Abstracts

Landau-Ginzburg/Calabi-Yau correspondence – A. Chiodo

In this series of lectures I will present work in collaboration with Hiroshi Iritani and Yongbin Ruan on a recent formulation of the physical Landau-Ginzburg/Calabi-Yau correspondence in terms of enumerative geometry of moduli of curves. The correspondence may be regarded as an approach to the Gromov-Witten theory of Calabi-Yau hypersurfaces. The Landau-Ginzburg side of the correspondence is a theory whose construction has been provided in 2008 by Fan, Jarvis, and Ruan, based on ideas of Witten. Recent progress allows us to present the correspondence in three steps so that each step of the way involves fundamental tools of independent interest:

Lecture 1. The correspondence in cohomology via the Milnor fibre;
Lecture 2. The quantum correspondence via moduli of curves;
Lecture 3. Matching the correspondence via Orlov’s equivalence.

An introduction to log Gromov–Witten theory – M. Gross

In this series of lectures, I will give an introduction to the concepts behind a theory of logarithmic Gromov-Witten invariants currently under development with Bernd Siebert. The goal is to generalize the setting of the relative invariants of Li-Ruan and Jun Li to more general divisors, such as normal crossings divisors or more generally toroidal crossings divisors. To do this, one needs to work from the beginning in the category of log schemes. The first lecture will be devoted to giving the necessary background in log geometry. The second will introduce the moduli spaces of log stable curves, and the third will outline known and hoped-for results.

Moduli of stable quotients and the geometry of the moduli space of curves – R. Pandharipande

Concentrating eigenfunctions and local GW invariants – T. Parker

Junho Lee and I have a program for using geometric analysis methods to calculate the GW invariants of Kähler surfaces with $p_g > 0$. I will describe our method of using $(0,2)$-forms to localize $J$-holomorphic maps, and how it reduces the calculation of GW invariants first to finding certain local GW
invariants, and then to an index calculation. I will then show how a deformation of operators allows one to explicitly visualize the eigenfunctions that contribute to the required index and, in some cases, calculate the index using only linear algebra.

**Curve counting in 3-folds** – R. Thomas

I will review and compare GW, GV, MNOP and stable pairs theories for counting curves in 3-folds.