Abstract: Computer vision problems are inherently ambiguous and in general we can only make educated guesses about the content of images. A natural approach to address this problem involves using prior models of the world. In this talk I will describe a class of probabilistic grammars that generate complex scenes with multiple objects and hierarchical structures. Probabilistic scene grammars capture relationships between objects using compositional rules. For example, a rule might specify the different parts that can make up a face. Such rules provide contextual cues for inference with ambiguous data. This leads to a unified framework for a variety of vision tasks. I will illustrate experiments on two applications to demonstrate the generality of the framework. The first application involves detecting curves in noisy images. The second application involves localizing faces and parts of faces in images. In both applications the same framework leads to robust inference algorithms that can effectively combine weak local information to reason about a scene.

Biography: Pedro F. Felzenszwalb is a Professor of Engineering and Computer Science at Brown University. His main research interests are in computer vision, geometric algorithms and artificial intelligence. He received his PhD degree in Computer Science from the Massachusetts Institute of Technology in 2003. In 2010 he received the Longuet-Higgins Prize for a fundamental contribution to computer vision. He received an IEEE Technical Achievement Award in 2014 and the 2013 ACM Grace Murray Hopper Award.