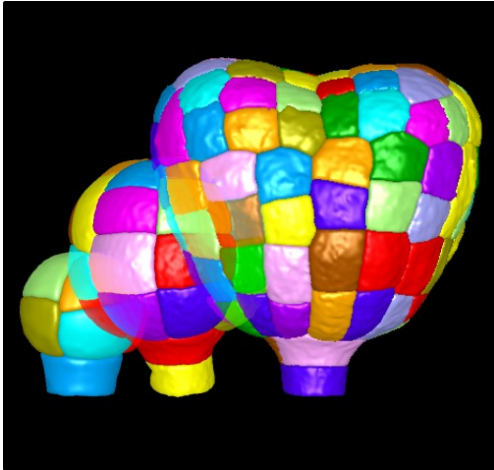


### \*\*\* Funding available for PhD or post-doc at IJPB \*\*\*

*Due to a last minute withdrawal, we are urgently looking for candidates to work on a project centered on the development of a 3D multi-cellular model of plant development and its applications to plant embryogenesis. The details of the project will be tailored to candidate profiles (PhD or post-doc):*

## Development of an image-based 3D computer model of plant multi-cellular growth and morphogenesis



Cell division and differential cell growth are the two major cellular mechanisms that underlie the elaboration of specific shapes in plant development. A fundamental question that remains largely unsolved is to understand the respective contributions and the coordination of these two mechanisms in the morphogenesis of plant organs, and how they are orchestrated with molecular processes and cell signalling. The embryo of the model plant *Arabidopsis thaliana* is a unique system to address these questions, showing stereotyped shape transitions and symmetry breaking within a few generations downstream the first embryonic cell. Following our previous work (Moukhtar et al, *PLoS Comput Biol*, 2019), the objective of this project is to develop a 3D computer model of plant tissue development

based on a discrete, image-based representation. Combined with quantitative 3D image analysis, the model will be applied to provide a better understanding of the role of self-organization in the emergence of plant cell patterns and embryonic shapes.

**Keywords :** *computer modelling, quantitative image analysis, 3D, C++, GPU programming, cell division, cell growth, plant embryogenesis, self-organization.*

*Candidates should have a strong background in applied mathematics, computer science, computational biology, or physics, with some experience in digital image processing and analysis. Experience in object-oriented programming (C++ or Java) would be appreciated. Candidates should also have a real motivation for working at the interface with biology and should demonstrate their ability to interact in a multi-disciplinary context.*

*The contract is for 2 years (post-doc) or 3 years (PhD) and should start before end of 2021.*

Located a few minutes away from the Palace of Versailles, the [Institut Jean-Pierre Bourgin](#) is one of the largest research centers in Plant Sciences in Europe. It gathers a unique ensemble of experimental resources and pluridisciplinary expertise in biology, chemistry and computer science. The project will be conducted under the supervision of Philippe Andrey (team [Modeling and Digital Imaging](#)) in collaboration with Jean-Christophe Palauqui (team [Cell Differentiation and Polarity](#)). The project is funded by the [Saclay Plant Sciences](#) network, one of the major actor for basic research and predictive biology in plant science in France and Europe.

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