A. Examples from the HELEN dataset

In this section we provide further reconstructions from the HELEN dataset. Figures 1,2,3 give further illustrations of the proposed decomposition in comparison to the blind decomposition of [19]. Figure 4 shows equivalent reconstructions of some of the images using publicly available commercial morphable model implementations.

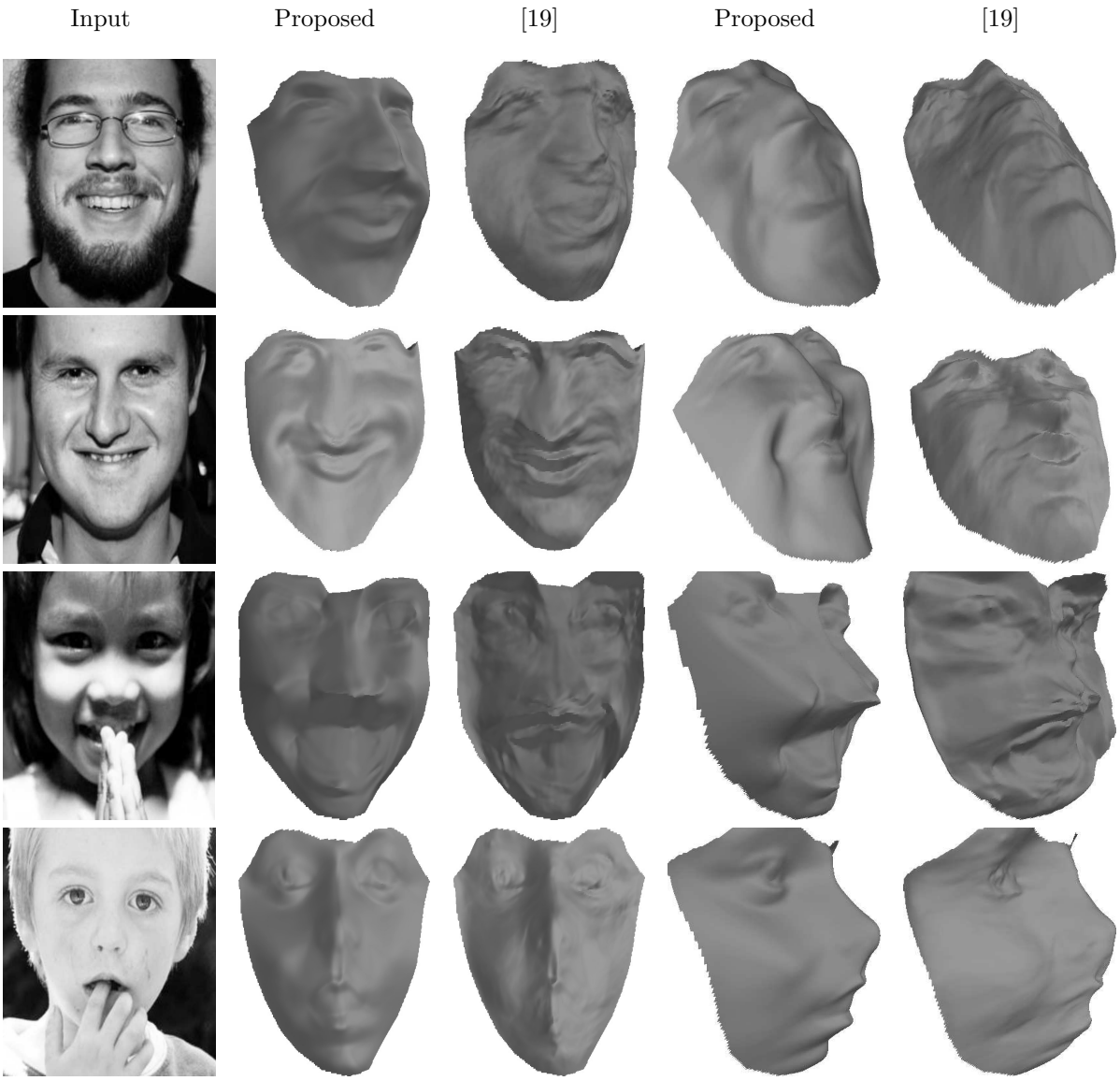

Figure 1: **Comparison with the blind decomposition of [19]**. Images from the HELEN dataset.

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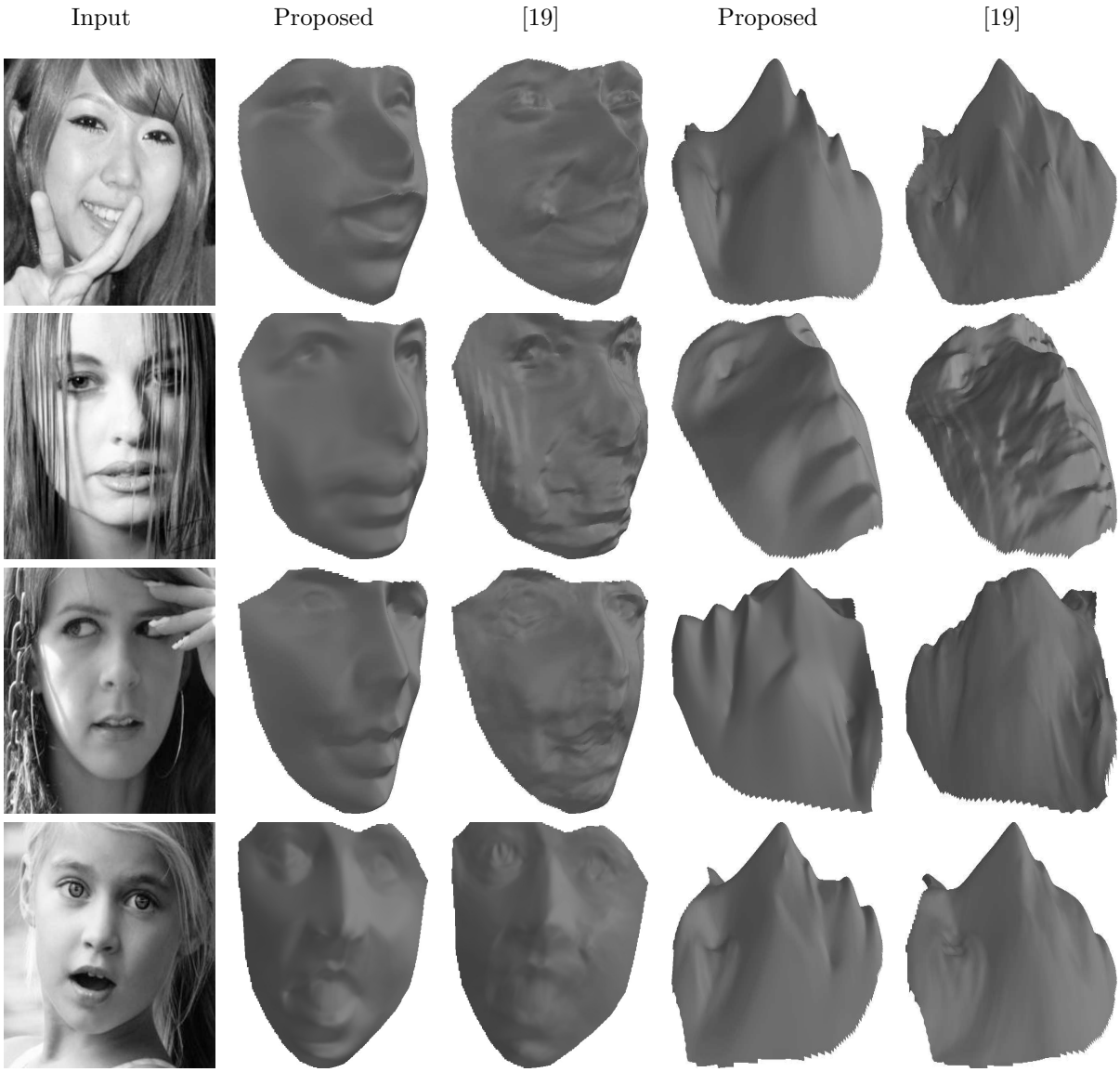

Figure 2: **Comparison with the blind decomposition of [19]**. Images from the HELEN dataset.

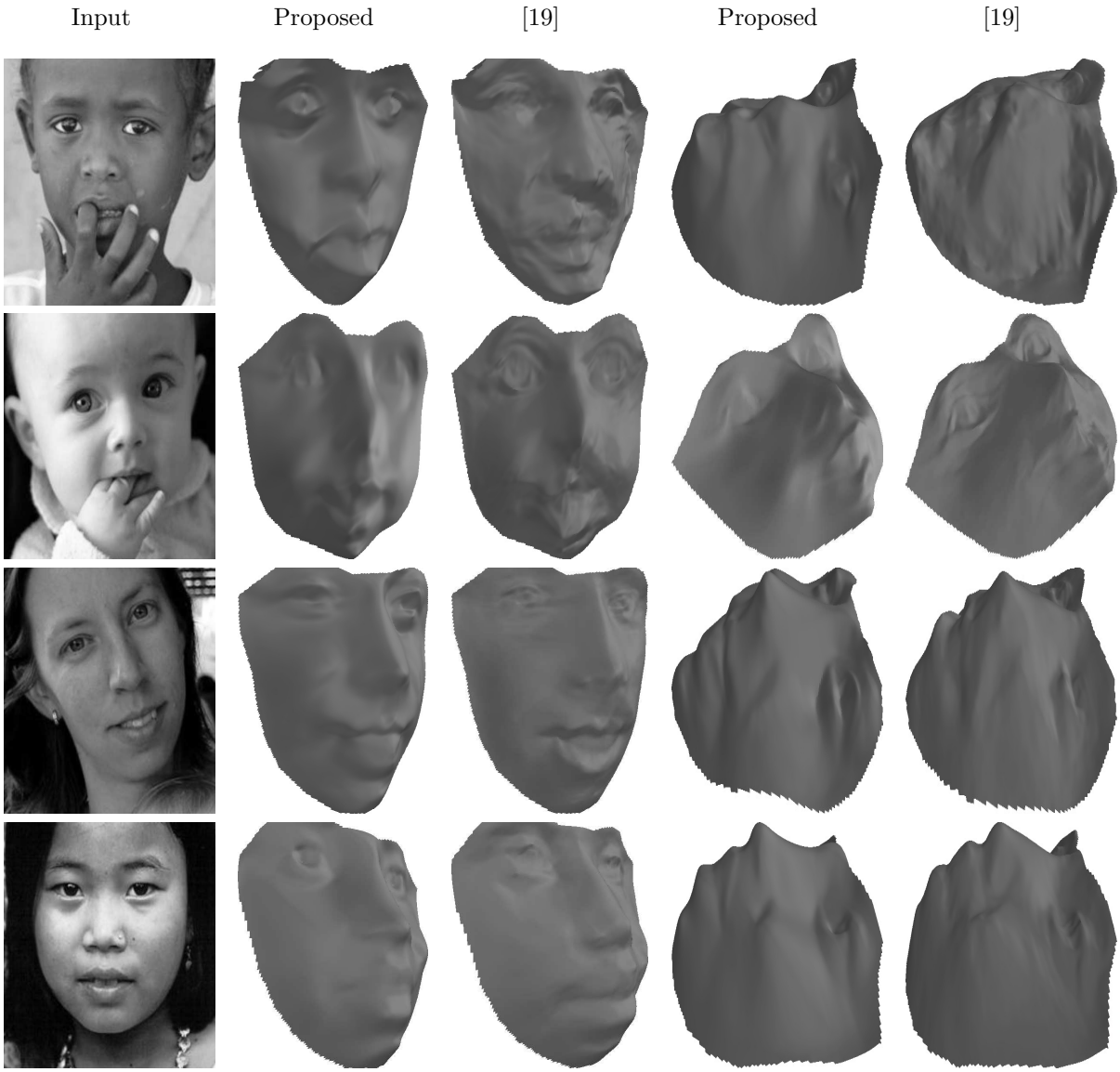

Figure 3: **Comparison with the blind decomposition of [19]**. Images from the HELEN dataset.

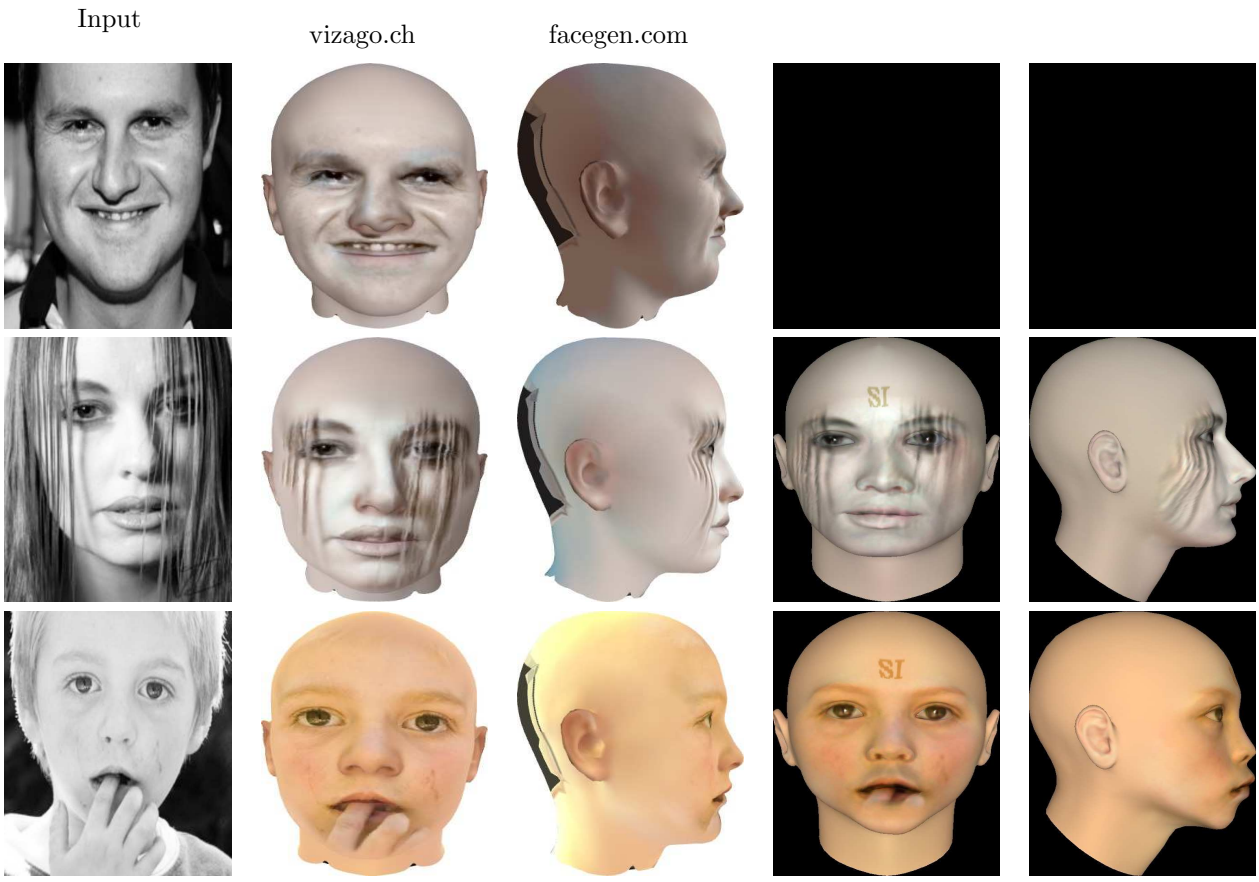

Figure 4: Examples of difficult reconstructions for existing commercial Morphable Model implementations. Images from the HELEN dataset. Both implementations do not provide the ability to render textureless surfaces. Facegen.com reported invalid landmarks for the image given in the first row.

B. Photometric Stereo Examples

In this section, we provide examples of the proposed technique when applied to a Photometric Stereo (PS) dataset. In this case, $k = 1$ as the images all represent the same shape under varying illumination. In Figure 5, it can be seen that our technique successfully recovers an accurate facial 3D shape. The proposed recovered shapes are smoother than the traditional PS as the low rank constraint recovers the low frequency information from the images. A standard least-squares photometric stereo is performed to serve as the baseline reconstruction.

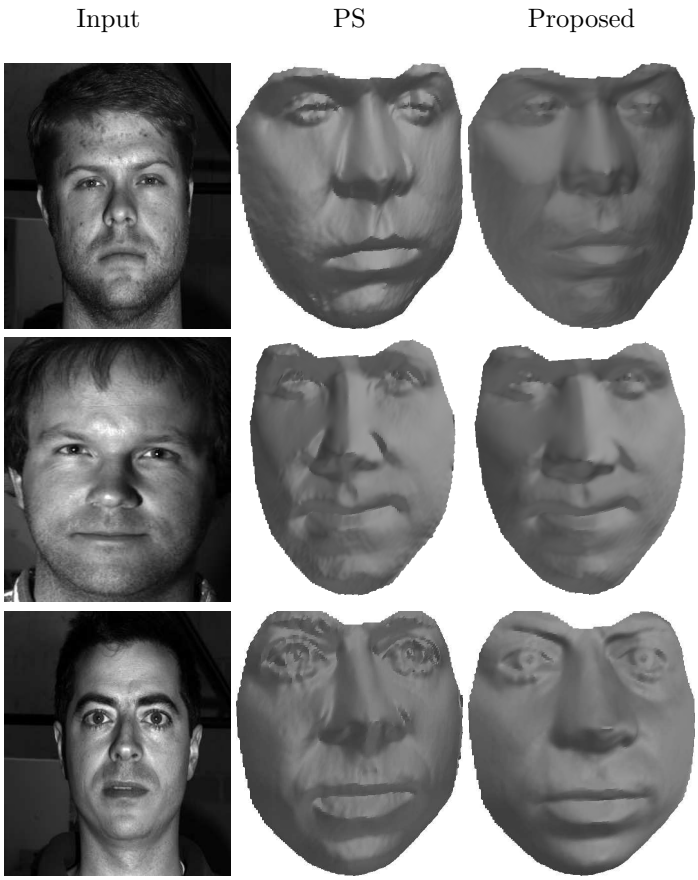

Figure 5: Examples comparing against traditional Photometric Stereo. Images from the Yale B dataset. First column is the input images, second column is traditional photometric stereo and the third column is the proposed algorithm.

C. Tom Hanks Examples

In this section we provide examples of reconstructions from the automatically collected dataset of Tom Hanks. This dataset was acquired by automatically downloading images of Tom Hanks from Google using the search query "Tom Hanks". The images were then fit using the facial alignment method provided by the Dlib library. Figure 6 shows these reconstructions.

Figure 7 shows the average face warped into the reference frame for the alignment experiment performed in the main paper. It clearly shows the improvement in fitting as the image becomes sharper after the 10 global iteratons.

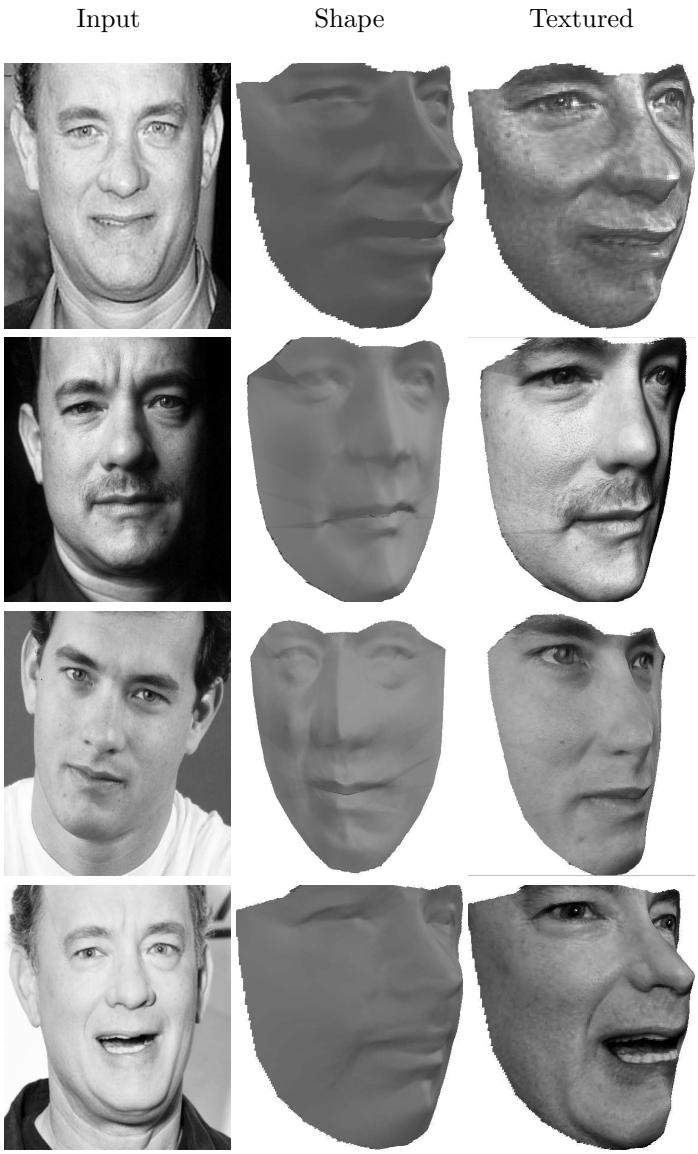

Figure 6: Example reconstructions of Tom Hanks. Images automatically downloaded from Google. First column is the input images, second column is the untextured shape from the proposed technique and the third column is the textured shape.

(a) (b)

Figure 7: **Fitting Improvement of Tom Hanks Video**. Mean of all warped frames of the Youtube video of the first and final iterations. (a) Start of first iteration. (b) End of final (10th) iteration.