

## **Efficient holistic scene understanding of urban scenes**

*Prof. Raquel Urtasun*

*Toyota Technological Institute at Chicago*

Developing autonomous systems that are able to assist humans in everyday's tasks is one of the grand challenges in modern computer science. Notable examples are personal robotics for the elderly and people with disabilities, as well as autonomous driving systems which can help decrease fatalities caused by traffic accidents. In order to perform tasks such as navigation, recognition and manipulation of objects, these systems should be able to efficiently extract 3D knowledge of their environment. In this talk, I'll show how Markov random fields provide a great mathematical formalism to extract this knowledge. In particular, I'll focus on a few examples, i.e., 3D reconstruction, 3D layout estimation, 2D holistic parsing and object detection, and show representations and inference strategies that allow us to achieve state-of-the-art performance as well as several orders of magnitude speed-ups.