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**The Remarkable Life of the Isoperimetric Problem:
The World's Most Influential Mathematics Problem**

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In contrast to other disciplines in mathematics, problems in optimization are usually quite easy to state and to understand—even for those with limited mathematical sophistication. As such, important optimization problems embedded in some controversy have played a major role in motivating and promoting mathematical activity.

Writing circa 200 BC, the Greek mathematician Zenodorus considered the so-called isoperimetric problem: Determine, from all simple closed planar curves of the same perimeter, the one that encloses the greatest area.

In this talk the speaker will argue that the isoperimetric problem has been the most influential mathematics problem of all time. It played a major role in motivating the calculus of variations activity credited to the Bernoullis, Newton, Euler, and Lagrange in the late 1600's and early 1700's. In turn the early calculus of variations led to the golden era of mathematics that we recognize as the 18th and 19th centuries. Yet a complete proof of the isoperimetric problem eluded these early pioneers. Indeed, it was Weierstrass who first gave a complete proof more than a century later. In this talk the speaker will demonstrate that Euler and later Lagrange were one direct observation away from deriving a sufficiency condition that would have given a straightforward resolution of the isoperimetric problem. The missing ingredient was convexity. We ask rhetorically: was it not known to these two great mathematicians.