Launching Omero at the DRFZ Berlin
- the setup and our plans

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Longitudinal intravital microendoscopy in the murine bone marrow (LIMB)

- Miniaturized version of conventional fixator as used in clinics
- Internal System
  - Stable fixation close to the cortex
- Medical grade Ti-alloy
  - Biocompatibility
  - High rigidity and low density
Characterization via *ex vivo* methods
- μCT, Histochemistry and Immunofluorescence

- **Fixation (4 % PFA, 10-30 % Sucrose Sol.)**
- **7 µm freeze-sections (T. Kawamoto, 2012)**
- **μCT**
- **Histochemistry**
  - Movat-Pentachrome stain
  - Masson-Goldner stain
- **Immunofluorescence**
Registering of 2D and 3D imaging data of bone - a new tool for Amira

Server Setup


RAID1
1 TB
(2x 1TB SSD)

RAID5
15 TB
(4x 5TB HDD)

GeForce GTX Titan
6144 MB

Intel Core i7
3.4 GHz

DDR3-1600
32 GB
(4x 8GB)

DRFZ-Server
(Administration by IT-Group)
Server Setup

Software: Win Server 2012, Omero.Server 5.1.1 (Ice 34)

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32 GB
(4x 8GB)

RAID1
1 TB
(2x 1TB SSD)

DRFZ-Server
(Administration by IT-Group)

USB-HDD

Charité-Server
(Administration by IT-Group)
Open Questions

1. How to link Amira-tools to Omero?
2. Can Omero handle (raw) μCT-files like .isq and .rsq?
3. How to prepare the histo-images for the creation of a binary template?
4. Which tools are best suited for stitching of 3D tilescans with rotations and translations?
5. ...
A Joint Intravital Microscopy and Imaging Platform

Thank you for your attention!
Longitudinal intravital imaging of CD19-tdRFP mouse

Imaging parameter
Ex.: 1100 nm (OPO)
Image size: 150 x 150 µm
z-Stack: 54 µm
Averaging: 2

Post processing:
smoothing (Gaussian)
deconvolved (Huygens, SVI)

CD19-tdRFP vessels (Qdots 655 i.v.)
Omero diagnostics
vivaCT 40

Specifications
Type Cone-beam *in vivo* microCT
Fully shielded
No external shielding required
X-ray source Sealed
Air-cooled
Maintenance-free
30 - 70 kVp
Detector 2048 x 256 elements, 26 µm pitch
Resolution < 14 µm (10% MTF)*
5 - 76 µm nominal isotropic (pixel size)*
Image matrix 512 x 512 to 4096 x 4096 pix
Max. scan size 38.9 x 145 mm (ØxL)
Max. specimen size 80** x 500 mm*** (ØxL)
Min. scan time 30 s
Electrical 100 - 230 V / 50 - 60 Hz
370 W
Dimensions 1650 x 1090 x 920 mm (HxWxD)
Weight 258 kg
Outlook
...reduce iatrogenic damage to the BM

→ Use of dental bone adhesive

Challenges:
• Mechanical stability
• Application of adhesive and implant
Manual drilling causes iatrogenic distortion of the BM - introduction of bone fragments

cancellous bone
Cytoplasm
cell nuclei
mineralized cartilage
3D reconstruction of μCT scan w/o implant - the bone adapts due to bone-to-plate contact
Preliminary experiments
- Identification of hotspots