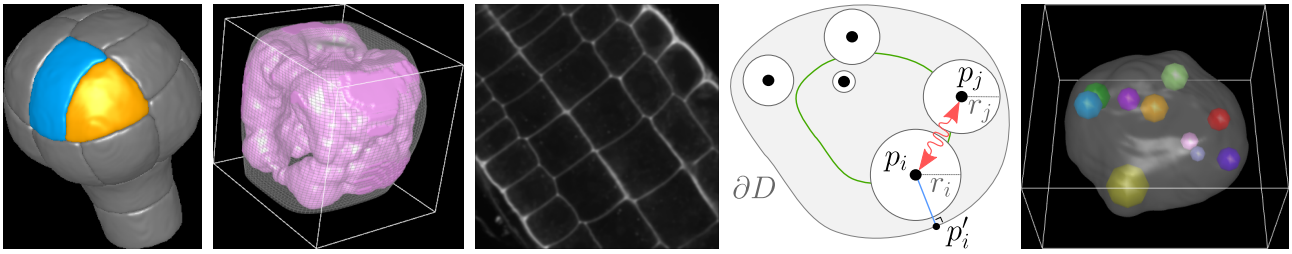
Post-doc position (2y): computer modelling of 3D plant tissues

Keywords. Plant morphogenesis; Computer modelling; Image-based model; OO programming.



Working environment. The Modelling and Digital Imaging team at the Institute Jean-Pierre Bourgin for Plant Sciences in INRAE Versailles conducts original researches in image processing, applied mathematics and computational modelling to decipher plant function, development, and morphogenesis. In addition to this human-sized, friendly working environment, you will enjoy the green, unique surroundings of the Palace of Versailles gardens in which our research center is located, at about 45 min from Paris by public transportation.

Job description. This position is part of a project aiming at developing new concepts and tools for modelling the development of plant tissues and the generation of plant organ shapes, addressing the bottlenecks that currently hamper our capacity to model and understand these processes. The main goal of the post-doc project is to design, implement, and validate the core of a new, 3D image-based computational modeling formalism of plant cells and tissues. Previous work by the team already established the potential of the image-based approach to model plant cell division patterns[1,2,3]. The challenge is now to expand this modelling formalism into a broader perspective, allowing to investigate complex scenarios by combining multilevel processes such as cell division, growth, communication, gene expression, and mechanics. Both conceptual methodological developments and their biological applications will be valorized.

Salary commensurates with experience. Benefits from working at INRAE include health insurance; paid leaves; contribution to public transportation costs; telecommuting; social activities.

Expected skills. You have a PhD or equivalent in computer science, computational physics, applied mathematics, or computational biology. You have a solid experience in programming with an object-oriented language such as C++ (preferred) or Java. Some background or experience in digitial image processing and analysis would be a plus. No biological background is required, but you are curious and appreciate to work within a strongly inter-disciplinary environment at the interface with biology.

Applications. Please send a resume, a motivation letter (including a brief overview of past research experience), and 2-3 references to philippe.andrey@inrae.fr. Applications will be processed on a rolling basis until the position is filled. Expected starting date: End 2025/Early 2026.

References.

1. Moukhtar J, Trubuil A, Belcram K, Legland D, Khadir Z, Urbain A, Palauqui J-C and Andrey P (2019). Cell geometry determines symmetric and asymmetric division plane selection in Arabidopsis early embryos. *PLoS Computational Biology*, **15**, e1006771.

2. E Laruelle, K Belcram, A Trubuil, JC Palauqui and P Andrey (2022). Large-scale analysis and computer modeling reveal hidden regularities behind variability of cell division patterns in Arabidopsis thaliana embryogenesis. *ELife*, **11**, e79224.

3. A Durrmeyer, JC Palauqui and P Andrey (2025). Deep learning of geometrical cell division rules. *arXiv* preprint arXiv:2507.22587.

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