
THE EATCS AWARD 2017

LAUDIATIO FOR ÈVA TARDOS

The EATCS Award 2017 is awarded to

Èva Tardos

for her seminal contributions to many areas of Theoretical Computer Science.

Èva Tardos is a leading researcher in the theory of computing whose deep contributions shaped the field of algorithms across three decades and through several of its major developments as a discipline. Her work is characterized by deep theoretical advances, the resolution of major challenges in the field, the shaping of new research areas, and a track record of significant impact on key application areas.

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In the early phase of Èva's career, she emerged as the leading pioneer in bringing techniques from discrete optimization to bear on the design of efficient algorithms. Her solo work on strongly polynomial algorithms was a breakthrough. First, it resolved a major open problem in the field, showing that minimum-cost flow problems - one of the basic problems in network flow - could be solved in strongly polynomial time, with a running time depending only on the number of nodes and edges of the network, not on the magnitudes of its capacities or costs. Shortly afterward, she went on to prove (with Andras Frank) an unanticipated major generalization of this result, showing that all "combinatorial" linear programs

have strongly polynomial time algorithms. The arguments used to establish these results were profound and aesthetically elegant, a mixture of novel combinatorial techniques and an unexpected connection to the theory of Diophantine approximation.

Over the next decade, Èva's played a pivotal role in establishing the modern use of linear programming in algorithm design, and in shaping the basic architecture of the area of approximation algorithms, one of the most influential research themes in the field. For example, her work with Lenstra and Shmoys provided one of the first examples of how a sophisticated rounding scheme for a linear programming relaxation could produce strong approximation guarantees; the road map laid out in this paper has been followed literally hundreds of times in the three decades since it appeared. In subsequent work, Èva's developed approximation algorithms for fundamental problems in a very wide range of areas, including many practical problems in communication network design, facility location, routing, clustering, classification, and social network analysis. The extensive follow-up work generated in each of these areas shows how her approaches have catalyzed new research directions and the development of novel techniques.

This is already a track record of enormous impact, but it is still only part of the picture: beginning in the late 1990s, Èva emerged as one of the leaders in shaping a completely new and broadly influential subfield of algorithms, the study of algorithmic game theory. Her results with Tim Roughgarden on the game-theoretic analysis of network traffic laid the foundation of algorithmic game theory. In this area, Èva has gone on to establish some of the field's fundamental results in additional directions, including algorithmic mechanism design, game-theoretic network design, and sponsored search market design.

In addition to the profound and influential research that has established Èva as a central figure in computer science research, she has also contributed enormously to the field as an educator. She has mentored a long sequence of students, co-authored a widely-used textbook on algorithms, and was co-editor of the central handbook in algorithmic game theory. She has also been a leader through her service to the community including roles as editor-in-chief of major journals, program chair of major conferences, and membership on national advisory boards.

Èva has long been one of the central figures setting the directions for theoretical computer science. Her combination of long-term vision, creativity, and sheer technical strength has reshaped and rebuilt the foundations of algorithm design. For all these reasons, the EATCS wants to celebrate Èva Tardos and her influential work, and is honored to award her with its most prestigious prize.

The EATCS Award Committee 2017

- Fedor V. Fomin (chair)
- Christos Papadimitriou
- Jean-Eric Pin

The EATCS Award is given to acknowledge extensive and widely recognized contributions to theoretical computer science over a life-long scientific career. The list of the previous recipients of the EATCS Award is available at

<http://eatcs.org/index.php/eatcs-award>.

The EATCS Award carries a prize money of 1000 Euros and will be presented at ICALP 2017, which will take place in Warsaw (Poland) from the 10th till the 14th of July 2017.