

Pathways Lecture Series in Mathematics, KEIO



Speaker : **Prof. Mario Micallef**
(University of Warwick)

Place : Room 14-203, 2nd Floor, Bldg. 14
Faculty of Science and Technology
KEIO University

Lecture 1 16:30-18:00 October 4, 2007 (Thursday)

Isotropic minimal surfaces and holomorphic curves in flat tori

Isotropy of a minimal surface is characterised by the vanishing of certain holomorphic differentials. Holomorphic curves in a complex torus with a flat metric are precisely the minimal surfaces which are maximally isotropic. I will discuss the deformation of a holomorphic curve in a complex torus with a flat metric to a minimal surface with a prescribed degree of isotropy. This is based on joint work with Elisabeta Nedita and it is related to earlier work with Claudio Arezzo.

Lecture 2 14:45-16:15 October 5, 2007 (Friday)

Area Minimization and Holomorphicity

It is well known that a surface which is holomorphic in a Kahler manifold minimizes area in its homology class. (More simply, a surface which is holomorphic in C^n has least area among all surfaces with the same boundary.) An issue of considerable importance in complex and Riemannian geometry is an understanding of the extent of validity of the converse to this fact. I will survey the major results in this area and provide an indication of the methods used to establish these results. I will also discuss a construction of mine and Wolfson's of an area minimizing two-sphere in a K-3 surface with an appropriate (but fairly general) Calabi-Yau metric which is not holomorphic with respect to any of the complex structures compatible with the metric.