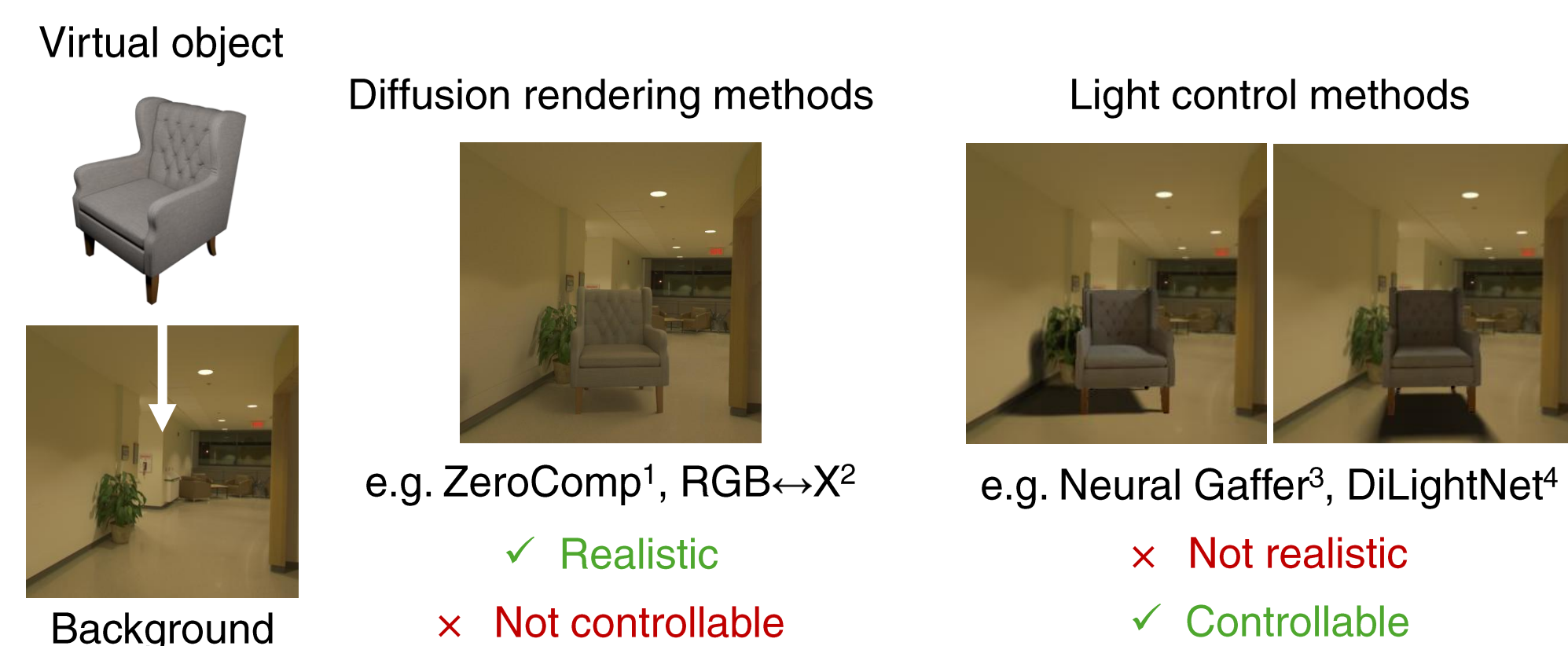


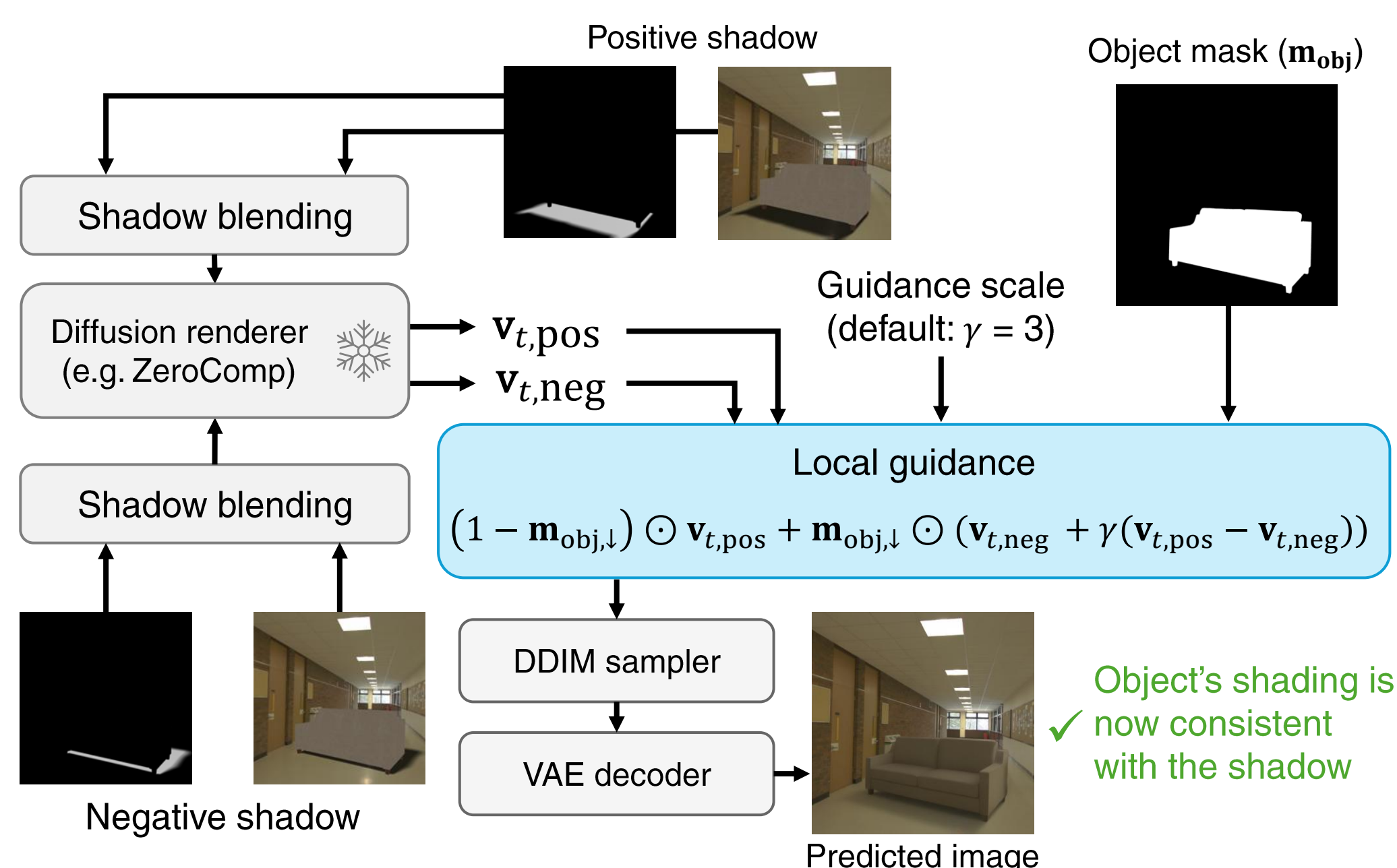


**TLDR: Precise lighting control can be achieved simply by drawing shadows, without training**

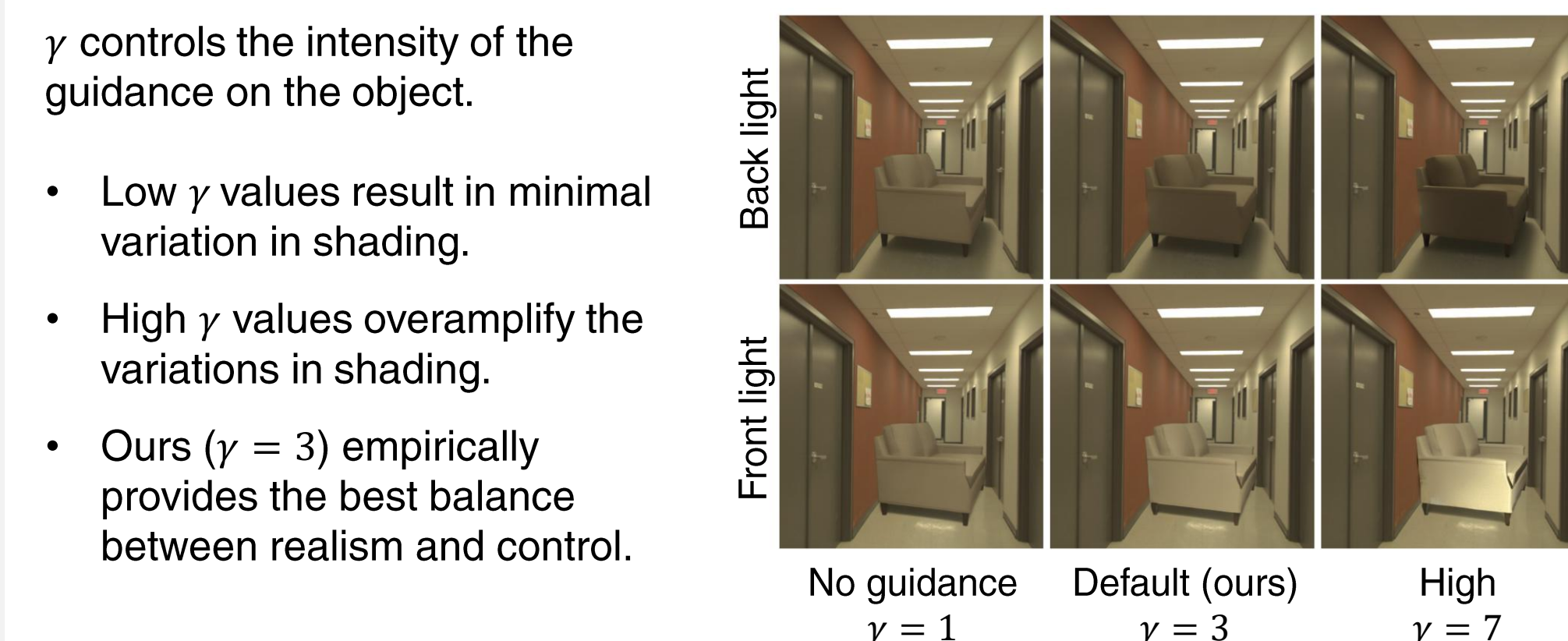
## Goal: object compositing with lighting control



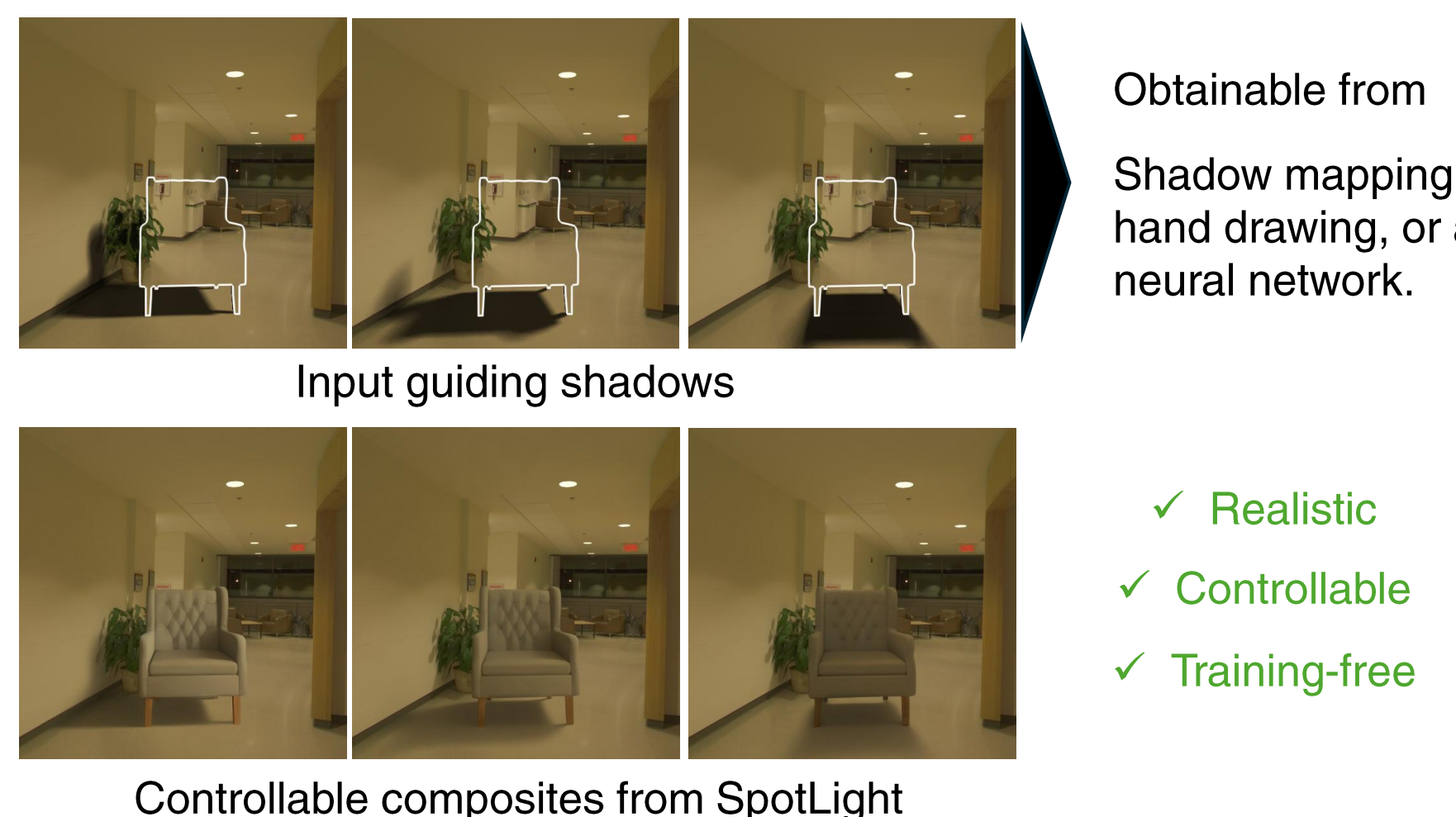
## Enhancing light control on the object



## Effect of varying the local guidance scale



## SpotLight enables shadow-guided light control



## Evaluation on 3D object compositing

We start with the ZeroComp benchmark (real backgrounds & 3D inserted objects).

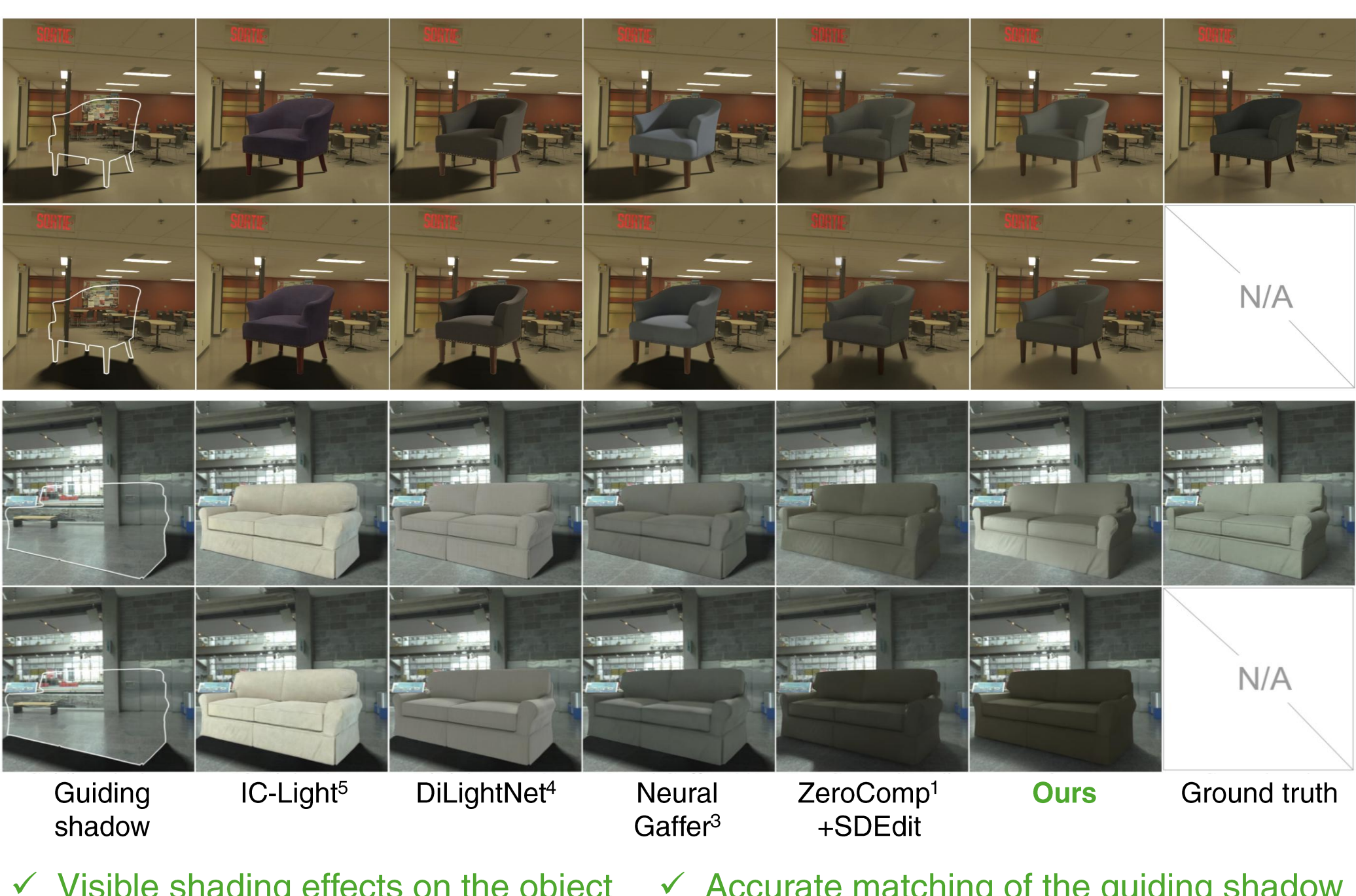
- We estimate the background geometry to obtain shadow catchers.
- We obtain the guiding shadows from a point light source.
- Our benchmark consists 210 different scenes, with 9 light configurations each.

### Reference-based scenario

The light is placed at the ground truth dominant light source's position (1<sup>st</sup> and 3<sup>rd</sup> row).

### User-controlled scenario

The light is placed at 8 different lighting directions around the object (2<sup>nd</sup> and 4<sup>th</sup> row).

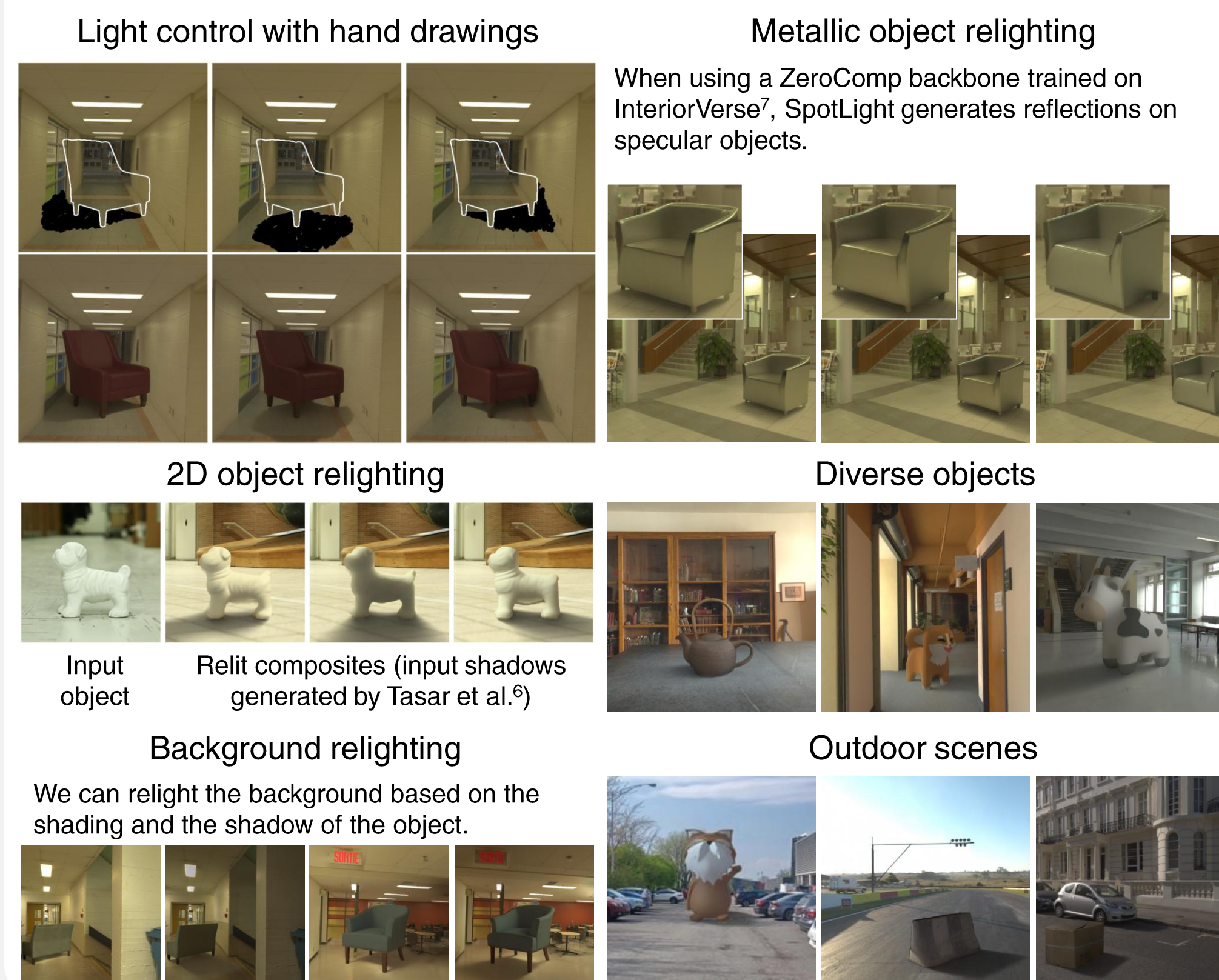


## Quantitative results

Our method outperforms baselines on standard metrics and is preferred by users in our user studies on realism (N=35) and controllability (N=8).

Method	PSNR	SSIM	LPIPS	Realism (user study)	Control (user study)
<i>Light-conditioned methods</i>					
DiLightNet <sup>4</sup>	24.67	0.948	0.042	N/A	N/A
Neural Gaffer <sup>3</sup>	28.44	0.963	0.038	- 0.28	N/A
<i>Shadow-conditioned methods</i>					
IC-Light <sup>5</sup>	26.87	0.959	0.040	- 0.84	N/A
ZeroComp <sup>1</sup> +SDEdit	26.00	0.938	0.079	0.47	- 2.42
<b>SpotLight</b>	<b>30.68</b>	<b>0.974</b>	<b>0.030</b>	<b>0.65</b>	<b>2.42</b>

## Applications



## Injecting lighting in diffusion renderers

