Portrait Lighting Transfer using a Mass Transport Approach: Supplementary Document

This document provide additional results by Algorithm 1 in main document (Fig. 1 to 12).

In Fig. 13, we show the visual difference of results by different parameters (stochastic sampling and update rate).

From Fig. 14 to 17, we show more results of skin tone preserving lighting transfer.

In Fig. 18 and Fig. 19, we show more results of portrait relighting applying to subject with different ethnicity.

In Fig. 20, we show an example that in two-scale manipulation, for the application of portrait relighting, additive residual is better than multiplicative residual.

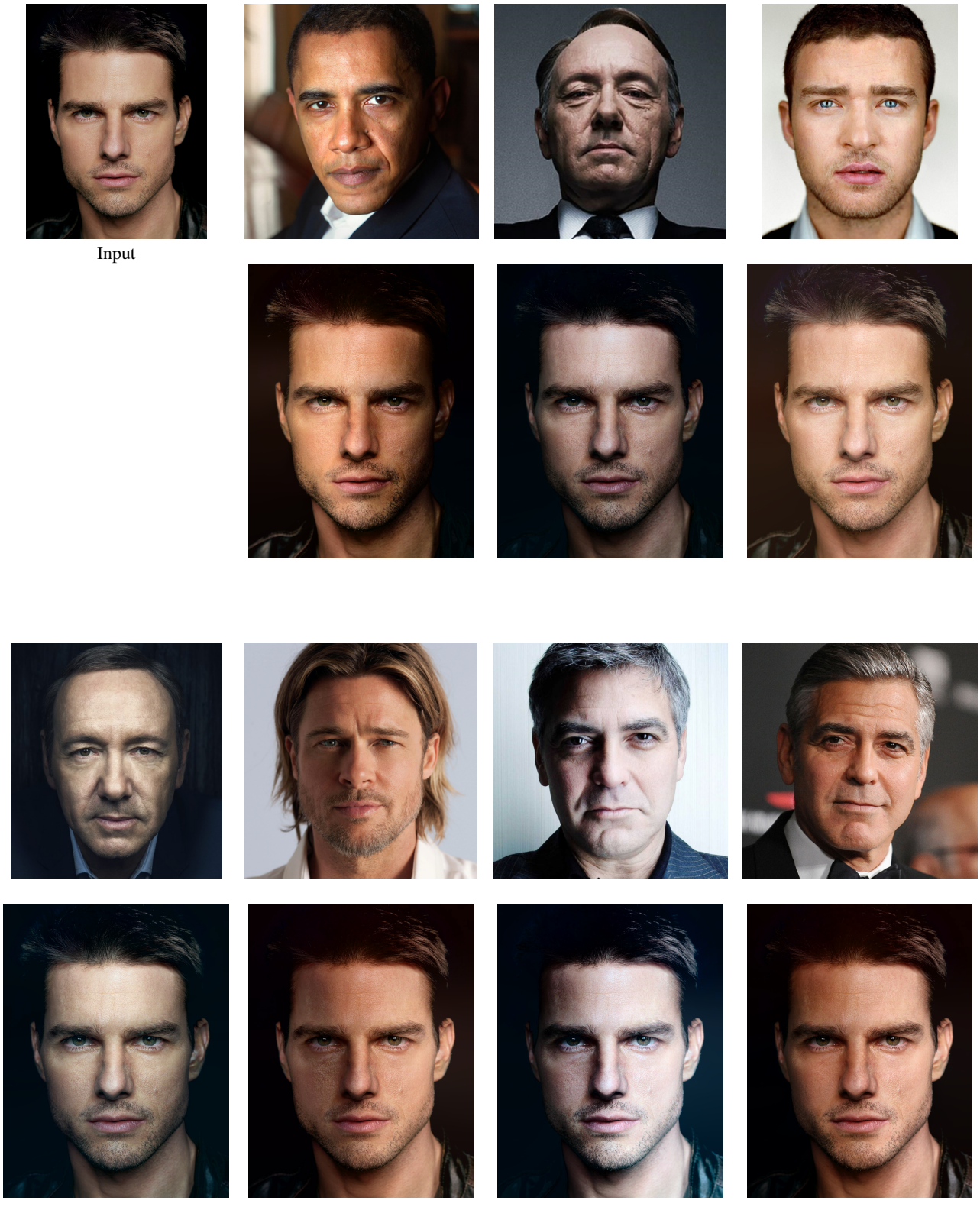


Figure 1: *Results of our portrait relighting technique.*

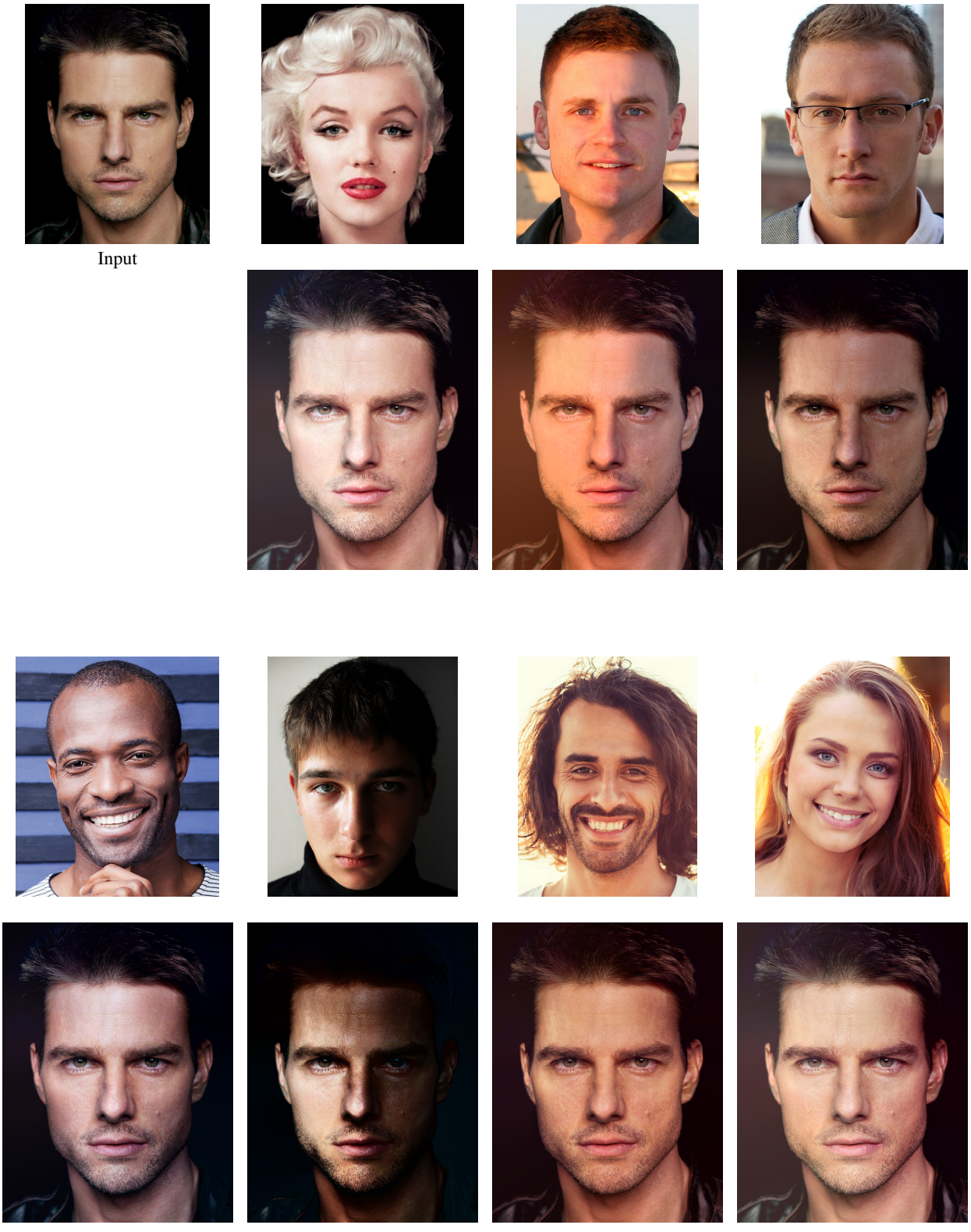


Figure 2: *Results of our portrait relighting technique.*

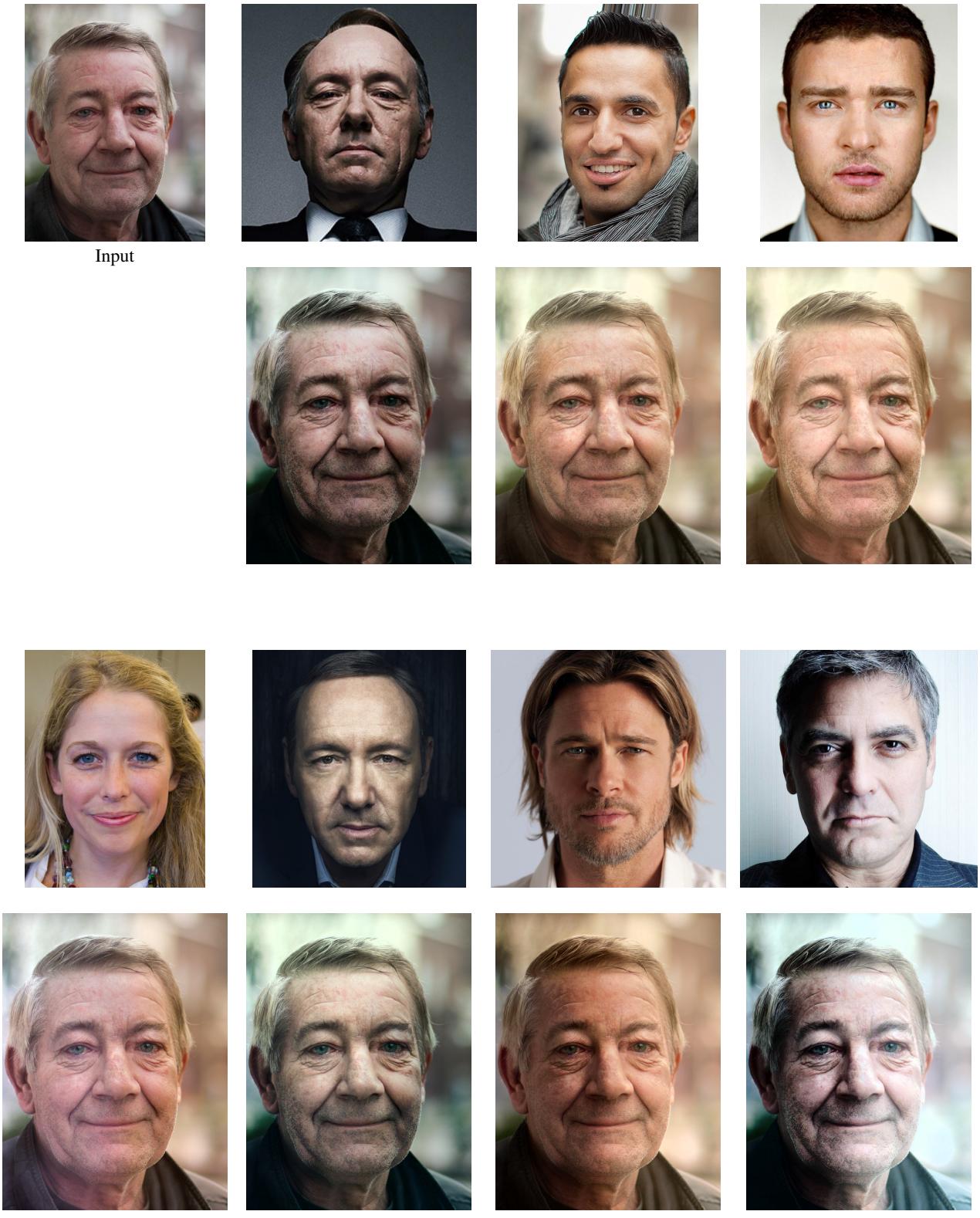


Figure 3: *Results of our portrait relighting technique.*

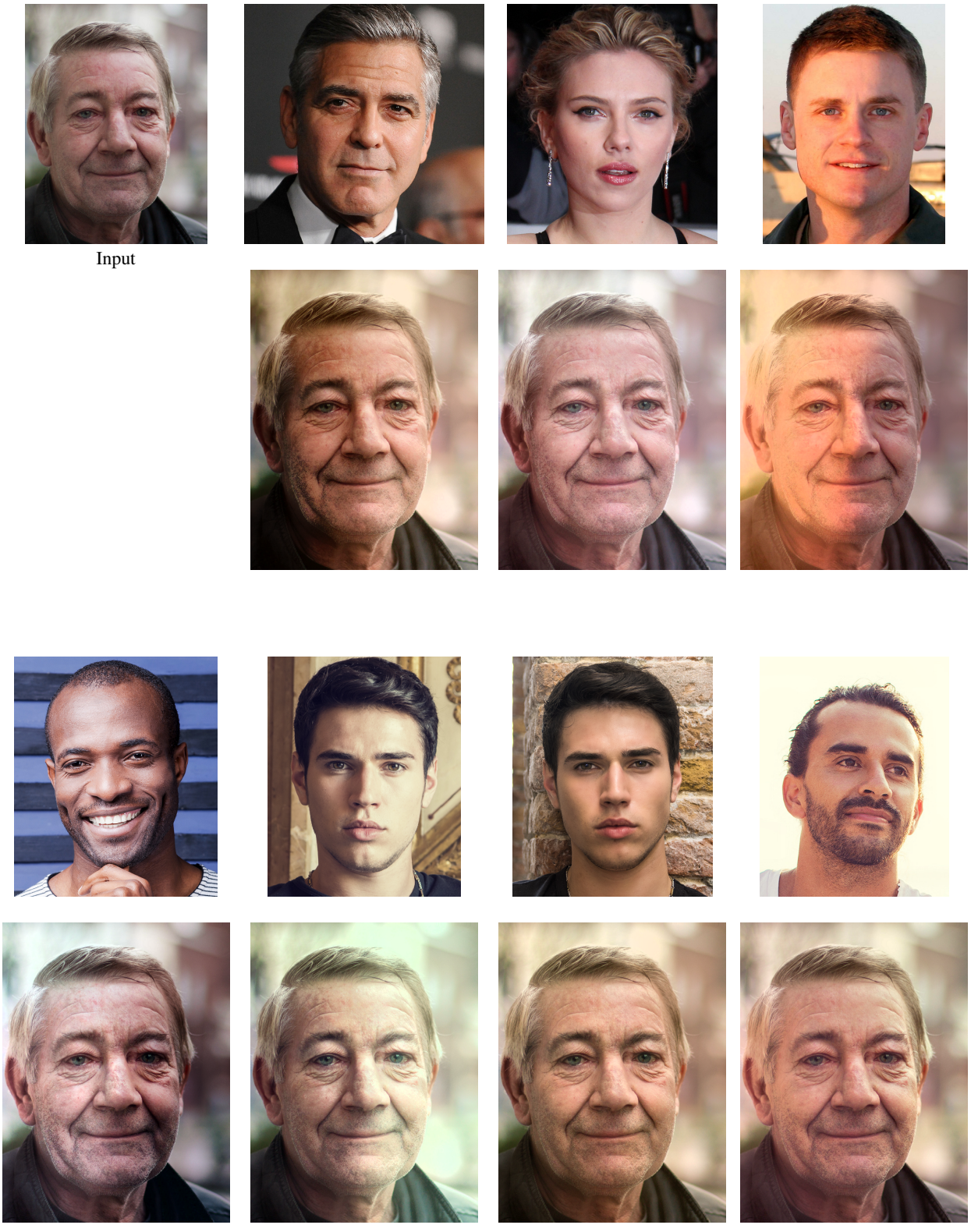


Figure 4: *Results of our portrait relighting technique.*

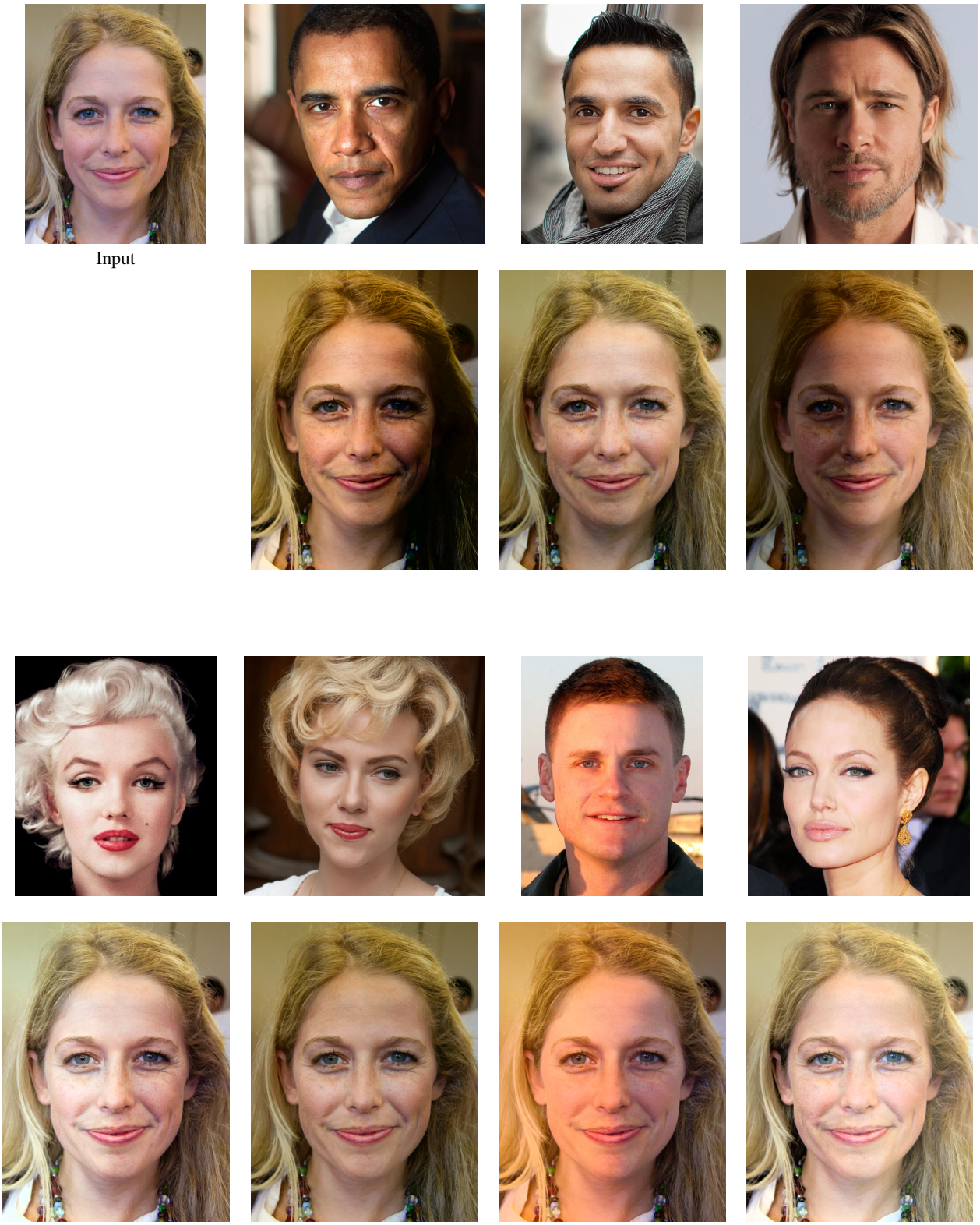


Figure 5: *Results of our portrait relighting technique.*

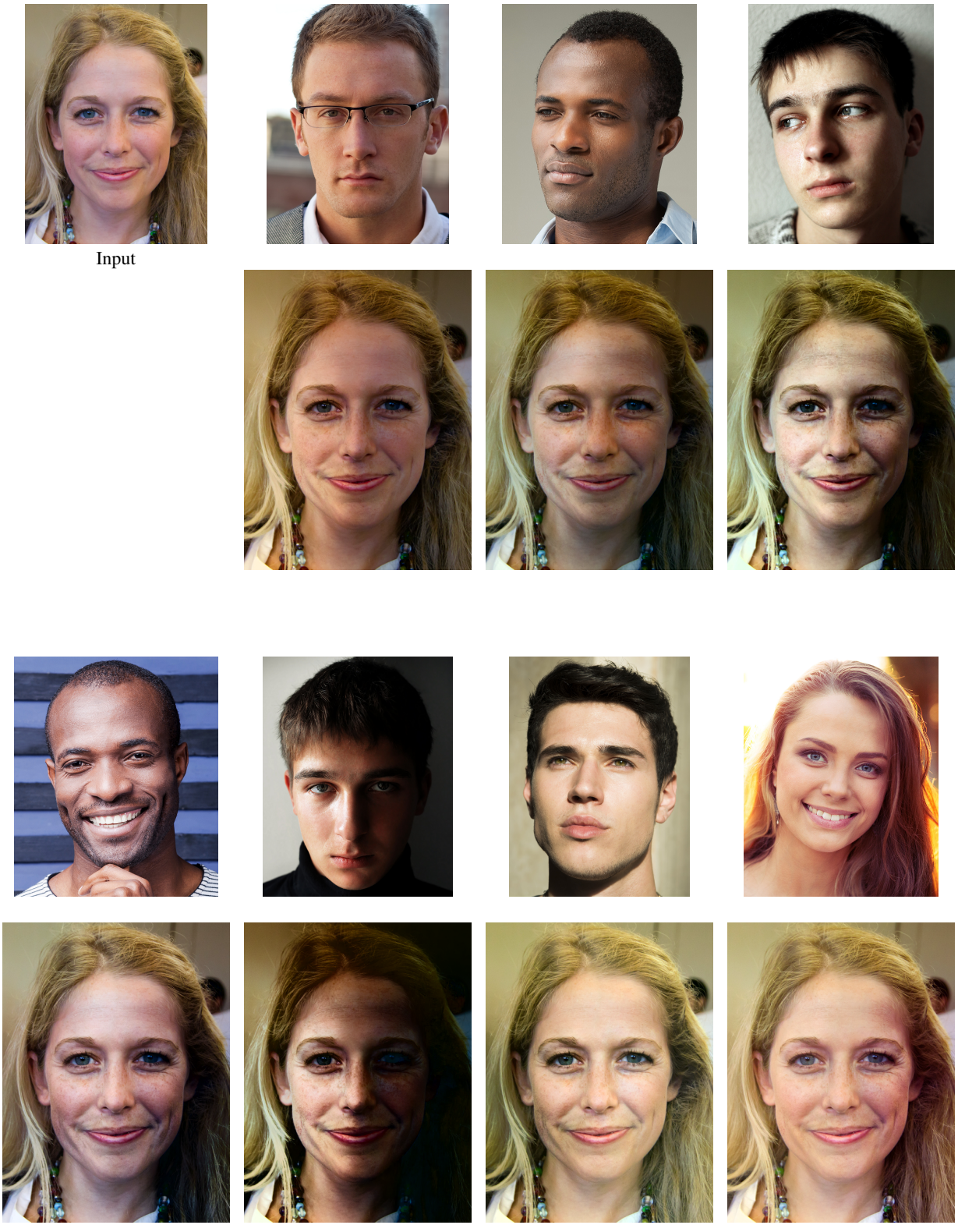


Figure 6: *Results of our portrait relighting technique.*

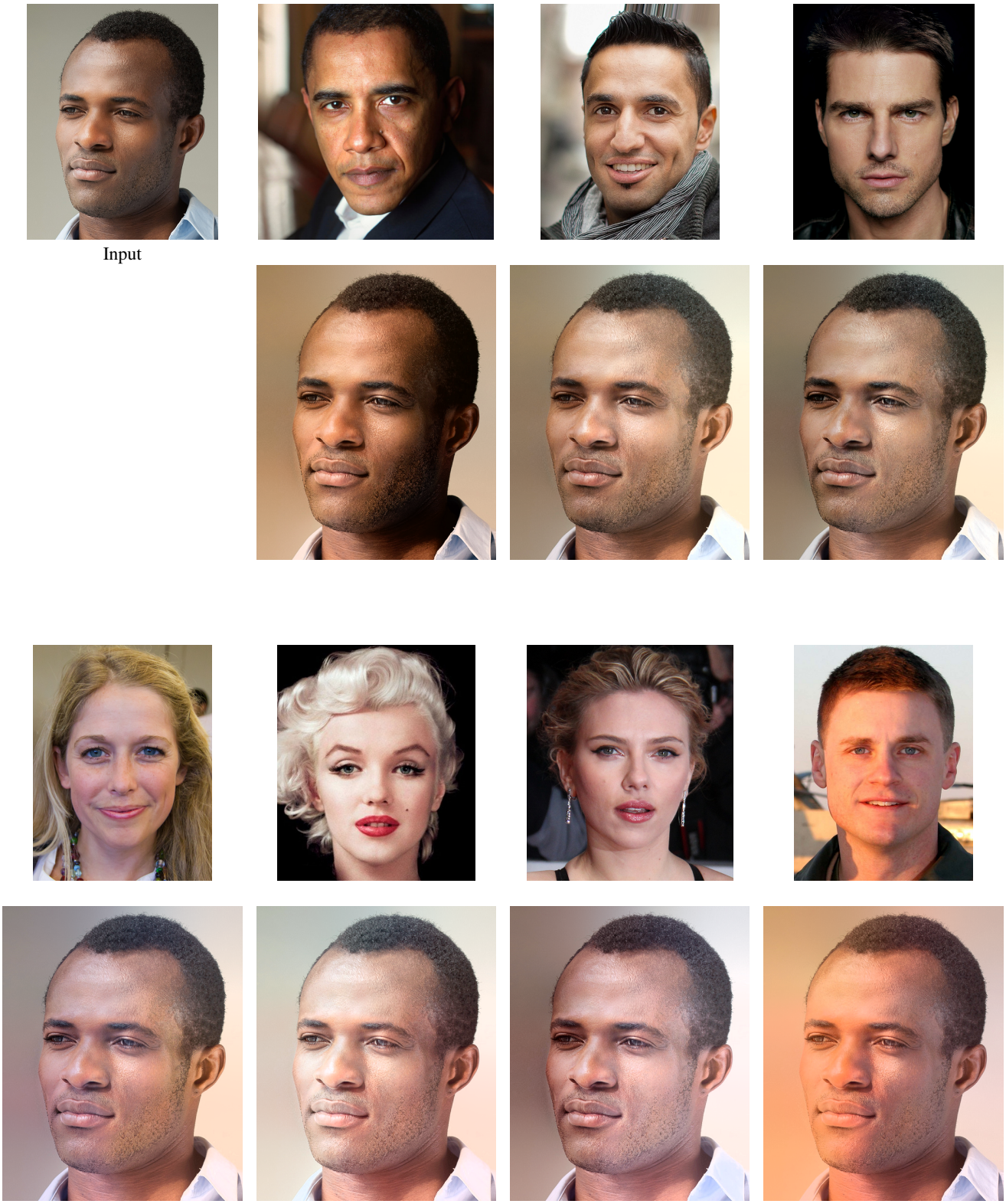


Figure 7: *Results of our portrait relighting technique.*

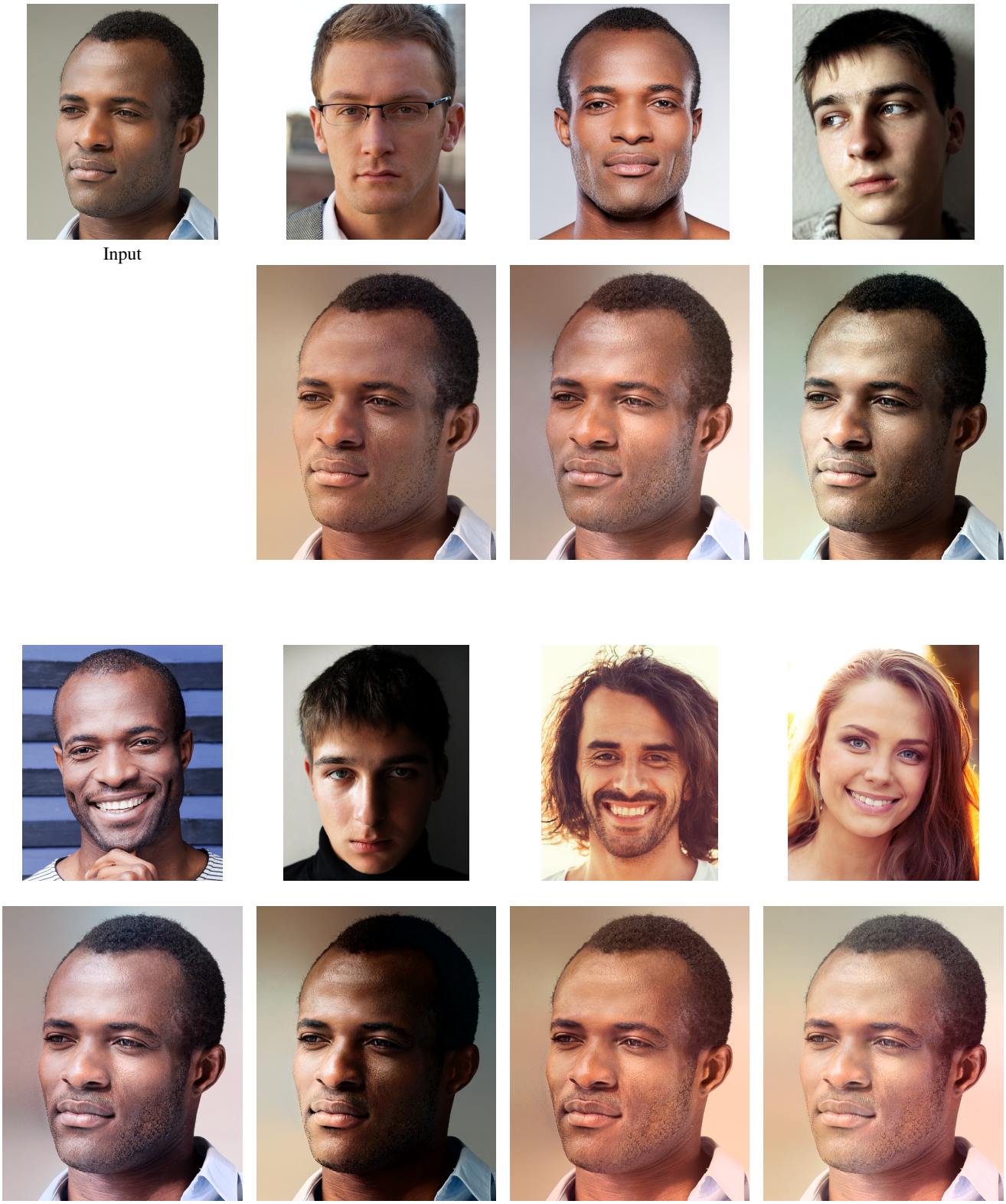


Figure 8: *Results of our portrait relighting technique.*

Figure 9: *Results of our portrait relighting technique.*

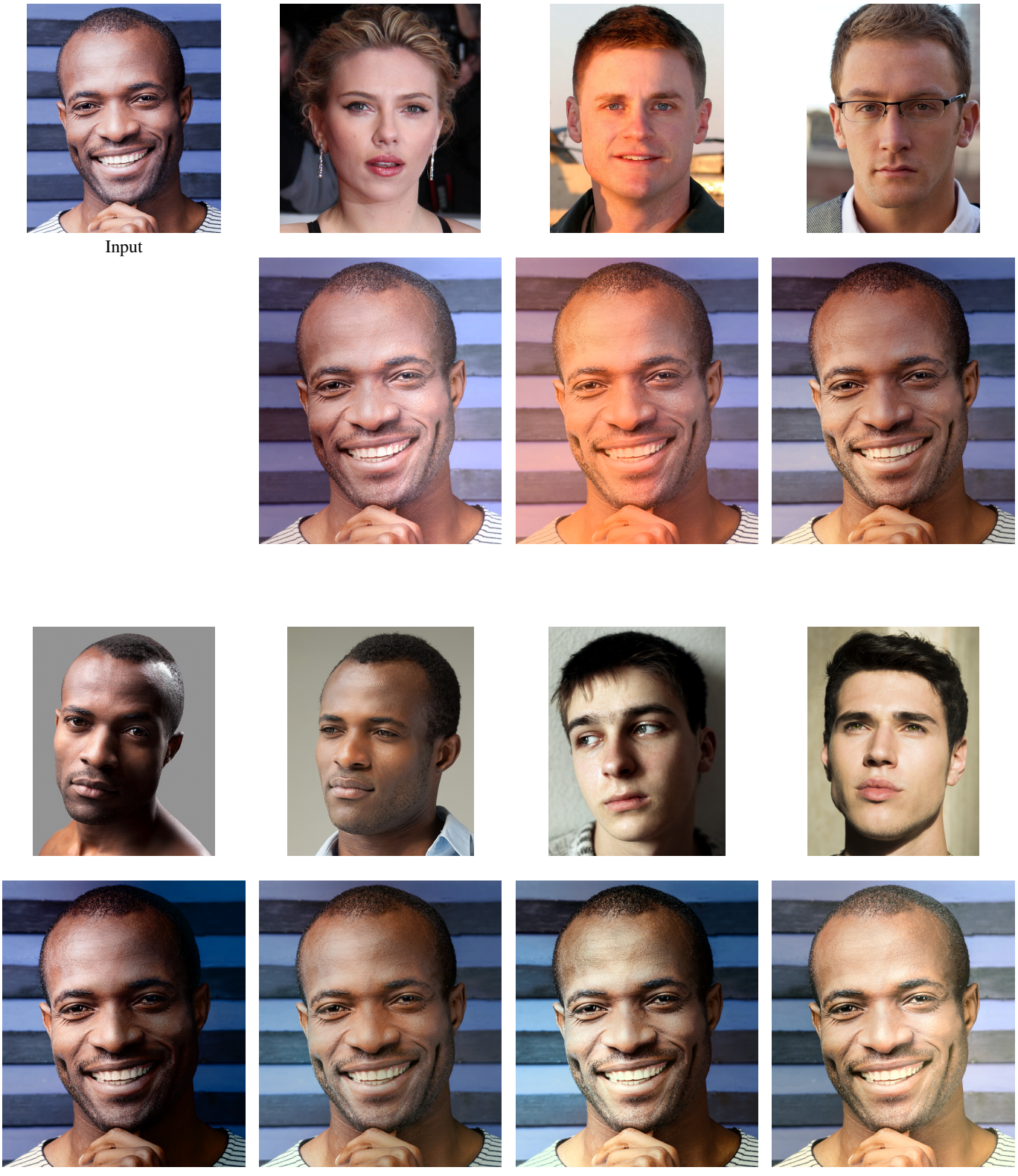


Figure 10: *Results of our portrait relighting technique.*

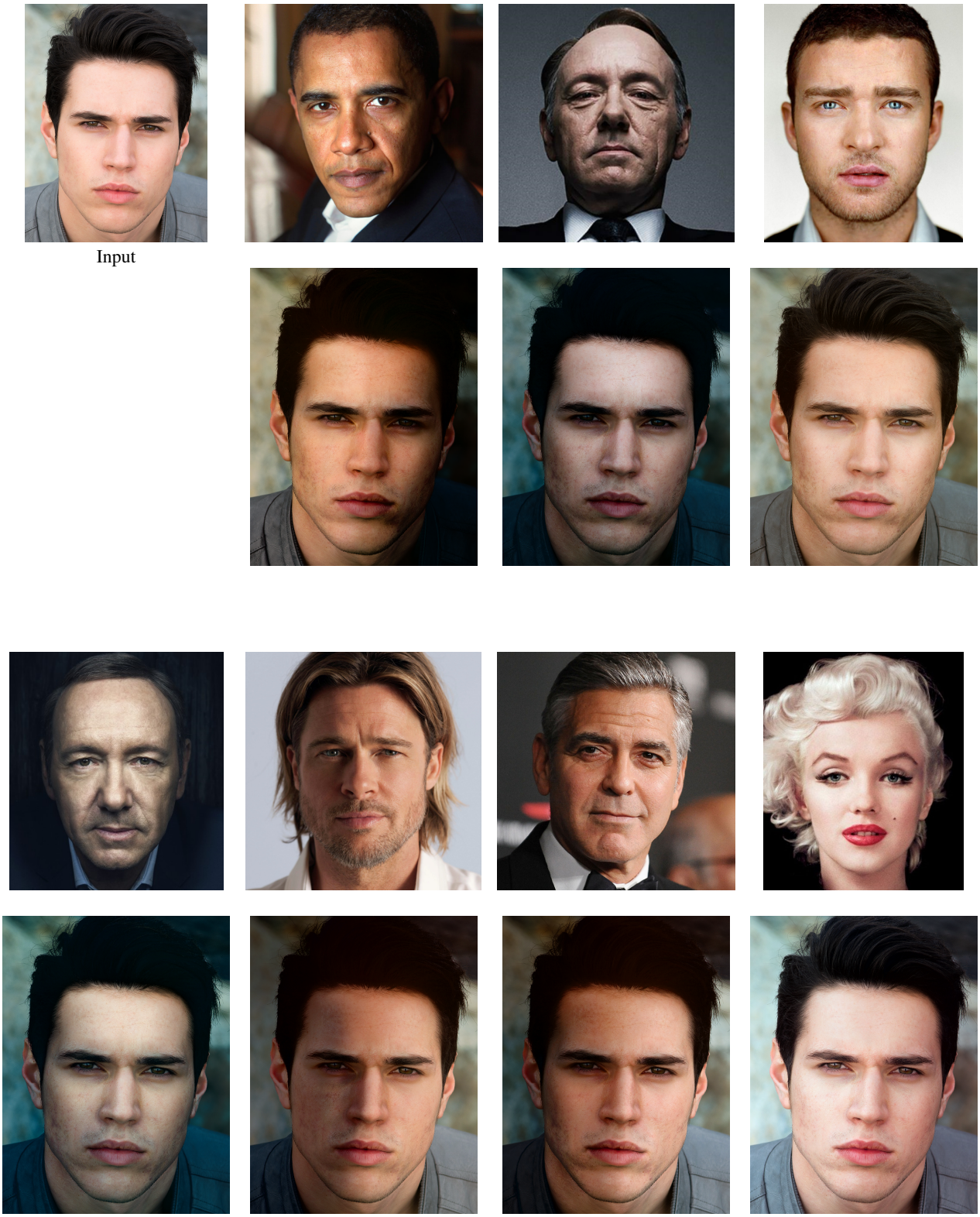


Figure 11: *Results of our portrait relighting technique.*

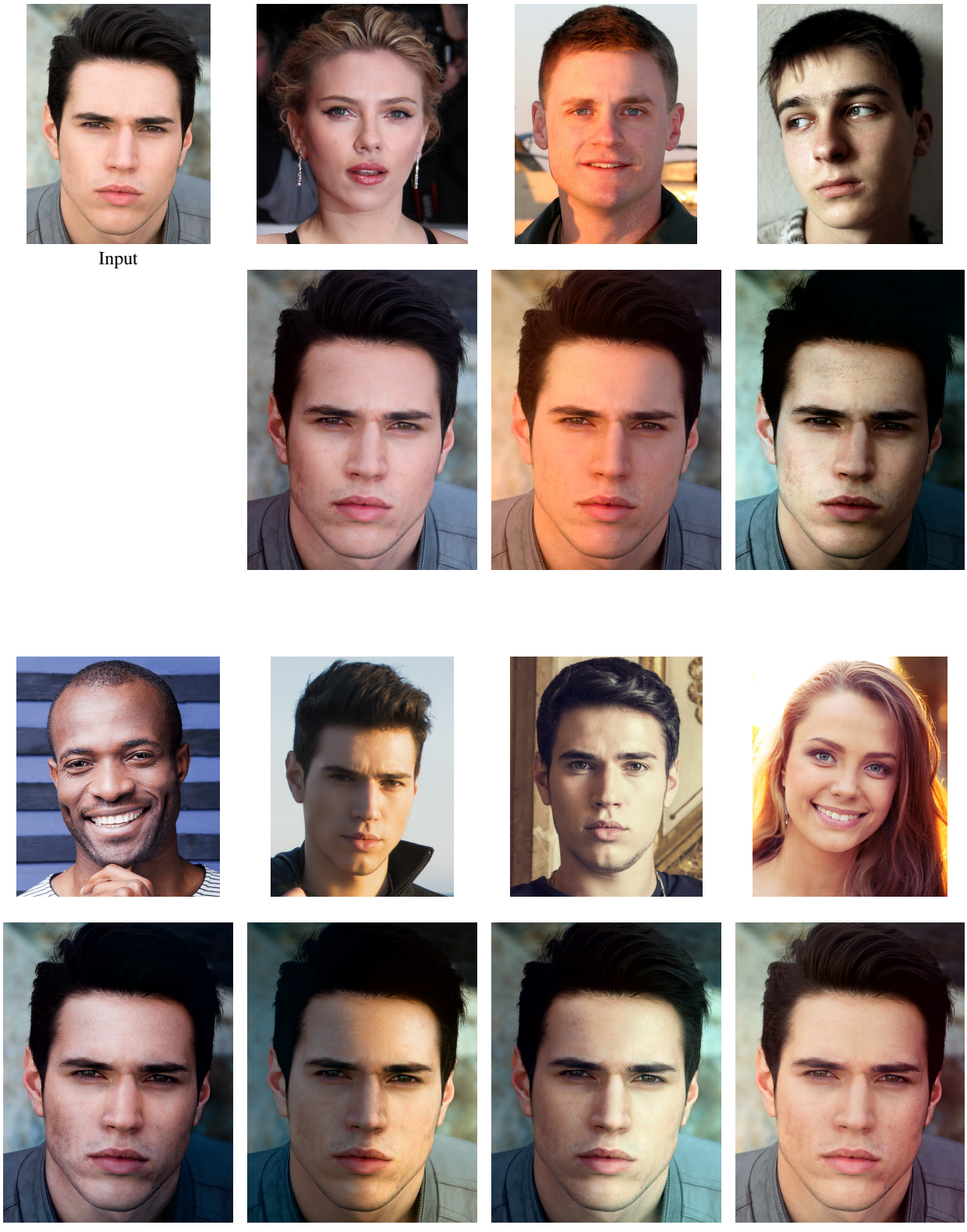


Figure 12: *Results of our portrait relighting technique.*

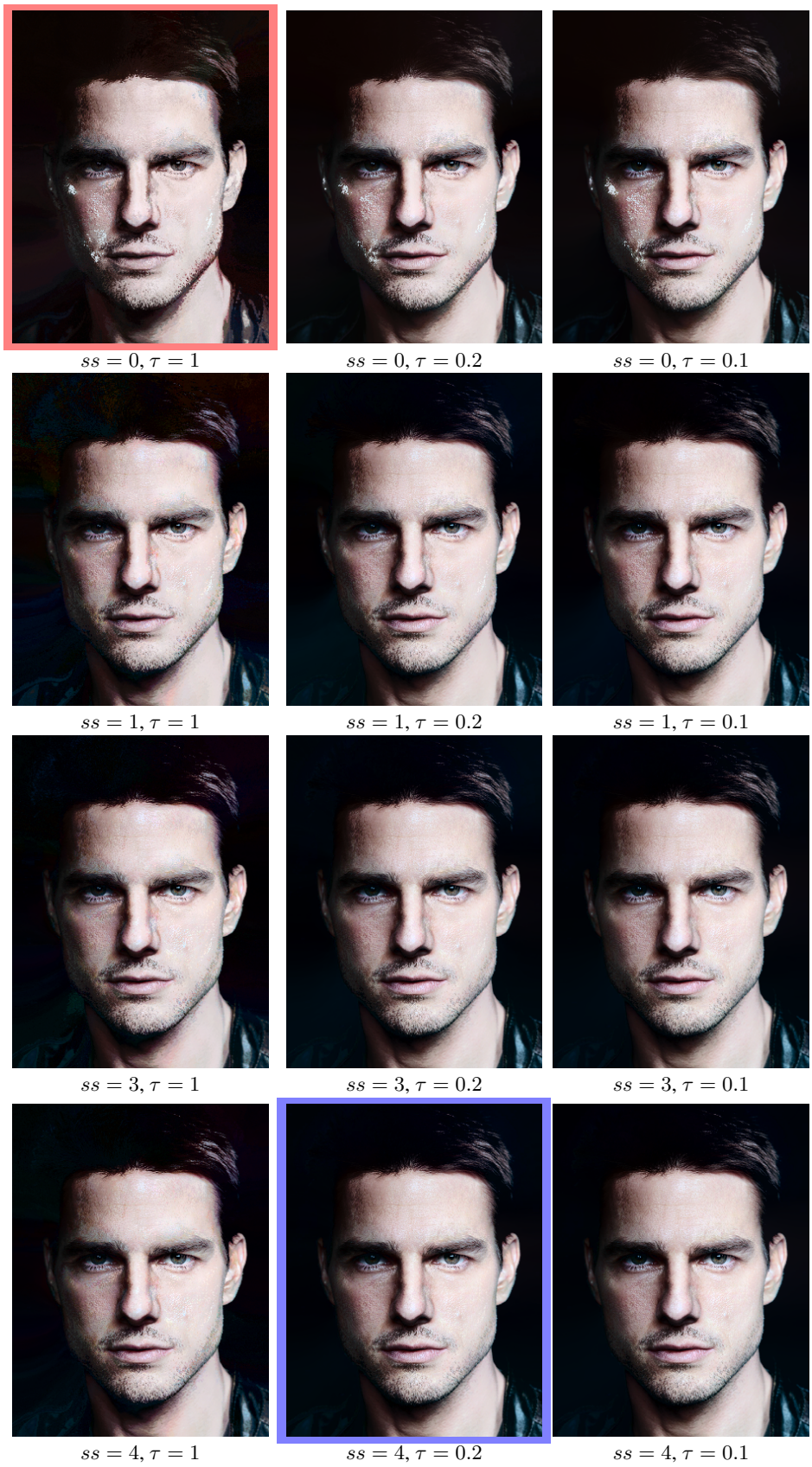


Figure 13: *Visual differences of results by varying amount of stochastic sampling (ss) and update rate (τ) (with sufficient amount of iterations). The case where $ss = 0$ and $\tau = 1$ (red box) represents the result using algorithm from [Pitie et al. 2005]. The case where $ss = 4$ and $\tau = 0.2$ (blue box) is our result.*

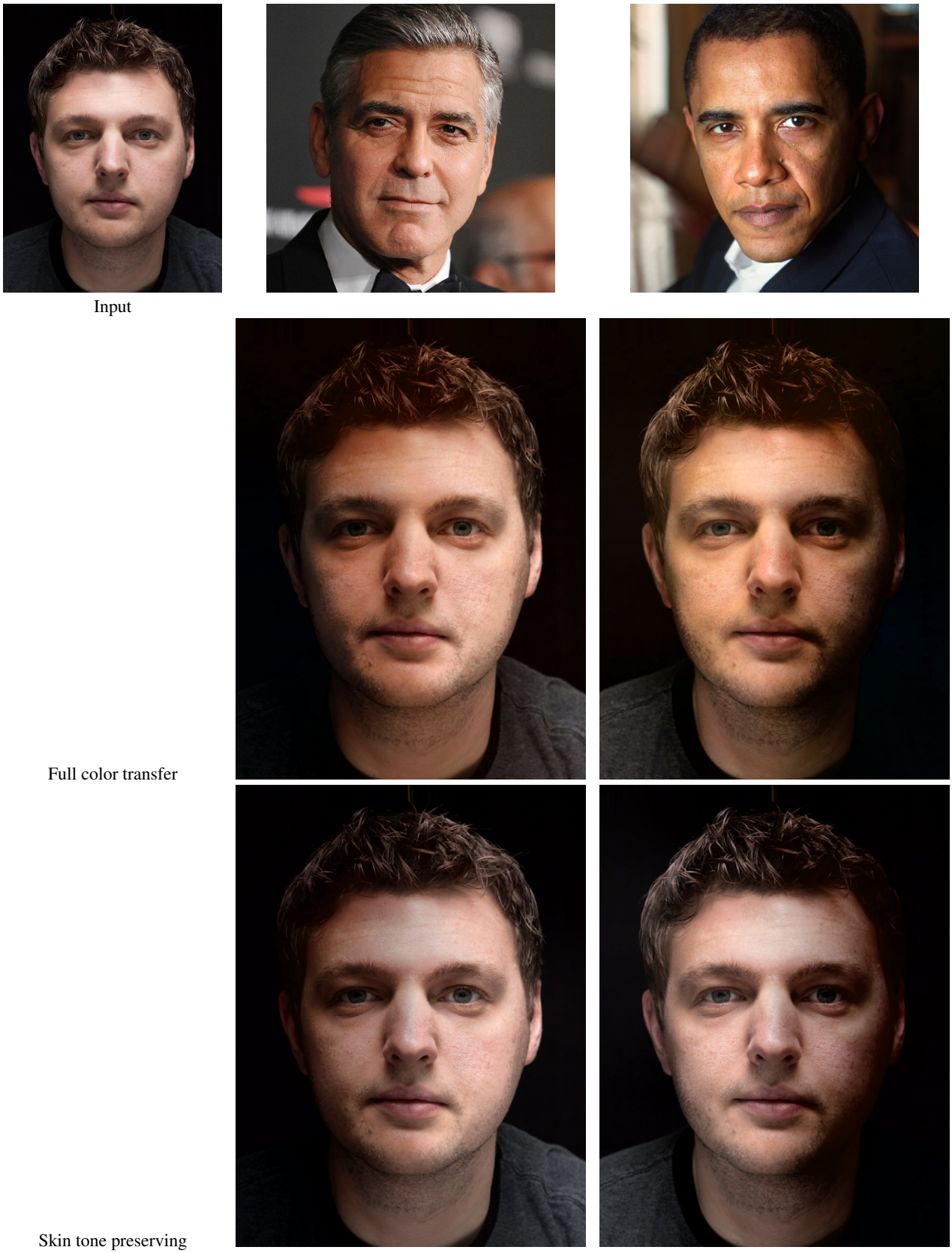
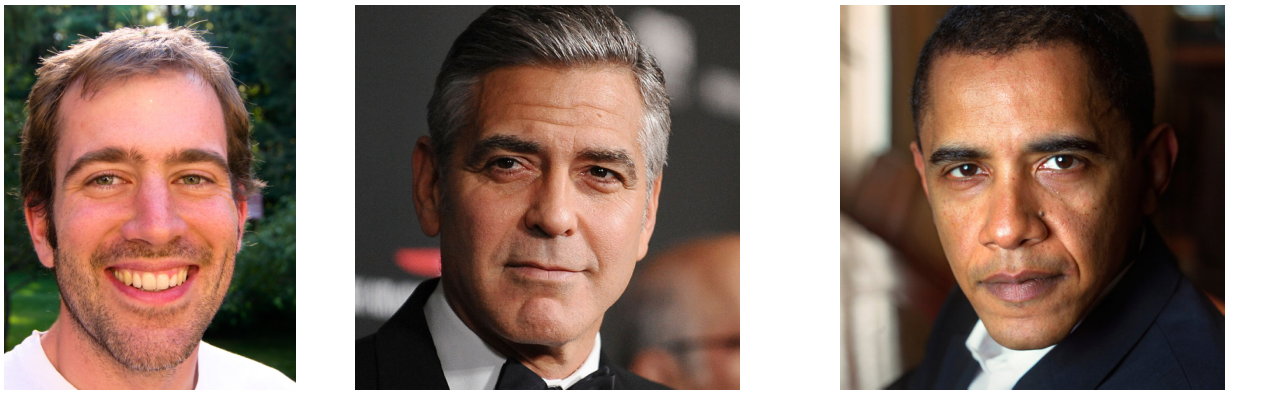


Figure 14: *Full color transfer and skin tone preserving transfer.*

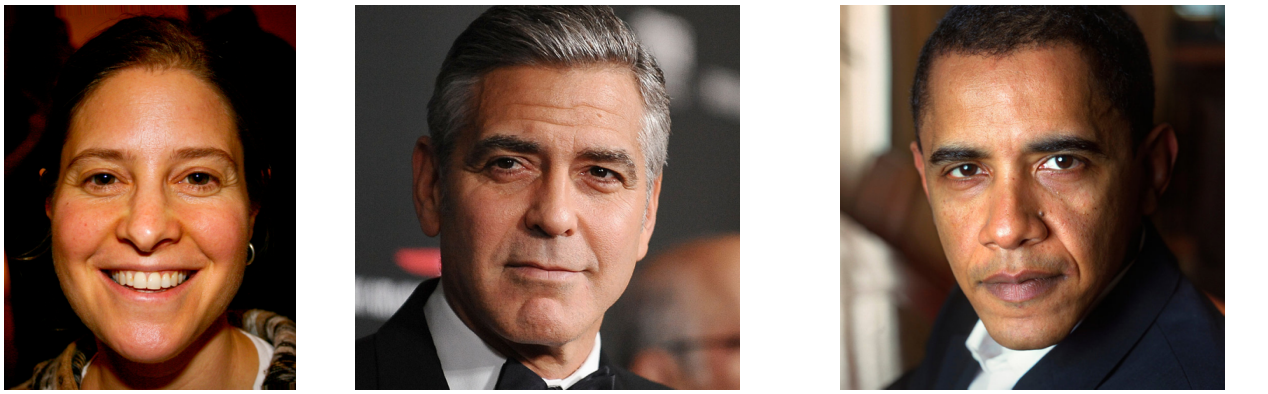


Input

Full color transfer

Skin tone preserving

Figure 15: *Full color transfer and skin tone preserving transfer.*

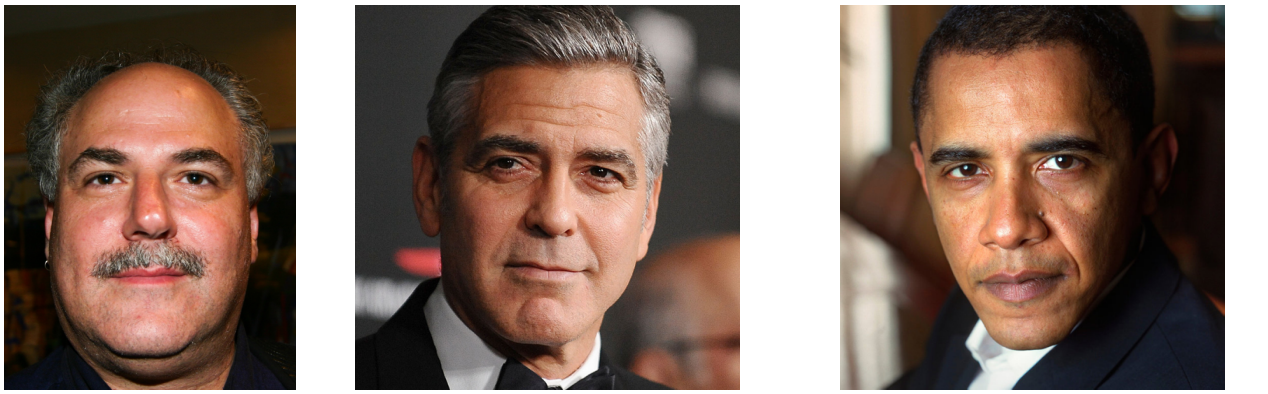


Input

Full color transfer

Skin tone preserving

Figure 16: *Full color transfer and skin tone preserving transfer.*



Input

Full color transfer

Skin tone preserving

Figure 17: *Full color transfer and skin tone preserving transfer.*

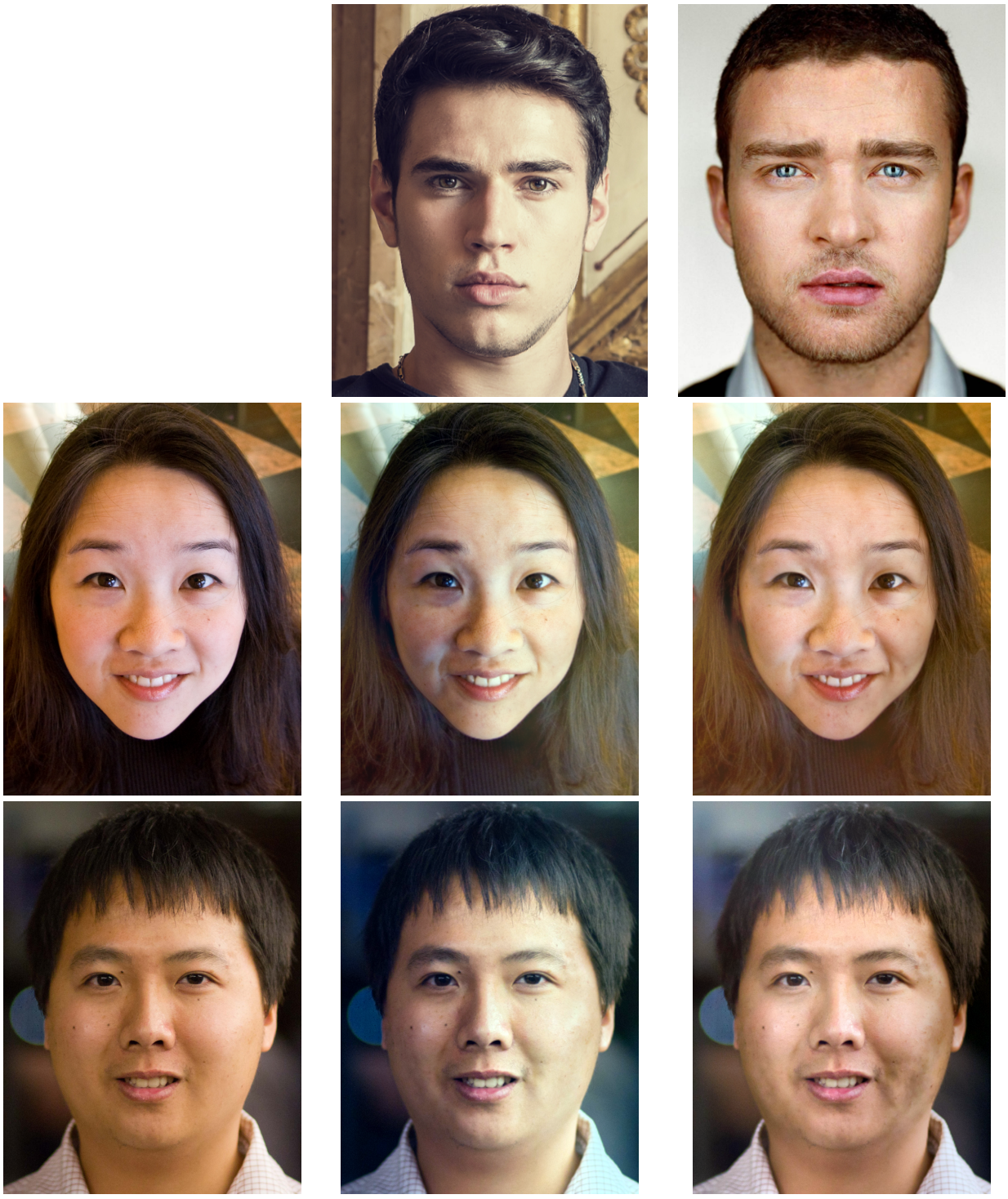
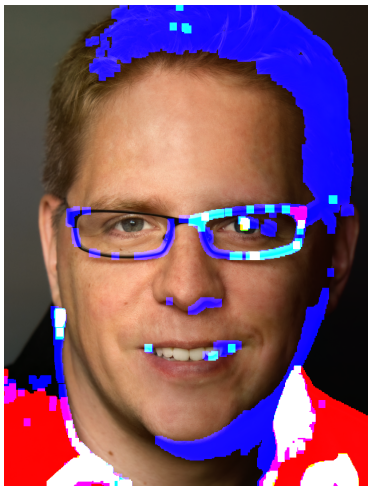


Figure 18: *Portrait Lighting Transfer to Different Ethnicity.*

Figure 19: *Portrait Lighting Transfer to Different Ethnicity.*

(a) input

(b) reference



(c) using multiplicative residual

(d) using multiplicative residual with offset

(e) using additive residual (ours)

(f) zoom-in of (d)

(g) zoom-in of (e)

Figure 20: *Two-scale manipulation using different types of residual. Operating on log-space, i.e., using multiplicative residual for relighting, suffers from numerical instability (a). By adding a small value offset while computing the logarithm of image will significantly reduce the noise (d). However, small artifacts often exist in the result (d,f). While using additive residual in the two-scale manipulation pipeline, we can faithfully transfer the illumination with no artifact observed (e,g).*

References

PITIE, F., KOKARAM, A., AND DAHYOT, R. 2005. N-dimensional probability density function transfer and its application to color transfer. In *ICCV 2005.*, vol. 2, 1434–1439.