

Project Summary for IgANN website

AI.IgAN

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Brief Description

Nephropathology diagnostics faces challenges due to inter-observer variability, limiting standardized, objective, and quantitative biopsy readouts in clinical practice. Traditional analysis of histology images only utilizes a small portion of the available information, often in a qualitative or semi-quantitative manner. With the advent of novel treatments and biomarkers for IgAN, there is a growing need for more precise, reproducible, and quantitative histologic assessment to guide patient selection, risk stratification, and treatment response evaluation. The integration of computer vision, particularly deep learning (DL), in histopathology image analysis offers new opportunities to enhance histopathology diagnostics — enabling automated segmentation and feature extraction from whole slide images, more consistent classification, and outcome prediction that reduces reliance on subjective visual estimation. The aim of the AI.IgAN study is to leverage large multicenter datasets from international collaborators to develop DL-based solutions for IgAN in routine nephropathology and clinical nephrology, aimed at automated quantification, prediction of clinical outcomes such as progression to kidney failure or response to therapy, and augmenting diagnostic capabilities in digital nephropathology.

Project Status

Several projects already published (see publications), several are ongoing.

The data collection and analysis is continues and any interested center can participate – please contact pboor@ukaachen.de to participate.

Publications

Hölscher, D.L., Bouteldja, N., Joodaki, M., Russo, M.L., Lan, Y.-C., Sadr, A.V., Cheng, M., Tesar, V., Stillfried, S.V., Klinkhammer, B.M., Barratt, J., Floege, J., Roberts, I.S.D., Coppo, R., Costa, I.G., Bülow, R.D., Boor, P., 2023. Next-Generation Morphometry for pathomics-data mining in histopathology. **Nat. Commun.** 14, 470.

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Bouteldja, N., Hölscher, D.L., Bülow, R.D., Roberts, I.S.D., Coppo, R., Boor, P., 2022. Tackling stain variability using CycleGAN-based stain augmentation. **J. Pathol. Inform.** 13, 100140.

Hölscher, D.L., Schmitz, N.E.J., Niggemeier, L., Pilva, P., Strauch, M., Tesar, V., Barratt, J., Roberts, I.S.D., Coppo, R., Barisoni, L., Yanagita, M., Alabalik, U., Rule, A.D., Jagtap, J.M., Abreu, E.S., Taal, M.W., Kalra, P.A., Floege, J., Kramann, R., Boor, P., Bülow, R.D., 2026. Individualized treatment effects of corticosteroids in IgA nephropathy. **EBioMed in press.**

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