Working title: the most amaz-zing SPIM and how we built it. Authors currently alphabetical.

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Abstract. 200 words limit. no numerical references presenting concisely the objectives, methodology used, results obtained, and their significance.

Keywords: Light sheet microscopy, Big data, Optical clearing, Data management, whole brain imaging, rolling shutter, 7,8..

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1 Introduction

Here will be an introduction to whole brain imaging the challenges it is facing and how light sheet microscopy is addressing those challenges. Points to raise: briefly optical clearing, big data generation and management, image quality degradation necessitating rolling shutter, refocusing?, double sided illumination, maybe Bessel beam illumination, etc. The next parts will be in clear sections so that we can divide them better between us if necessary. Can be merged later on if we wish so.

2 Optomechanics

2.1 Optical path

Here we describe our optical setup, the components we use etc. Use references[1] to old SPIM.

2.2 Alignment

and maybe also some details on how we aligned everything. we have our sample mirror with the hole in it, the shear plate, periscopes etc...

2.3 Sample chamber

the sample chamber is probably of particular interest, how was it designed and made, how do we protect the objectives, stop it from leaking, soft connections and hard connections.

3 Software Management

Here we describe all things murmex, components and their communication/ interaction. how is the rolling shutter timed with galvos, triggers and clocks etc.

4 Data Management

4.1 Pipeline

Here we describe our data pipeline: data production rate as function of frame rate and image size, stack size, tomo size, SSD space, transfer to NAS digital downsampling, and tiff compression, Leo's python script, NAS to CINECA, 10 gigabit connection etc.

5 Bioinformatics

5.1 Automated cell counting

See Reference[2] for details.

5.2 Blood vessel segmentation

6 Data

some pretty images to prove that it all worked.

7 Conclusion

summary

8 Outlook

where are we going next with this?

Acknowledgments

References

1 Silvestri, L., Bria, A., Sacconi, L., Iannello, G. & Pavone, F. S. *Opt Express* **20**, 20582-20598 (2012).

2 Frasconi, P., Silvestri, L., Soda, P., Cortini, R., L., Pavone, F. S., & Iannello, G. *Bioinformatics* **30**, i587-i593 (2014).

List of Figures

List of Tables