## **The IMSA Great Minds Program®**

Date: September 18, 2000

Time: 3:30 PM

Location: Auditorium

## Dr. Douglas Hofstadter

Abstract:

## "A JOLLY ROMP IN THE EUCLIDUAL PLANE, WHERE POINTS AND LINES HAVE THEIR ROLES REVERSED"

......Several years ago, it occurred to me that, for reasons of abstract symmetry, Euclidean geometry must have a "dual" geometry in which there are "parallelpoints" but no parallel lines. I pondered this bizarre idea for a while, and gradually and gropingly worked out some of the most basic concepts and theorems in what I dubbed "Euclidual" (it rhymes with "residual") geometry. What, for instance, do the three slides of a "trislide" add up to? And what is the shape of a "circual"? (Incidentally, not least of the several challenges I had to face was that of figuring out what to call the new objects that populate the Euclidual plane. This led to some rather amusing terminology.)

......After further pondering, I realized that by allowing both parallel points and parallel lines, or by allowing neither notion, or by exploring other variants, I could coax out of the woodwork a small family of nine closely related geometries, including not only the famous Noneuclidean geometries but also their duals -- the "Noneuclidual" (of course!) geometries.

.....I later learned, to my disappointment, that much of what I had uncovered had been found before, but to this day these lovely ideas are little known and little appreciated. In my talk I will describe my intuitive explorations, concentrating most of all on the disorienting world of Euclidual geometry, but also suggesting a little of the flavor of the others.