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Thin Plate Splines: We are looking for students to extend our work on thin plate splines. Possible projects include; adaptive refinement, parallel implementation, high dimensional problems and the formulation in different spaces. These results are important in a number of application areas including; data mining, 3D reconstruction of geometric models, finger print matching, image warping, medical image analysis and optic flow computations.

Adaptive Optics: Projects are available in adaptive optics to obtain real-time results, especially in the presence of noise. The work will require both a good understanding of the computation science issues (cache aware algorithms) and mathematical algorithms (inverse problems).

Domain Decomposition: We are also doing some work with Geosciences Australia. To handle applications with large amounts of data it is necessary to break up the computational domain into subregions, which leads to the question of how to pass the information between the subregions. The mathematical tool used here is the subspace correction method. This is also a technique often used to include multiscale physics in a model.

Turbulent Transport Models: Two possible, related, topics are available. The first one is the study of the solution of stiff odes, focussing on the solution of turbulent transport models. The aim is to develop an algorithms that will generate long term time series. The second topic will use the time series to study the chaotic behaviour of the system.