



## Quick intro to ggplot2

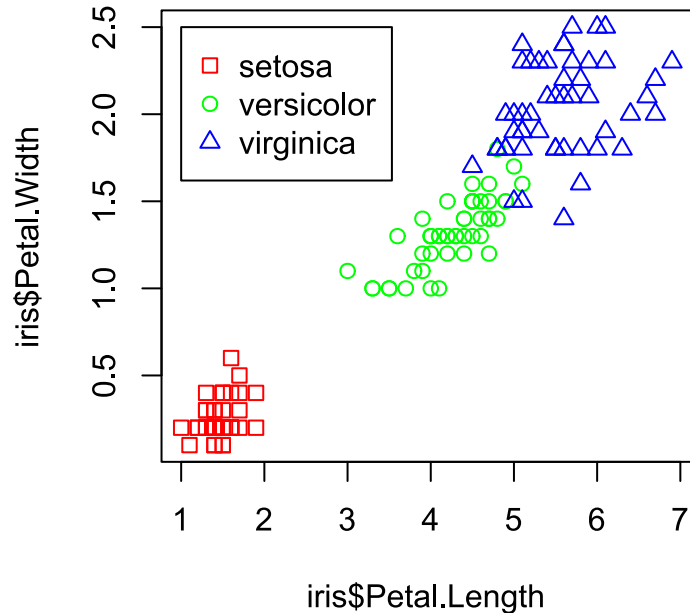
Roy Francis • 23-Sep-2021

<https://royfrancis.github.io/course-r>

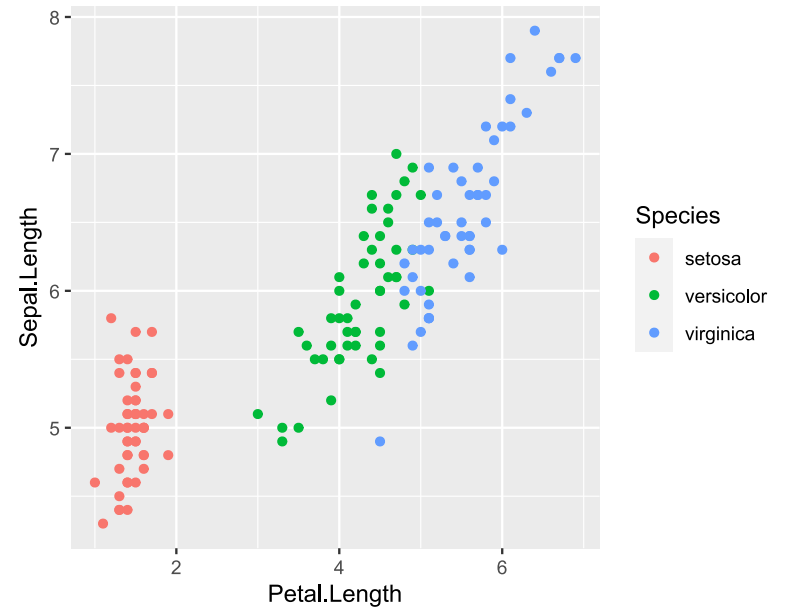
roy.francis@nbis.se

# ggplot2 vs Base Graphics

```
plot(iris$Petal.Length,iris$Petal.Width,  
     col=c("red","green","blue")[iris$Species],  
     pch=c(0,1,2)[iris$Species])  
legend(x=1,y=2.5,  
       legend=c("setosa","versicolor","virginica"),  
       pch=c(0,1,2),col=c("red","green","blue"))
```



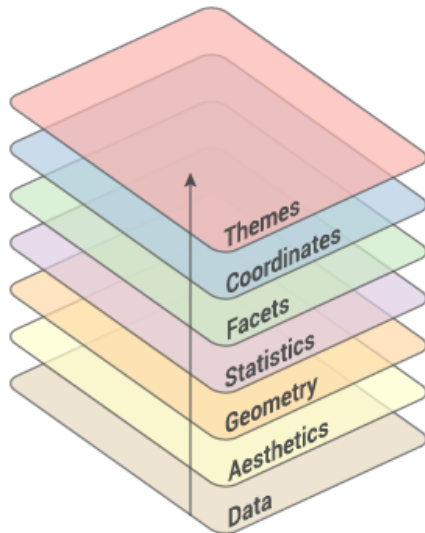
```
ggplot(iris,aes(Petal.Length,Sepal.Length,color=Species))  
geom_point()
```



# Grammar Of Graphics



- **Data:** Input data
- **Geom:** A geometry representing data. Points, Lines etc
- **Aesthetic:** Visual characteristics of the geometry. Size, Color, Shape etc
- **Scale:** How visual characteristics are converted to display values
- **Statistics:** Statistical transformations. Counts, Means etc
- **Coordinates:** Numeric system to determine position of geometry. Cartesian, Polar etc
- **Facets:** Split data into subsets



# Building A Graph: Syntax

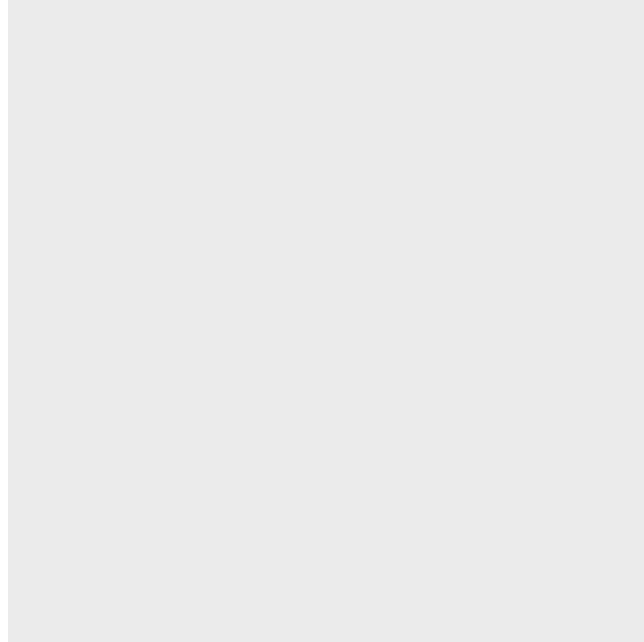
```
ggplot (data = <DATA>) +  
  <GEOM_FUNCTION> (mapping = aes(<MAPPINGS>),  
    stat = <STAT>, position = <POSITION>) +  
  <COORDINATE_FUNCTION> +  
  <FACET_FUNCTION> +  
  <SCALE_FUNCTION> +  
  <THEME_FUNCTION>
```

required

Not required, sensible defaults supplied

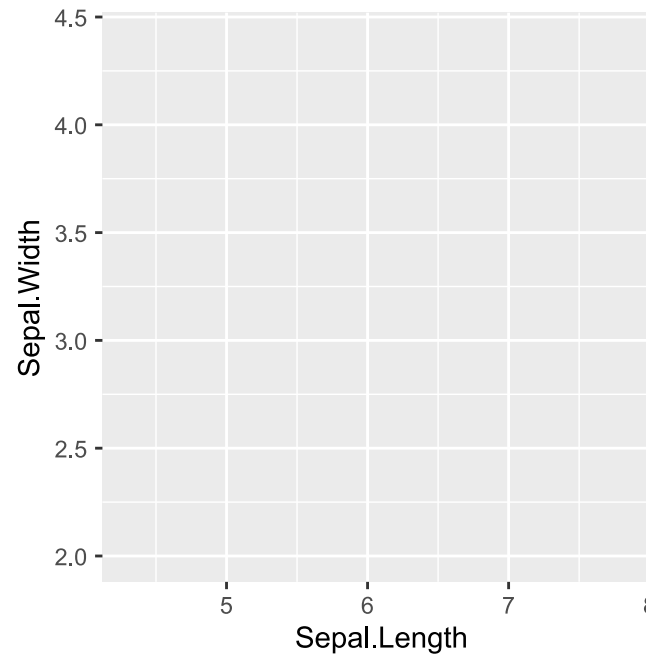
# Initialise data

```
library(ggplot2)  
ggplot(iris)
```



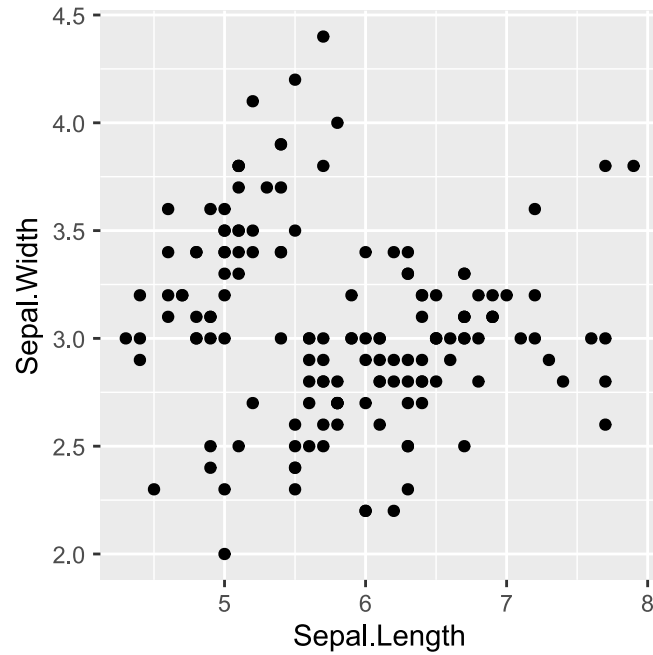
# Map variables to axes

```
ggplot(iris,aes(x=Sepal.Length,  
                y=Sepal.Width))
```



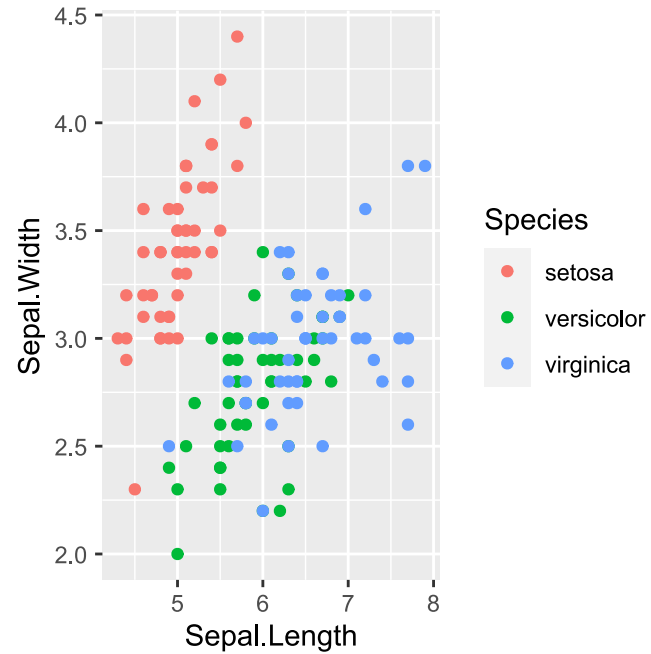
# Set geometry

```
ggplot(iris,aes(x=Sepal.Length,  
                y=Sepal.Width))+  
  geom_point()
```



# Map variable to colour

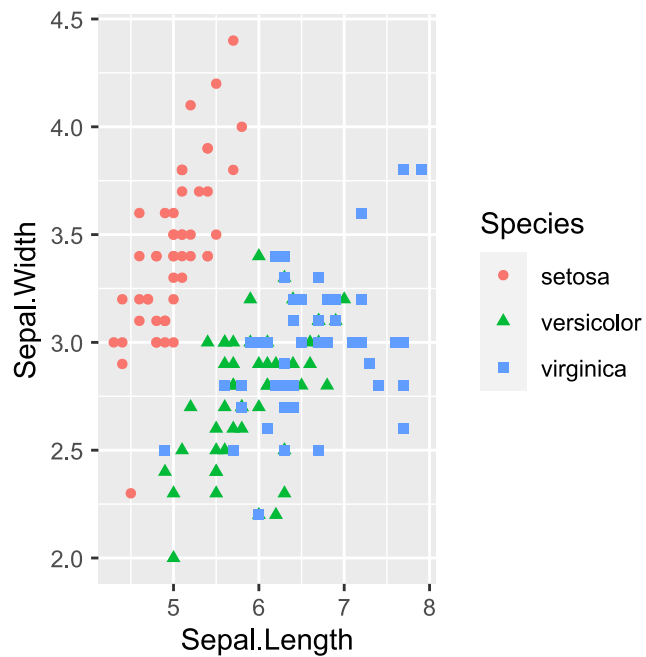
```
ggplot(iris,aes(x=Sepal.Length,  
                y=Sepal.Width,  
                colour=Species))+  
geom_point()
```





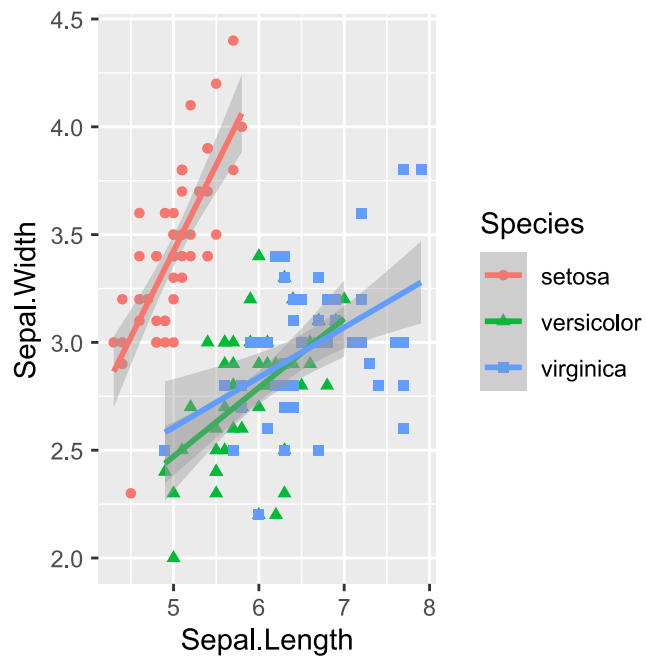
# Map variable to shape

```
ggplot(iris,aes(x=Sepal.Length,  
                y=Sepal.Width,  
                colour=Species,  
                shape=Species))+  
  geom_point()
```



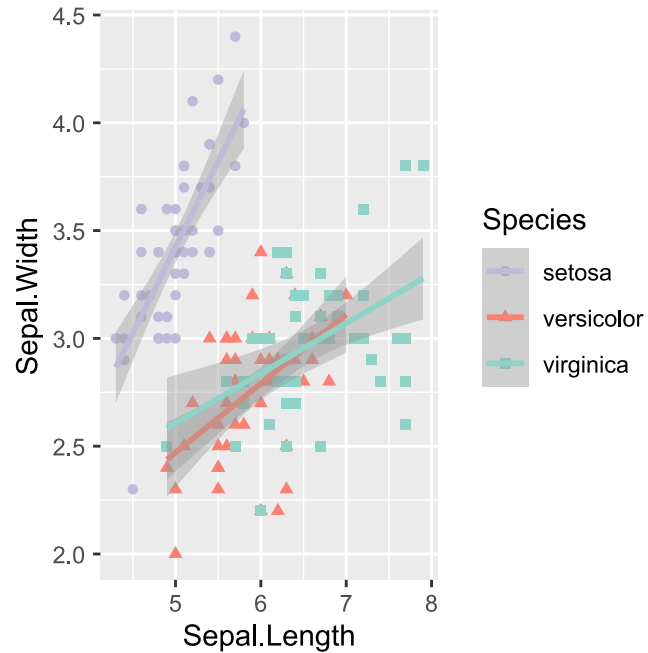
# Add more geometries

```
ggplot(iris,aes(x=Sepal.Length,  
               y=Sepal.Width,  
               colour=Species,  
               shape=Species))+  
  geom_point()+  
  geom_smooth(method="lm")
```



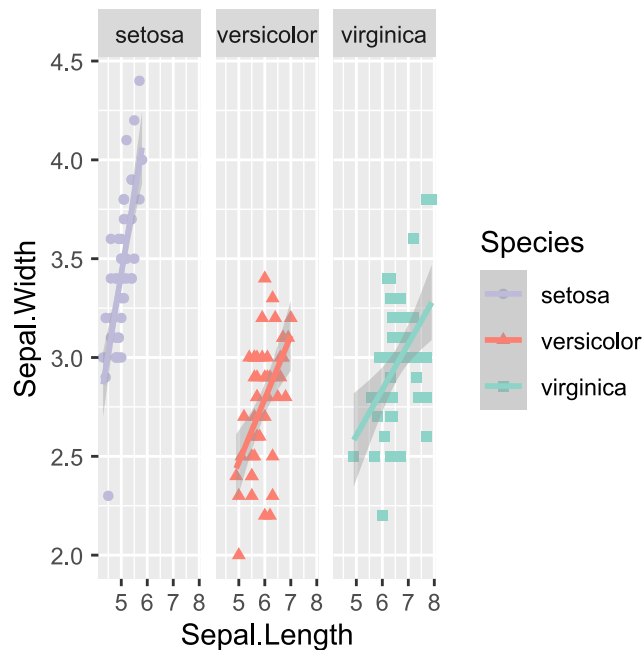
# Set custom colour scale

```
ggplot(iris,aes(x=Sepal.Length,  
               y=Sepal.Width,  
               colour=Species,  
               shape=Species))+  
  geom_point()+  
  geom_smooth(method="lm")+  
  scale_colour_manual(values=c("#bebad8",  
                               "#e41a1c",  
                               "#377eb8"))
```



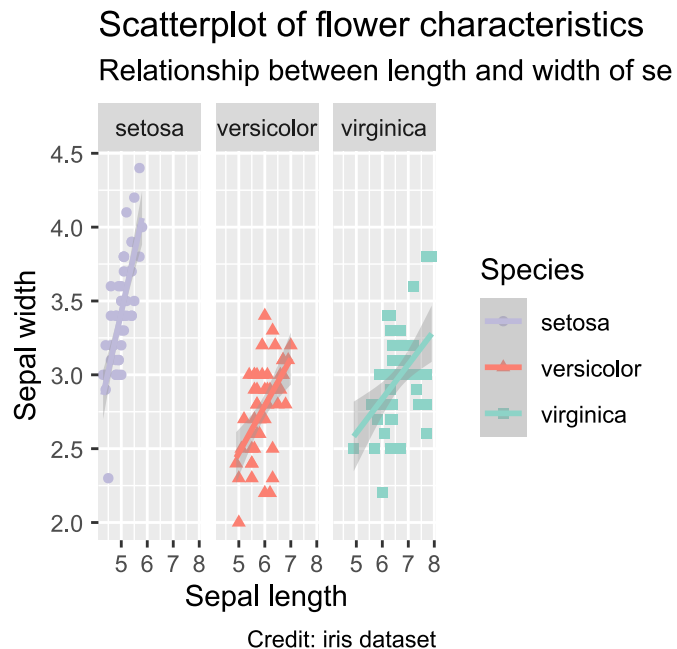
# Subplots using facetting

```
ggplot(iris,aes(x=Sepal.Length,  
               y=Sepal.Width,  
               colour=Species,  
               shape=Species))+  
  geom_point()+  
  geom_smooth(method="lm")+  
  scale_colour_manual(values=c("#bebad3",  
                               "#e41a1c",  
                               "#377eb8"))+  
  facet_wrap(~Species)
```



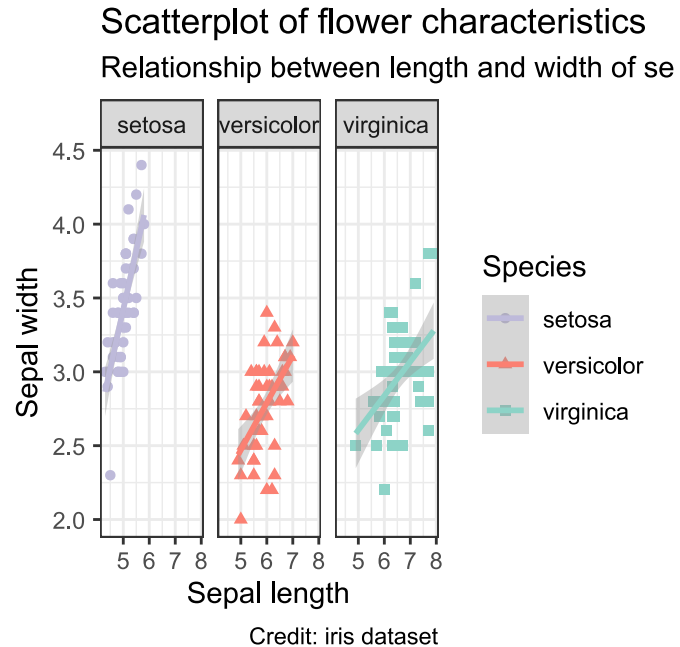
# Set labels

```
ggplot(iris,aes(x=Sepal.Length,  
               y=Sepal.Width,  
               colour=Species,  
               shape=Species))+  
  geom_point()+  
  geom_smooth(method="lm")+  
  scale_colour_manual(values=c("#bebada",  
                               "#f4a582",  
                               "#d73027"))+  
  facet_wrap(~Species)+  
  labs(x="Sepal length",y="Sepal width",  
       title="Scatterplot of flower characteristics",  
       subtitle="Relationship between length and width of sepal",  
       caption="Credit: iris dataset")
```



# Change theme

```
ggplot(iris,aes(x=Sepal.Length,  
               y=Sepal.Width,  
               colour=Species,  
               shape=Species))+  
  geom_point()+  
  geom_smooth(method="lm")+  
  scale_colour_manual(values=c("#bebad0",  
                                "#e41a1c",  
                                "#b2df8a"))+  
  facet_wrap(~Species)+  
  labs(x="Sepal length",y="Sepal width",  
       title="Scatterplot of flower characteristics",  
       subtitle="Relationship between length and width of sepal",  
       caption="Credit: iris dataset")+  
  theme_bw()
```

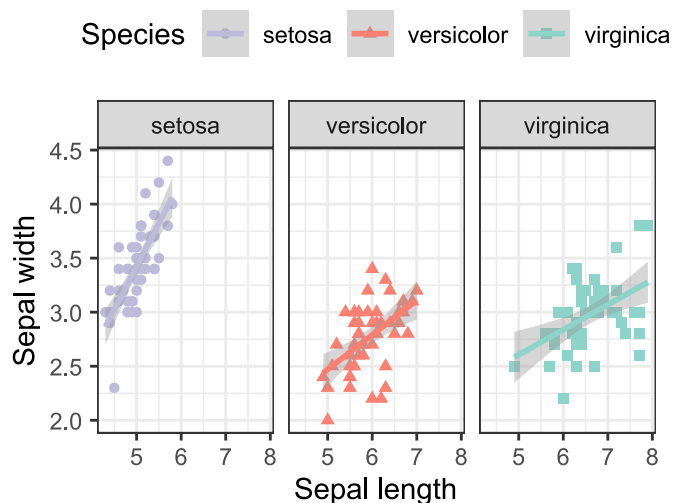


# Customise theme elements

```
ggplot(iris,aes(x=Sepal.Length,  
               y=Sepal.Width,  
               colour=Species,  
               shape=Species))+  
  geom_point()+  
  geom_smooth(method="lm")+  
  scale_colour_manual(values=c("#bebad6",  
                               "#e41a1c",  
                               "#b2df8a"))+  
  facet_wrap(~Species)+  
  labs(x="Sepal length",y="Sepal width",  
       title="Scatterplot of flower characteristics",  
       subtitle="Relationship between length and width of sepal",  
       caption="Credit: iris dataset")+  
  theme_bw()+  
  theme(legend.position="top",  
        plot.caption=element_text(size=10,weight="bold"))
```

## Scatterplot of flower characteristics

Relationship between length and width of sepal



Credit: iris dataset

# Thank you! Questions?

Graphics from  freepik.com

Created: 23-Sep-2021 • Roy Francis • SciLifeLab • NBIS

