Optical projection tomography scanner Milano

OPT Scanner Milano was developed in cooperation with Technical University in Milano and was constructed from components available on the market. It uses high-quality telecentric optics, but without zoom, and a sensitive EMCCD camera providing us with sharp images of projections.

Location

Room DaI / basement / room 002 (tel. 2124)
Laboratory of Biomathematics, Institute of Physiology of the Czech Academy of Sciences, Vídeňská 1083, Prague 4, Czech Republic

Contacts

Manager:
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Administrative tasks and technical operation, consultations.

Deputy Manager:
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Administrative tasks and technical operation in manager's absence.

Head of the Laboratory of Biomathematics:
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Consultations in the field of image processing and analysis.

Fees

Information about fees is at https://www.fgu.cas.cz/en/articles/672-poplatky-czbi.

Usage rules

1. Registered users are enabled to make reservations of the device. Reservation instructions and rules are at https://www.fgu.cas.cz/en/articles/664-reservation-czbi. Any problems with the reservation system should be reported to IT Helpdesk, IPHYS CAS (helpdesk@fgu.cas.cz).

2. Initial user training includes work safety rules, device control and operation and application tips. For training please contact the manager.

3. The device is used by the trained users in accordance with the [Training protocol](). The work may be consulted with the manager during working hours (workdays 8 am to 5 pm).

4. The user is obliged to fill in specifications of his/her usage into the device attendance book (name, start time, end time, affiliation, financial source for payment, experiment duration, purpose and notes) and signature. Information about fees is at https://www.fgu.cas.cz/en/articles/672-poplatky-czbi.

5. When the results are used in a publication, the users have to mention the used device. The Open Access users are further obliged to include the CzBI project in Acknowledgments: "The results were obtained using the National Infrastructure for Biological and Medical Imaging (Czech-BioImaging LM2018129 funded by MEYS CR)." Any questions will be answered by the manager.

Technical parameters

The most suitable specimens for acquisition are the fixed ones that were made transparent by optical clearing, e.g. using protocols of BABB, CLARITY and CUBIC. The diameter of specimens can be in the range of 0.1-10 mm. The specimens are glued to a metal holder by a super-glue, either directly or embedded in agarose. Small specimens MUST be embedded in agarose. The resolution of the scanners is from circa 20 µm, for small specimens and 10x objective, isotropic along all axes (xyz). Projections are acquired either in transmission mode using white light or, in fluorescence mode, using monochromatic diodes and emission filters.

Excitation source: Monochromatic diodes.

1. GFP1, excitation 405/10 nm, emission 447/60 nm (BP) or emission from 450 nm (LP),
2. GFP+, excitation 472/30 nm, emission 520/35 nm (BP) or emission from 550 nm (LP),
3. Cy5, excitation 624/40 nm, emission 692/40 nm (BP).

Useful links

- information about OPT principle:
  https://www.emouseatlas.org/emap/about/collaborations/OPT/introduction.html
- **FIJI** - open source programme (Fiji is Just ImageJ): https://imagej.nih.gov/ij/, ImageJ world mailing list: https://imagej.nih.gov/ij/list.html.
- **NRecon** - basic SW for 3D reconstruction of captured projection data.

- **DataViewer** - for 3D visualization of reconstructed data in the form of orthogonal projections, available for download (together with NRecon) at https://ww.skyscan.be/products/downloads.htm.
- **VolViewer** - for data visualization in the form of 3D views using "volume rendering" and MIP (maximum intensity projection), enables rotation, zoom, multiple channel view, 3D measurement, virtual sections etc. Free download at https://cmpdartsvr1.cmp.uea.ac.uk/wiki/BanghamLab/index.php/VolViewer.
- **Zoner Photostudio Pro** - recommended, for basic processing and visualization of both captured projections and reconstructed sections. Paid SW, free demo version download at https://www.zoner.cz.
- **IrfanView** - less comfortable alternative of Zoner, free download at https://www.irfanview.com.