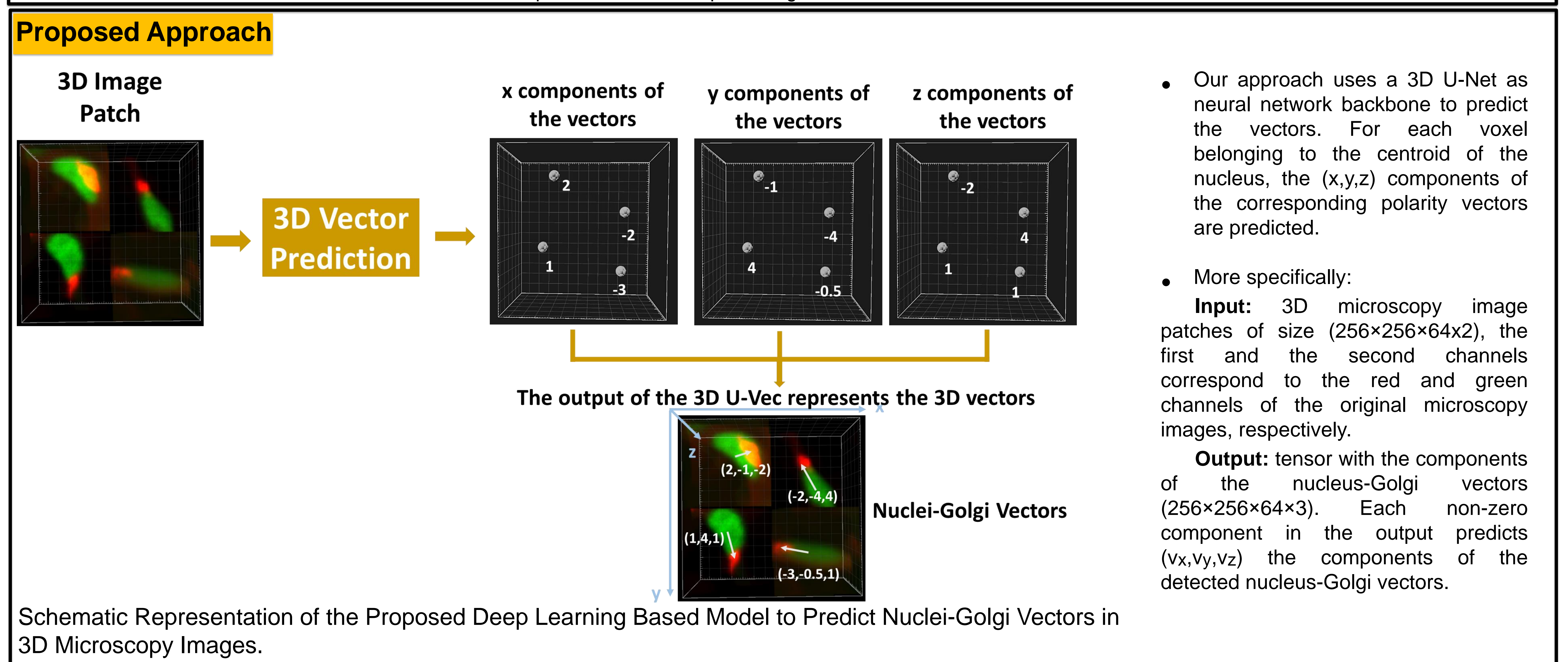
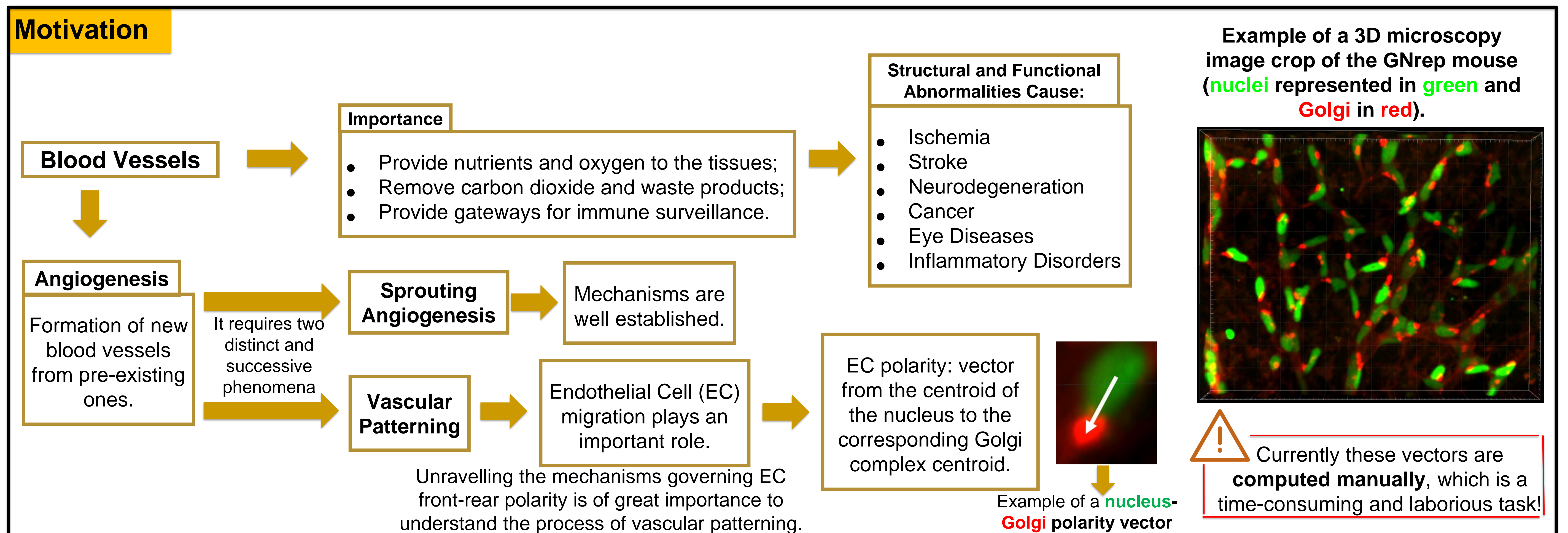




Deep Learning based Prediction of Nucleus-Golgi Vectors in 3D Microscopy Images

PhD in Biomedical Engineering

HEMAXI NAROTAMO (hemaxi.narotamo@tecnico.ulisboa.pt)



Results

Cosine Similarity (1 if pred=gt, 0 if pred!=gt)	0.847 ± 0.241
Distance between nuclei centroids (μm)	2.438 ± 2.411
Distance between Golgi centroids (μm)	3.286 ± 3.198
Vector Distance Length(pred-gt) (μm)	2.892 ± 2.356
True Positives	74
False Positives	12
False Negatives	17

White - Predicted nucleus-Golgi vectors
Green - Nuclei Channel
Red - Golgi Channel

Conclusions

Problem: nuclei and Golgi complex pairing in 3D fluorescence microscopy images of mouse retinas.

Importance: unravel the mechanisms of vascular patterning.

Approach:

- Novel deep learning-based model to compute the polarity vectors.
- It predicts nucleus-Golgi vectors in a single pass presenting good results.
- Method with promising results and possibly of great importance for the automatic computation of axial polarity.

Acknowledgements: This work was supported by the Fundação para a Ciência e Tecnologia (FCT) Doctoral Grant 2020.04511.BD.