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*Medical Imaging meets Machine Learning*

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**Lecture 1: The role of anatomical and physiological models in Medical Imaging Computing**

**Lecture 2: Biophysical simulation of medical images with pathologies for Machine Learning**

I will show a progression of models of the human body which can support the computational analysis of medical images. These models can be of geometrical, statistical, biological and/or physico-chemical nature and describe the living tissues and organs at various scales. The parameters of these models are adjusted to the observed images to create a personalized and quantitative description of the patient which can be used to support the diagnosis. The personalized models of the patients can be used to simulate an evolution of the disease, to support the prognosis. They can be used to simulate the effect of a therapy, to optimize the patients' treatments.

Also, those computational models of the human body can be used to create large databases of simulated images with known pathologies. These databases can then be used to train machine learning algorithms on various tasks. I will show examples in the domain of Alzheimer's disease, brain and liver tumors, and heart diseases