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沖縄科学技術大学院大学

VISITING PROGRAM

TSVP TALK

Isoperimetric Inequality: A Force Shaping the Real World



2025
Wed. **May. 07**

15:00–16:00

HYBRID L4E48, ZOOM



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Isoperimetric inequality is one of the most profound and important inequalities in all fields of mathematics. In the plane, it states that among the sets with given perimeter, the one with maximal area is the disk (or, equivalently, that among all the sets with given area, the disk is the one with the shortest perimeter). In the 3-dimensional (or higher dimensional) space, it tells that the ball has the largest volume among all the sets with given boundary measure (or, equivalently, that among all the sets with given volume, the ball has the smallest boundary). Despite the simple statement, its proof turned out to be quite hard and ignited a lot of important research in geometry, analysis, measure theory, etc. This difficulty is also related to the intrinsic problem to give a suitable definition of area/measure and, especially, perimeter. Its impact on the shaping of the real world is extremely interesting, since it explains why the “round shape” is so common in nature and why balls and circles are so often the best and “cheapest” options in many practical situations.

Paolo Salani is a Full Professor of Mathematical Analysis at the Department of Mathematics and Computer Science “U. Dini” of the University of Florence since 2017. He is also the Vice President of the Italian Mathematical Union UMI, since 2024 as well as the Director of CIME Foundation “R. Conti” since 2023. His research activity mainly concerns isoperimetric or geometric-analytic inequalities (such as Brunn-Minkowski inequalities for variational functionals, Prékopa-Leindler inequality, etc.) and geometric properties (such as symmetry, convexity, etc.) of solutions to elliptic and parabolic PDEs. Personal Website

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