

Relighting Neural Radiance Fields with Shadow and Highlight Hints

Chong Zeng*
State Key Lab of CAD and CG,
Zhejiang University
Hangzhou, China
chongzeng2000@gmail.com

Guojun Chen
Microsoft Research Asia
Beijing, China
guoch@microsoft.com

Yue Dong
Microsoft Research Asia
Beijing, China
yuedong@microsoft.com

Pieter Peers
College of William & Mary
Williamsburg, USA
ppeers@siggraph.org

Hongzhi Wu
State Key Lab of CAD and CG,
Zhejiang University
Hangzhou, China
hwu@acm.org

Xin Tong
Microsoft Research Asia
Beijing, China
xtong@microsoft.com

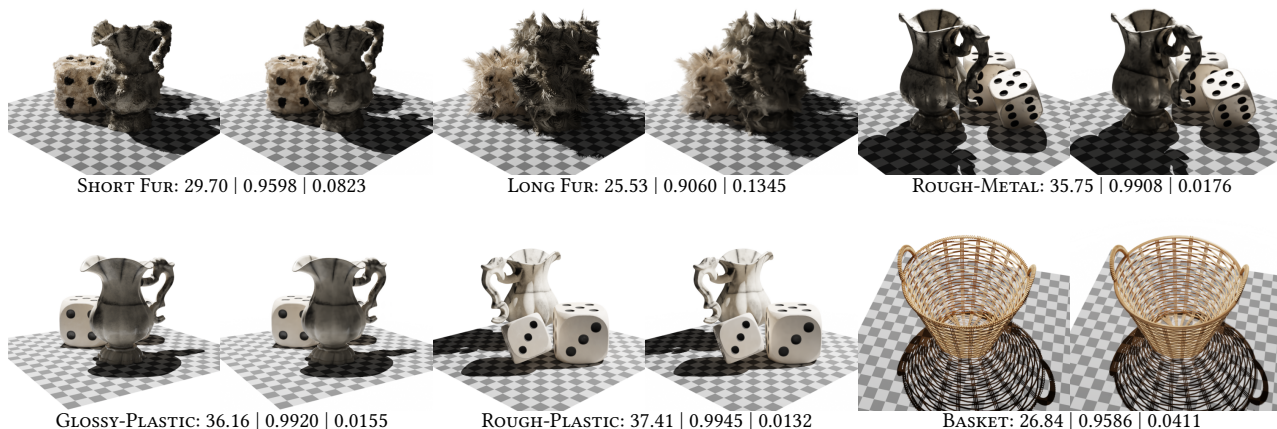


Figure 1: Qualitative comparison between additional synthetic scenes relit (right) for a novel viewpoint and novel lighting direction (not part of the training data) and a rendered reference image (left). For each example we list average PSNR, SSIM, and LPIPS computed over a uniform sampling of view and light positions.

ACM Reference Format:

Chong Zeng, Guojun Chen, Yue Dong, Pieter Peers, Hongzhi Wu, and Xin Tong. 2023. Relighting Neural Radiance Fields with Shadow and Highlight Hints. In *Special Interest Group on Computer Graphics and Interactive Techniques Conference Conference Proceedings (SIGGRAPH '23 Conference Proceedings)*, August 6–10, 2023, Los Angeles, CA, USA. ACM, New York, NY, USA, 2 pages. <https://doi.org/10.1145/3588432.3591482>

*Work done during internship at Microsoft Research Asia.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than the author(s) must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from permissions@acm.org.
SIGGRAPH '23 Conference Proceedings, August 6–10, 2023, Los Angeles, CA, USA
© 2023 Copyright held by the owner/author(s). Publication rights licensed to ACM.
ACM ISBN 979-8-4007-0159-7/23/08...\$15.00
<https://doi.org/10.1145/3588432.3591482>

1 ADDITIONAL RESULTS

Figure 1 shows additional synthetic results to further test our method on scenes with different material properties. The BASKET scene is included in the ablation study figures, but not listed in Figure 3 (of the main paper); we include it here for completeness.

2 NETWORK ARCHITECTURE DETAILS

We follow exactly the same architecture as NeuS [Wang et al. 2021] for the density MLP: 8 hidden layers with 256 nodes using a Softplus activation and a skip connection between the input and the 4th layer. The input (i.e., current position along a ray) is augmented using a frequency encoding with 6 bands. The relightable radiance network has a similar network architecture as NeuS' color MLP: 4 hidden layers with 256 nodes using a ReLU activation. The final color is outputted after a Sigmoid activation, ensuring that the output color is within the $(-1, 1)$ range. Figure 2 details network architecture of our method.

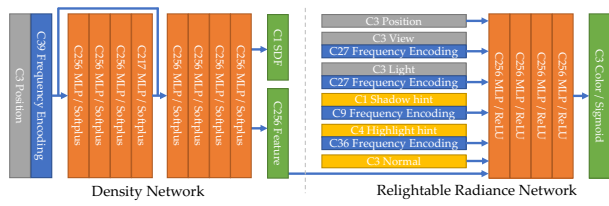


Figure 2: Detailed network architecture of the density and relightable radiance network. The number of output channels and activations are also marked.

REFERENCES

Peng Wang, Lingjie Liu, Yuan Liu, Christian Theobalt, Taku Komura, and Wenping Wang. 2021. NeuS: Learning Neural Implicit Surfaces by Volume Rendering for Multi-view Reconstruction. *NeurIPS* (2021).