MSRI–Evans Talk

Monday, 4:10–5:00pm, 60 Evans

Sept. 14   **Tudor Ratiu**, École Polytechnique Fédérale de Lausanne
Applications of Symplectic Geometry: Rigid Bodies, Fluidas, Liquid Crystals, KDV, Teichmüller Geodesics

Symplectic geometry appears in the kinematics of conservative dynamical systems. If these have symmetries, the equations of motion induce dynamics on quotient spaces which have additional geometric structure. This phenomenon is ubiquitous in classical and continuum mechanics, leading to the geometric formulation of many models. This talk will present examples of such systems and emphasize the rich geometric background underlying them, both in Hamiltonian and Lagrangian formulations. Already the formal aspect leads to a better understanding of the motion equations and to conservation laws. On the other hand, endowing the formal objects with infinite dimensional Banach manifold structures sets the stage for an analytic investigation of the properties of certain conservative evolutionary PDEs. Both aspects will be discussed for these examples.