Engineer in scientific computing : 3D image analysis, visualization, modeling

The Modelling and Image Analysis team at Institut Jean-Pierre Bourgin (INRAE Versailles) is looking for a computer science engineer/developer to contribute to the development of image processing and analysis libraries, 3D visualization tools, or software interfaces.

Our research activities are centered on image analysis and computer modeling. Our project aims at deciphering the cellular bases of plant development and morphogenesis, by integrating different scales from subcellular to organ levels and by combining complementary approaches. We develop original methods and algorithms to quantify and to model imaging data (shape registration and averaging, spatial statistical analysis of object distribution or of gene expression domains, image-based computational modeling of tissue and organ growth, etc.). These developments are integrated into a suite of libraries and software tools that are made available to the community.

The recruited engineer will contribute to these developments. The project(s) s/he will join and the tasks s/he will be assigned will be defined based on background and previous experience. Possible options include HPC implementation of image analysis algorithms or morphogenetic models (OpenACC), implementation of machine learning-based solutions, development of new functionalities for 3D graphics rendering tools (OpenGL), or development of new plugins for the Free-D software (Qt).

Required skills : C++ (mandatory), and at least one among : scientific high-performance computing (OpenMP, OpenACC, or OpenCL), image processing and analysis, 3D graphics (OpenGL), development of software interfaces (Qt).

Required profile : Master or engineer in computer science or applied mathematics.

The position is open for at least 12 months (with possibility of extension) and should start as soon as possible. The net salary will depend on experience.

Contact

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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. Arpòn J, Gaudin V and Andrey P (2018). A Method for Testing Random Spatial Models on Nuclear Object Distributions. *Methods in Molecular Biology*, **1675**, 493-507.
3. Selka F, Blein T, Burguet J, Biot E, Laufs P and Andrey P (2017). Towards a spatio-temporal atlas of 3D cellular parameters during leaf morphogenesis. *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, Venise, 56-63.
4. Biot E, Crowell E, Burguet J, Höfte H, Vernhettes S and Andrey P (2016). Strategy and software for the statistical spatial analysis of 3D intracellular distributions. *Plant Journal*, **87**, 230-242.
5. Biot E, Cortizo M, Burguet J, Kiss A, Oughou M, Maugarny-Calès A, Gonçalves B, Adroher B, Andrey P, Boudaoud A and Laufs P (2016). Multiscale quantification of morphodynamics: MorphoLeaf, software for 2-D shape analysis. *Development*, **143**, 3417-3428.