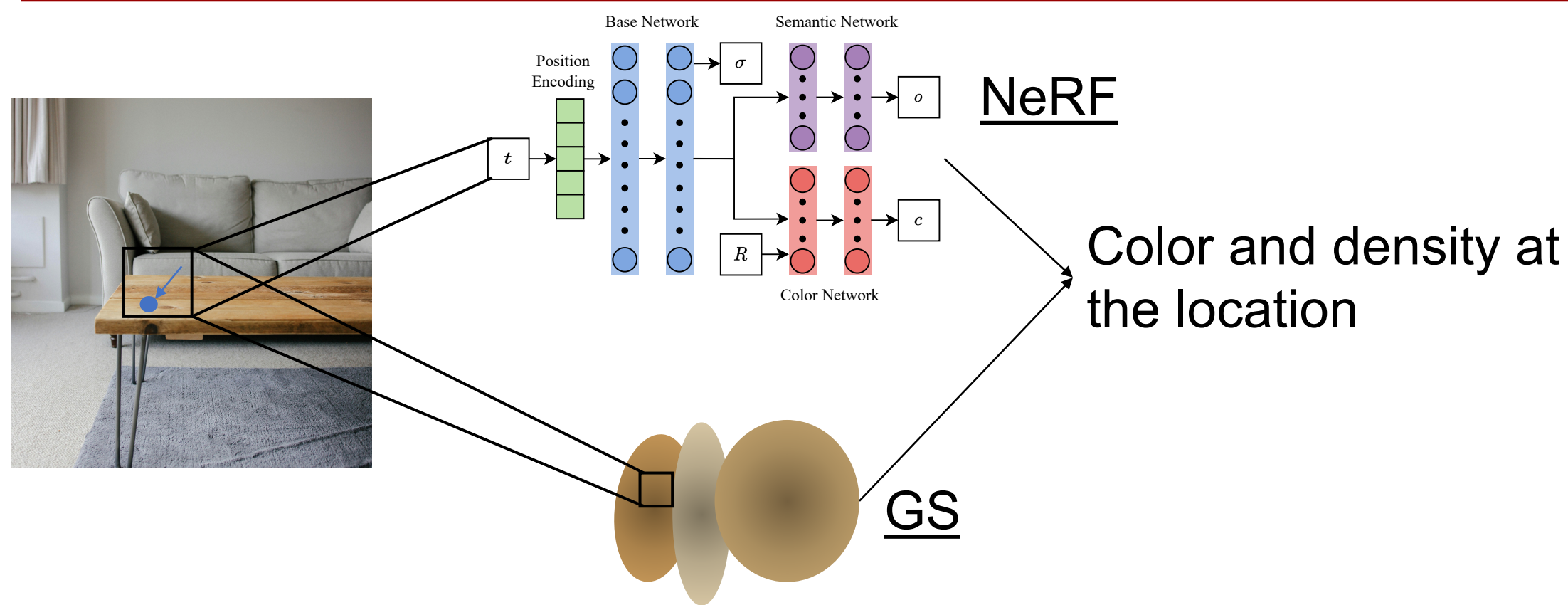


## Overview

**NeRF** stores the 3D geometry and photometry information of an environment into a neural network.



Generalize from few ego-centric views

Compact storage

Fast rendering

Handle dynamic scene

**Gaussian Splatting (GS)** stores the same information into a set of Gaussians.



**We develop a procedure to go back and forth between NeRF and GS, leveraging the strengths of both approaches.**

## Glossary

NeRF-SH: a NeRF method.

Splatfacto: a GS method.

NeRFGS: our method of converting NeRF to GS.

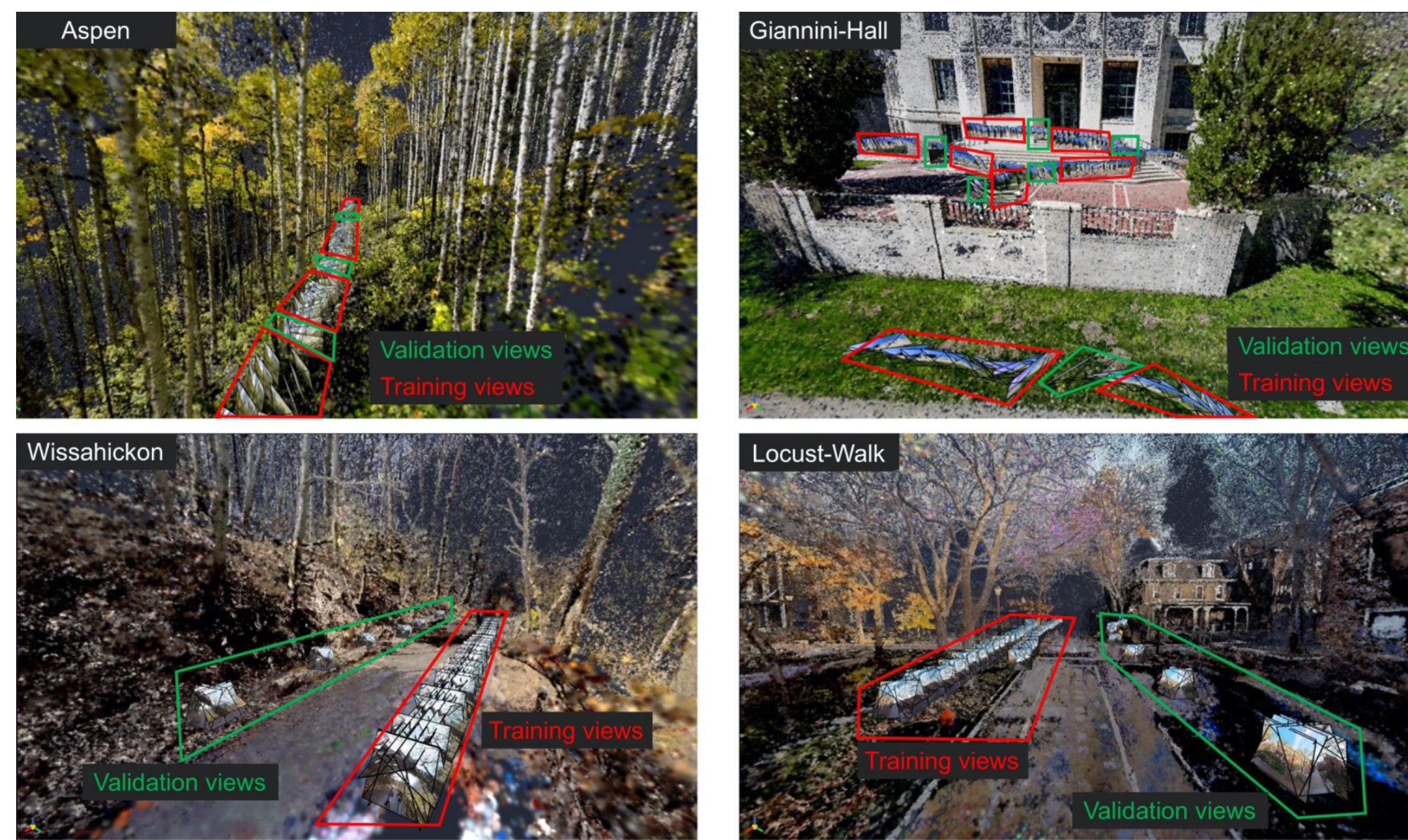
GSNeRF: our method of converting GS to NeRF

## New Dataset

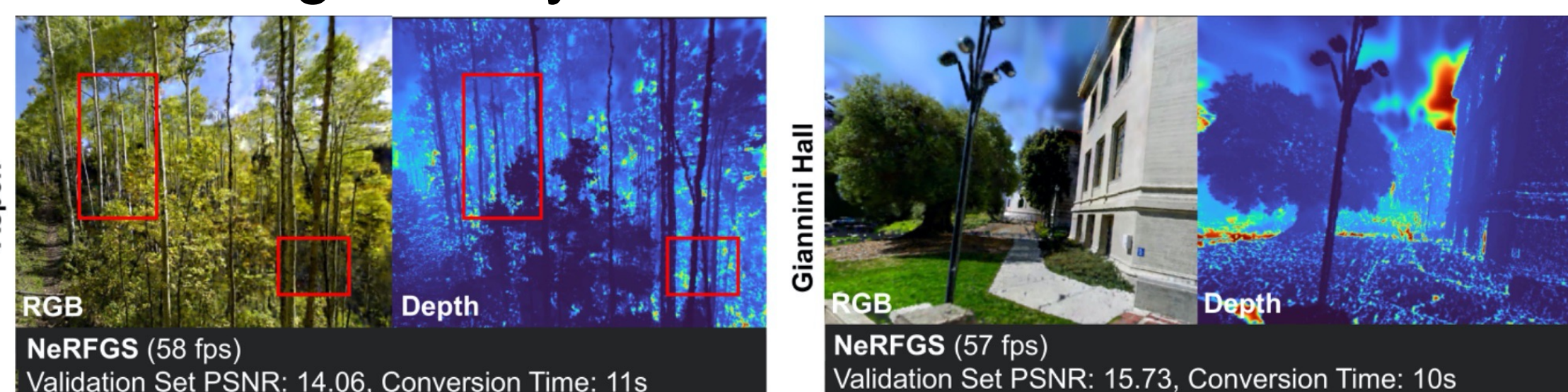
A lot of datasets, e.g., Aspen and Giannini Hall, have similar training & validation views. We created two new scenes, named Wissahickon and Locust-Walk where training and validation views are very different.

## Qualitative Results

NeRF generalizes better than GS.



Converting a NeRF to GS allows fast rendering & accurate geometry.



## Quantitative Results

Iterations ( $\times 10^2$ )	Aspen			Giannini Hall			Wissahickon			Locust Walk			
	PSNR (Val)	SSIM	LPIPS	PSNR (Val)	SSIM	LPIPS	PSNR (Train/Val)	SSIM	LPIPS	PSNR (Train/Val)	SSIM	LPIPS	
NeRFacto-big [1]	300	17.75	0.5	0.43	20.11	0.68	0.3	22.17 / 20.75	0.75	0.26	22.29 / 21.49	0.8	0.3
Splatfacto [1]	300	17.63	0.5	0.39	20.87	0.7	0.33	23.46 / 14.62	0.55	0.45	24.04 / 17.72	0.7	0.31
NeRF-SH	300	17.73	0.48	0.45	19.89	0.65	0.32	22.41 / 17.46	0.61	0.39	21.73 / 18.74	0.7	0.33
RadGS [23]	1	11.65	0.28	0.74	12.37	0.49	0.61	12.4 / 15.17	0.62	0.46	10.84 / 11.85	0.6	0.46
RadGS [23]	10	17.85	0.51	0.44	20.84	0.72	0.3	20.7 / 20.73	0.76	0.29	21.15 / 21.04	0.8	0.25
NeRFGS	0	13.96	0.3	0.58	16.19	0.47	0.49	- / 14.40	0.47	0.51	- / 14.87	0.51	0.47
NeRFGS	1	14.06	0.34	0.57	15.73	0.53	0.46	16.62 / 17.07	0.63	0.4	15.7 / 17.22	0.65	0.37
NeRFGS	10	17.7	0.51	0.4	21.05	0.73	0.26	20.67 / 20.64	0.75	0.27	21.11 / 21.14	0.8	0.24
GSNeRF	50	18.1	0.44	0.44	21.22	0.69	0.31	- / 17.65	0.63	0.39	- / 19.32	0.71	0.33
GSNeRF	300	18.58	0.51	0.36	23.71	0.82	0.17	- / 17.59	0.64	0.37	- / 19.32	0.72	0.31

NeRFGS can be edited easily before converting back to a NeRF.

