Taming 3DGS: Supplemental Material

1 PER-SCENE ABLATION RESULTS

The following tables (1–4) show the impact of adjusting budgets on quality for all datasets individually. Tables 5 and 6 show the impact of removing the individual components of our cost function on all scenes.

Table 1: Quality changes with budget for Tanks&Temples

	SSIM	PSNR	LPIPS	Count (M)
truck	0.87	25.57	0.17	0.52
	0.88	25.78	0.15	1.03
	0.88	25.79	0.15	1.55
	0.88	25.82	0.14	2.07
	0.89	25.9	0.13	2.58
train	0.78	22.01	0.27	0.22
	0.8	22.12	0.24	0.43
	0.81	22.28	0.23	0.65
	0.81	22.27	0.22	0.87
	0.81	22.23	0.21	1.09

Table 2: Changes with budget for MipNeRF-360 *outdoor*

	SSIM	PSNR	LPIPS	Count (M)
bicycle	0.73	25.02	0.28	1.2
	0.76	25.21	0.24	2.39
	0.77	25.43	0.21	3.59
	0.78	25.41	0.2	4.79
	0.78	25.47	0.2	5.99
flowers	0.57	21.29	0.39	0.72
	0.59	21.59	0.36	1.45
	0.6	21.67	0.35	2.17
	0.61	21.74	0.34	2.89
	0.61	21.76	0.34	3.62
garden	0.84	27.13	0.15	1.15
	0.86	27.41	0.12	2.29
	0.87	27.53	0.11	3.44
	0.87	27.61	0.1	4.54
	0.87	27.64	0.1	5.07
stump	0.76	26.53	0.26	0.97
	0.77	26.84	0.23	1.95
	0.78	26.9	0.21	2.92
	0.78	26.98	0.2	3.89
	0.78	26.96	0.2	4.87
treehill	0.62	22.96	0.39	0.75
	0.64	22.97	0.35	1.51
	0.64	23	0.34	2.26
	0.64	23.06	0.32	3.02
	0.65	23.09	0.31	3.77

Table 3: Changes with budget for Deep Blending scenes

	SSIM	PSNR	LPIPS	Count (M)
drjohnson	0.9	29.56	0.26	0.65
	0.91	29.79	0.25	1.31
	0.91	29.73	0.24	1.96
	0.91	29.72	0.24	2.62
	0.91	29.68	0.24	3.27
playroom	0.9	30.32	0.26	0.47
	0.91	30.26	0.25	0.93
	0.91	30.56	0.24	1.4
	0.91	30.02	0.24	1.86
	0.91	30.44	0.24	2.33

Table 4: Changes with budget for MipNeRF-360 *indoor*

	SSIM	PSNR	LPIPS	Count (M)
bonsai	0.93	31.14	0.24	0.25
	0.94	31.93	0.22	0.5
	0.94	32	0.21	0.75
	0.94	32.13	0.21	1
	0.94	32.22	0.2	1.19
counter	0.89	28.46	0.23	0.24
	0.9	28.78	0.21	0.48
	0.9	28.92	0.21	0.71
	0.91	28.93	0.2	0.95
	0.91	29.03	0.2	1.19
kitchen	0.92	30.92	0.15	0.36
	0.92	31.46	0.13	0.72
	0.93	31.68	0.13	1.08
	0.93	31.74	0.12	1.44
	0.93	31.74	0.12	1.61
room	0.91	31.65	0.24	0.31
	0.92	31.9	0.23	0.62
	0.92	31.97	0.22	0.93
	0.92	32.07	0.22	1.24
	0.92	32.12	0.21	1.55

2 COMPARISON WITH CONCURRENT WORK

Fig. 1 shows qualitative comparison of outputs generated by our methods with concurrent work on reducing the number of Gaussians [Fang and Wang 2024; Papantonakis et al. 2024].

REFERENCES

Guangchi Fang and Bing Wang. 2024. Mini-Splatting: Representing Scenes with a Constrained Number of Gaussians. In *Proceedings of the European Conference on Computer Vision (ECCV)*. arXiv:2403.14166 [cs.CV]

Panagiotis Papantonakis, Georgios Kopanas, Bernhard Kerbl, Alexandre Lanvin, and George Drettakis. 2024. Reducing the Memory Footprint of 3D Gaussian Splatting. *Proceedings of the ACM on Computer Graphics and Interactive Techniques* 7, 1 (May 2024). https://repo-sam.inria.fr/fungraph/reduced_3dgs/

Table 5: Ablation of individual terms in scoring function for all scenes.

scene	ours	blending weights	pixel coverage	depth	pixel distance	laplacian filter	positional gradients	saliency	L1	opacity	scale
bicycle	24.97	22.89	22.94	22.99	22.9	22.93	22.93	22.95	22.97	22.94	22.94
bonsai	31.8	30.97	30.94	30.94	30.96	30.87	30.91	30.95	31.01	30.94	30.93
counter	28.59	27.77	27.76	27.81	27.77	27.81	27.76	27.77	27.78	27.78	27.79
flowers	21.18	19.43	19.46	19.44	19.44	19.45	19.47	19.47	19.46	19.46	19.44
garden	27.45	25.1	25.08	25.12	25.1	25.08	25.07	25.09	25.09	25.1	25.09
kitchen	31.14	30.28	30.36	30.38	30.41	30.24	30.4	30.37	30.31	30.35	29.94
room	31.39	30.68	30.59	30.71	30.64	30.7	30.67	30.7	30.5	30.72	30.46
stump	26.04	23.49	23.61	23.61	23.55	23.59	23.61	23.58	23.59	23.55	24.04
treehill	23.04	21.83	21.8	21.95	21.98	21.96	21.95	21.86	21.97	21.96	21.96
truck	25.37	24.59	24.58	24.6	24.59	24.59	24.58	24.55	24.59	24.56	24.46
train	22.36	21.83	21.8	21.95	21.98	21.96	21.95	21.86	21.97	21.96	21.96
drjohnson	29.56	28.53	28.62	28.5	28.64	28.66	28.56	28.61	28.66	28.53	28.49
playroom	30.4	28.9	29.17	28.94	28.94	28.69	29.15	29.47	29.48	29.21	29.35

Table 6: Same experiment as Table 5, but each cell shows the difference in dB from *Ours*.

Scene	blending weights	coverage	depth	pixel distance	Laplacian filter	pos. gradients	saliency	L1	opacity	scale
bicycle	-2.08	-2.03	-1.98	-2.07	-2.04	-2.04	-2.02	-2.00	-2.03	-2.03
bonsai	-0.83	-0.86	-0.86	-0.84	-0.93	-0.89	-0.85	-0.79	-0.86	-0.87
counter	-0.82	-0.83	-0.78	-0.82	-0.78	-0.83	-0.82	-0.81	-0.81	-0.8
flowers	-1.75	-1.72	-1.74	-1.74	-1.73	-1.71	-1.71	-1.72	-1.72	-1.74
garden	-2.35	-2.37	-2.33	-2.35	-2.37	-2.38	-2.36	-2.36	-2.35	-2.36
kitchen	-0.86	-0.78	-0.76	-0.73	-0.9	-0.74	-0.77	-0.83	-0.79	-1.2
room	-0.71	-0.8	-0.68	-0.75	-0.69	-0.72	-0.69	-0.89	-0.67	-0.93
stump	-2.55	-2.43	-2.43	-2.49	-2.45	-2.43	-2.46	-2.45	-2.49	-2
treehill	-1.21	-1.24	-1.09	-1.06	-1.08	-1.09	-1.18	-1.07	-1.08	-1.08
truck	-0.78	-0.79	-0.77	-0.78	-0.78	-0.79	-0.82	-0.78	-0.81	-0.91
train	-0.53	-0.56	-0.41	-0.38	-0.4	-0.41	-0.5	-0.39	-0.4	-0.4
drjohnson	-1.03	-0.94	-1.06	-0.92	-0.9	-1	-0.95	-0.9	-1.03	-1.07
playroom	-1.5	-1.23	-1.46	-1.46	-1.71	-1.25	-0.93	-0.92	-1.19	-1.05

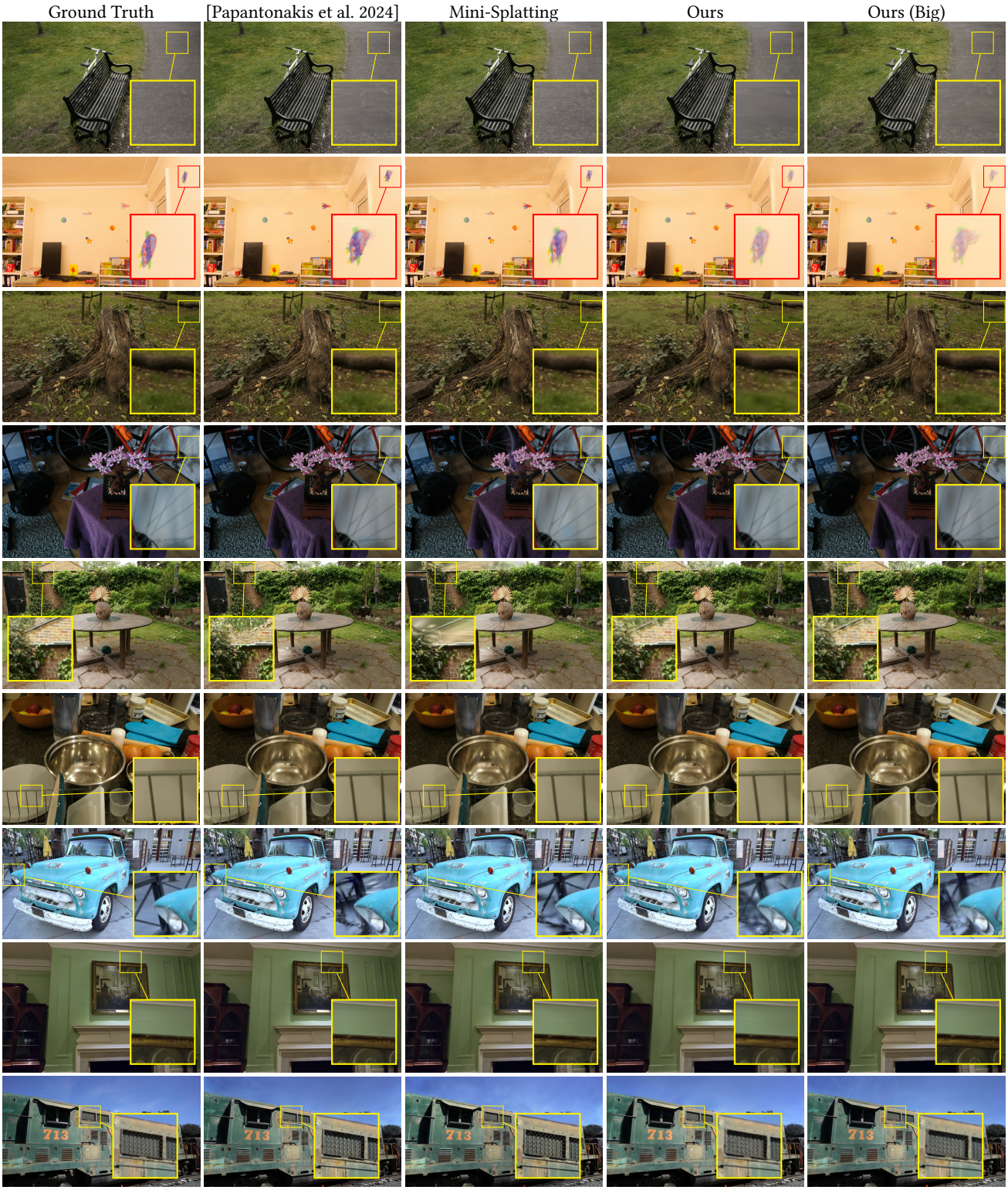

Figure 1: Qualitative comparison of results of our method in two budgeted scenarios and concurrent work [Fang and Wang 2024; Papantonakis et al. 2024]. Mini-Splatting can occasionally produce crisper detail in the background (BICYCLE, STUMP), but can also lead to spurious artifacts and undersampling (BONSAI, GARDEN). Overall, our budgeted method yields quality that is on par with concurrent methods, while being fully controllable and significantly faster.