1159-74-70 **Tagir Farkhutdinov**, , Canada, **Francois Gay-Balmaz**, Paris, France, and **Vakhtang Putkaradze*** (vakhtang.putkaradze@atco.com), 5302 Forand St SW, Calgary, AB T3E8B4, Canada. *Geometric variational methods in deformable porous media, with applications to active materials.*

Many biological organisms are comprised of deformable porous media, with additional complexity of an embedded muscle, see e.g. Ludeman et al., BMC Evol. Biol. 2014 for 'sneezing' dynamics of a freshwater sponge. Using geometric variational methods, we derive the equations of motion of a for the dynamics of such an active porous media (*i.e.*, a deformable porous media that is capable of applying a force to itself with internal muscle work. We then proceed to extending this theory by computing the case when both the active porous media and the fluid are incompressible, with the porous media still being deformable, which is often the case for biological applications. For a particular case of uniform initial state, we rewrite the equations of motion in terms of two coupled telegraph-like equations for the material (Lagrangian) particles expressed in the Eulerian frame of reference, particularly suitable for numerical simulations, formulated for both the compressible media/incompressible fluid case and the doubly incompressible case. We derive interesting conservation laws for the motion, perform numerical simulations in both cases and show the possibility of self-propulsion of a biological organism due to particular running wave-like application of the muscle stress. (Received July 29, 2020)