R Class Descriptions (Advanced) with Learning Objectives

Doug Joubert

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Table of contents

[Data Visualization in R: Customization in ggplot 1](#_Toc143245010)

[Description 2](#_Toc143245011)

[Learning Objectives 2](#_Toc143245012)

[Assumptions for This Class 3](#_Toc143245013)

[Data Visualization in R: ggplot 1](#_Toc143245014)

[Description 1](#_Toc143245015)

[Learning Objectives 2](#_Toc143245016)

[Assumptions for This Class 2](#_Toc143245017)

[Data Visualization in ggplot: Visualizing Relationships and Linear Regression 3](#_Toc143245018)

[Description 3](#_Toc143245019)

[Learning Objectives 3](#_Toc143245020)

[Assumptions for This Class 3](#_Toc143245021)

[Introduction to Bioconductor 4](#_Toc143245022)

[Description 4](#_Toc143245023)

[Learning Objectives 4](#_Toc143245024)

[Assumptions for This Class 4](#_Toc143245025)

[Working with Data in Bioconductor 5](#_Toc143245026)

[Description 5](#_Toc143245027)

[Learning Objectives 5](#_Toc143245028)

[Assumptions for This Class 5](#_Toc143245029)

# Data Visualization in ggplot

## Description

This class provides a basic overview of creating plots using ggplot. ggplot is a part of the Tidyverse, a [collection of R packages](https://www.tidyverse.org/packages) designed for data science. This class will focus on identifying the appropriate packages for plotting, defining plot aesthetics, and demonstrating how to add layers to ggplot graphs. Participants are encouraged to install [R](https://mirrors.nics.utk.edu/cran/), [RStudio](https://www.rstudio.com/products/rstudio/download/), and the [tidyverse](https://www.tidyverse.org/) package, before the class so that they can follow along with the instructor. **You must have taken Introduction to R and RStudio class to be successful in this class**. By the end of this class, participants should be able to discuss the connection between data, aesthetics, & the grammar of graphics, describe how ggplot works, and define geoms and distinguish between individual geoms and collective geoms

## Assumptions for This Class

This class makes a few assumptions about your understanding of R and RStudio. Specifically, you have:

1. Installed [R](https://cran.r-project.org/) and [RStudio](https://www.rstudio.com/products/RStudio/#Desktop)
2. Experience with R and RStudio. If not, here are some resources for getting started:
   1. [Introduction to R and RStudio](https://carpentries-incubator.github.io/R-ecology-lesson-alternative/introduction-r-rstudio.html)
   2. [A Few Notes to Get Started with R](https://rcompanion.org/rcompanion/a_06.html)
   3. [Getting started with R and RStudio](http://rafalab.dfci.harvard.edu/dsbook/getting-started.html)
3. Experience creating scripts and/or markdown files.

# Data Visualization in ggplot: Customizations

## Description

This class provides an overview of options for customizing a ggplot graph. This class will focus on methods for creating small multiples, options for customizing a graph, and how to apply ggplot themes. Participants will need to install [R](https://mirrors.nics.utk.edu/cran/), [RStudio](https://www.rstudio.com/products/rstudio/download/), and the [tidyverse](https://www.tidyverse.org/) package before the class in order to follow along with the instructor. By the end of this class, participants should be able to describe options for time series data, create a line plot in ggplot, learn how to facet a plot, demonstrate options for customizing the title and axis, and apply different ggplot themes. **You must have taken Data Visualization in R: ggplot class to be successful in this class**.

## Assumptions for This Class

This class makes a few assumptions about your understanding of R and RStudio. Specifically, you have:

1. Installed [R](https://cran.r-project.org/) and [RStudio](https://www.rstudio.com/products/RStudio/#Desktop)
2. Experience with R and RStudio. If not, here are some resources for getting started:
   1. [Introduction to R and RStudio](https://carpentries-incubator.github.io/R-ecology-lesson-alternative/introduction-r-rstudio.html)
   2. [A Few Notes to Get Started with R](https://rcompanion.org/rcompanion/a_06.html)
   3. [Getting started with R and RStudio](http://rafalab.dfci.harvard.edu/dsbook/getting-started.html)
3. Experience creating scripts and/or markdown files.

# Data Visualization in ggplot: Visualizing Relationships and Linear Regression

## Description

This class provides an overview of the methods used to visualize the association among two or more quantitative variables. This class will focus on scatterplots, scatterplot matrix, and visualizing paired data. Upon completion of this class, participants should be able to define bivariate data, create a scatterplot using ggplot, define linear regression, and demonstrate how to perform a simple linear regression in R. **You must have taken Data Visualization in R: ggplot class to be successful in this class**.

## Assumptions for This Class

This class makes a few assumptions about your understanding of R and RStudio. Specifically, you have:

1. Installed [R](https://cran.r-project.org/) and [RStudio](https://www.rstudio.com/products/RStudio/#Desktop)
2. Experience with R and RStudio. If not, here are some resources for getting started:
   1. [Introduction to R and RStudio](https://carpentries-incubator.github.io/R-ecology-lesson-alternative/introduction-r-rstudio.html)
   2. [A Few Notes to Get Started with R](https://rcompanion.org/rcompanion/a_06.html)
   3. [Getting started with R and RStudio](http://rafalab.dfci.harvard.edu/dsbook/getting-started.html)
3. Experience creating scripts and/or markdown files.

# Introduction to Bioconductor

## Description

This class will provide an overview of Bioconductor. We will learn how to identify Bioconductor packages that are appropriate for a project, explore package documentation, and demonstrate how to download and install R packages from Bioconductor.

Upon completion of this class participants should be able to describe what the Bioconductor project comprises, navigate the Bioconductor website to find packages for a particular task, install and update Bioconductor package, open a package vignette and practice running through the examples that they contain, and ensure that they are using the correct version of R to work with packages.

## Assumptions for This Class

This class makes a few assumptions about your understanding of R and RStudio. Specifically, you have:

1. Installed [R](https://cran.r-project.org/) and [RStudio](https://www.rstudio.com/products/RStudio/#Desktop)
2. Experience with R and RStudio. If not, here are some resources for getting started:
   1. [Introduction to R and RStudio](https://carpentries-incubator.github.io/R-ecology-lesson-alternative/introduction-r-rstudio.html)
   2. [A Few Notes to Get Started with R](https://rcompanion.org/rcompanion/a_06.html)
   3. [Getting started with R and RStudio](http://rafalab.dfci.harvard.edu/dsbook/getting-started.html)
3. Experience creating scripts and/or markdown files.

# Working with Data in Bioconductor

## Description

This class will provide an overview of common Bioconductor datatypes and explore options for working with biological sequence data.  Specifically, this class will focus on the object types for storing and manipulating genomic features and sequences.

Upon completion of this class participants should be able to locate resources on S4Vector classes, understand the standard R datatypes, list the 6 basic Bioconductor classes, and iscuss methods for working with biological sequences.

## Assumptions for This Class

This class makes a few assumptions about your understanding of R and RStudio. Specifically, you have:

1. Installed [R](https://cran.r-project.org/) and [RStudio](https://www.rstudio.com/products/RStudio/#Desktop)
2. Experience with R and RStudio. If not, here are some resources for getting started:
   1. [Introduction to R and RStudio](https://carpentries-incubator.github.io/R-ecology-lesson-alternative/introduction-r-rstudio.html)
   2. [A Few Notes to Get Started with R](https://rcompanion.org/rcompanion/a_06.html)
   3. [Getting started with R and RStudio](http://rafalab.dfci.harvard.edu/dsbook/getting-started.html)
3. Experience creating scripts and/or markdown files.