Three PhD Student Positions in Fault Tolerant Algorithms

The research group Theory and Applications of Algorithms at the University of Vienna (UV) and the research group Parallel Computing at Vienna University of Technology (TU) have three openings for PhD students (two of them at UV, one at TU) in a joint research project on resilient and fault tolerant algorithms in numerical linear algebra (with co-PIs [Wilfried Gansterer](#) and [Jesper Larsson Träff](#)).

We offer an excellent working environment with a wide range of expertise in a strongly integrated project team and intensive support for successfully completing a PhD project. We expect active, self-motivated and cooperative research activities and publication of research results in peer-reviewed journals and conference proceedings. There are no teaching requirements – if desired, small teaching assignments may be possible.

Required qualifications for all positions:

- A first-rate Master or Dipl.-Ing. degree in computer science, computer engineering, or a closely related field with focus on algorithms and data structures, discrete mathematics and linear algebra, computer systems, parallel computing, and programming.
- Strong analytical skills, as well as solid software development and programming skills.
- Background in high performance computing (HPC), dense numerical linear algebra, and in fault-tolerance for parallel and distributed computing systems.
- Parallel computing experience (shared and/or distributed memory, programming models, interfaces, algorithms).
- Demonstrated written and oral communication skills and effective interpersonal skills.

The working language is English. German is not a requirement, but willingness to learn a plus.

Desired qualifications for all positions:

- Demonstrated research experience in fault-tolerant algorithms for parallel and distributed systems.
- Expertise and practical experience in programming and working with HPC systems as well as in parallel discrete event simulation.

More specifically, **PhD student 1** will investigate the resilience of fundamental parallel reduction operations and basic vector and matrix kernels with a focus on design and theoretical analysis of efficient algorithms. This requires strong expertise in numerical analysis, numerical linear algebra (in particular, efficient algorithms for basic vector and matrix kernels), distributed aggregation algorithms, rumor spreading algorithms.

PhD student 2 will investigate novel fault-tolerant algorithms for prototypical numerical linear algebra problems in HPC with a focus on design and theoretical analysis of efficient algorithms. This requires strong expertise in numerical linear algebra (e.g., matrix factorizations as well as dense and sparse linear solvers) and parallel algorithms.

PhD student 3 will focus on questions related to efficient and scalable parallel implementations of new fault-tolerant algorithms for practical computations, including solid

benchmarking. This requires strong expertise in MPI and other parallel/distributed programming frameworks as well as in large scale simulations of parallel algorithms.

Additional information: Applicants must have completed all degree requirements before starting their appointment. Each position is for three years. Expected starting date is March 1st, 2016. Positions are initially for 30 hours/week but can be upgraded to 40 hours/week (subject to a positive evaluation).

Please send your application, which *has* to include (i) a letter of motivation, including a clear statement for which of the three positions you want to apply, **(ii)** a complete CV, and **(iii)** names and contact information (ideally e-mail address and web page) of at least two references, by e-mail to <*applyf15@univie.ac.at*>.

Applications received by *February 1st, 2016* will receive full consideration. Review of applications will continue until the positions are filled. Please address any questions to <*applyf15@univie.ac.at*>. Please note that travel costs for personal employment interviews cannot be covered.