



# *Applied Mathematics*



## *McGill & CRM Applied Mathematics Seminar*

2:35 pm Monday 20 October 2003

At McGill, Burnside Hall 1205

“Well-posed boundary value problems for 3d div-curl systems”

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*Coffee and refreshments will be served after the seminar*

**Abstract:** In both fluid mechanics and electromagnetic field theory, we need to solve various boundary value problems for “div-curl” systems. These are linear systems for which physically reasonable well-posedness results have only recently been found. Depending on the boundary conditions specified, different extra data may be needed to specify unique solutions depending on the differential topology of the region and/or the boundary data.

The analysis is based on special orthogonal decompositions of the classes of allowable vector fields using scalar and vector potentials. The solutions are characterized using variational principles for these potentials. The results have physical interpretations, involve some surprises and are appropriate, and necessary, for the development of good computational simulations.