

Introduction

The first half of this issue of the *Proceedings* features four survey articles covering a wide ranging selection of currently very active areas in partial differential equations. It is the intention that these papers will provide authoritative overviews of the current ‘state of the art’ in the areas covered, and that these will be of interest both to specialists and to anyone wanting a good general introduction to these areas. I would like to express my sincere thanks to the authors of these papers for the time and effort they have devoted to producing such high quality and interesting articles.

The papers are based on a series of mini-courses held in the International Centre for Mathematical Sciences (ICMS) in Edinburgh during 2010. These courses were organized jointly by the Centre for Analysis and Nonlinear Partial Differential Equations (CANPDE), based in Edinburgh, and the Oxford Centre for Nonlinear PDE, based in the University of Oxford. Each course consisted of between four and six one-hour lectures on a specific area of analysis related to nonlinear partial differential equations, presented by invited lecturers of internationally recognized standing. I think that the papers speak for themselves and need no introduction from me, but some further comments on the background to their production, and the general state of the mathematical research environment in Edinburgh may be of some interest.

ICMS was set up in 1990 as a joint project between the School of Mathematics in The University of Edinburgh and the Departments of Mathematics and of Actuarial Mathematics & Statistics in Heriot-Watt University. Its general aim is to support research in the mathematical sciences, and its core activity is the organization of international workshops and conferences in all areas of mathematics. To date, ICMS has organized well over 100 meetings, which have attracted leading mathematicians from the United Kingdom and overseas. ICMS also provides the administrative back-up for the journals *Proceedings of the Royal Society of Edinburgh* and *Proceedings of the Edinburgh Mathematical Society*. In the period 1994–2010, ICMS occupied an elegant and imposing Georgian townhouse in the centre of Edinburgh’s New Town – which happened to be the birth place of James Clerk Maxwell!

The foundation of ICMS could be regarded as the beginning of a process of ever closer links between the Edinburgh and Heriot-Watt mathematics departments. This culminated in the founding of the Maxwell Institute for Mathematical Sciences, which brings together within a single body the research activities of these departments. The Maxwell Institute was set up to be an internationally pre-eminent centre for research and postgraduate training in the mathematical sciences, and to offer an environment that can attract and foster the very best mathematical talent from around the world.

As one of various means to further this aim, CANPDE was established in 2007, under the auspices of the Maxwell Institute, to stimulate and support the development of the research base in nonlinear differential equations in the United Kingdom. CANPDE is funded by the UK Engineering and Physical Sciences Research Council and the Scottish Funding Council.

I hope that you enjoy these survey papers.

BRYAN RYNNE

Chair of the Editorial Board

Proceedings of the Royal Society of Edinburgh