

# Santos Awarded 2015 Fulkerson Prize

FRANCISCO SANTOS of the University of Cantabria has been awarded the 2015 Delbert Ray Fulkerson Prize for his paper “A counterexample to the Hirsch conjecture,” *Annals of Mathematics*, volume 176, July 2012, pages 383–412.

The prize citation reads: “The Hirsch conjecture states that in any  $d$ -dimensional polytope with  $n$  facets, the edge distance between any pair of vertices (the diameter of the skeleton graph) is bounded from above by  $n-d$ . As stated, the conjecture provides a simple and elegant bound on the worst-case behavior of a primal simplex algorithm in terms of the number of nondegenerate pivots, provided a clairvoyant pivot strategy is used.

“For almost fifty years, many well-known mathematicians have tried unsuccessfully to settle the conjecture, until a counterexample was cleverly constructed by Francisco Santos.

“Santos constructs a 43-dimensional polytope with 86 facets having diameter at least 44. So it lives in a space where intuition has left most of us.

“To construct the counterexample, Santos combines ideas and techniques stemming from various disciplines of mathematics. Although he gives a negative answer to a highly visible and more than half-a-century-old conjecture, his methods substantially influence today’s mathematics. This is witnessed by the large number of follow-up papers that build on this award-winning paper and carry his techniques further on.”

Francisco Santos Leal was born in Valladolid, Spain, in 1968. He received his doctorate from the University of Cantabria in 1995, under the supervision of Tomás Recio. He held a postdoctoral fellowship at the University of Oxford in 1996 and joined the faculty at the University of Cantabria in 1997. He has held visiting positions at the University of California Davis, the Mathematical Sciences Research Institute at Berkeley, and École Normale Supérieure. He received the Young Researcher Award from the Fundación General de la Universidad Complutense de Madrid in 2003 and was a semiplenary speaker at the 2006 International Congress of Mathematicians.

*\*The MOS was formerly known as the Mathematical Programming Society (MPS).*

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Santos has been an organizer of many workshops and advanced courses. He has been a referee for a number of mathematical journals, including the *Journal of the American Mathematical Society* and *Proceedings of the American Mathematical Society*. He is currently an editor in chief of the *Electronic Journal of Combinatorics*. His research interests are discrete and computational geometry, real algebraic geometry, and geometric and topological combinatorics.

## About the Prize

The Delbert Ray Fulkerson Prize recognizes outstanding papers in the area of discrete mathematics. Established in 1979, the prize is sponsored jointly by the Mathematical Optimization Society (MOS)\* and the AMS. Up to three awards of US\$1,500 each are presented at each (triennial) international symposium. Originally, the prizes were paid out of a memorial fund administered by the AMS that was established by friends of the late Delbert Ray Fulkerson to encourage mathematical excellence in the fields of research exemplified by his work. The prizes are now funded by an endowment administered by MOS.

The prize is presented for papers published during the six calendar years preceding the year in which the prize is given. The prize is given for single papers, not series of papers or books, and in the event of joint authorship, the prize is divided. The topics of papers considered for the prize include graph theory, networks, mathematical programming, applied combinatorics, and related subjects.

—From an announcement of the Fulkerson Prize Committee

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