PhD and postdoc positions in HPC/NLA

We are inviting applications for PhD or postdoctoral positions at Sorbonne Université, in the PEQUAN team of the LIP6 laboratory, in Paris, France (https://www.lip6.fr/?LANG=en) in the field of high performance computing (HPC) and numerical linear algebra (NLA). We have multiple open positions, either for three-year PhD contracts or two-year postdoctoral contracts, funded by the French National Agency for Research. The start date is flexible, from March 2025 or later. The gross monthly salary follows the standard grid of Sorbonne University and is 2200€ for PhD contracts and ranges between 2643€ and 3647€, depending on experience, for postdoc contracts.

Scientific details The emergence of low precision floating-point arithmetic on modern computer hardware provides new opportunities for HPC. Indeed, low precisions can be used to reduce the time, storage, and communications costs of many important NLA computations, such as matrix multiplication and the solution of linear systems. However, it is also paramount to evaluate and control the loss of accuracy and stability resulting from these low precisions.

This motivates the development of both new analyses, e.g., based on probabilistic models for rounding errors [3, 1], and new algorithms, e.g., using mixed precision arithmetic [4, 2]. You will work in a team project investigating such topics, covering both fundamental questions about the design and analysis of innovative numerical algorithms, and practical questions about their efficient implementation on modern parallel supercomputers and use in computational science applications.

To apply please send your CV and cover letter to theo.mary@lip6.fr.

[1] Michael P. Connolly, Nicholas J. Higham, and Theo Mary. Stochastic Rounding and its Probabilistic Backward Error Analysis. *SIAM J. Sci. Comput.*, 43(1):A566–A585, 2021.

[2] Stef Graillat, Fabienne Jézéquel, Theo Mary, and Roméo Molina. Adaptive precision sparse matrix-vector product and its application to krylov solvers. *SIAM J. Sci. Comput.*, 46(1):C30–C56, 2024.

[3] Nicholas J. Higham and Theo Mary. A New Approach to Probabilistic Rounding Error Analysis. *SIAM J. Sci. Comput.*, 41(5):A2815–A2835, 2019.

[4] Nicholas J. Higham and Theo Mary. Mixed precision algorithms in numerical linear algebra. *Acta Numerica*, 31:347–414, May 2022.