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Neurobiology Centre Investments

National imaging research centre in biological and biomedical sciences as a Part of Euro-BioImaging

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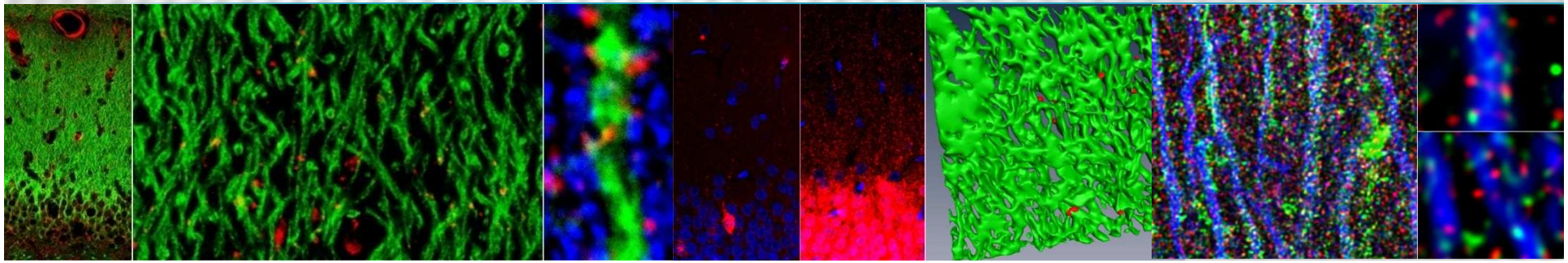

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Establishment of the Neurobiology Centre (2007-2013)

The Neurobiology Centre (NC) has been established as a group of new core facilities (CF) of the Nencki Institute and is currently in the construction phase. NC facilities will primarily have a service orientation and will be based on the European Molecular Biology Laboratory (EMBL) functional model for core facilities, supporting research excellence.

ERDF investments close to 15M euro

Part of the Centre for Preclinical Research and Technology (CePT) investment programme (100 M euro)

Recruitment of CF leaders and post-doctoral fellows within an FP7 Capacities (increasing regional potential) project – BIO-IMAGINE

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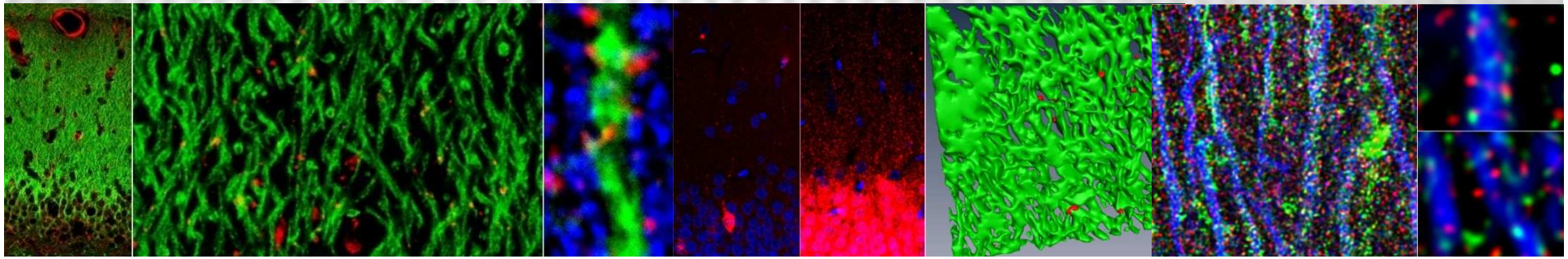
The Neurobiology Centre at the Nencki Institute

- Five core facilities will be furnished with state-of-the-art research equipment and will provide open access and services to internal and external users
  - Research equipment (30 M PLN)
  - Construction works (15M PLN)
  - Other project-related activities (7 M PLN)
- Following EMBL approach, each core facility will be open to external users and will establish transparent access rules. Each will be headed by a CF leader recruited in an open competition who will build his own service / research team.



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The Neurobiology Centre at the Nencki Institute

Advanced light microscopy (ALM) and electron microscopy (EM) core facility

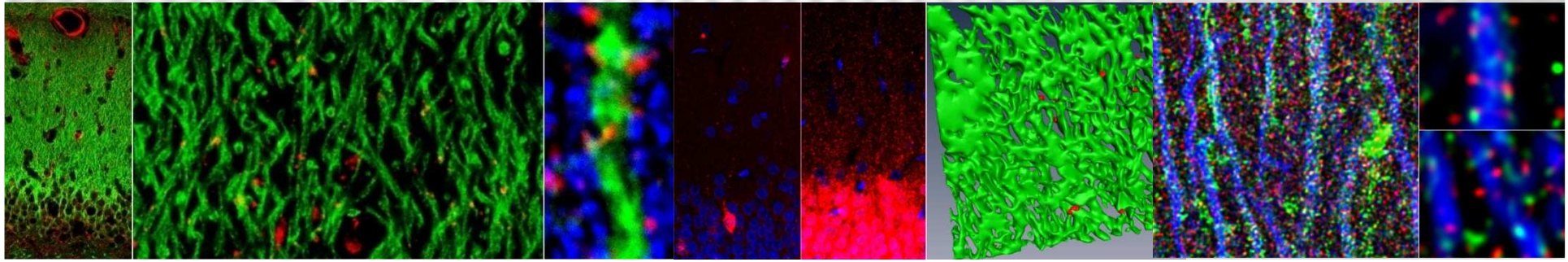
focused on tissue structure and function imaging

Brain imaging core facility using 3T MRI scanner

focused on structural and functional magnetic resonance imaging in normal subjects and in patients with various neurological disorders, dyslexia, and speech and hearing impairments

Animal models laboratory

In-vivo live animal imaging



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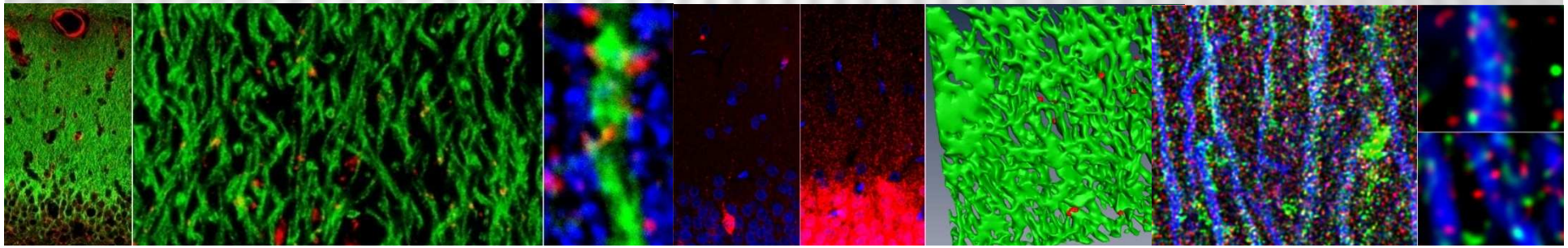
ALM equipment:

- **commercial high-end confocal systems:**
  - a laser-scanning confocal for **live imaging of cultured cells, with FLIM/FRET and FCS** (fluorescence correlation spectroscopy) – will enable molecular quantitative studies on cell structure and function, including protein-protein interactions and molecular motion
  - a spinning disk confocal for **ultrafast live imaging of cells** – will be used to study the kinetics of vesicular transport and other ultrafast processes; the Nipkow disk allows to minimise phototoxicity



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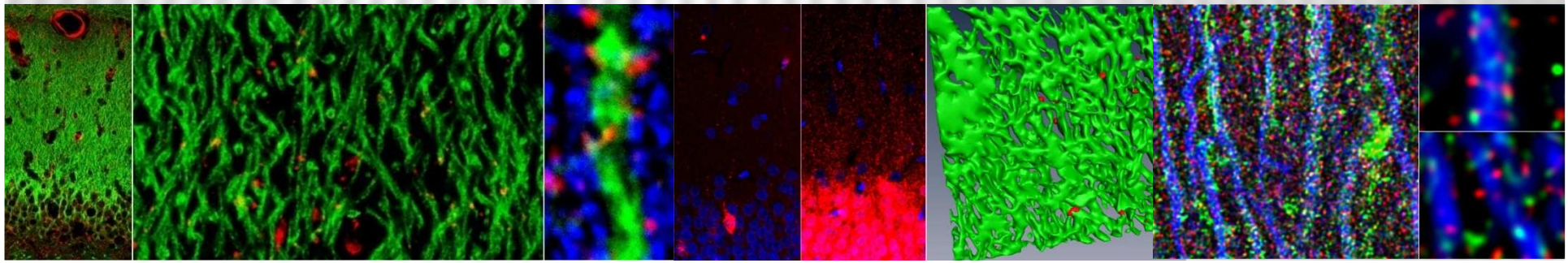
ALM equipment:

- **multiphoton** laser scanning microscope that allows confocal **deep imaging of live animal organs and tissues** – will be used for in vivo studies of the brain, such as observations of dendritic spine dynamics)

- a laser-scanning confocal with **enhanced spectral resolution**, e.g. the "META" detector – will enable enhanced spectral unmixing of multiple fluorophores; appropriate for LUX-FRET technique; will be functionally coupled to a scanning electron microscope, as a part of the correlative light-electron microscopy system



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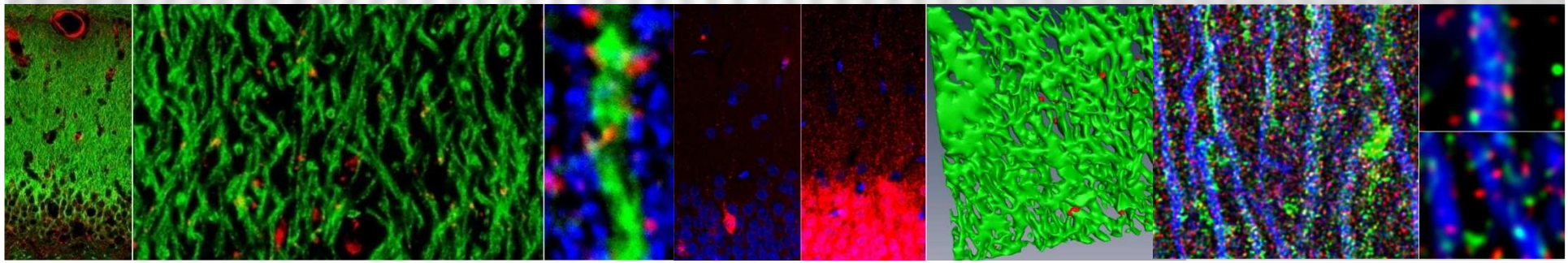
ALM equipment:

- an upgrade of the existing laser scanning **superresolution** confocal with two-color pulse-laser based STED (Leica TCS SP5 STED) – will enable colocalisation studies with super-resolution

- a laser scanning confocal for routine imaging of fixed specimens (Leica TCS SP2)



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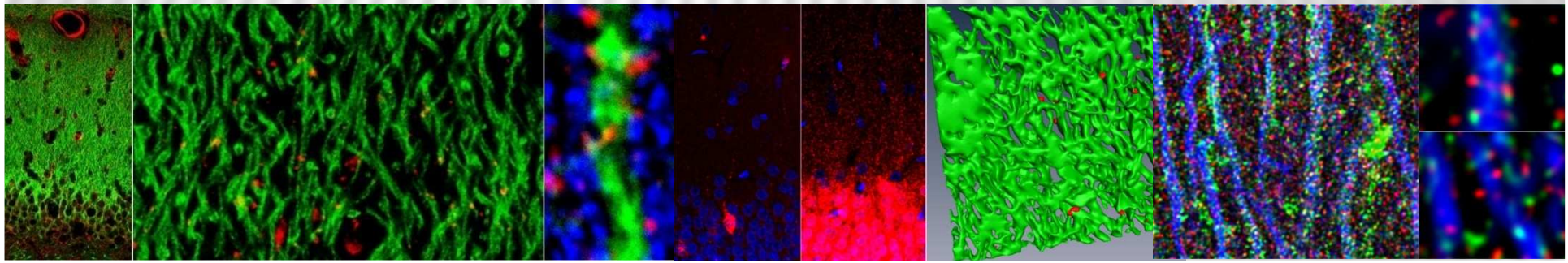
ALM equipment:

- **a custom made superresolution system** based on STORM/PALM (photo-activation-localization-microscopy/ stochastic optical reconstruction microscopy), an alternative approach to superresolution; will allow resolution down to 20 nm; custom-made system can be continuously upgraded and enhanced (i.e. for in vivo studies); this is a starting point for microscopy research and will be developed at the Neurobiology Centre in a multidisciplinary collaborative effort with two leading university physics departments



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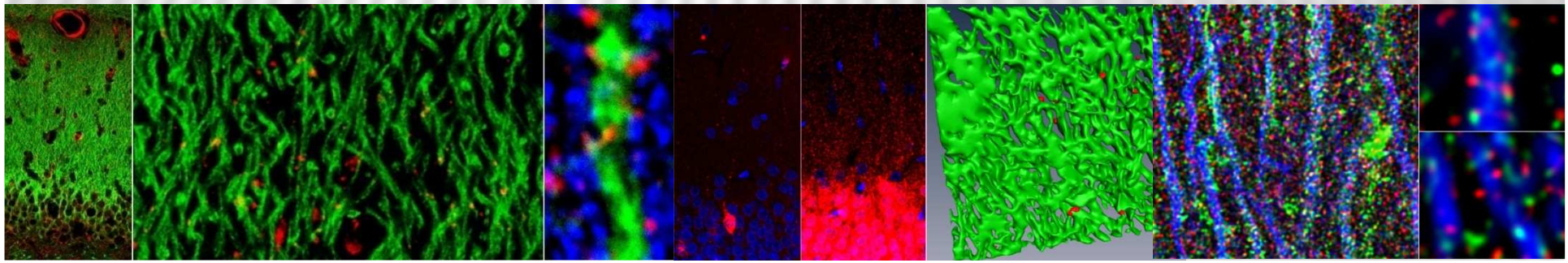
Electron microscopy (EM) equipment:

- **a system for 3D electron microscopic imaging** of cells and tissues based on automatic serial sectioning and block-face scanning – a revolutionary technique allowing precise mapping of large tissue volumes, such as synaptic structures and connections in brain regions

- **a transmission electron microscope with EM-tomography and EDX elemental analysis** (Jeol)



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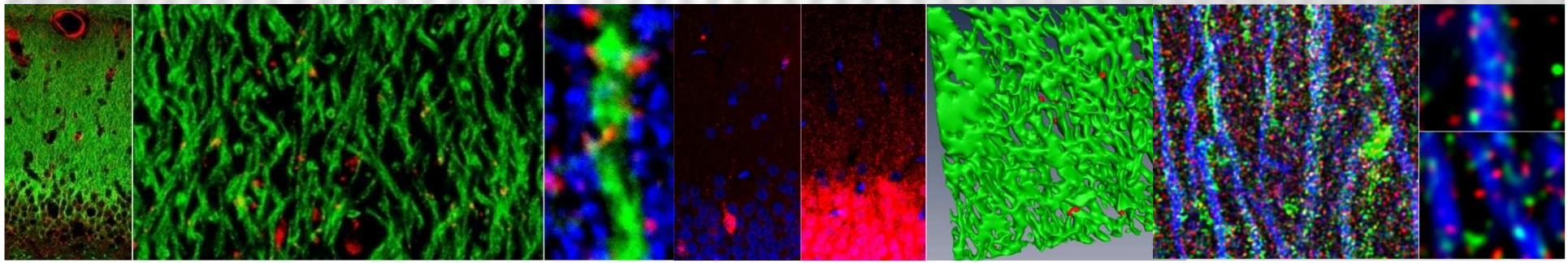
EM equipment:

- **a transmission electron microscope for routine applications** (Jeol)
- a system for **tissue processing with high-pressure freezing, automatic freeze-substitution, and cryo-embedding/cryo-polymerization** - preservation of close-to-live ultrastructure and antigenicity.



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The laboratories should become fully operational in the fall of 2012

Recruitment of lab leaders should be completed by the end of 2011

for any general questions please contact

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