

## Deep learning for microscopy, optical trapping, and active matter

- Giovanni Volpe<sup>1</sup>

<sup>1</sup>*Physics Department, Gothenburg University, Gothenburg, Sweden*

After a brief overview of artificial intelligence, machine learning and deep learning, I will present a series of recent works in which we have employed deep learning for applications in photonics and active matter. In particular, I will explain how we employed deep learning to enhance digital video microscopy, to estimate the properties of anomalous diffusion, to characterize microscopic force fields, to improve the calculation of optical forces, and to characterize nanoparticles. Finally, I will provide an outlook for the application of deep learning in photonics and active matter.