Topic 12: Theory and Algorithms for Parallel Computation

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Topic Chairs

Parallelism exists at all levels in computing systems from circuits to grids. Effective use of parallelism crucially relies on the availability of suitable models of computation for algorithm design and analysis, and on efficient strategies for the solution of key computational problems on prominent classes of platforms. The study of foundational and algorithmic issues has led to many important advances in parallel computing and has been well represented in the Euro-Par community over that past two decades. A distinctive feature of this topic is the variety of results it as reported over the years that address classical problems as well as the new challenges posed by emerging computing paradigms. This year was no different.

Thirteen papers were submitted to the topic of which five were accepted as full papers for the conference. The resulting papers run the gamut from low-level architectural issues to high-level algorithmic analysis. What they have in common is the same basic theoretical approach to problem-solving. The topics covered include: a hierarchical version of the Craig, Landin and Hagersten (CLH) queue lock which achieves locality while maintaining many of the desirable performance properties of CLH locks and overcoming the fairness issues of previous approaches; the first competitive analysis for the age or freshness of state returned by algorithms for maintaining wait-free data objects in multiprocessor and real-time systems; a new parallel algorithm for the two dimensional cutting stock problem; an on-line adaptive solution to the problem of performing parallel prefix operations on a set of processors running at different and possibly changing speeds; and an efficient algorithm in the Bulk Synchronous Parallel model of computing for the problem of finding all the maximal contiguous subsequences of a sequence of numbers.

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