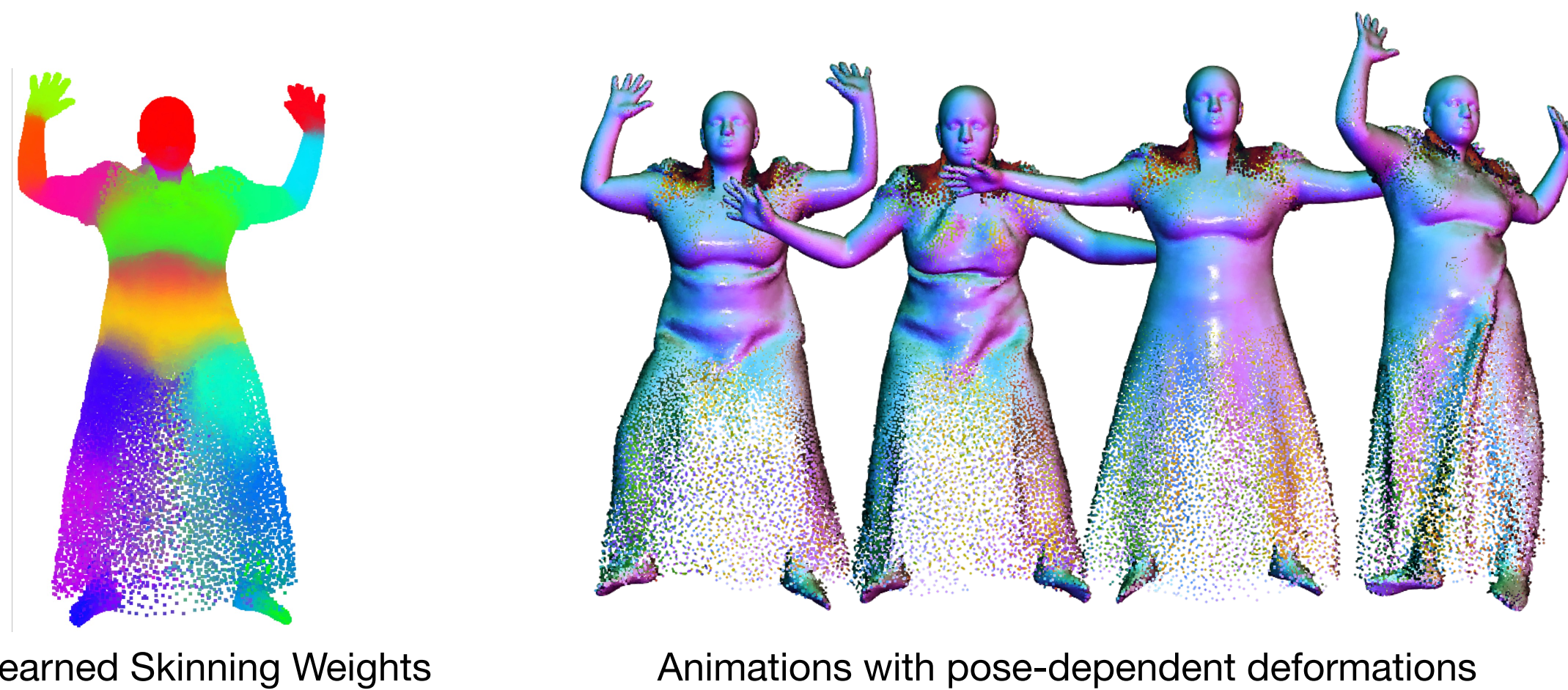




TL;DR

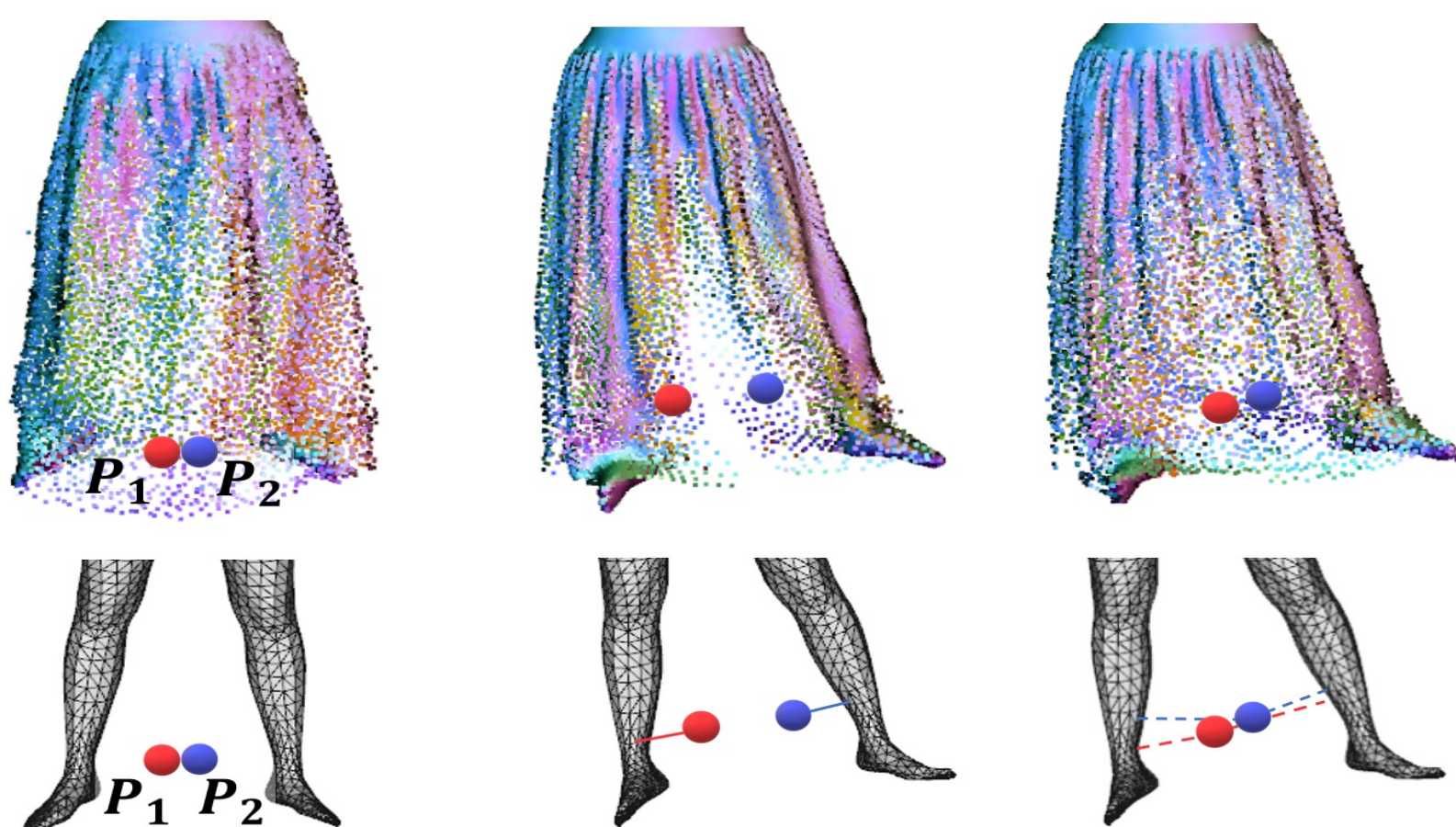
Goal: Building realistic pose-dependent shape models of 3D avatars from scans, robust to challenging clothing types such as jackets, skirts and dresses.

Method: “SkiRT” — A point cloud-based representation for clothed humans with the learned Linear Blend Skinning (LBS) weights for clothing, trained with a coarse-to-fine scheme.

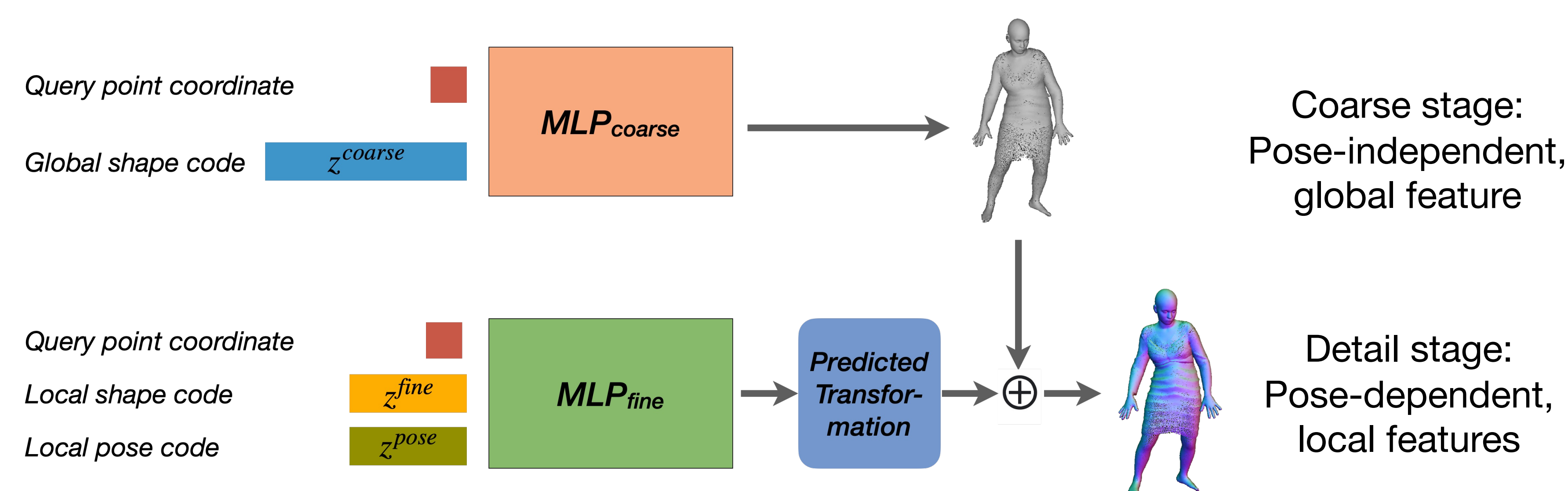


Problem

Existing data-driven clothed body models ^[1,2] rely on the unclothed body topology and skinning weights to model clothing. This limits their capability of handling garments that are loose or topologically different from the body.



SkiRT: Skinned Refined Template-free



Representation

- Representing a clothed human body as a displacement *field* from the body surface
- Densely querying points on the body results in a displaced *point cloud* of a clothed body

Coarse-to-fine Scheme

- A coarse stage learns a pose-*independent* coarse shape “template” that minimizes the distance to all training examples
- A detail stage learns pose-dependent offsets on the coarse shape in local coordinates

Learning the Local Transformations

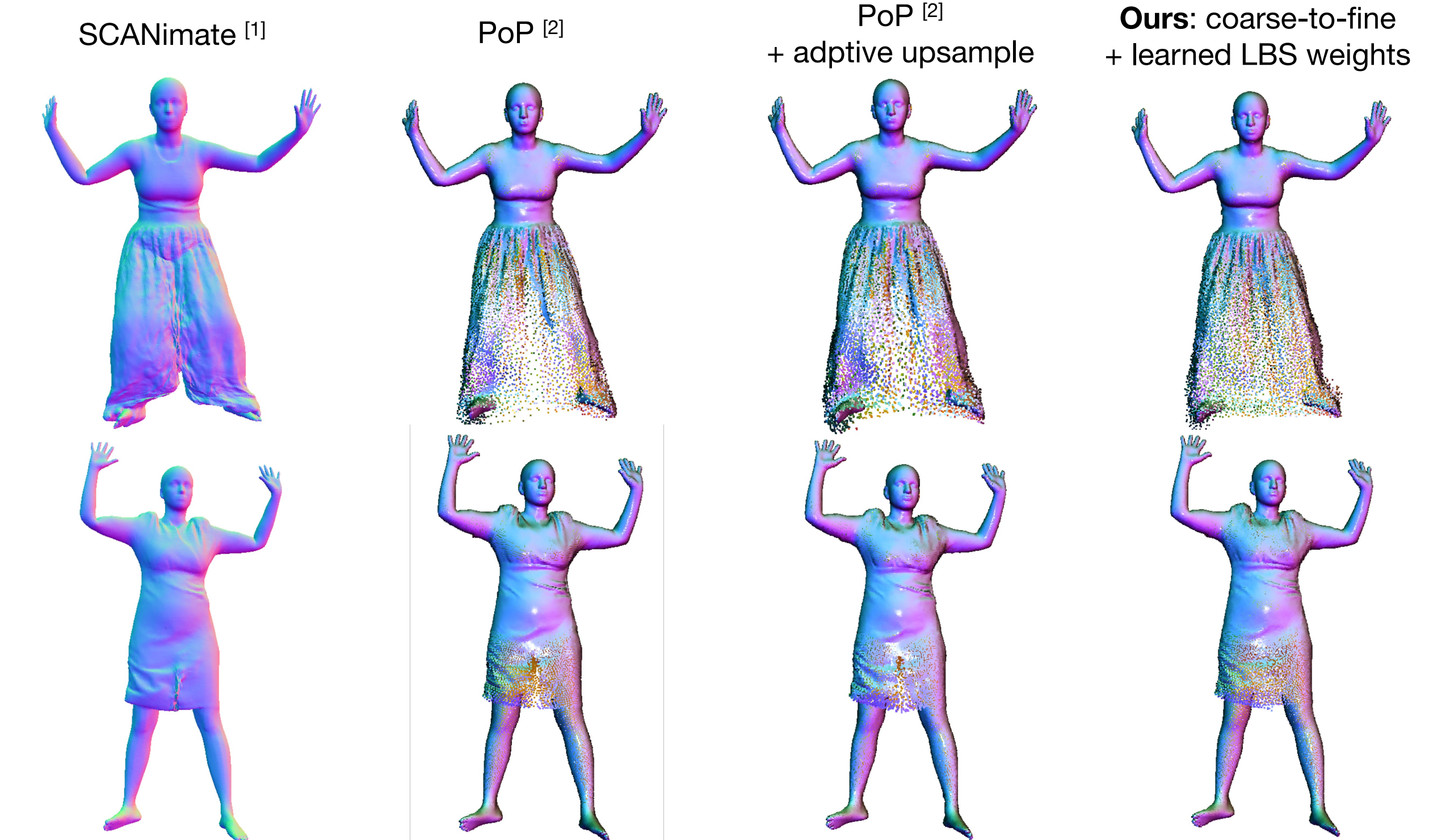
- Local-to-world transformation: linear combination of body joint transformations weighted by skinning weights
- Learn a skinning weight field for the clothed body surface

References

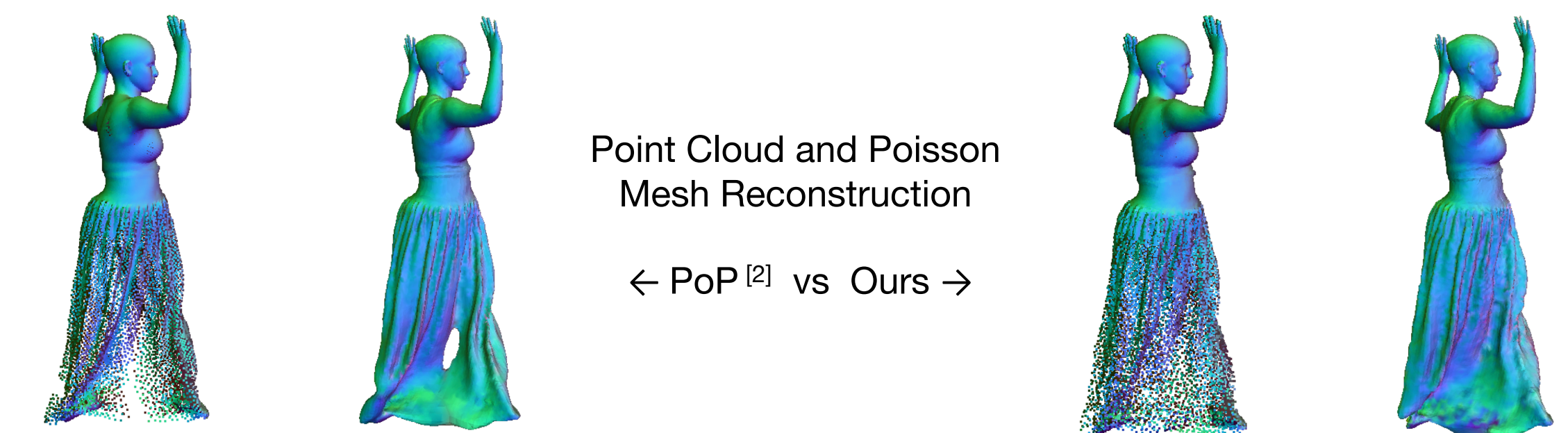
- [1] Saito et al. SCANimate: Weakly Supervised Learning of Skinned Clothed Avatar Networks. In CVPR 2021.
[2] Ma et al. The Power of Points for Modeling Humans in Clothing. In ICCV 2021.

Results

Pose-dependent Shape Prediction: Challenging Clothing Types



Comparison: Mesh Reconstruction Quality



Scan Completion



Creating Avatars from Raw Scans

