



INTERACTIVE MAPS WITH LEAFLET IN R

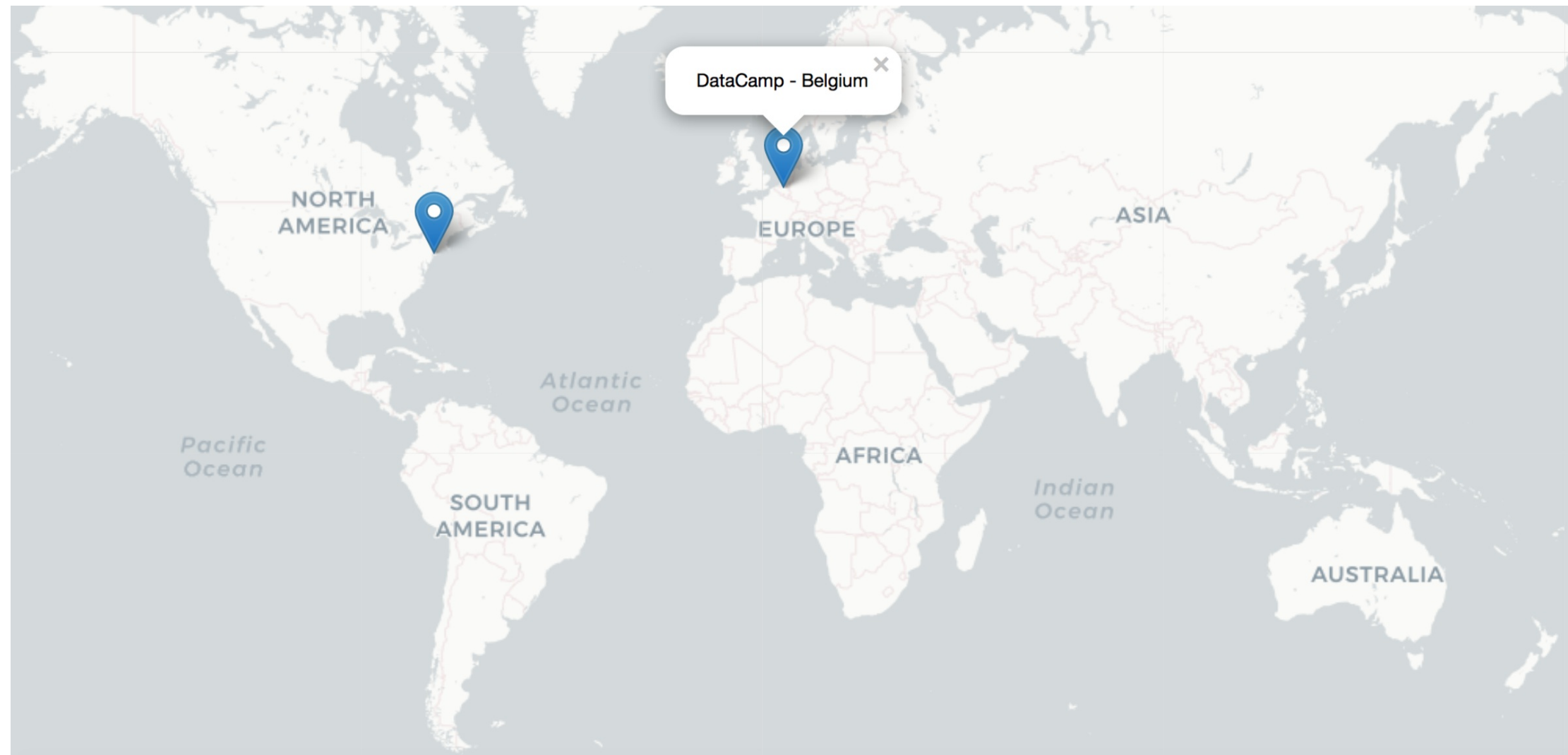
# Chapter 2 Overview

Rich Majerus

Assistant Vice President, Colby College

# Where We Left Off

```
leaflet() %>%  
  addProviderTiles("CartoDB") %>%  
  addMarkers(lng = dc_hq$lon, lat = dc_hq$lat, popup = dc_hq$hq)
```

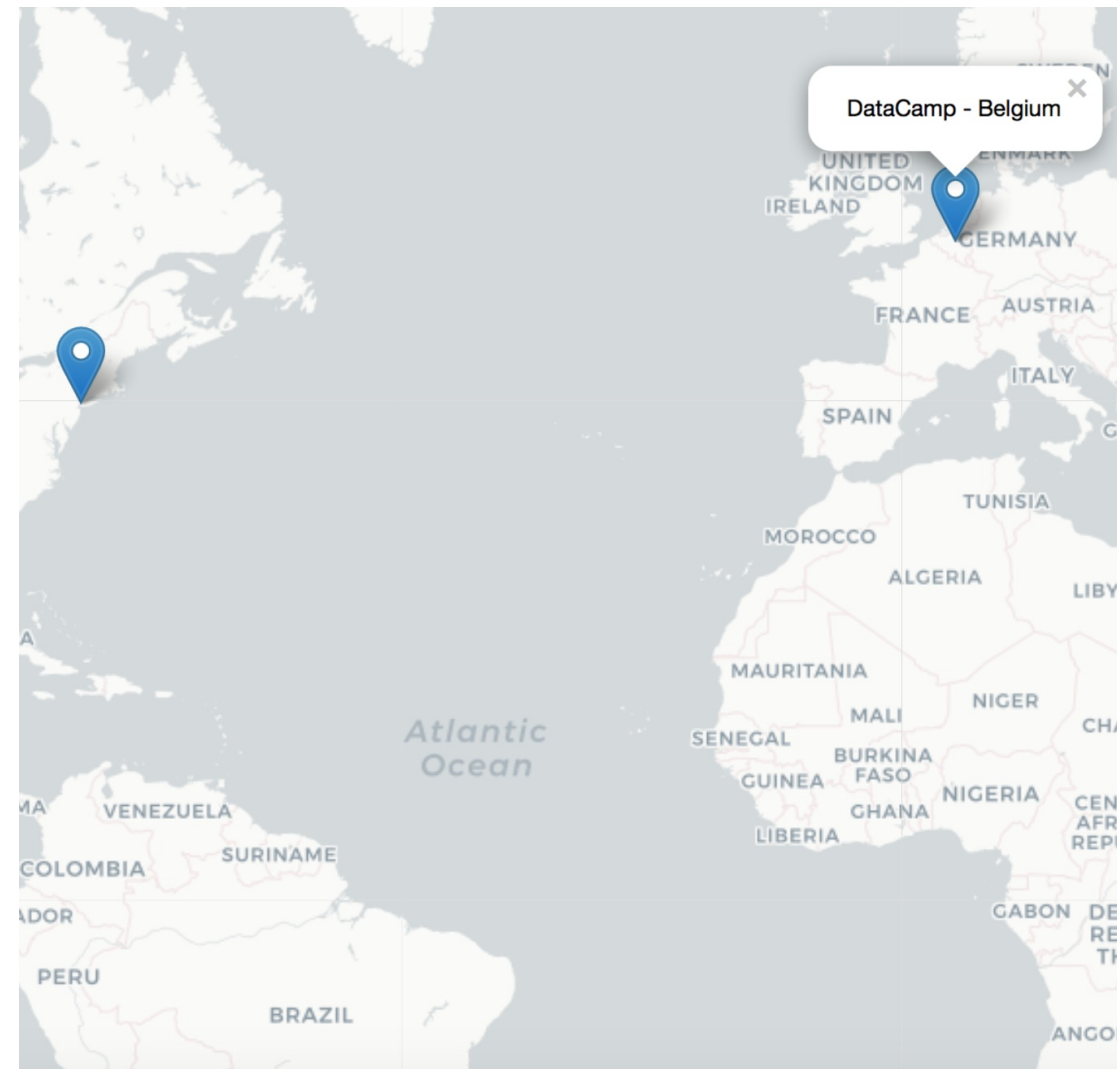
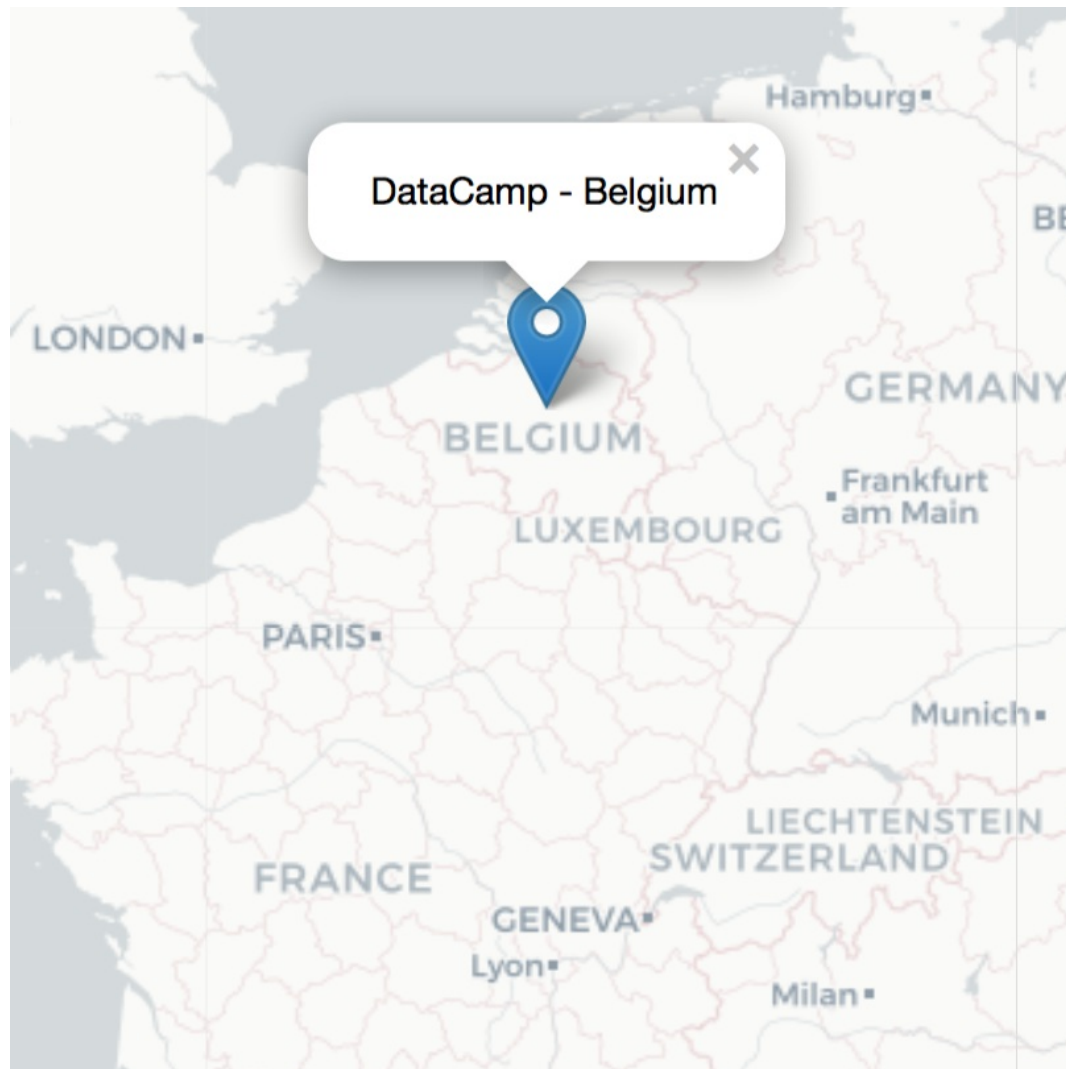




# Cleaning up the Base Map

```
m <- m %>%  
  setView(lat = 50.881363,  
          lng = 4.717863,  
          zoom = 5)
```

```
# Restore view based on  
# data displayed on map  
m %>%  
  clearBounds()
```

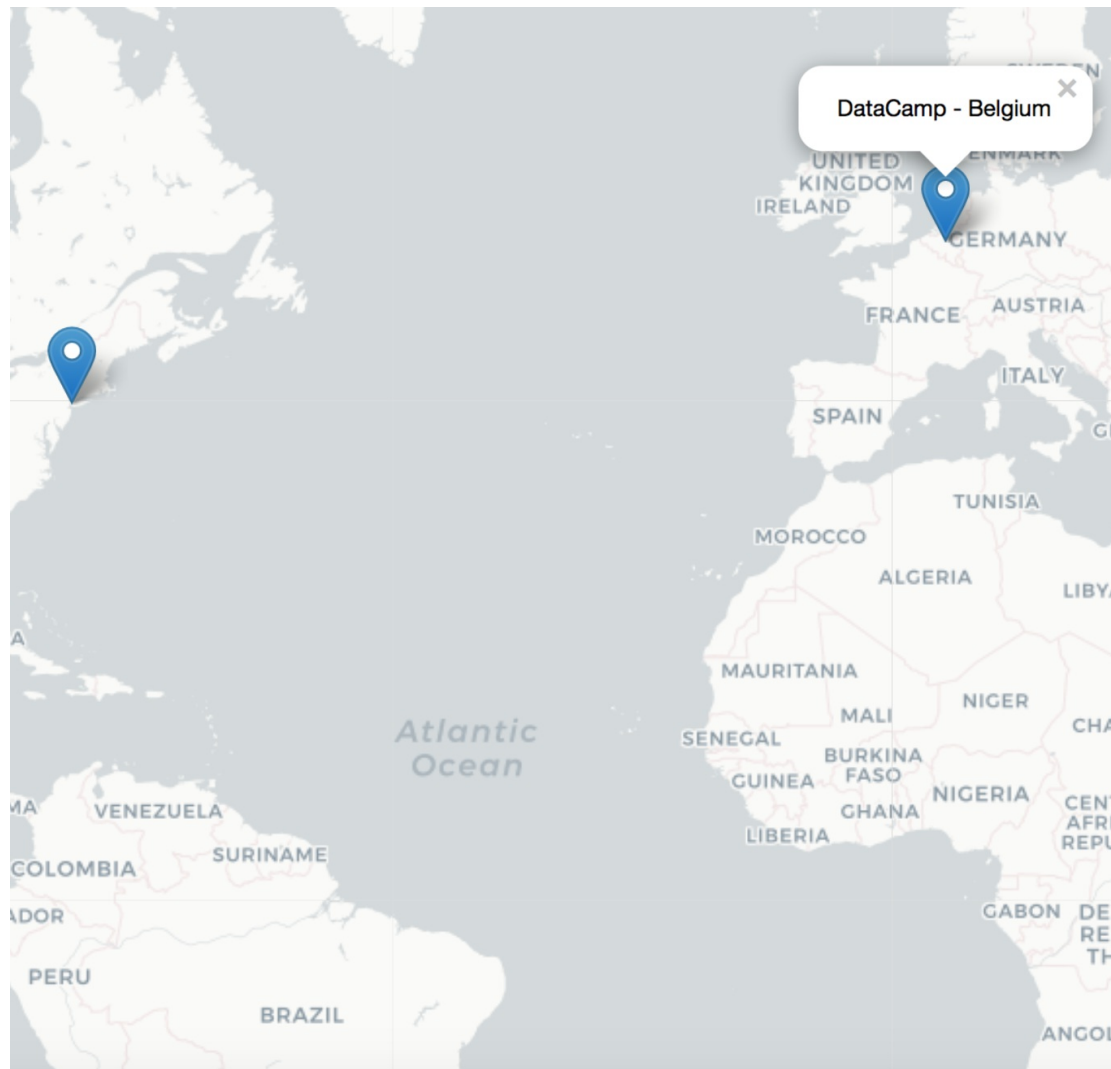




# Cleaning up the Base Map

```
# Restore view based on  
# data displayed on map  
m %>%  
  clearBounds()
```

```
# Remove markers  
m %>%  
  clearBounds() %>%  
  clearMarkers()
```





# IPEDS

- Integrated Postsecondary Education Data System (IPEDS)
- Administered by National Center for Education Statistics (NCES)
- Data from all institutions participating in federal student financial aid programs
  - colleges
  - universities
  - technical and vocational institutions

# Our IPEDS Dataset

```
> glimpse(ipeds)
```

```
Observations: 3,146
```

```
Variables: 5
```

```
$ name      <chr> "A T Still University of Health Sciences", ...  
$ lng       <dbl> -92.58918, -99.70954, -83.52828, -93.29968, ...  
$ lat       <dbl> 40.19365, 32.46915, 31.48189, 44.85621, 29.65008, ...  
$ state     <chr> "MO", "TX", "GA", "MN", "FL", "CA", "CA", "CA", ...  
$ sector_label <chr> "Private", "Private", "Public", "For-Profit", ...
```

```
ipeds %>% group_by(state) %>% count %>% arrange(desc(n))
```

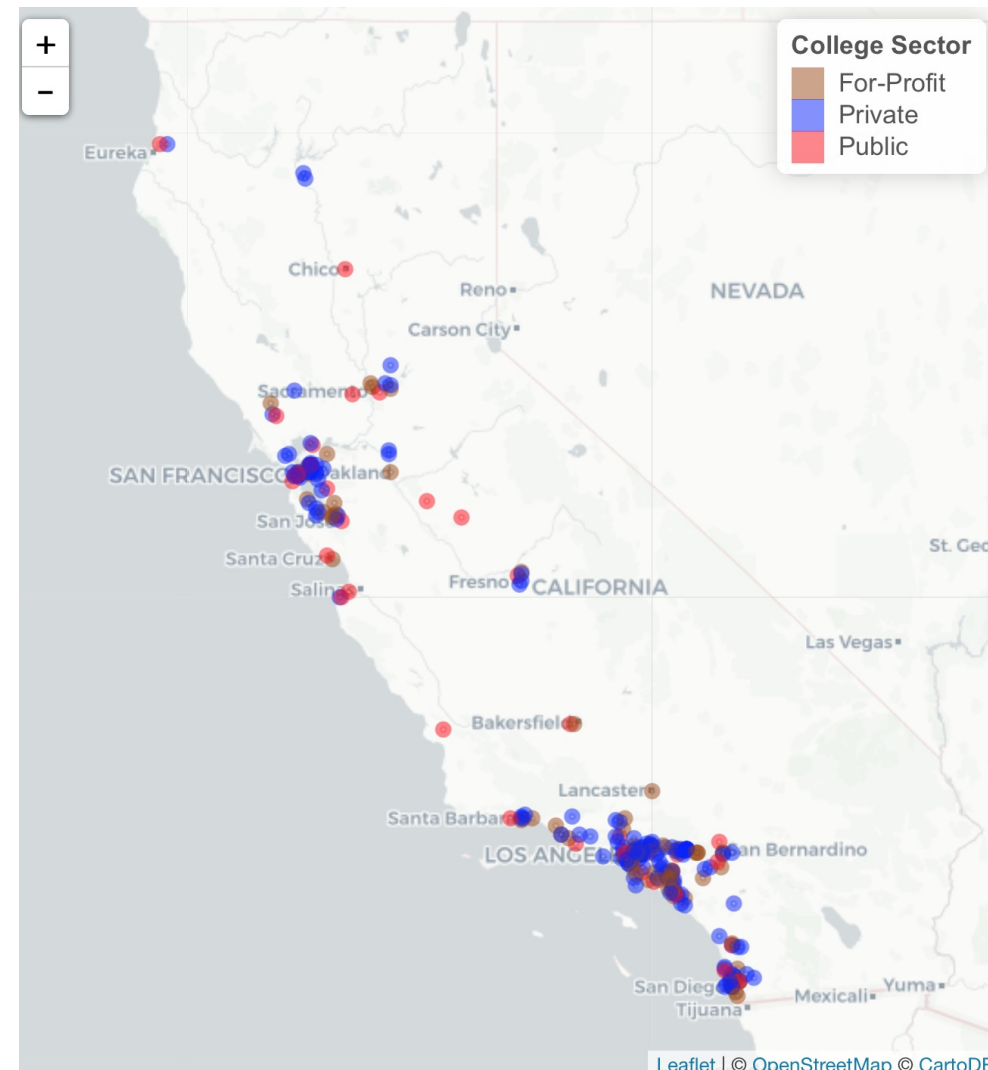
```
# A tibble: 56 x 2
```

```
# Groups:   state [56]
```

	state	n
	<chr>	<int>
1	CA	286
2	NY	239
3	PA	164
4	FL	160
5	TX	157

# Where We are Going in Chapter 2

- Filter the data to California colleges
- Map all of the colleges in California
- Use circle markers instead of pins
- Color our markers by sector







## INTERACTIVE MAPS WITH LEAFLET IN R

**Let's practice!**





INTERACTIVE MAPS WITH LEAFLET IN R

# Mapping a State's Colleges

Rich Majerus

Assistant Vice President, Colby College

# How many 4-year colleges are there in Maine?

```
ipeds %>%  
  filter(state == "ME")
```

```
# A tibble: 21 x 5
```

	name <chr>	lng <dbl>	lat <dbl>	state <chr>	sector_label <chr>
1	Bates College	-70.20333	44.10530	ME	Private
2	Bowdoin College	-69.96524	43.90690	ME	Private
3	Colby College	-69.66337	44.56421	ME	Private
4	College of the Atlantic	-68.22885	44.39958	ME	Private
...					

# Mapping a State's Colleges

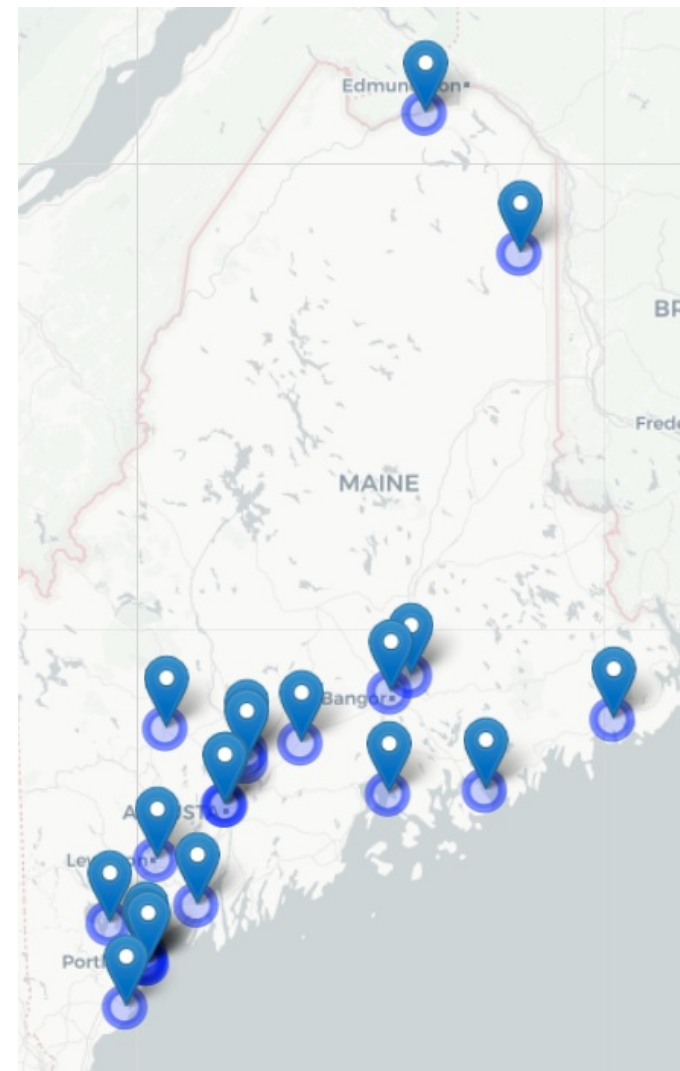
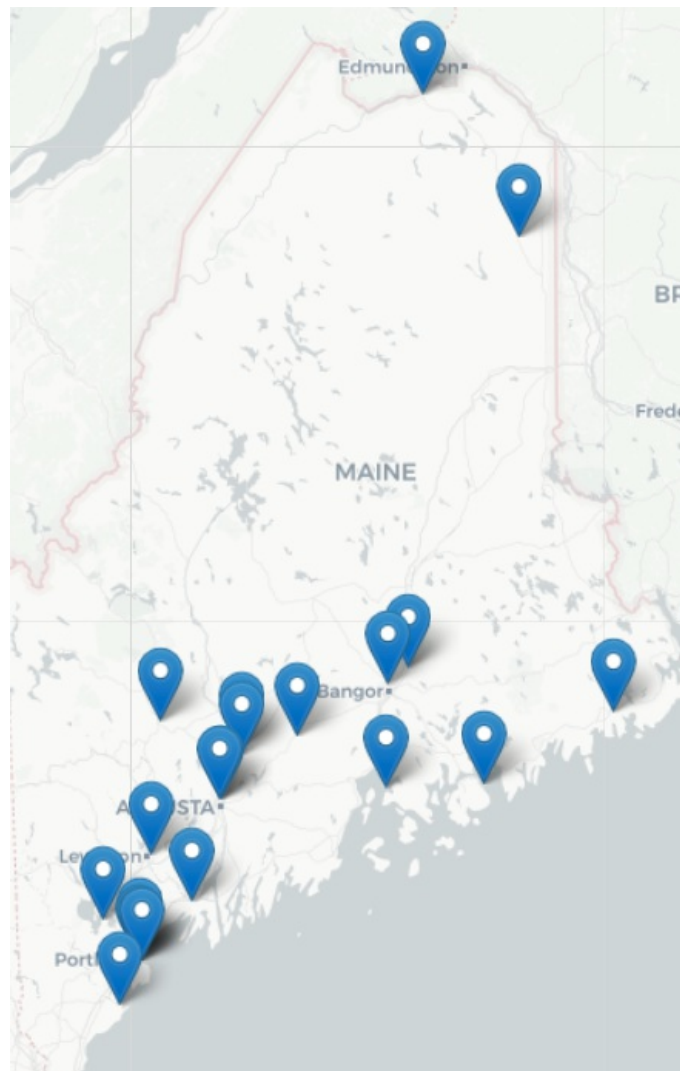
```
maine_colleges_map <-  
  leaflet() %>%  
    addProviderTiles("CartoDB") %>%  
    addMarkers(data = maine_colleges)
```

Assuming '**lng**' and '**lat**' are longitude and latitude, respectively

# Mapping a State's Colleges

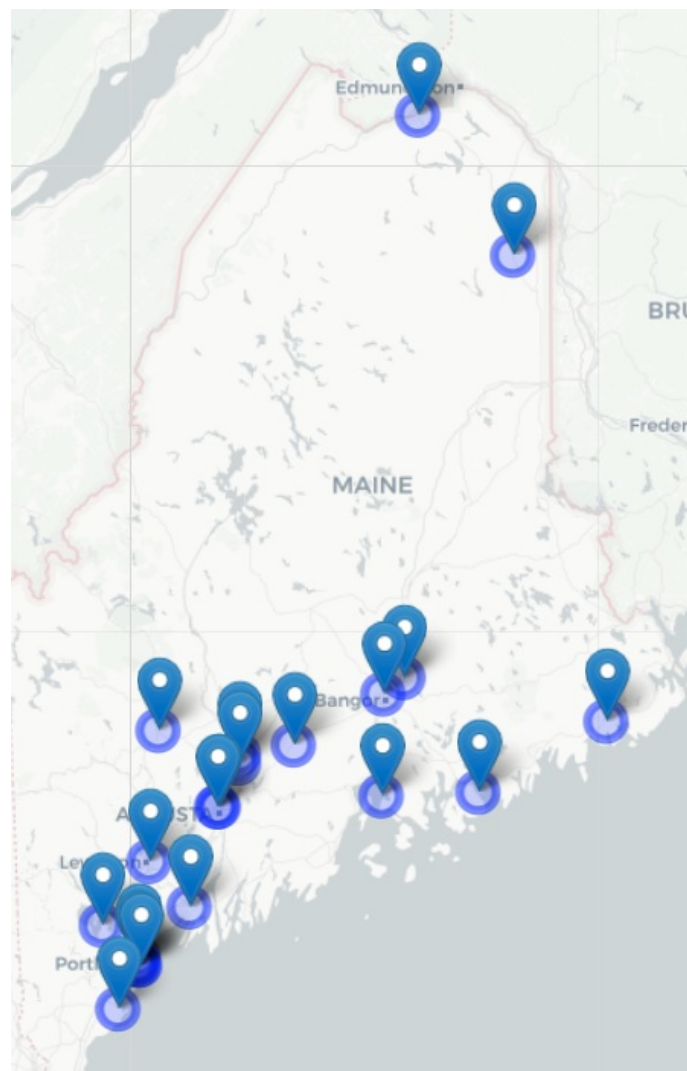
```
maine_colleges_map <-  
  leaflet() %>%  
    addProviderTiles("CartoDB")%>%  
    addMarkers(data = maine)
```

```
# adding more markers will  
# not remove existing markers  
maine_colleges_map %>%  
  addCircleMarkers(data = maine)
```

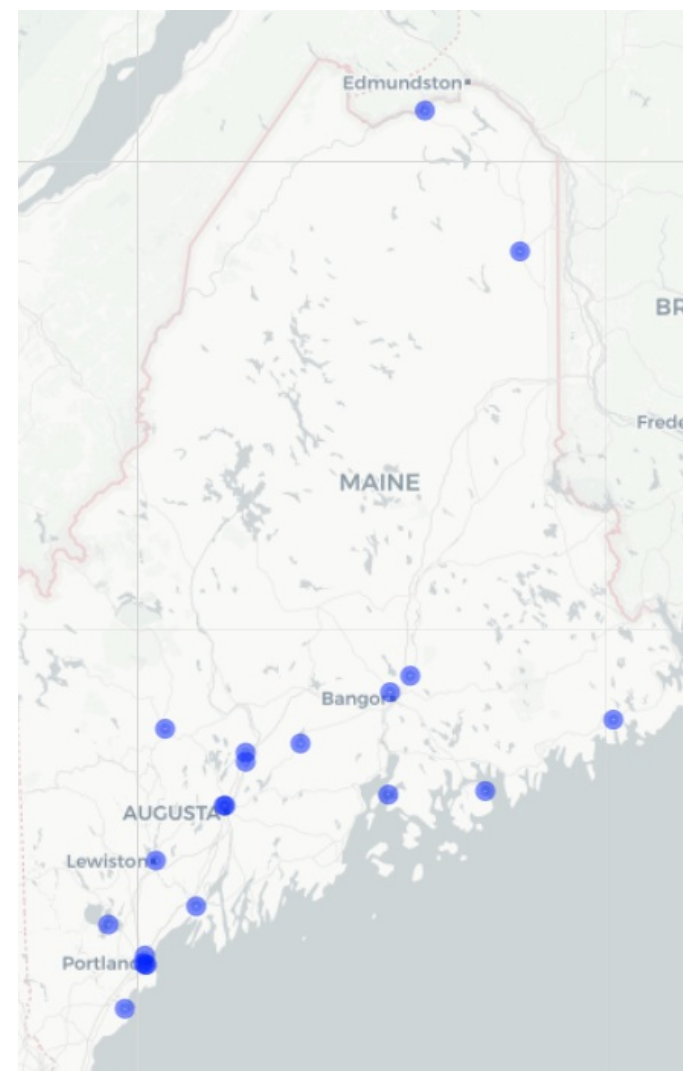


# Mapping a State's Colleges

```
# adding more markers will
# not remove existing markers
maine_colleges_map %>%
  addCircleMarkers(data = maine)
```

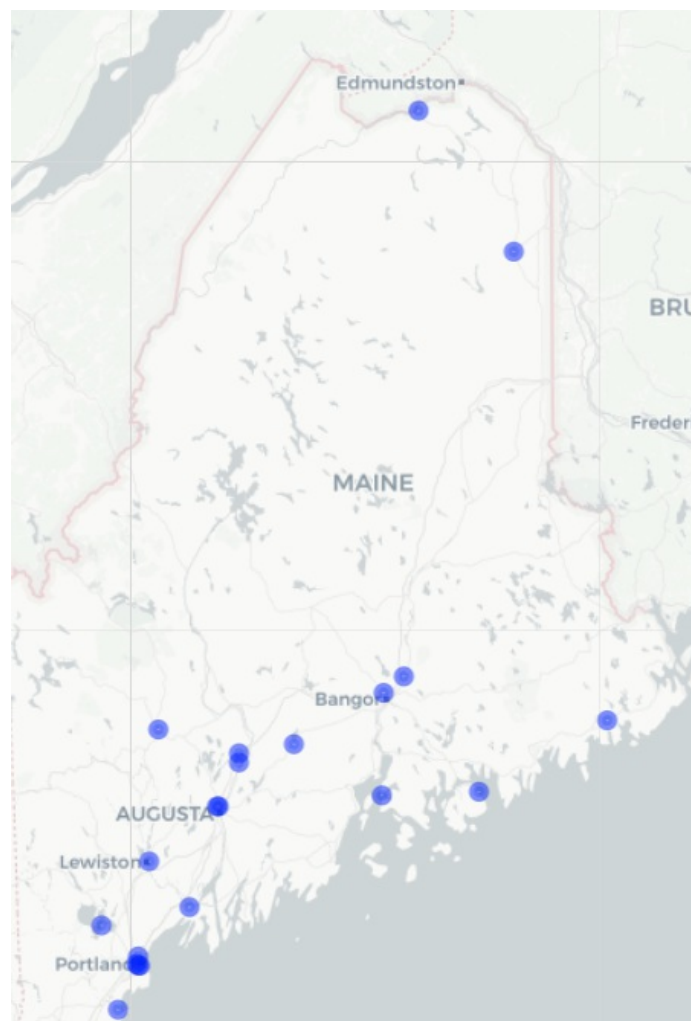


```
maine_colleges_map %>%
  clearMarkers() %>%
  addCircleMarkers(data = maine,
    radius = 3)
```

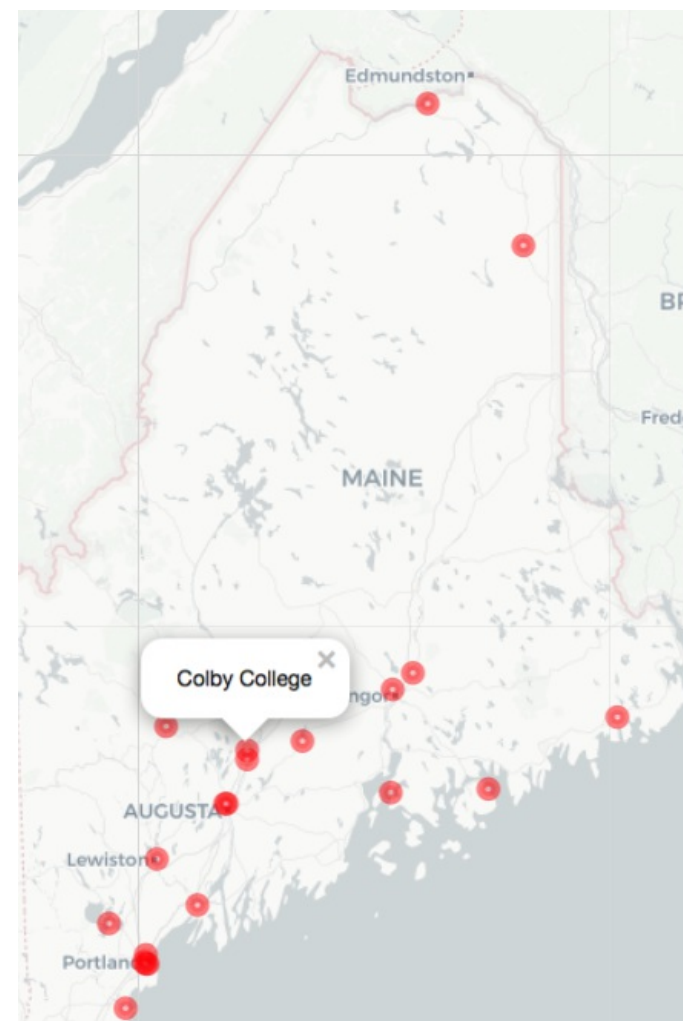


# Mapping a State's Colleges

```
maine_colleges_map <-  
  maine_colleges_map %>%  
    clearMarkers %>%  
    addCircleMarkers(  
      data = maine_colleges,  
      radius = 3)
```



```
maine_colleges_map %>%  
  addCircleMarkers(  
    data = maine_colleges,  
    radius = 4,  
    color = "red",  
    popup = ~name)
```





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INTERACTIVE MAPS WITH LEAFLET IN R

# Labels and Pop-ups

Rich Majerus

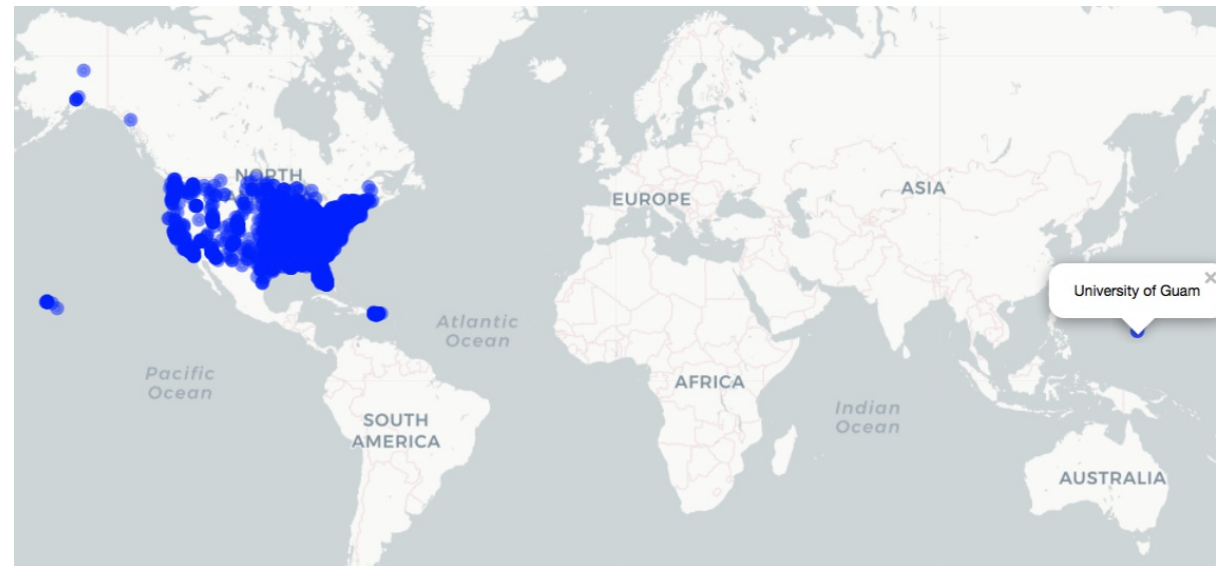
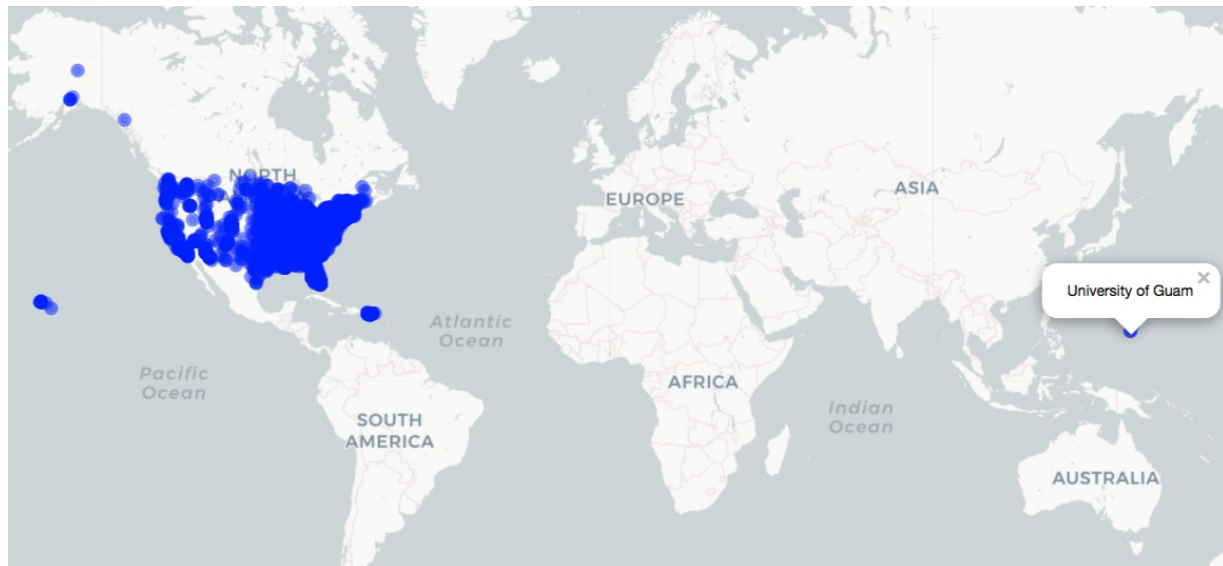
Assistant Vice President, Colby College



# Piping and the ~ Operator

```
ipeds %>%  
  leaflet() %>%  
  addProviderTiles("CartoDB") %>%  
  addCircleMarkers(  
    lng = ~lng, lat = ~lat,  
    popup = ~name, color = "#FF0000")
```

```
# ipeds is specified 3 times  
leaflet() %>%  
  addProviderTiles("CartoDB") %>%  
  addCircleMarkers(  
    lng = ipeds$lng, lat = ipeds$lat,  
    popup = ipeds$name, color = "red")
```



# All the Colors

```
ipeds %>%  
  leaflet() %>%  
    addProviderTiles("CartoDB")%>%  
    addCircleMarkers(  
      lng = ~lng,  
      lat = ~lat,  
      popup = ~name,  
      color = "#FF0000")
```

Hex	Decimal	RGB Color
FF	255	<b>Red</b>
00	0	<b>Green</b>
00	0	<b>Blue</b>

✎ #ff0000

✎ rgb(255, 0, 0)

$$= 16^1 * 15 + 16^0 * 15$$

$$= 16 * 15 + 1 * 15$$

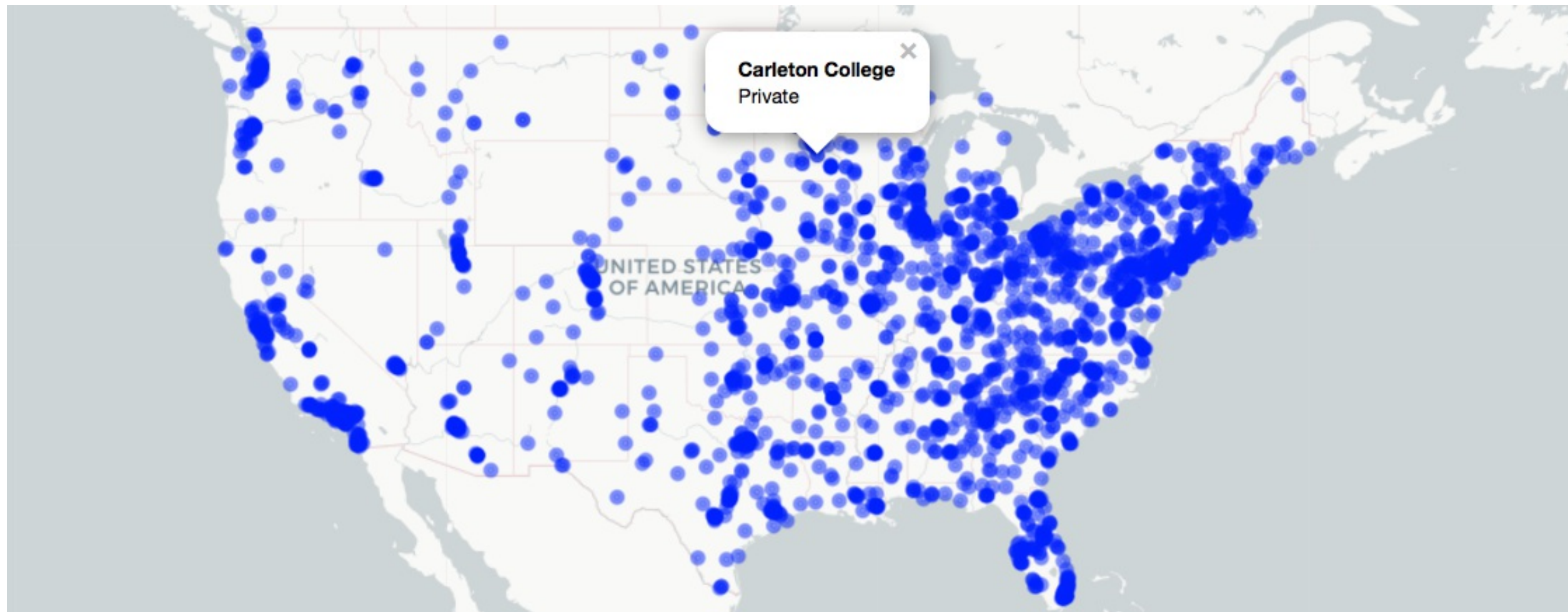
$$= 240 + 15$$

$$= 255$$



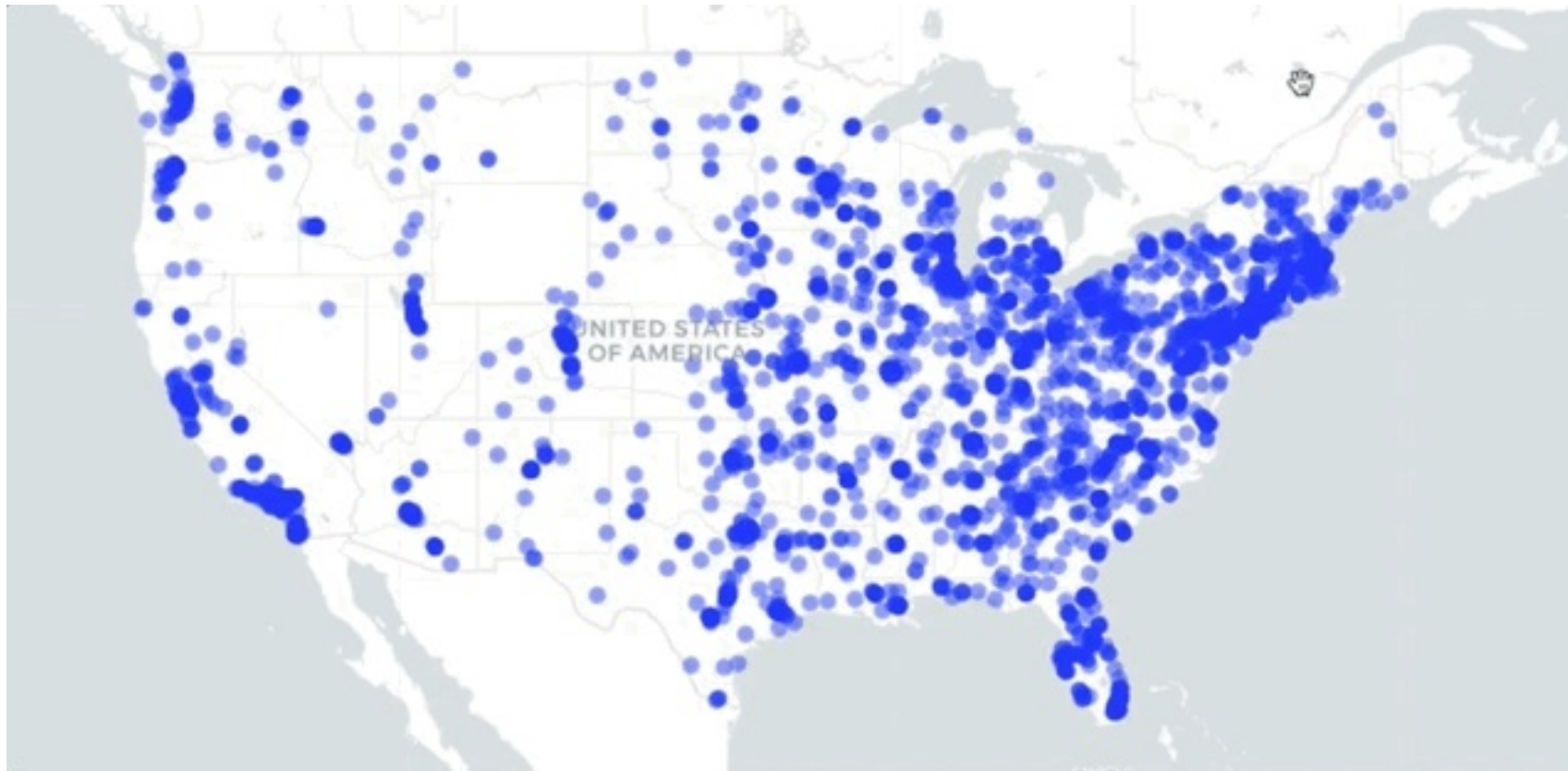
# Building a Better Pop-up

```
addCircleMarkers(popup = ~name)
addCircleMarkers(popup = ~paste0(name, "-", sector_label))
addCircleMarkers(popup = ~paste0("<b>",name,"</b>","<br/>",sector_label))
```



# Labels

```
ipeds %>%  
  leaflet() %>%  
  addProviderTiles("CartoDB") %>%  
  addCircleMarkers(label = ~name, radius = 2)
```





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**Let's practice!**



INTERACTIVE MAPS WITH LEAFLET IN R

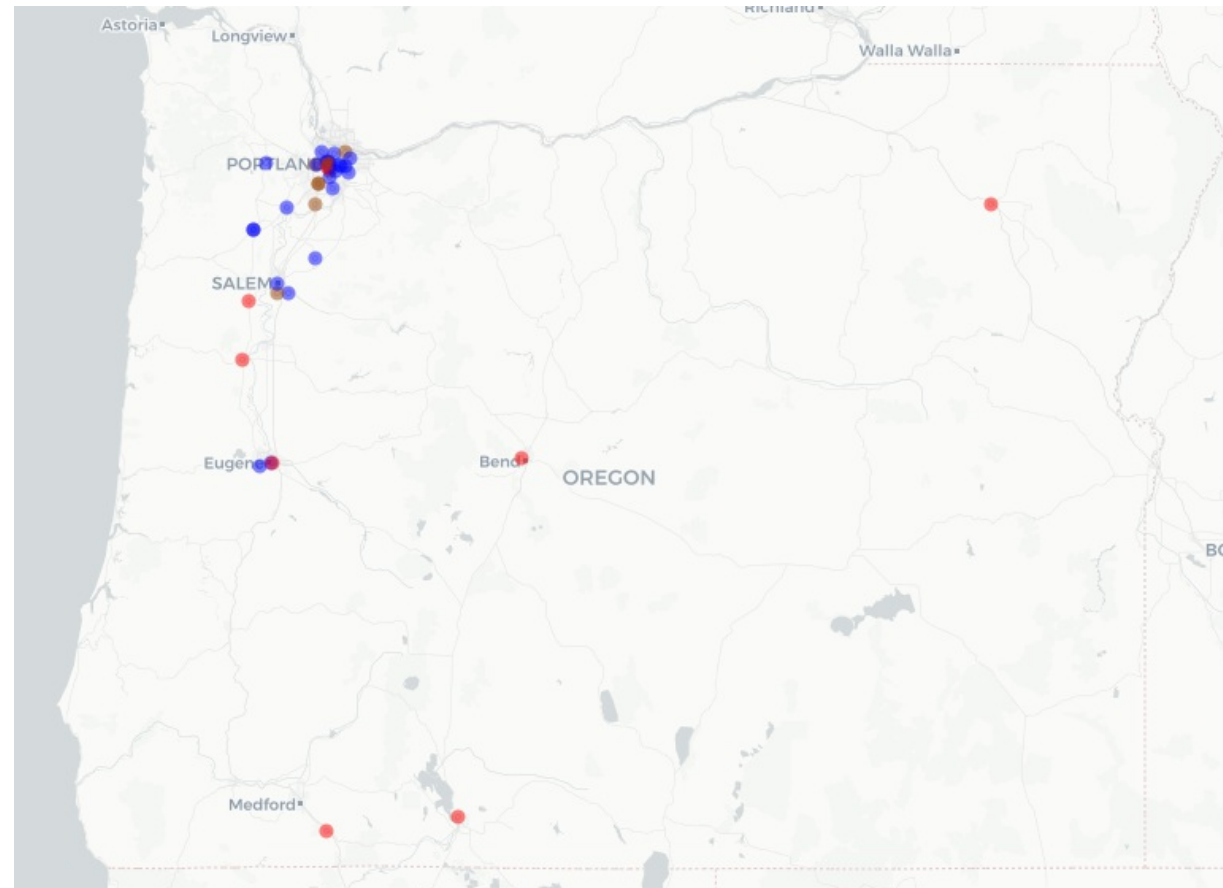
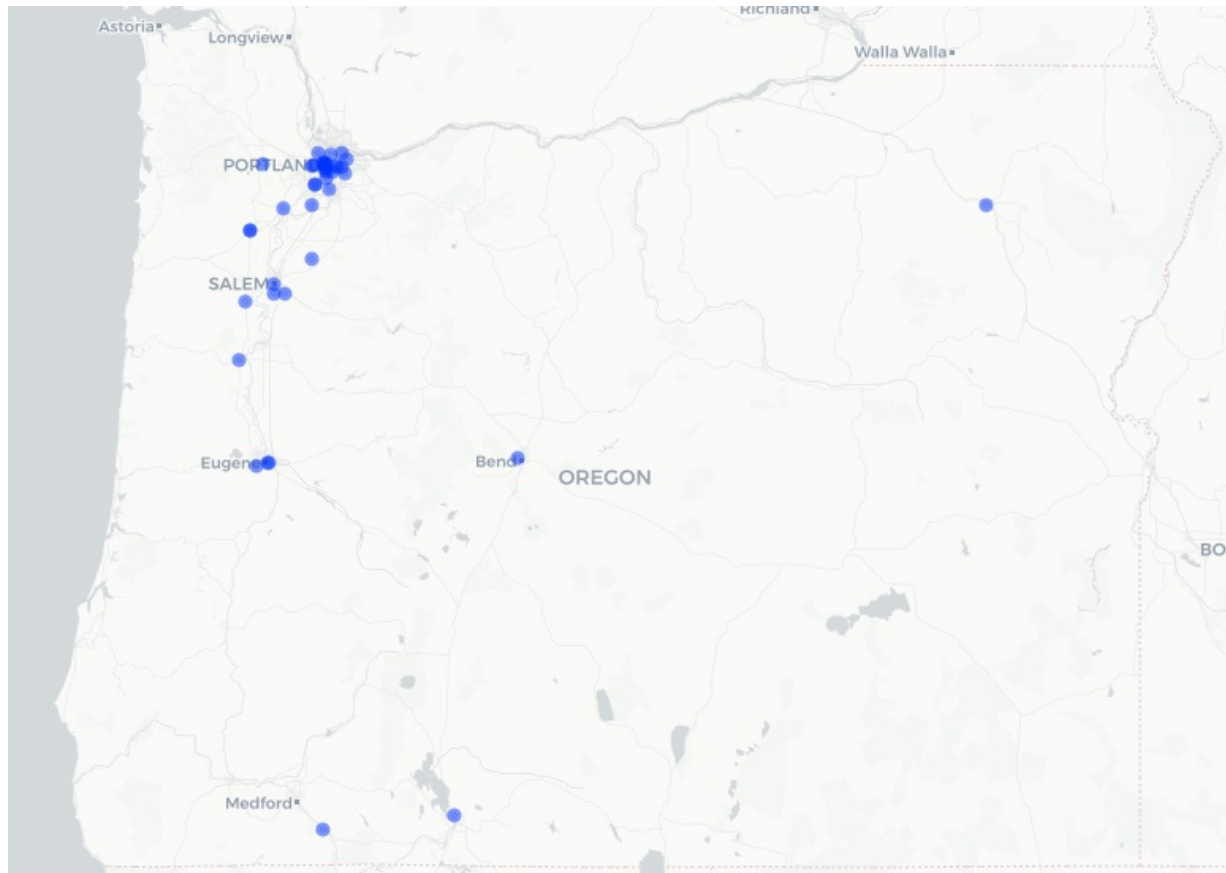
# Color Coding Colleges

Rich Majerus

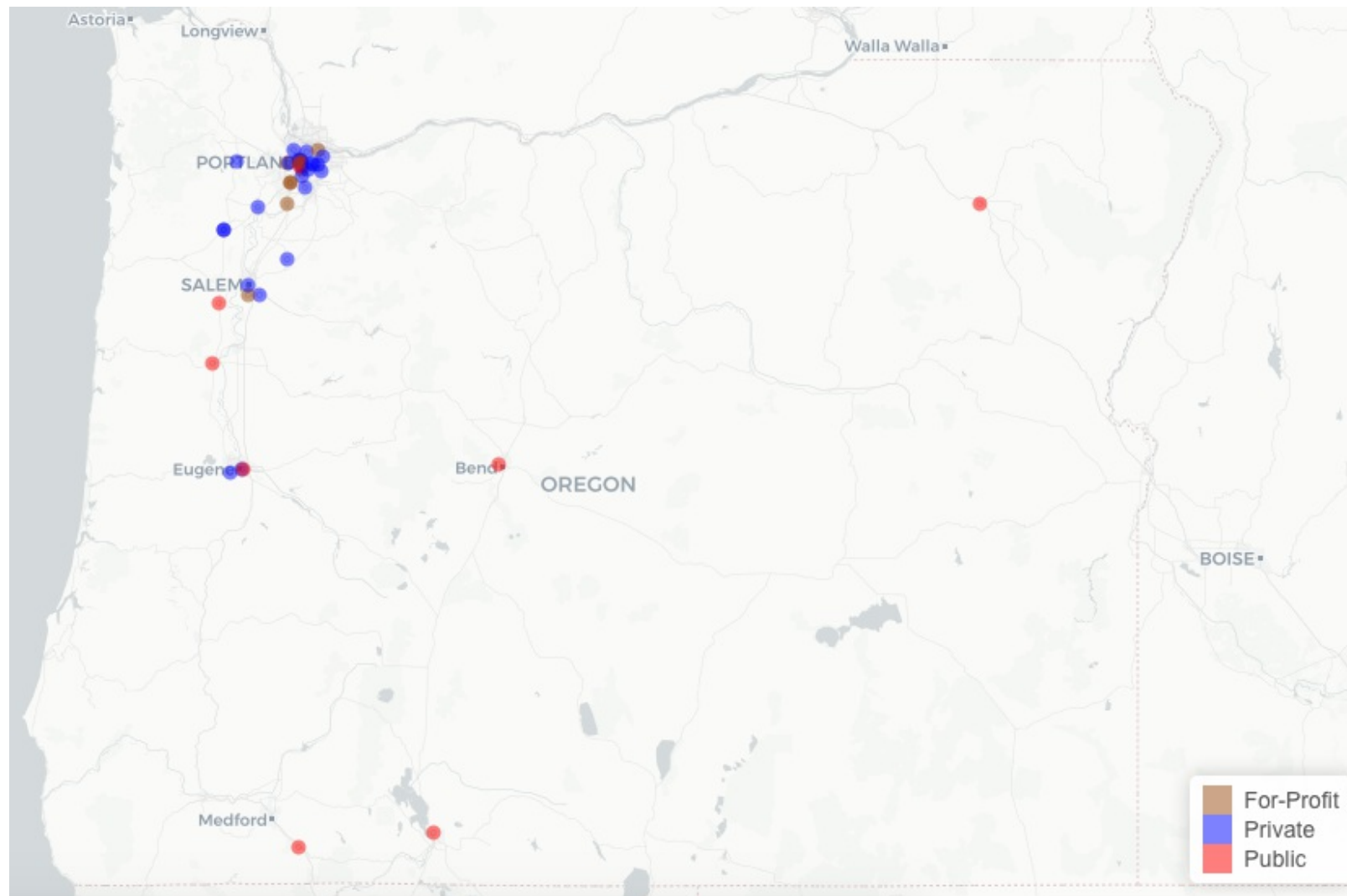
Assistant Vice President, Colby College



# Adding Color (and Information)



# Remembering your Colors



# colorFactor()

```
OR <- ipeds %>%  
  filter(state == "OR")  
  
pal <- colorFactor(palette = c("red", "blue", "#9b4a11"),  
  levels = c("Public", "Private", "For-Profit"))
```

```
oregon_colleges <-  
  OR %>%  
  leaflet() %>%  
    addProviderTiles("CartoDB") %>%  
    addCircleMarkers(radius = 2,  
      color = ~pal(sector_label),  
      label = ~name)
```

```
oregon_colleges %>%  
  addLegend(position = "bottomright",  
    pal = pal,  
    values = c("Public", "Private", "For-Profit"))
```

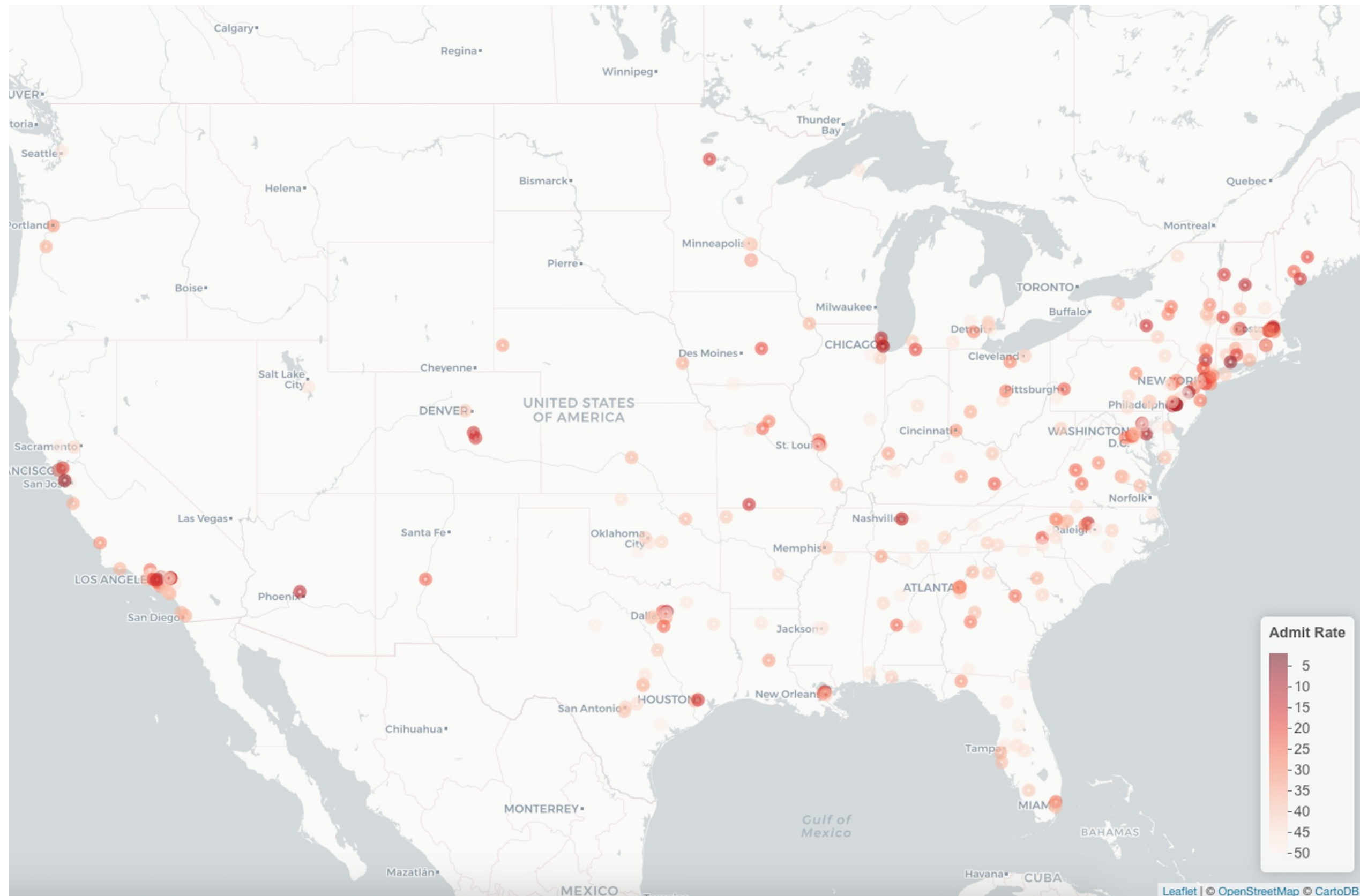


# colorNumeric()

```
admit <- admit %>%  
  filter(!is.na(rate),  
         rate < 50,  
         rate > 0)
```

```
pal <- colorNumeric(palette = "Reds", domain = c(1:50), reverse = TRUE)
```

```
admit_map <-  
  admit %>%  
  leaflet() %>%  
  addProviderTiles("CartoDB") %>%  
  addCircleMarkers(radius = 4, color = ~pal(rate), label = ~name) %>%  
  addLegend(title = "Admit Rate", pal = pal, values = c(1:50),  
            position = "bottomright")
```



# Picking a Color Palette

```
# see http://colorbrewer2.org/ for interactive examples
library(RColorBrewer)
display.brewer.all()
```





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**Let's practice!**