2003 Kemeny Lecture Series

Geometry Old and New: From Euclid to String Theory

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Monday, May 12, 2003
104 Wilder Hall, 7:00 pm
(Reception To Follow)

Abstract

The dream of geometers since the time of Euclid has been to explain the phenomena of the physical world in terms of very simple concepts and objects (such as circles, lines, spheres, Platonic solids, and so on) that display a high degree of symmetry. As our understanding of the physical world has become more sophisticated, it has become evident that symmetry plays a more profound role than is apparent at first glance. This deep connection turns out to hinge on our ability to formulate principles governing physical processes as principles of "least action", as was explained by Emmy Noether less than 100 years ago. In this talk, I will describe some of the ideas and the history of the development of this mathematical understanding of the relationship between symmetry (for example, the principle of invariance) and conserved quantities (such as energy and momentum) and how it still shapes our attempts to develop a "theory of everything". I will attempt to explain why string theory seems to require our universe to be a space of much higher dimension than is apparent to our senses. No mathematics beyond vector calculus will be assumed.

This talk should be accessible to undergraduates.