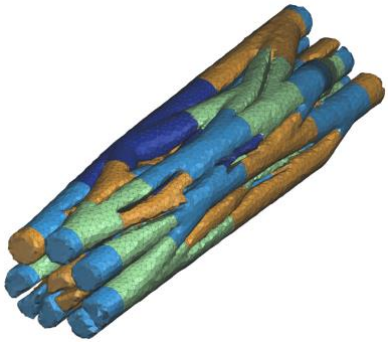
Parallel isovalue discretization and mesh adaptation on hybrid architectures

Post-doctoral or engineer position, fixed-term contract, 12 months, renewable

Context

The post-doctoral researcher will work in the context of the MICROCARD European project which aims to develop a production-ready simulation platform able to exploit future exascale computers and to simulate cardiac electrophysiology on models with micrometer resolution.
To do so, it is necessary to automatically generate in parallel the 3D meshes of the cardiac tissue (i.e. the spatial discretization of the computational domain).



Model of 50 myocytes (identified by colors), M. Potse

Missions

At its current state of implementation, the open source software ParMmg, based on iterative calls of the serial remesher Mmg over sub-meshes, allows to adapt a mesh using a distributed algorithm based on the MPI norm. The post-doctoral researcher will in charge of writing a new task-based algorithm. Then, he will implement it using StarPU task scheduler in order to exploit both the shared memory available within a computational node and the distributed memory at the cluster level.

Desired profile

You have a PhD thesis and you are specialized in high performance computing, parallelization and code optimization. Basic knowledges about meshes would be appreciated.

Competences

- Programming: C language and MPI norm knowledges are required, StarPU knowledge would be appreciated as well as knowledges in shared memory parallelization (pthreads or openMP)
- Classical programming tools: Git, CMake/CTest, Jenkins or github workflow, gdb…
- Linux environment
- Other: English (fluent), drafting ability and autonomy.

Location: Inria Bordeaux, 200, avenue de la Vieille Tour 33405 Talence CEDEX, CARMEN team
Employer: Université de Bordeaux
Starting date: 2022, between August and November
Application: Send a resume and cover letter to algiane.froehly@inria.fr