Floer Homology, Gauge Theory, and Low Dimensional Topology at the Alfréd Rényi Institute

The 2004 Clay Mathematics Institute Summer School on Floer homology, gauge theory and low-dimensional topology was held at the Rényi Mathematics Institute in Budapest, Hungary. Six lecture series — five lectures each — were given by researchers working in 3- and 4-dimensional topology, knot theory and symplectic and contact topology. These lectures were complemented by talks in the afternoon sessions and by mini-courses (mostly held on the last week of the Summer School) on related topics, given by leading researchers (Ekholm, Stern, Auroux, Honda, Smith, Ozbagci, Park, Goda, Lisca, Akbulut, TJ Li, Strle and Owens, Nemethi, Mark and Jabuka). Additional lectures elaborating some aspects of questions raised in the main lectures were given by Lipschitz, Gornik, Kalman, Rustamov, Schonenberger, Ghiggini, Hedden, Usher and Plamenevskaya.

The school had two objectives. The first was to give an introduction to low-dimensional topology for students new to the field, and the second was to provide some important invariants for graduate students familiar with topology but not specialized in any particular problem. To this end, CMI organized lectures on a more advanced level for recent PhDs describing new developments. The format chosen (introductory lectures in the morning and more advanced research talks in the afternoon) helped achieve both these aims. Special efforts were also made to encourage interaction between participants with different levels of knowledge and interest, at group lunch every day and during an excursion to Visegrád on Saturday, June 12. It was evident from the very active after-lecture discussions that the format of the school proved fruitful.

Organizing Committee: András Stipsicz, David Alexandre Ellwood, Ronald Fintushel and John Etnyre.

John Etnyre, *Contact structures and open book decompositions*

Ronald Fintushel, *Manifolds and the knot surgery construction*

Cameron Gordon, *Manifolds and Dehn surgeries*

Péter Ozváth, *Advanced Heegaard Floer theory*

András Stipsicz, *Contact surgery and Heegard Floer theory*

Zoltán Szabó, *Heegard Floer theory — an introduction*

Roughly one hundred graduate students or recent PhDs and twenty researchers participated in the activities of the Summer School. The Summer School was one of the major activities in 2004 for the Rényi Institute and for Hungarian mathematics. The presence of leading scientists generated a lively atmosphere, bringing university professors and researchers affiliated with many Hungarian universities to the program. Moreover, the scientific agenda of the school generated a renewed interest in geometry and topology in Hungary. The Rényi Institute did a fantastic job hosting the school and making it an enjoyable and fruitful experience for the participants. The lecture notes were produced and posted to the Internet each day. Videos of the lectures were stored for later reference. The lecturers of the main lecture series and of the research talks are putting together a Conference Proceedings, in which most of the Summer School lectures will be included. Editing of the proceedings is in its final stages, and the volume should appear in late 2005.