

# 3d Brain Atlas Reconstructor

*Software dedicated to automatic generation of models of 3D brain structures.*

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## Project goals

1. Creating software dedicated to automated reconstruction of 3D brain models. Key features:
  - ◆ Generating model of any combination of structures (ie. basing on structures hierarchy),
  - ◆ Arbitrary resolution of generated model (depends on source atlas quality only),
  - ◆ Exporting models as polygonal mesh or volumetric datasets.
  - ◆ Modularity: One 3D model generation module, many wrappers for different input atlases.
2. Support the software with:
  - ◆ Own data (ultimate goal),
  - ◆ Existing 2D atlases (as training sets).
3. Creating special dataset format
  - ◆ Based on SVG format,
  - ◆ Adapted for handling representation of brain structures,
  - ◆ Supporting brain regions hierarchy,
  - ◆ Maximizing possibilities of atlas systems interoperability.
4. Ultimately, 3D Brain Atlas Reconstructor would be available as an open source project and on-line service.

## Publications

- Common Atlas Format and 3D Brain Atlas Reconstructor, the infrastructure for constructing 3D brain atlases by Piotr Majka, Ewa Kublik, Grzegorz Furga, Daniel K. Wójcik (2011) submitted
- Automated reconstruction of three-dimensional brain structures based on 2D histological atlases by Piotr Majka, Grzegorz Furga, Ewa Kublik and Daniel Wójcik. Neuroinformatics 2010 Conference, Kobe, Japan. Poster Presentation.
- Serving three-dimensional models of brain structures online Piotr Majka, Jakub M. Kowalski, Rembrandt Bakker, Daniel K. Wójcik. Neuroinformatics 2011, Boston, USA. Poster Presentation.

## Talks

- 3D Brain Atlas Reconstructor and Common Atlas Format, the infrastructure for constructing tree dimensional brain atlases, presentation at "Python in Neuroscience" workshop, August 29-30 2011, Ecole Normale Supérieure, Paris.

## 3d Brain Atlas Reconstructor workflow

### Application screenshots

**Ontology tree** (left) allows browsing for structures, select structures for reconstruction or load already reconstructed models. **Structure selection tab** (right) displays detailed information about currently reconstructed structure as well as provides reconstruction properties.

**Model customization tab:** Reconstructed structures may be previewed before exporting. Furthermore, additional model modifications (smoothing, mesh complexity reduction, etc. ) may be applied.