## Detailed 3D Representations for Object Recognition and Modeling M. Z. Zia, M. Stark, B. Schiele, K. Schindler (PAMI 2013)



- Combines detailed models of 3D geometry with modern discriminative appearance models into a richer and more fine-grained object representation
- Method overview:
  - Starts from a database of 3D computer aided design (CAD) models of the desired object class as training data
  - Applies principal components analysis to obtain a coarse 3-dimensional wireframe model which captures the geometric intra-class variability
  - Trains detectors for the vertices of the wireframe, which they call 'parts'
  - At test time, generates evidence for the parts by densely applying the part detectors to the image
  - Explores the space of possible object geometries and poses by guided random sampling from the shape model, in order to identify the ones that best agree with the image evidence
- Evaluates on 3D Object Classes and EPFL Multi-view cars datasets