

Geometry and analysis in physical systems; papers presented in honour of Darryl D Holm's  
60th birthday

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## PREFACE

# Geometry and analysis in physical systems; papers presented in honour of Darryl D Holm's 60th birthday

This special issue of *Journal of Physics A: Mathematical and Theoretical* is dedicated to Darryl Holm on the occasion of his 60th birthday. The papers were largely drawn from the lectures at a meeting held in his honour at the Bernoulli Center at the EPFL in Lausanne, Switzerland, 22–28 July, 2007.

The papers cover, as much as it is possible, the tremendous range and depth of work done by Darryl over the years. These topics include the Camassa–Holm equation and waves, geometric mechanics, symmetry and integrable systems, fluid and plasma dynamics, including stability problems, regularized incompressible fluid models (such as the  $\alpha$ - or LANS models), including turbulence and multiscale methods, ocean dynamics, the EPDiff equation (a higher dimensional version of the CH equation) and computational anatomy. Perhaps a little less well known is Darryl's influential work in adiabatic fluids in general relativity, liquid crystals and other topics. But underlying all of Darryl's work is the geometric view of mechanics and physics, which was already kindled in his 1976 PhD thesis at Michigan.

One of Darryl's and our favorite accomplishments is the development of the Camassa–Holm equation, a remarkable integrable PDE with, amazingly, spatially non-smooth, peaked, solitons. This is understandable—the equation caught on like wildfire because of its fascinating properties and the ideas in that paper proved to be a gold mine of research. It is his most cited paper with nearly a thousand citations, according to Google Scholar. We are pleased that our joint 1985 paper on fluid and plasma stability comes in second and the paper that was a precursor to the alpha model series of papers, namely our Euler–Poincaré paper, comes in third.

Of course having an equation named after you is a very nice bonus. Congratulations Darryl on a brilliant career that shows no signs of slowing down!

**Jerrold E Marsden and Tudor S Ratiu**

**Guest Editors**