

Segmentation of 3D biological images using parallel computing

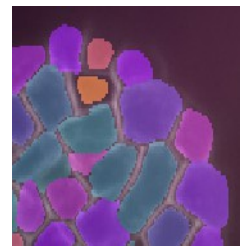
Master1/Master2 Internship offer – 2013

Subject

One of the main issues of quantitative imaging is the correct cellular level segmentation of 3D images of plant tissues, issued from confocal microscopy. The basic segmentation methods we use, are watershed combined with the level set method. The goal of the internship is to optimise and give an efficient implementation of the level set method.

Therefore, the student is invited to

- study the used image analysis methods,
- review the optimization and parallelizing techniques, applicable on the used level set segmentation
- implement the method in C++, using the optimal parallelizing technique
- deliver the implementation as a plugin to existing computing platforms



Environment, location

The Biophysics and Development team of the RDP Laboratory is focusing on the mechanisms of morphogenesis combining cellular and molecular biology approaches with quantitative imaging, physical measures and modelling. The team is located in a highly pluridisciplinary environment, the Joliot Curie Laboratory, on the site of the ENS of Lyon.

On the other hand, the CBP (Centre Blaise Pascal) is a "house of modelling", a place for conferences, training and research related to numerical modelling in all fields of science and the PSMN (Pôle Scientifique de Modélisation Numérique) is the scientific platform of ENS Lyon hosting high performance computing resources.

Required profile:

- 4th or 5th year of Engineering School/University.
- interest for scientific computing and software development skills (C++, Python).
- knowledge of parallelizing techniques (OpenMP, MPI, CUDA, OpenCL) is a plus.
- autonomy, curiosity and creative spirit will be particularly appreciated.
- good written and verbal communication skills.

Supervisors and contacts

Annamaria Kiss

annamaria.kiss@ens-lyon.fr

Research Engineer

Laboratoire de Reproduction et Développement des Plantes (RDP)/Laboratoire Joliot Curie (LJC),

ENS de Lyon

Tél : 04 72 72 89 37

<http://www.ens-lyon.fr/RDP/>

<http://www.ens-lyon.fr/Joliot-Curie/>

Cerasela Iliana Calugaru

cerasela.iliana.calugaru@ens-lyon.fr

Research Engineer in Scientific Computing

Centre Blaise Pascal (CBP)/Pôle Scientifique de Modélisation Numérique (PSMN)

ENS de Lyon

Tél : 04 72 72 86 31

<http://www.cbp.ens-lyon.fr>

<https://www.psmn.ens-lyon.fr>