

Post-Doctoral Fellowship on “Computational homogenization and related issues”

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Applications are invited for a postdoctoral fellowship to work on a project in computational homogenization. The overall aim is to develop efficient numerical approaches for the evaluation of the homogenized properties of heterogeneous materials, or media.

Computing the homogenized properties of heterogeneous materials is recognized as a challenging issue. Our research team has a solid experience in contributing to the improvement of such computations [2]. A lot remains to be done. The post-doc position will address some of the many relevant aspects, at the intersection between homogenization approaches, (multi-scale) finite element approaches [3, 4] and recent theoretical developments on non periodic multi-scale problems [1]. The project will be made precise together with the candidate, depending on his/her skills and interests, and on the current interests of the team at the time of application.

The candidate is expected to have a PhD either in applied mathematics or in computational mechanics, a good publication record and a solid expertise in computational techniques. Please feel free to contact us for any more details.

Keywords: Homogenization, Multi-scale problems, Model reduction, Finite element methods.

Supervision: Claude Le Bris and Frédéric Legoll (Ecole Nationale des Ponts et Chaussées and INRIA MATHATERIALS project-team). The successful candidate will take up the position as soon as possible and will be based at Ecole des Ponts-INRIA, 77455 Marne La Vallée, France. See our webpage <https://team.inria.fr/mathaterials/>.

References

- [1] X. Blanc, C. Le Bris and P.-L. Lions, *Local profiles for elliptic problems at different scales: defects in, and interfaces between periodic structures*, Communications in P.D.E. 40(12) (2015), pp. 2173-2236.
- [2] C. Le Bris and F. Legoll, *Examples of computational approaches for elliptic, possibly multiscale PDEs with random inputs*, J. Comp. Phys. 328 (2017), pp. 455-473.
- [3] C. Le Bris, F. Legoll and A. Lozinski, *An MsFEM type approach for perforated domains*, SIAM MMS 12(3) (2014), pp. 1046-1077.
- [4] C. Le Bris, F. Legoll and F. Madiot, *A numerical comparison of some Multiscale Finite Element approaches for advection dominated problems in heterogeneous media*, M2AN 51(3) (2017), pp. 851-888.