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CVPR



Seeing Through the Glass: Neural 3D Reconstruction of Object Inside a Transparent Container

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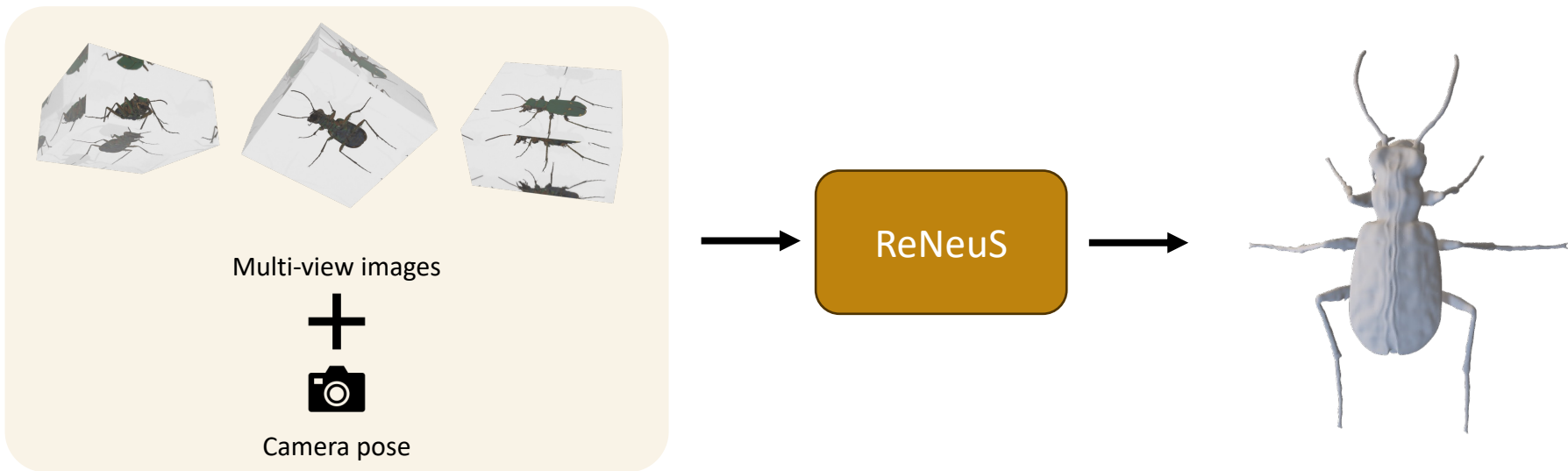
Poster: WED-PM-020

Code: <https://github.com/hirotong/ReNeuS>

Paper: <https://arxiv.org/abs/2303.13805>

Overview

- New task: 3D reconstruction of the object inside a transparent container
- New method: ReNeuS



Motivation

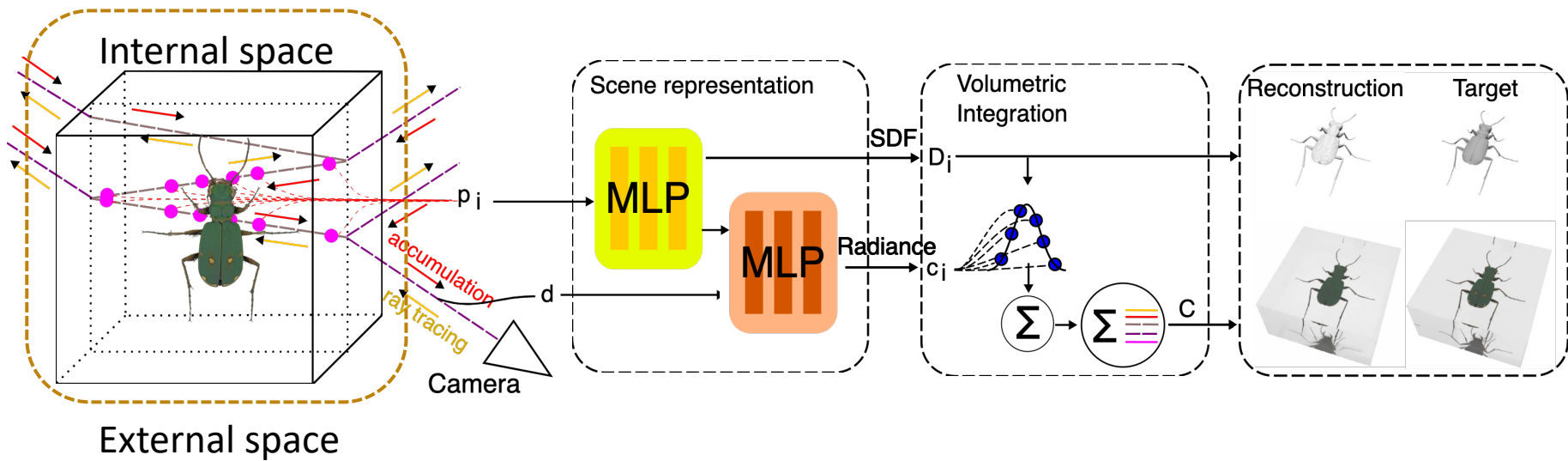


Assumption

- ✓ Known geometry and pose of the transparent block.
- ✓ Homogeneous background and ambient lighting.



Method



Dataset

Dataset	Sync	Real
N_{object}	13	10
N_{view}	60	60

Synthetic



Real



Experiment

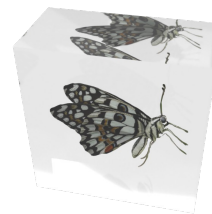
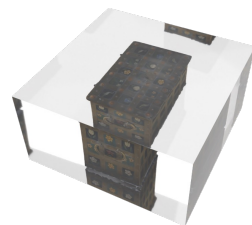
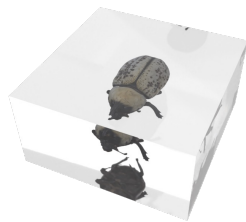
Items	w/o box				w/ box			
	COLMAP $_{\xi=0}$	COLMAP $_{\xi=7}$	IDR	NeuS	COLMAP $_{\xi=0}$	COLMAP $_{\xi=7}$	NeuS	ReNeuS
beetle	1.10	3.67	0.76	2.42	15.48	17.55	27.40	1.40
box	4.09	5.28	0.51	3.76	35.38	14.15	15.43	2.29
butterfly	6.10	1.15	0.78	9.98	12.44	18.82	19.85	1.15
coral	4.93	11.23	1.68	2.11	142	17.32	21.18	8.78
coral2	1.81	2.75	1.66	1.42	21.38	29.25	20.75	2.44
dinosaur	2.22	1.18	0.82	2.80	28.15	36.33	15.46	1.47
goku	2.21	2.13	0.81	1.37	22.48	11.09	17.23	1.48
insect	2.56	0.96	0.62	5.89	45.78	35.88	21.71	1.10
insect2	1.34	1.15	0.76	4.07	15.34	18.65	22.11	1.30
lobster	13.27	12.20	17.17	12.97	40.52	26.72	14.61	11.08
shiba	2.33	17.73	2.24	2.22	24.30	13.92	20.30	3.38
statuette	0.85	0.92	0.87	0.79	61.74	22.16	25.44	2.26
vase	1.37	1.30	1.31	1.35	15.02	15.06	24.68	3.68
mean	3.22	4.47	2.28	3.72	35.86	20.83	20.59	3.19

Table 1. Qualitative evaluation on the synthetic dataset.

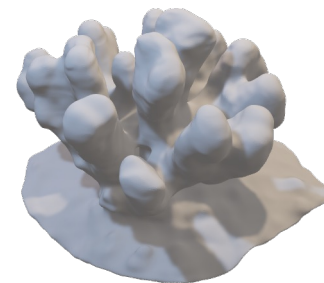
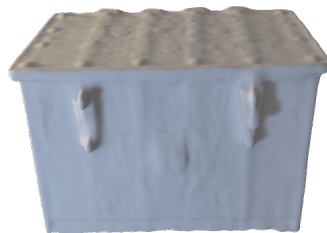


Experiment

Reference



Mesh

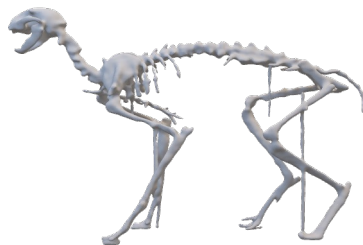


Experiment

Reference



Mesh



Thank you!

