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Geometry and topology of an intracellular organelle

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Venue: S4-625
Time: 14:00

The endoplasmic reticulum (ER) is an extensive organelle of eukaryotic cells, which reaches outward from the cell's nucleus all the way to the plasma membrane. For 70 years, electron microscopists have seen amazing things in the ultrastructure of the ER, and the complexity of its shape has inspired various picturesque characterizations: tubules, sheets, lamellae, cisternae, flattened vesicles, reticulated matrices. Despite the elegant physics of bilayer membranes offered by the work of Helfrich and Canham, physical theory applied to the ER has mostly sat on the sidelines. However, in the last decade, refined imaging of the ER has revealed beautiful and subtle geometrical forms -- almost minimal geometries, from the mathematical point of view. Rather than being a mere footnote for physicists, these structures suggest answers to long-standing questions about its function, formation and evolution.