1062-49-282 **Nathan D Cahill*** (nathan.cahill@rit.edu), Rochester Institute of Technology, 85 Lomb Memorial Drive, Rochester, NY 14623-5603. *Exploiting the Structure of Regularizers for Rapid Solutions of Variational Image Registration Problems.*

Variational image registration techniques combine image similarity measures with regularization terms in order to guarantee that the resulting functional minimization problem is well-posed. In practice, typical regularization terms are quadratic differential forms that can be either spatially homogeneous or adaptive. In this talk, we describe two different rapid computing paradigms for estimating the solution to the Euler-Lagrange equations resulting from various families of regularizers; one paradigm uses Fourier series solutions of the discretized Euler-Lagrange equations; the second employs convolution with a discretized Gaussian kernel to mimic the Green's function solution to coupled PDE systems related to the Euler-Lagrange equations. (Received August 11, 2010)