

# The Traveling Salesman Problem with Road Distances

W. Cook<sup>1</sup>

**Abstract:** The traveling salesman problem is one of the most widely studied models in discrete optimization. Given  $n$  cities, the TSP asks for the shortest route to visit all of them and return to your starting point. Easy to state, but if  $\mathcal{P} \neq \mathcal{NP}$  then no solution method can have good asymptotic performance as  $n$  increases to infinity. But this not mean it is impossible to solve large-scale examples. Indeed, following the work of Dantzig, Fulkerson, and Johnson (1954), we show that a certain tour of 49,603 sites in the United States is the shortest possible, measuring distance with point-to-point routes obtained from Google Maps. The talk is based on joint work with Daniel Espinoza, Marcos Goycoolea, and Keld Helsgaun.

---

<sup>1</sup> Combinatorics and Optimization Department  
University of Waterloo  
[bico@uwaterloo.ca](mailto:bico@uwaterloo.ca)