The images above are examples of procedural models. These define a family of geometric objects indirectly by a computer program procedure. By adjusting the structure and parameters of this procedure, you can produce different objects. See also: 1, 2, 3.

For robotics and perception, a nice property of procedural models is that they can be much more concise than traditional representations (such as point clouds, meshes or voxel grids), thereby reducing memory footprint and eliminating unnecessary degrees of freedom.

However, an open problem is how to obtain procedural models and their parameters from observations of a scene efficiently. You will investigate how machine learning can help. This may involve such techniques as:

- 3D pose and shape estimation
- Deep neural networks
- Reinforcement learning
- Program synthesis

Contact: Simen Haugo