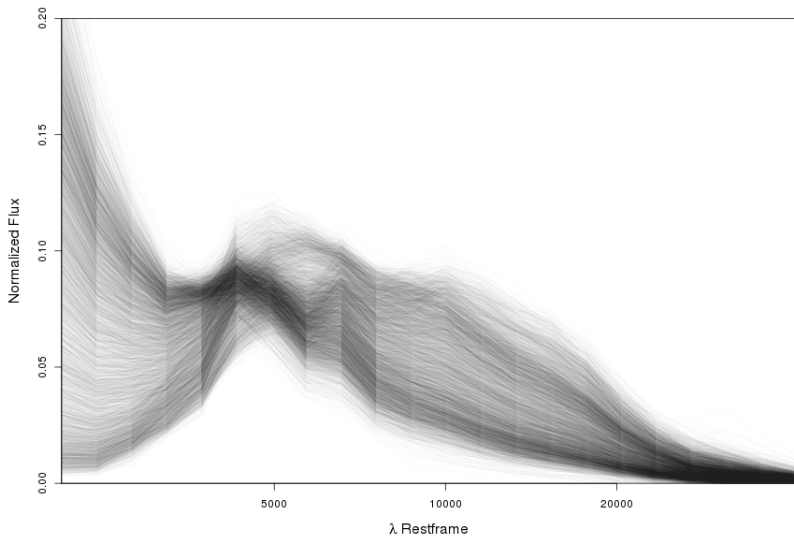


Making Composites

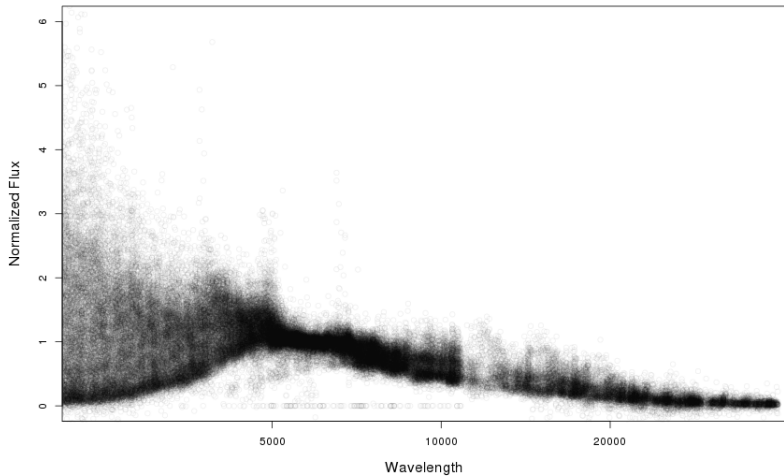
James Long

November 19, 2015

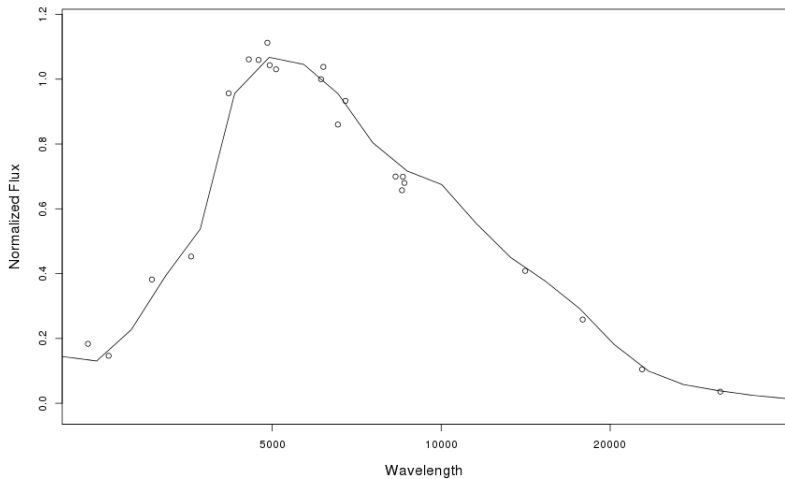
Synthetic Photometry



Actual Photometry (in Restframe)



Synthetic and Actual Photometry for Galaxy 52



Shifting Photometry to Restframe

- ▶ Photometry for galaxy i is

$$\{(\lambda_{ij}, f_{ij})\}_{j=1}^{n_i}$$

- ▶ Restframe (deredshifted photometry) is

$$\left\{ \left(\frac{\lambda_{ij}}{1+z_i}, f_{ij} \right) \right\}_{j=1}^{n_i}$$

where z_i is the redshift of galaxy i .

- ▶ `restframe_photometry.txt` contains restframe photometry

$$\left(id_i, \frac{\lambda_{ij}}{1+z_i}, f_{ij} \right)$$

```
## read in rest frame photometry
fname <- paste0(data_folder,"restframe_photometry.txt")
rest <- read.table(fname,header=TRUE)

## normalize each galaxy by
## median flux value in [flux_min,flux_max]
flux_min <- 5000
flux_max <- 7000
for(id in unique(rest[,1])){
  to_use <- rest[,1]==id
  temp <- rest[to_use,]
  in_range <- ((temp[,2] < flux_max) &
               (temp[,2] > flux_min))
  normalized_flux <- temp[,3] / median(temp[in_range,3])
  rest[to_use,3] <- normalized_flux
}
```

Composite

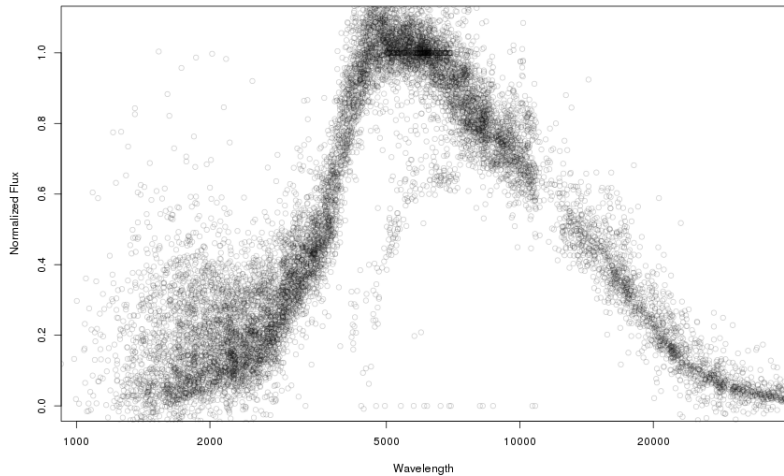
Definition:

- ▶ Use clustering methods on synthetic photometry to find groups.
- ▶ The composite is the average (or median) of restframe, normalized photometry (not synthetic).
- ▶ Can see composite in plot.

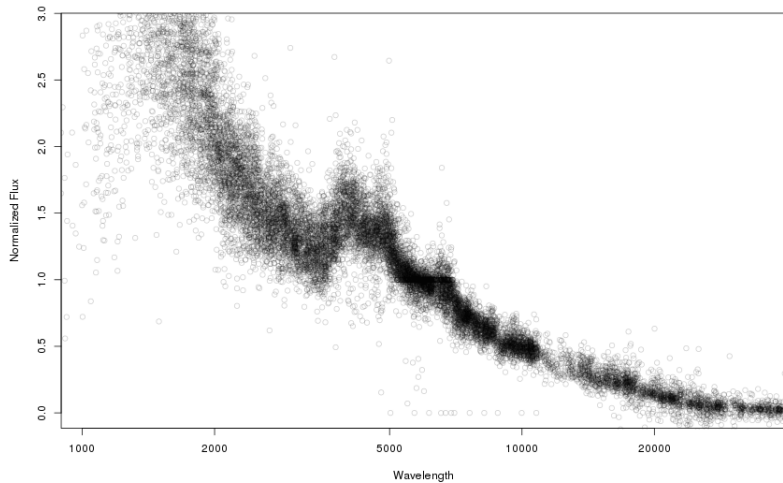
Example:

- ▶ Ran complete linkage hierarchical agglomerative clustering.
- ▶ Selected 10 clusters.

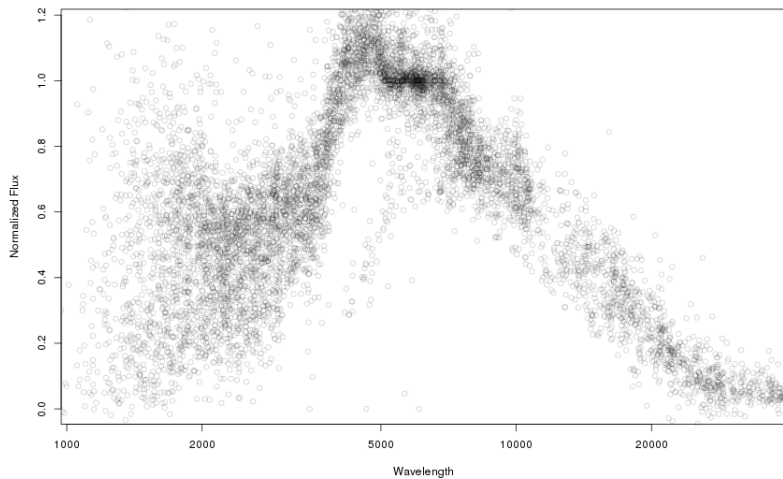
Composite 1



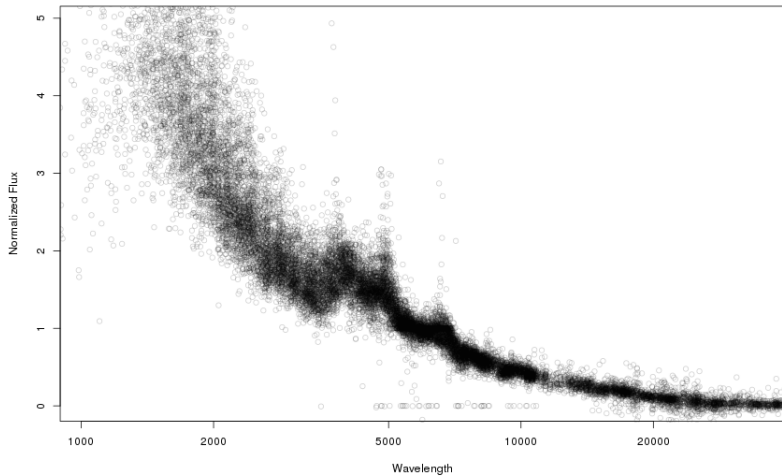
Composite 2



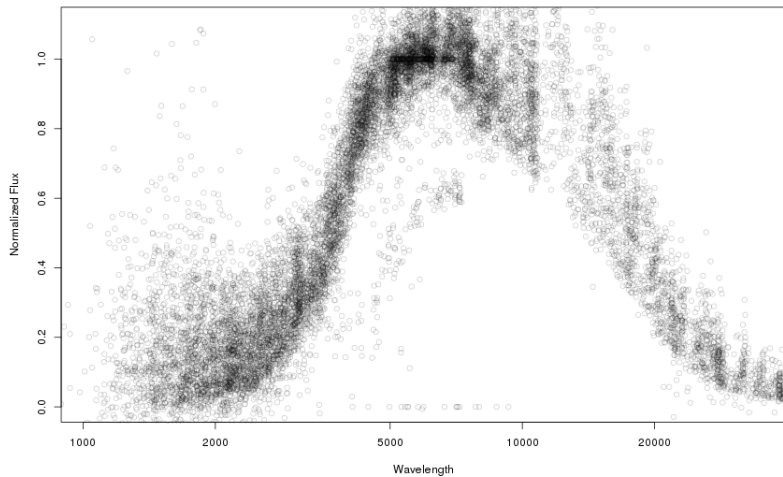
Composite 3



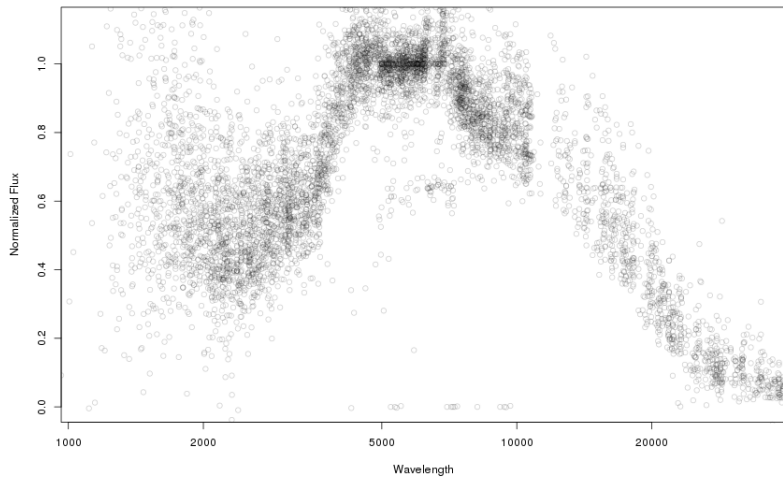
Composite 4



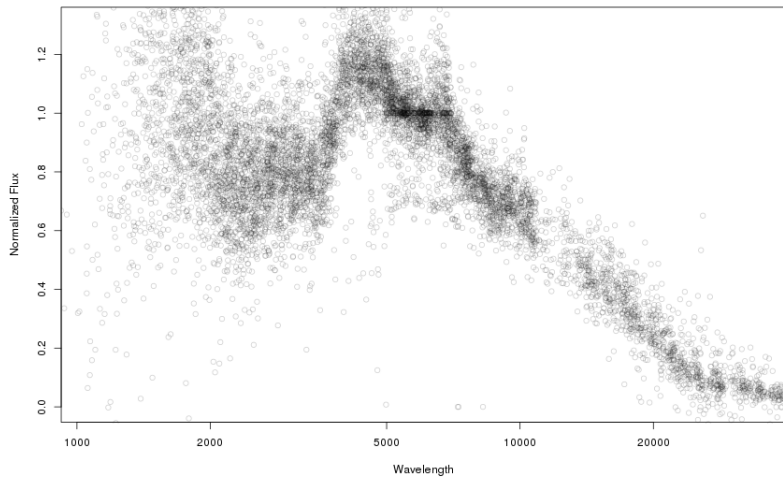
Composite 5



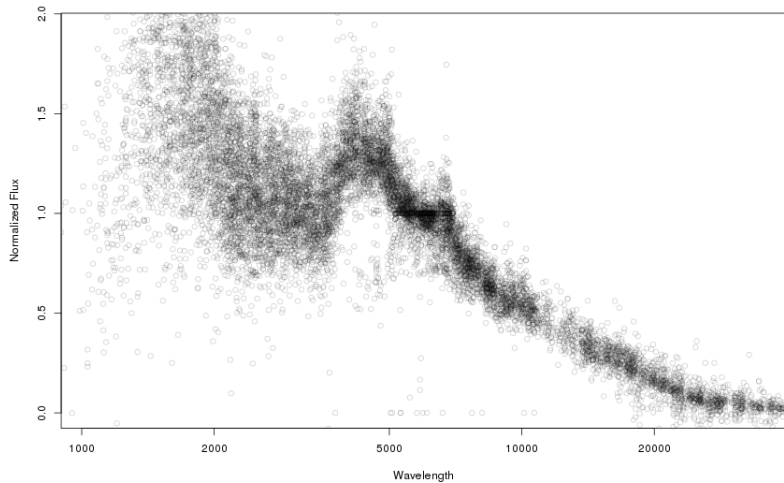
Composite 6



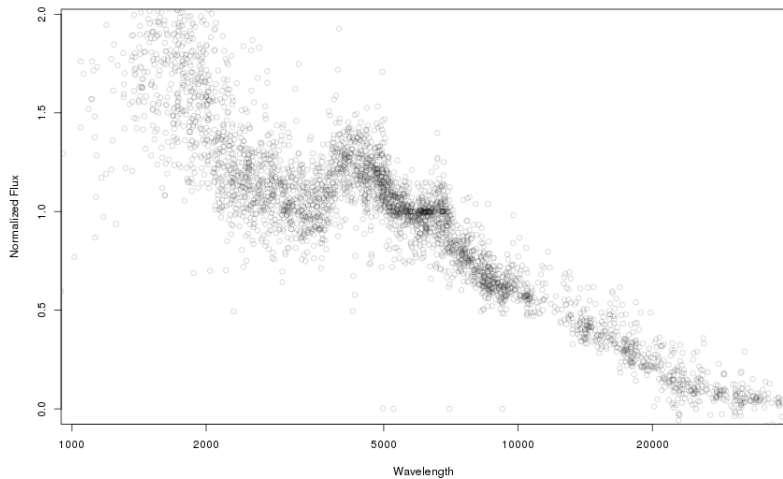
Composite 7



Composite 8



Composite 9



Composite 10

