

Nadine Rueegg<sup>1</sup>, Shashank Tripathi<sup>2</sup>, Konrad Schindler<sup>1</sup>, Michael J. Black<sup>2</sup>, Silvia Zuffi<sup>3</sup>  
<sup>1</sup>ETH Zurich, <sup>2</sup>MPI for Intelligent Systems, <sup>3</sup>IMATI-CNR

## GOAL

3D pose and shape estimation from images



## IDEA

Exploit contact with the ground

## CHALLENGE

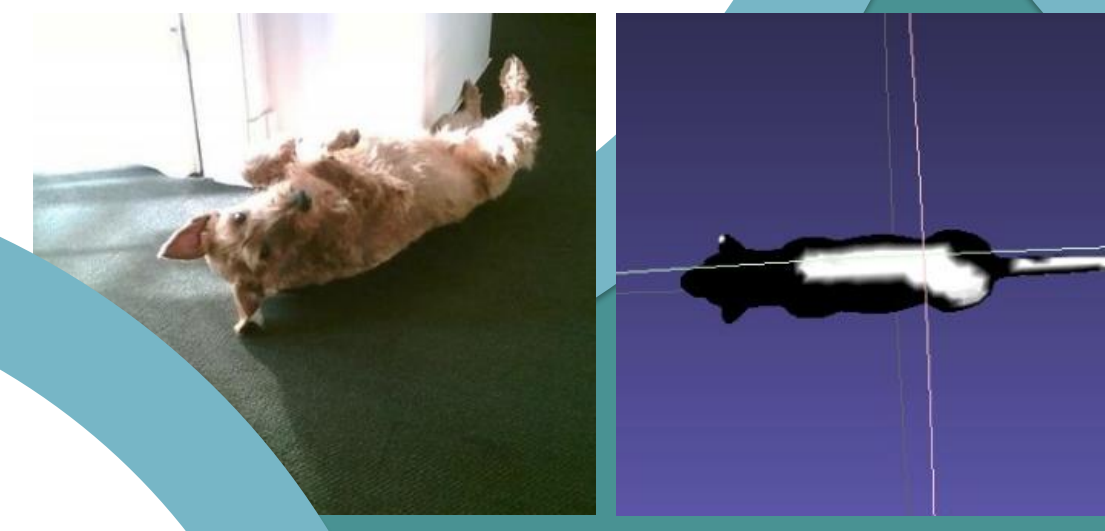
Due to the lack of 3D data, existing methods cannot deal with complex poses



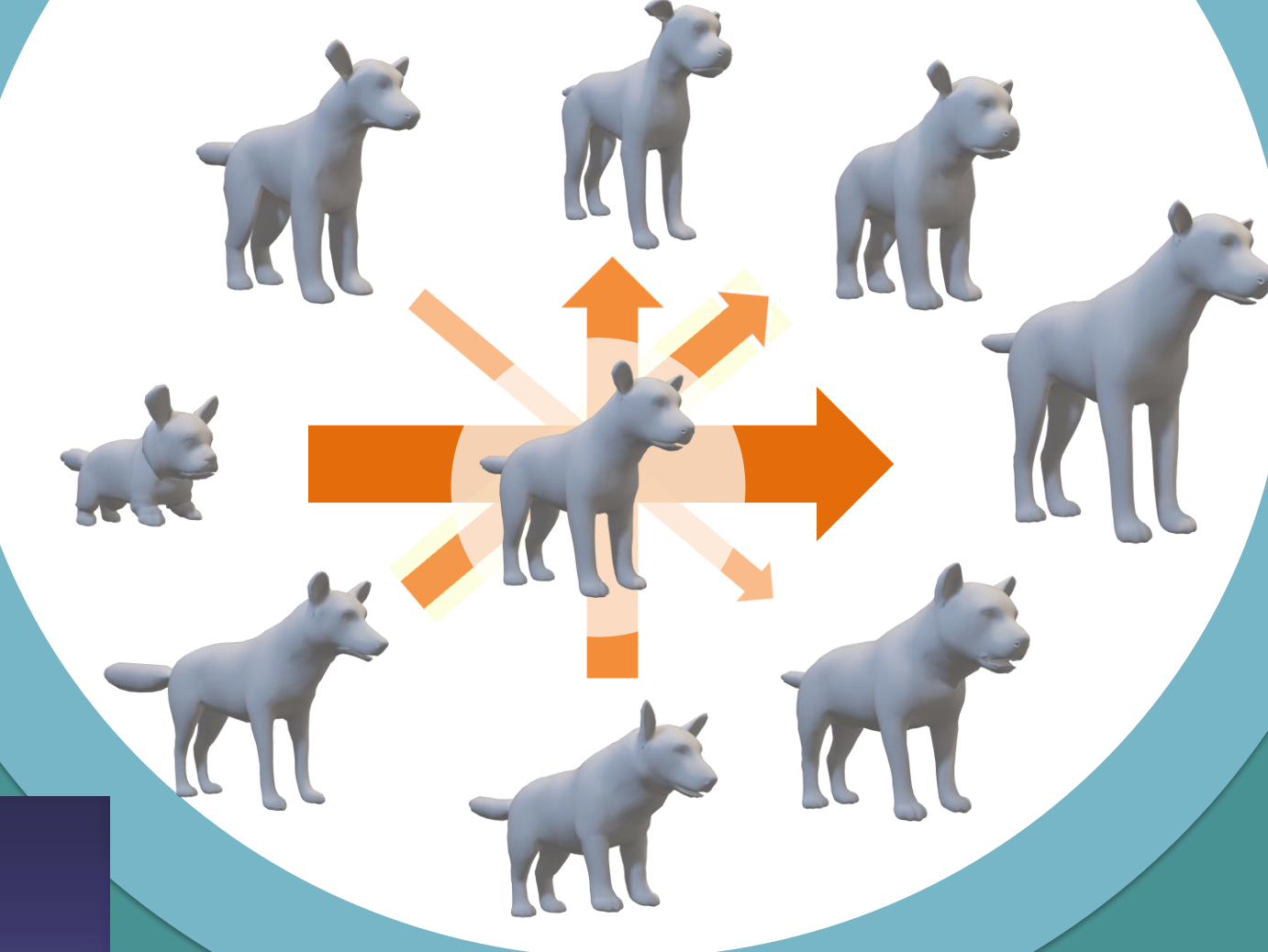
**WLDO**: B. Biggs et al., Who left the dogs out: 3D animal reconstruction with expectation maximization in the loop. ECCV, 2020  
**CTF**: Chen Li and Gim Hee Lee, Coarse-to-fine animal pose and shape estimation. NeurIPS, 2021  
**BARC**: N. Ruegg et al., BARC: Learning to regress 3d dog shape from images by exploiting breed information. CVPR, 2022

## DATASET

Annotated with contact vertices on the 3D model template



## 3D MODEL



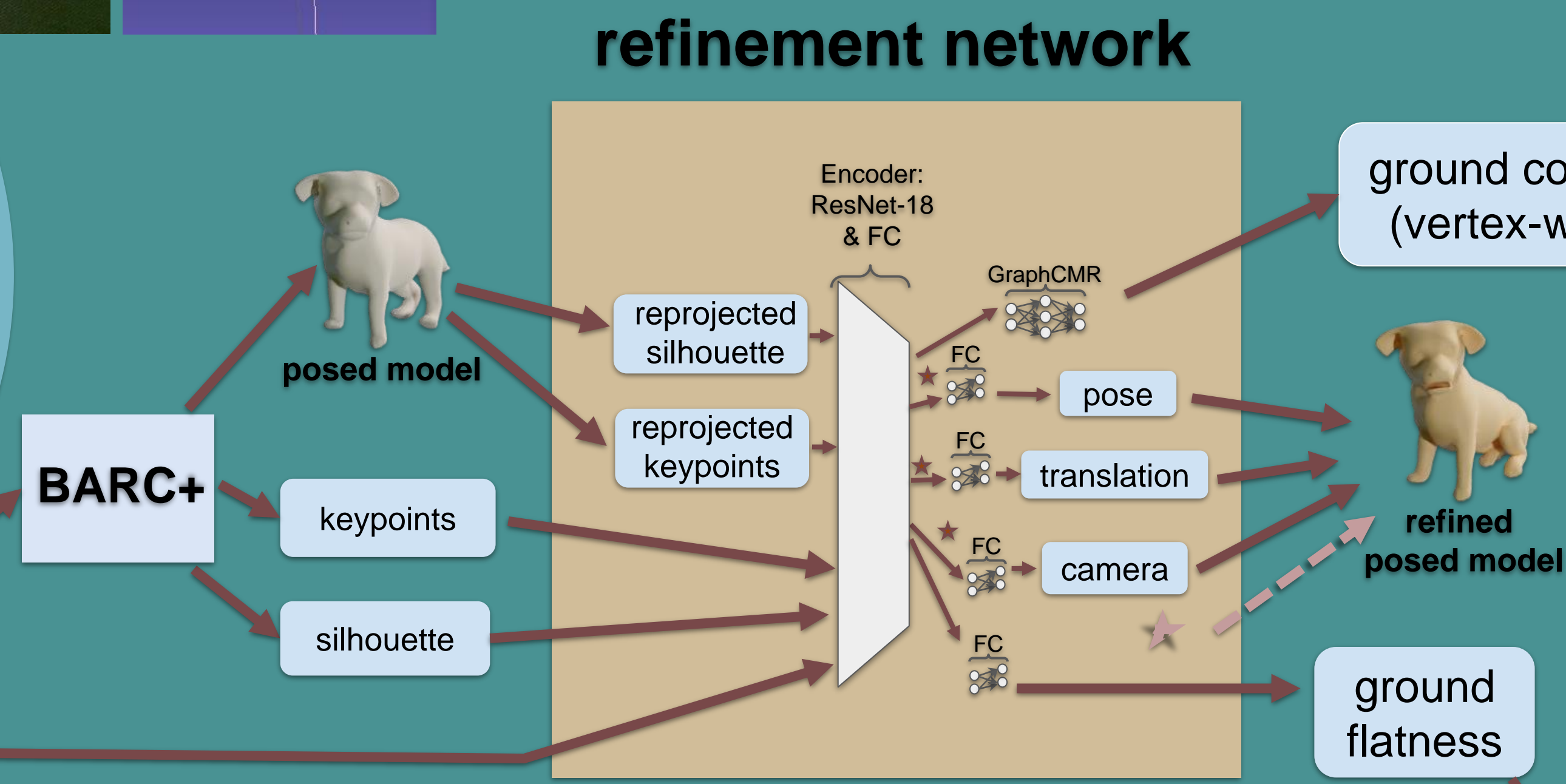
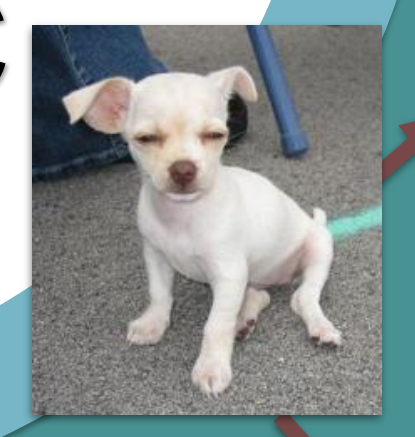
## RESULTS

We introduce a new testset for 3D evaluation



## NETWORK

Predicts a refined solution from BARC



Method	IOU	PCK	Scan → Mesh	Mesh → Scan
WLDO	74.2	78.8	2.65	7.55
CTF	81.6	83.4	2.59	6.17
BARC	75.1	82.8	2.40	3.93
BITE	79.4	84.8	2.07	3.15
<b>BITE-ttopt</b>	<b>85.5</b>	<b>86.3</b>	<b>2.03</b>	<b>2.84</b>

**optimization loop**  
 refine pose, translation, camera and shape;  
 allows symmetric vertex shifts

