data distributions, prompting the need for innovative domain generalization (DG) solutions.

[CellOMaps: A compact representation for robust classification of lung adenocarcinoma growth patterns](#) A Al-Rubaian et al, Computers in Biology and Medicine

Lung adenocarcinoma (LUAD) is a morphologically heterogeneous disease, characterized by five primary histological growth patterns. The classification of such patterns is crucial due to their direct relation to prognosis but the high subjectivity and observer variability pose a major challenge. Related studies in the literature focus on machine learning methods for growth pattern classification, often formulating the problem as a slide-level predominant pattern classification problem. The study

proposed a generalizable machine learning pipeline capable of classifying lung tissue into one of the five patterns or as non-tumor.

[Development and validation of an artificial intelligence-based pipeline for predicting oral epithelial dysplasia malignant transformation](#) A Shephard et al, Communications Medicine

Oral epithelial dysplasia (OED) is a potentially malignant histopathological diagnosis given to lesions of the oral cavity that are at risk of progression to malignancy. Manual grading of OED is subject to substantial variability and does not reliably predict prognosis, potentially resulting in sub-optimal treatment decisions. A transformer-based artificial intelligence (AI) pipeline for the prediction of malignant transformation from whole-slide images (WSIs) of Haematoxylin and Eosin (H&E) stained OED tissue slides was developed, named ODYN (Oral Dysplasia Network). ODYN can simultaneously classify OED and assign a predictive score (ODYN-score) to quantify the risk of malignant transformation.

Other News items

[Professor Nasir Rajpoot Showcases Groundbreaking AI Tool at New Zealand Cancer Conference](#) – read about Professor Rajpoot's experience at the The Cancer Society of New Zealand's annual conference in March 2025

[Bigpicture Annual Meeting](#) – read about the Bigpicture Consortium Annual Meeting in Uppsala, Sweden in January 2025 and the TIA Centre's involvement in the project

[VIVA Success for TIA Student](#) – congratulations go to Ruoyu Wang, a TIA Centre's PhD student, who officially passed their PhD viva in March 2025. Read more about their research

[TIA Triumphs at PUMA Grand Challenge](#) – read more about how "TIAKong" secured leading positions in the recent PUMA (Panoptic segmentation of nuclei and tissue in advanced Melanoma)Challenge <https://puma.grand-challenge.org/puma/>, organized by the Department of Medical Oncology, University Medical Center Utrecht, in the Netherlands.

[TIA Triumphs at Monkey Grand Challenge](#) – read more about the "TIAKong" team also securing leading positions in the recent Monkey Grand Challenge <https://monkey.grand-challenge.org/>, organized by the Department of Pathology, Radboudumc, Nijmegen, The Netherlands.

[Successful Grant for NPC Research Collaboration with Malaysia](#) – we are excited to announce our successful grant application through the British Council's ISPF Research Collaboration for the project "Development of Diagnosis and Prognosis Model Using Whole Slide Images (WSI)-Based Biomarkers for Personalised Treatment in Nasopharyngeal Carcinoma."

[TIAToolbox v1.6.0 Released: Major Updates and New Features](#) – find out more about the release of TIAToolbox v1.6.0, packed with significant updates and new features to enhance tissue image analysis workflows

One of the TIA Centre's Cancer Research UK-funded projects, ANTICIPATE, has now successfully concluded. The project developed AI tools to enhance the diagnosis and risk prediction of oral epithelial dysplasia — a precancerous condition with rising global incidence. Building on this momentum, and jointly led by Adam Shephard (Warwick) and Hanya Mahmood (Sheffield), the team is now preparing the next wave of funding applications to move the work closer to clinical implementation.  **[Read more about ANTICIPATE here](#)**

Our world leading Seminar Series runs throughout the academic year – please view the **[Seminars page](#)** on our website to see any upcoming seminars and links to recordings of previous seminars

Want to know who is involved in the **TIA Centre** – please take a look at our **[Team page](#)** on the website

For more information on the TIA Centre or if you have any queries please do not hesitate to contact us using the contact details found **[here](#)**.

More news stories can be found **[here](#)**.

The next TIA Centre Newsletter will be available towards the end of the year. If you would like to be removed from this mailing list then please reply to this email asking to be unsubscribed.

Many thanks for your interest and support.