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**Special Issue on Selected Papers from the  
Fifteenth International Symposium on  
Graph Drawing,  
GD 2007**

**Guest Editors Foreword**

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This special issue is devoted to the 15th International Symposium on Graph Drawing, held in September 2007 in Sydney, Australia. For the special issue, we invited several highest-rated papers. The authors submitted extended versions of their conference papers, which were refereed by the reviewers, and then revised afterwards. The result is a nice collection of the advances and trends in Graph Drawing research, including clustered graph planarity, two new variations on geometric simultaneous embeddings of graphs, and boundary labeling problems and DAG map representations.

The first two papers were inspired by real world applications. Benkert, Haverkort, Kroll and Nöllenburg study boundary labeling problems with various criteria. They present algorithms for computing a collection of crossing-free leaders that minimizes the total number of bends, the total length, or general *badness* function of the leaders for the one-sided case. A generalization to the two-sided boundary labeling problem is also presented, together with experimental results.

Inspired from gene ontology network visualisation, Tsiaras, Triantafilou and Tollis introduce the problem of visualizing a directed acyclic graph (DAG) using space filling techniques. They first present linear time algorithms for two special cases: two terminal series parallel digraphs and one-dimensional DAG maps. They also study complexity issues related to DAG maps, and present *NP-complete* results on the minimum vertex duplication problem and DAG map testing problem.

The next two papers study the clustered graph planarity testing problem for special cases. Di Battista and Frati consider the case of embedded  $c$ -planar flat clustered graphs with at most five vertices per face. They present characterisation and a linear-time testing algorithm for the  $c$ -planarity testing problem.

Jelínková, Kára, Kratochvíl, Pergel, Suchý, and Vyskočil consider the case, where each cluster has size at most three. Their main result is a polynomial-time algorithm for testing  $c$ -planarity of clusters of size at most three on a cycle, which is then generalized to a special class of Eulerian graphs. They also present an algorithm for the  $c$ -planarity testing of general 3-connected planar graphs.

The last two papers study new variations of geometric simultaneous embedding of graphs. Di Giacomo, Didimo, van Kreveld, Liotta and Speckmann introduce matched drawings of planar graphs. In a matched drawing of a pair of graphs, each matched pair of vertices has the same  $y$ -coordinate. They first show that a pair of 3-connected planar graphs, and a pair of a 3-connected planar graph and a tree may not be matched drawable. Then they show that two trees, a pair of a planar graph and an unlabeled level planar (ULP) graph, and a pair of a planar graph and carousel graphs are matched drawable.

Frati, Kaufmann and Kobourov study both constrained and relaxed versions of the geometric simultaneous embedding problem. They first consider the problem of geometric simultaneous embedding with disjoint edges and fixed embeddings. They show that there exist a pair of a planar graph and a path,

a pair of an outerplanar graph and a path, and two caterpillars, which do not admit geometric simultaneous embeddings. Then they show that a star and a path admit a geometric simultaneous embedding, where the star has a prescribed combinatorial embedding. Finally, they consider the near-simultaneous embedding problem, in which vertices are allowed to be placed at nearby points in different drawings, and present some positive results.

Finally, we would like to thank the authors for contributing their high quality papers, the reviewers for their excellent professional service with time constraints, and the Editors of the Journal of Graph Algorithms and Applications for making this special issue possible.