# **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 atlasing systems interoperability.

## **Publications**

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

#### Talks

• <u>3D Brain Atlas Reconstructor and Common Atlas Format, the infrastructure for constructing tree</u> <u>dimensional brain atlases</u>, 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.