The 5th annual meeting of the UK and Republic of Ireland (UKIE) SIAM Section attracted over 40 applied and industrial mathematicians to the University of Strathclyde in Glasgow, Scotland for an interesting and varied collection of presentations on Friday 5th January: the first SIAM meeting of the millennium (depending on how you count!).

The section officers Trevor Stuart (President, Imperial College), Des Higham (Vice President, University of Strathclyde) and Peter Jimack (Secretary and Treasurer, University of Leeds) should be congratulated for arranging speakers across such a varied cross section of the discipline -- this aspect of generality and non-specialism has quickly become a hallmark of this event and is much appreciated by those many of us whose main other exposure to the broad spectrum of research in industrial and applied maths is through the SIAM annual meeting.

The venue for the event was the rather grand Court/Senate Suite at the University of Strathclyde which provided an ideal small lecture theatre for the presentations. After introductory comments from the section President, the meeting was started by Tim Goodman (University of Dundee) who discussed results in approximation theory that relate to refinable functions. It is well known that B-splines, when suitably scaled, converge to a Gaussian, and it is of interest to know under what conditions a general refinable function has this property of asymptotic normality, and at what rate the convergence takes place. Goodman gave a range of results, some of which had been proved in weaker form by researchers in probability theory. He also explained how the results relate to Heisenberg's uncertainty principle and mentioned applications to signal processing.

The second speaker was Howard Elman (University of Maryland) who described some joint work with Alison Ramage (University of Strathclyde) on the numerical solution of advection-diffusion partial differential equation problems in two dimensions. The oscillatory nature of Galerkin finite element or centered finite difference approximations is well understood in a one-dimensional (ODE) setting: the onset of oscillations being triggered if the characteristic grid Peclet number is greater than unity. Elman employed discrete Fourier analysis techniques to show that in the two-dimensional case, oscillations can exist perpendicular to the flow direction even if the associated mesh Peclet number is less than one. This analysis was also used to shed light on the thorny issue of the optimal stabilisation parameter for streamline diffusion discretisations in multi-dimensions. In particular, two parameter choices were identified corresponding to a) the most accurate discrete solution; and b) the smallest value precluding the onset of oscillations. The merits of these alternative philosophies provided for an interesting
discussion with other international experts in the audience.

During the Business Section of the meeting, the regular secretary and treasurers reports were given: there was general support for the way funds had been dispersed to support applied and industrial mathematics in the UK and RoI and in the ensuing discussion it was agreed to look further at the small amount of budget spent on student prizes. Since the section President is now also the President of the London Mathematical Society, it was perhaps foreseeable that he would be questioned about possible reciprocity between the two societies – we wait to see...

The two-year terms of the President and Vice-President end in March 2001 and the results of the email election for new officers were announced by the secretary. David Parker (University of Edinburgh) will be the next section President and Ivan Graham (University of Bath) will serve as the next Vice President, both for two years from April 2001.

After lunch, Valerie Isham (University College, London) discussed spatio-temporal processes in hydrology. Based on radar and rain gauge data, both stochastic, point process models and empirical multivariate statistical models were developed. The techniques were illustrated on an interesting application to the prediction of rainfall patterns, and consequent flood damage, on housing in Galway, Ireland.

The next speaker, Mark Davis (Imperial College), had recently returned to academia from the financial sector and showed the audience the relevance of mathematical analysis even in the hectic world of option pricing! He described work that arose from a practical constraint: it is often impossible to trade the asset on which an option is written, but rather, one can trade a highly-correlated commodity. If the correlation is not perfect, what is a good hedging strategy? Davis defined the problem as maximizing a utility function. Studying a dual formulation allowed the problem to be expressed in terms of stochastic control under a quadratic penalty function and an elegant approach to computing a numerical solution based on an asymptotic expansion followed.

The final talk of the day, given by Alex Craik (University of St. Andrews) concerned a system of three nonlinear ordinary differential equations that arose from work on exact solutions of the Navier-Stokes equations. A special case of the system, which arises in the context of a rotating rigid body, was dealt with in a masterly manner by Euler by the use of Jacobian elliptic functions. The more general system that Craik studied can give rise to finite time blow up and spring-like solutions. A complicated four-leaf manifold of periodic solutions was illustrated numerically, and in conjunction with two saddle points this manifold was seen to organise the behaviour of the spring-like solutions.

Around half of the attendees stayed for the lively evening dinner – very much in keeping with the New Year spirit!
Overall this was a friendly and thought-provoking meeting. A good way to see some of the active research being pursued in the UK and RoI, to catch up with colleagues and to make new acquaintances.

The next meeting will be in January 2002, venue to be decided.

Andy Wathen is Reader in the Oxford University Computing Lab and thanks Des Higham and David Silvester for much help in the writing of this report.