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Geometric mechanics for modelling bioinspired robots locomotion: from rigid to continuous (soft) systems FREDERIC BOYER, MATHIEU POREZ, Ecole des Mines de Nantes, FEDERICO RENDA, Khalifa University — This talk presents recent geometric tools developed to model the locomotion dynamics of bio-inspired robots. Starting from the model of discrete rigid multibody systems we will rapidly shift to the case of continuous systems inspired from snakes and fish. To that end, we will build on the model of Cosserat media. This extended picture of geometric locomotion dynamics (inspired from fields' theory) will allow us to introduce models of swimming recently used in biorobotics. We will show how modeling a fish as a one-dimensional Cosserat medium allows to recover and extend the Large Amplitude Elongated Body theory of J. Lighthill and to apply it to an eel-like robot. In the same vein, modeling the mantle of cephalopods as a two dimensional Cosserat medium will build a basis for studying the jet propelling of a soft octopus like robot.

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