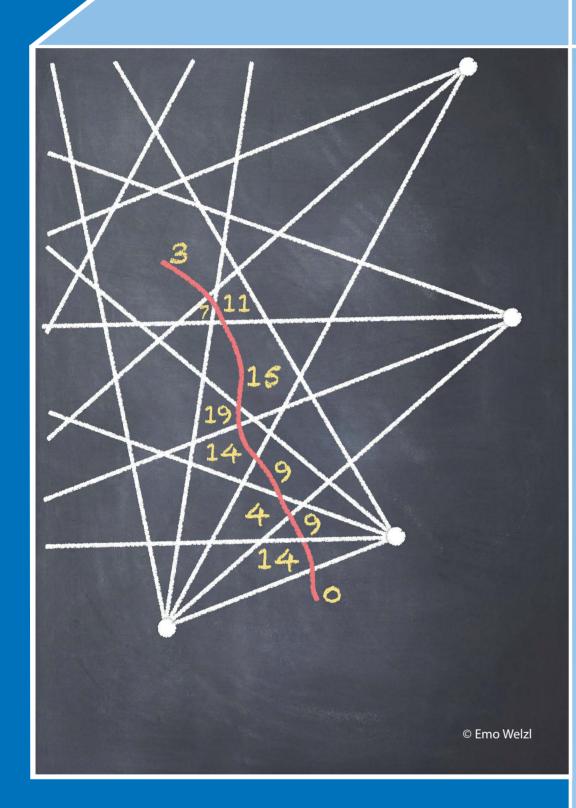# Berlin Mathematical School

BMS Friday Colloquium

Friday 27 November 2015 at 14:15
Tea & Cookies starting at 13:00

BMS Loft, Urania, An der Urania 17, 10787 Berlin

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Crossing-Free Perfect Matchings, etc., on Wheel Point Sets

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A perfect matching on a finite planar point set S is crossing-free if all of its edges are disjoint in the straight-line embedding on S. In 1948, Motzkin was interested in the number of such crossing-free perfect matchings for S the $2m$ vertices of a convex polygon and he proved that to be the m-th Catalan number.

S is called a wheel set if all, but exactly one point in S, are vertices of its convex hull. Again, we start by asking for the number of crossing-free perfect matchings of such a wheel set S going the smallest possible step beyond Motzkin's endeavor. Since position matters now, in the sense that the number is not determined by the cardinality of the wheel set alone, this immediately raises extremal and algorithmic questions. Answering these comes with all kinds of surprises and then it takes us on a journey with visits to the rectilinear crossing-number of the complete graph and polytopes with few vertices.

Emo Welzl has been professor of computer science at ETH Zurich since 1996. His research interests are in the foundations of computer science, mainly algorithms and data structures, in particular computational geometry, combinatorial models for optimization, randomized methods, and discrete geometry; recently also satisfiability of boolean formulas in propositional logic. Emo Welzl was born in Linz, Austria, in 1958. He finished his doctoral studies at TU Graz in 1983. From 1987 to 1996, he was a professor of mathematics at FU Berlin, where he also served as chair of the doctoral program „Algorithmic Discrete Mathematics" from 1991 to 1996, a joint doctoral program of FU Berlin, HU Berlin, TU Berlin, and ZIB.

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