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Graph Drawing and Network Visualization

25th International Symposium, GD 2017 Boston, MA, USA, September 25–27, 2017 Revised Selected Papers

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Preface

This volume contains the papers presented at the 25th International Symposium on Graph Drawing and Network Visualization (GD 2017), which was held September 25–27, 2017, in Boston, Massachusetts, USA. Graph drawing is concerned with the geometric representation of graphs and constitutes the algorithmic core of network visualization. Graph drawing and network visualization are motivated by applications where it is crucial to visually analyze and interact with relational datasets. Information about the conference series and past symposia is maintained at http://www.graphdrawing.org. The 2017 edition of the conference was hosted by Northeastern University, with Cody Dunne and Alan Keahey as co-chairs of the Organizing Committee. The conference sessions took place in the Pavillion room of the Northeastern University Alumni Center at Columbus Place. A total of 85 participants attended the conference.

Regular papers could be submitted to one of two distinct tracks: Track 1 for papers on combinatorial and algorithmic aspects of graph drawing and Track 2 for papers on experimental, applied, and network visualization aspects. Short papers were reserved a separate category, which welcomed both theoretical and applied contributions. An additional track was devoted to poster submissions. All the tracks were handled by a single Program Committee. In response to the call for papers, the Program Committee received a total of 107 submissions, consisting of 87 papers (35 in Track 1, 31 in Track 2, and 21 in the short paper category) as well as 20 posters. More than 320 expert reviews were provided, roughly a third of which were contributed by external reviewers. After extensive electronic discussions, the Program Committee selected 43 papers and 16 posters for inclusion in the scientific program of GD 2017. This resulted in an overall paper acceptance rate of 49% (65% in Track 1, 35% in Track 2, and 42% in the short paper category). This year it became mandatory for authors to publish an electronic version of their accepted papers on the ArXiv repository; a conference index with links to these contributions was made available before the conference.

There were two keynote talks at GD 2017. Timothy M. Chan, from the University of Illinois at Urbana-Champaign, USA, showed us how to have “Fun with Recursion and Tree Drawings.” Alessandro Vespignani, from the Northeastern University, USA, talked about methods for “Mapping the Next Pandemic.” Abstracts of both talks are included in the proceedings.

Springer sponsored awards for the best papers in Track 1 and Track 2, plus a best presentation award and a best poster award. As a result of a vote taken by the Program Committee, the award for the best paper in Track 1 was assigned to “Ordered Level Planarity, Geodesic Planarity, and Bi-Monotonicity” by Boris Klemz and Günter Rote, and the award for the best paper in Track 2 was assigned to “Revisited Experimental Comparison of Node-Link and Matrix Representations” by Mershack Okoe, Radu Jianu and Stephen Kobourov. The participants of the conference voted as the best presentation the one given by Philipp Kindermann for the paper “Experimental

Analysis of the Accessibility of Drawings with Few Segments" and as the best poster the one by Theresa Fröschl and Martin Nöllenburg entitled "Minimizing Wiggles in Storyline Visualizations." Congratulations to all the award winners for their excellent contributions!

Following the tradition, the 24th Annual Graph Drawing Contest was held during the conference. The contest was divided into two parts – the creative topics and the live challenge – each with two categories, automatic and manual. The creative topics featured two graphs, one about citations among papers from previous GD symposia and one about human metabolism. The live challenge focused on maximizing the minimum crossing angle in straight-line drawings. Awards were given in each of the four categories. We thank the Contest Committee for preparing interesting and challenging contest problems. A report about the contest is included in the proceedings.

Many people and organizations contributed to the success of GD 2017. We would like to thank the Program Committee members and the external reviewers for carefully reviewing and discussing the submitted papers and posters; this was crucial for putting together a strong and interesting program. Thanks to all the authors who chose GD 2017 as the publication venue for their research. The Organizing Committee did a terrific job; a big thanks goes to Cody Dunne and Alan Keahey, who co-chaired the committee, as well as to the other local organizers and volunteers. GD 2017 thanks the "gold" sponsor Tom Sawyer Software, the "silver" sponsor yWorks, and the "bronze" sponsor Springer. Their generous support helps to ensure the continued success of this conference.

The 26th International Symposium on Graph Drawing and Network Visualization (GD 2018) will take place in September 2018 in Barcelona, Spain. Therese Biedl and Andreas Kerren will co-chair the Program Committee, Vera Sacristán and Rodrigo Silveira will co-chair the Organizing Committee.

November 2017

Fabrizio Frati
Kwan-Liu Ma

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Keynote Presentations

Fun with Recursion and Tree Drawings

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Abstract. Divide-and-conquer has always been one of my favorite algorithm design paradigms. In this talk, I will survey existing techniques on drawings of trees on grids with small area or width, which nicely illustrate the power of recursive thinking. I will also mention some new improved upper bounds (work in progress) for certain types of tree drawings. Along the way, we will encounter a number of interesting functions and recurrences, and plenty of open problems.

Mapping the Next Pandemic

Alessandro Vespignani

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Abstract. In the last ten years, we have seen dramatic advances in data collection and availability in a number of areas ranging from pathogen genetic sequences to human mobility patterns, and social media data. These advances, often dubbed as the "big data" revolution, have finally lifted many of the limitations affecting epidemic predictive modeling.

The results of these modeling approaches however must be communicated to policy makers and public health practitioners, possibly lifting the veil of the mathematical and statistical jargon. For this reason a visual approach to the data exploration/exploitation is often required. Here I will introduce recent development in the field and show some of the challenges to the development of visualization tools that show commonalities and patterns in emerging health threats, as well as explore the wide range of possible scenarios that can be used by policy makers to anticipate trends, evaluate risks, and eventually manage future pandemics.

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