Special Issue on the 34th European Workshop on Computational Geometry, Guest Editors' Foreword

The 34th European Workshop on Computational Geometry (EuroCG 2018) took place March 21–23 2018 at Freie Universität Berlin, Germany. From the program of EuroCG 2018, we have selected six outstanding papers for presentation in this special issue. The papers were revised, extended, and carefully reviewed according to the high standards of *Computational Geometry: Theory and Applications*.

The six papers in this issue (listed in no particular order) offer new insights into classic problems in computational geometry, such as guarding, inspection, and visibility problems in simple polygons. They also provide glimpses into new areas of research, such as the study of beyond-planar graphs, morphs of planar graph drawings, and the use of linear algebra in combinatorial geometry.

Franz Aurenhammer, Michael Steinkogler, and Rolf Klein study a new variant of a classic inspection problem in simple polygons: how far can two guards reach from a given source vertex, while staying mutually visible? For more than 15 years, it has been known that one can decide in $O(n)$ time whether the whole boundary of a simple polygon with n vertices can be explored in this manner. Aurenhammer, Steinkogler, and Klein show what happens if this is not the case: there can be $\Theta(n)$ such walks, and one can find all of them in $O(n \log n)$ time.

Hee-Kap Ahn, Eunjin Oh, Lena Schlipf, Fabian Stehn, and Darren Strash also deal with polygons: two lovers, Romeo and Juliet, find themselves at different locations in a simple polygon P with n vertices, and they would like to obtain the quickest route in P so that they can see each other. Ahn et al. show that two variants of this problem (min-max and min-sum) can be solved in linear time, using an interesting sweepline-algorithm. They also study a data-structure version where P can be preprocessed. Here, it is possible to answer queries in $O\big(\log^2 n\big)$ time.

Ovidiu Daescu, Stephan Friedrichs, Hermant Malik, Valentin Polishchuk, and Christiane Schmidt consider the classic terrain-guarding problem with a twist. Here, the goal is to find a set of guards that cover the upper side of an x-monotone polygonal chain. The classic version of the problem is known to be NP-hard, and Daescu et al. study the "helicopter" variant where the guards may be placed on a horizontal line above the terrain. Perhaps surprisingly, they show that this variant of the problem allows for a polynomial algorithm and can be solved in linear time.

Clemens Huemer, Alexander Pilz, and Rodrigo I. Silveira discuss a problem from combinatorial geometry: given a set P of n points in the plane, how many crossing-free geometric graphs can be drawn with vertex set P? Huemer, Pilz, and Silveira exhibit a particular point set, the *generalized ziz-zag chain*, and, using new tools from linear algebra, they show that this point set allows for $\Omega(42.11^n)$ crossing-free geometric graphs. This improves the previous lower bound of $\Omega(41.18^n)$.

Steven Chaplick, Fabian Lipp, Alexander Wolff, and Johanns Zink present new algorithms for compact drawings of *beyond-planar graphs*. They resolve two open questions by showing that every n-vertex NIC-planar graph admits a NIC-planar RAC drawing with at most one bend per edge on a grid of size $O(n) \times O(n)$ and that every n-vertex 1-planar graph admits a 1-planar RAC drawing with at most two bends per edge on a grid of size $O(n^3) \times O(n^3)$.

Linda Kleist, Boris Klemz, Anna Lubiw, Lena Schlipf, Frank Staals, and Darren Strash propose a new method to improve the drawing of graphs: given a plane embedding, apply a continuous transformation so that (*i*) every face in the final graph is a convex polygon, (*ii*) the graph remains plane along the whole transformation and (*ii*) convexity increases monotonically (that is, whenever an angle in the embedding is convex, it will remain as such during the remainder of the transformation). They give a constructive method that satisfies the three properties in $O(n)$ moves, which is worst-case optimal.

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