

Interuniversity Institute for Biostatistics
and statistical Bioinformatics



Development of a robust E-learning system in (Bio)Statistics and data science using R & R Markdown

Ziv Shkedy

Hasselt University, Belgium

International symposium on current trends in modeling and software development in
data science and Statistics

Cape Town, South Africa

20/02/24-23/02/24



ER-BioStat

<https://erbiostat.wixsite.com/erbiostat>

GitHub <https://github.com/eR-Biostat>

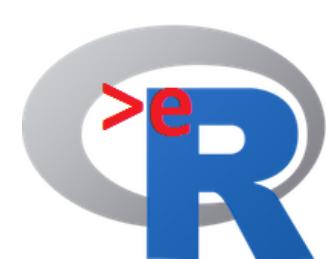
[@erbiostat](#)

The >eR-Biostat Initiative

- >eR-Biostat = E-learning system using R ((bio)statistics)
- Introduction to the workshop.
- A short introduction to the >eR-BioStat platform.

The >eR-Biostat initiative is a part of a past and an ongoing VLIR-UOS project.





The >eR-BioStat project & platform: the workshop on 20/02 & 21/02

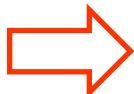
Our new website

<https://erbiostat.wixsite.com/erbiostat>

The workshop 20/02-21/02

20/02 + 21/02 in the afternoon:

Introduction to statistical modeling and output development using R.



21/02 in the morning:

Development of E-learning platform using R.



Introduction to statistical modeling and output development using R.

20/02 + 21/02 in the morning:

Statistics & data science education in South Africa and SSA.

A case study (from SAMRC) that was analyzed using R.

The workshop 20/02-21/02

- Statistics and data science in South Africa & Botswana:
 - Today:
 - Legesse Debusho (UNISA, South Africa).
 - Peter Njuho (University of Zululand, South Africa).
 - Caston Sigauke (University of Venda, South Africa).
 - Tomorrow:
 - Graceful Mulenga (Botswana international University of Science and Technology).
 - Peter Nyasulu and Innocent Maposa (Stellenbosch University, South Africa).
 - Nobuhle Mchunu (SAMRC, South Africa).

20/02 + 21/02 in the morning:

Statistics & data science education in South Africa and SSA.

A case study (from SAMRC) that was analyzed using R.

The workshop 20/02-21/02

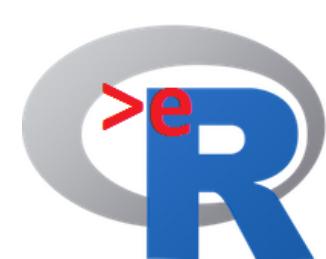
- For the R course:
 - Very basic knowledge in R.
 - Statistics: Simple linear regression, logistic regression, ANOVA.

The workshop 20/02-21/02

- Rudradev's course:
 - Today: Statistical modeling in R + R markdown and R Studio.
 - Tomorrow: Dashboard development in R.
- My course:
 - Development of products for an E-learning platform using R:
 - Today: introduction of the >eR-BioStat ITP project.
 - Tomorrow: how to use R to develop education products for an online system (example of a linear regression course).

The workshop 20/02-21/02

- All materials are available online:



The >eR-BioStat : short introduction about the ITP project

Our new website

<https://erbiostat.wixsite.com/erbiostat>

The >eR-BioStat ITP project

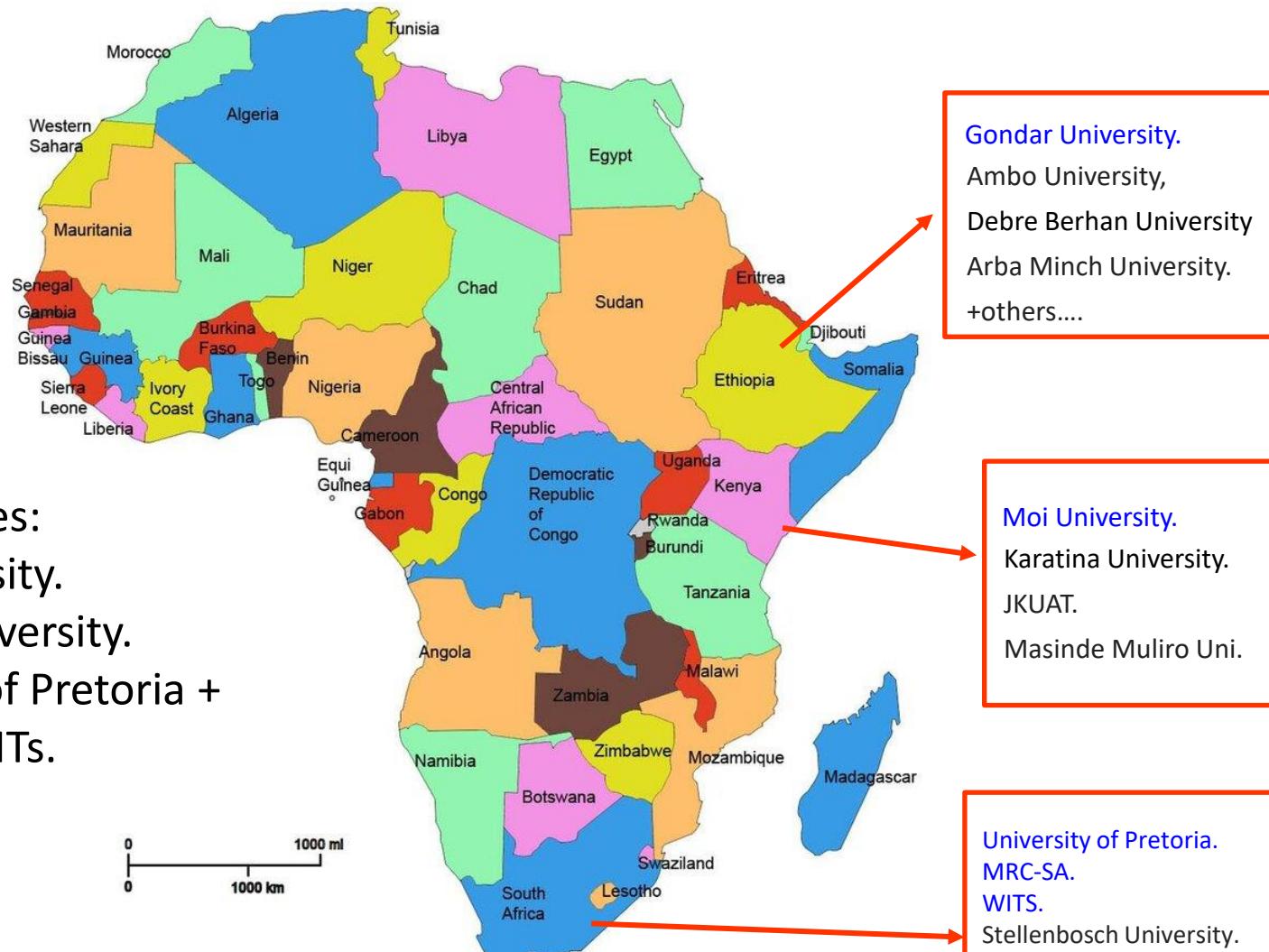
- A 3 years project (24/25/26).
- ITP: International Training Program.
- Focus: Development of (local) E-learning and digital education platforms for (bio)statistics & data science.
- All levels of HE:
 - Undergraduate.
 - Graduate.
 - Service courses for non statisticians.

Project's structure

- Three years project.
- Three countries:
 - Kenya.
 - Ethiopia.
 - South Africa.
- In total: 14+ Universities & institutes from the three countries.
- International team: USA, Canada Belgium.



Project's partners



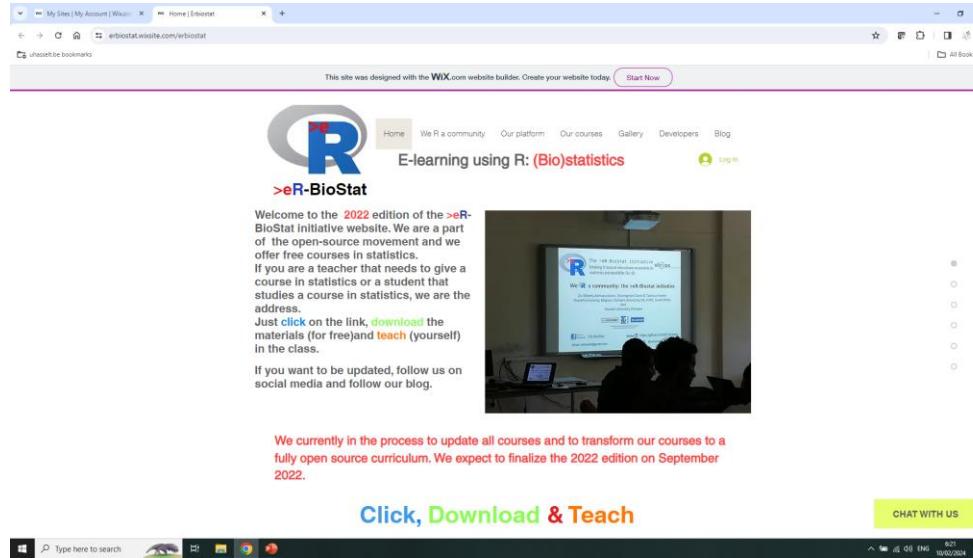
- Leading institutes:
 - Moi University.
 - Gondar University.
 - University of Pretoria + SA-MRC, WITs.

Project's objectives

- Development of (local) networks of universities in Kenya, Ethiopia, South Africa that use the digital platform for statistics & DS.
- Training of local academic staff to create their own contents & websites.
- Establish international network to support local universities.
- The project is designed to support young academic staff in university with low capacity in statistics & DS.

Deliverable

- The >eR-BioStat website:
 - A website that offers a collection of free courses in statistics and data science.
- Updated the global version of <https://erbiostat.wixsite.com/erbiostat>.
- Development of a Local version of the >eR-BioStat website.
- “Editorial board” for the website.

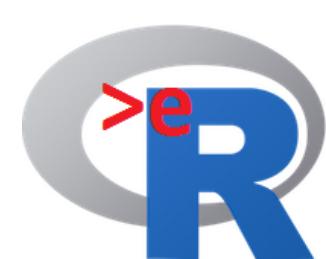


Activities

- From 01/24 to 12/26, workshops for training in the local universities:
 - 3 workshops per country (we aim for one per year) = 9 workshops in total.
 - Up to a 10 days workshop.
 - ~20 participants (local & international): for the partner institutes + others.
- Workshops will be located in the leading partners.
- If needed, online workshops (~3).

Project duration and activities

- Sponsor: VLIR-UOS.
- Three academic years: 23/24, 24/25 & 25/26.
- First workshop: Gondar (14/08/2023).
- First workshop: SA-MRC, cape town (end of February 24: workshop + conference).
- Second workshop: Moi University, Kenya.
- ...
- ...



The >eR-BioStat ITP project: project's structure

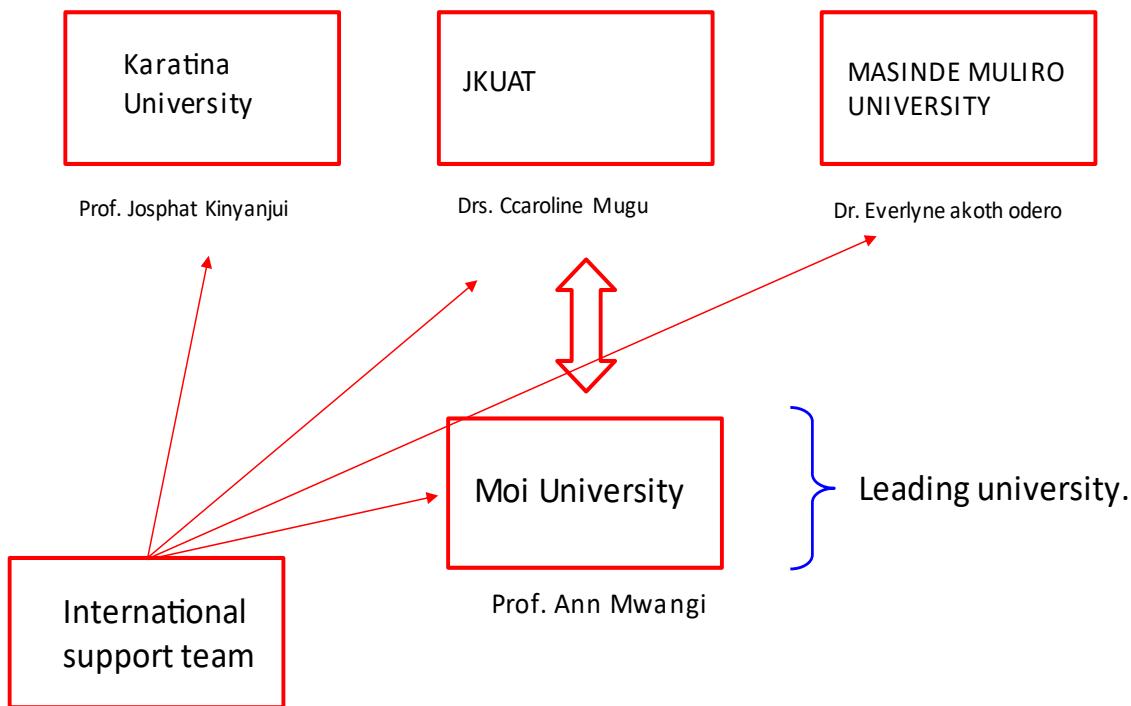
Our new website

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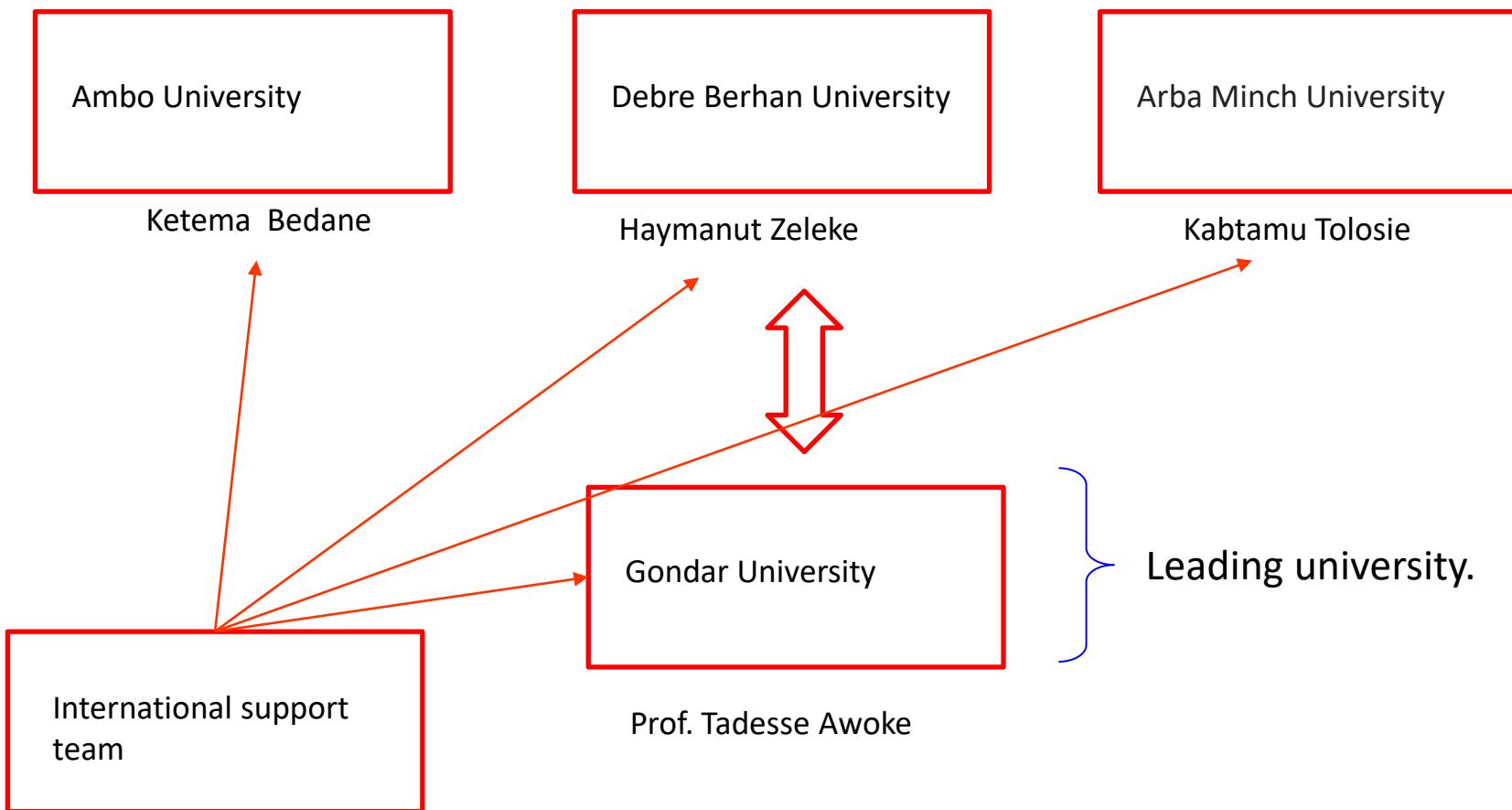
Collaborators network (South partners)

- Kenya:
 - [Moi University.](#)
 - Karatina University, The Department of Mathematics, Statistics and Actuarial Science.
 - Jomo Kenyatta University of Agriculture and Technology (JKUAT) ,The department of Statistics and actuarial science.
 - Masinde Muliro University of Science and Technology, department of statistics.
- Ethiopia:
 - [Gondar University.](#)
 - Ambo University, The department of statistics.
 - Arba Minch University, The Department of Statistics.
 - Debre Berhan University (DBU), Statistics Department.
- South Africa:
 - [University of Pretoria.](#)
 - [MRC-SA.](#)
 - [WITS.](#)
 - Stellenbosch University (SU), the division of epidemiology and biostatistics.
 - The University of Venda, The Department of Mathematical and Computational Sciences.
 - The University of Zululand (UNIZULU), The Department of Mathematical Science.

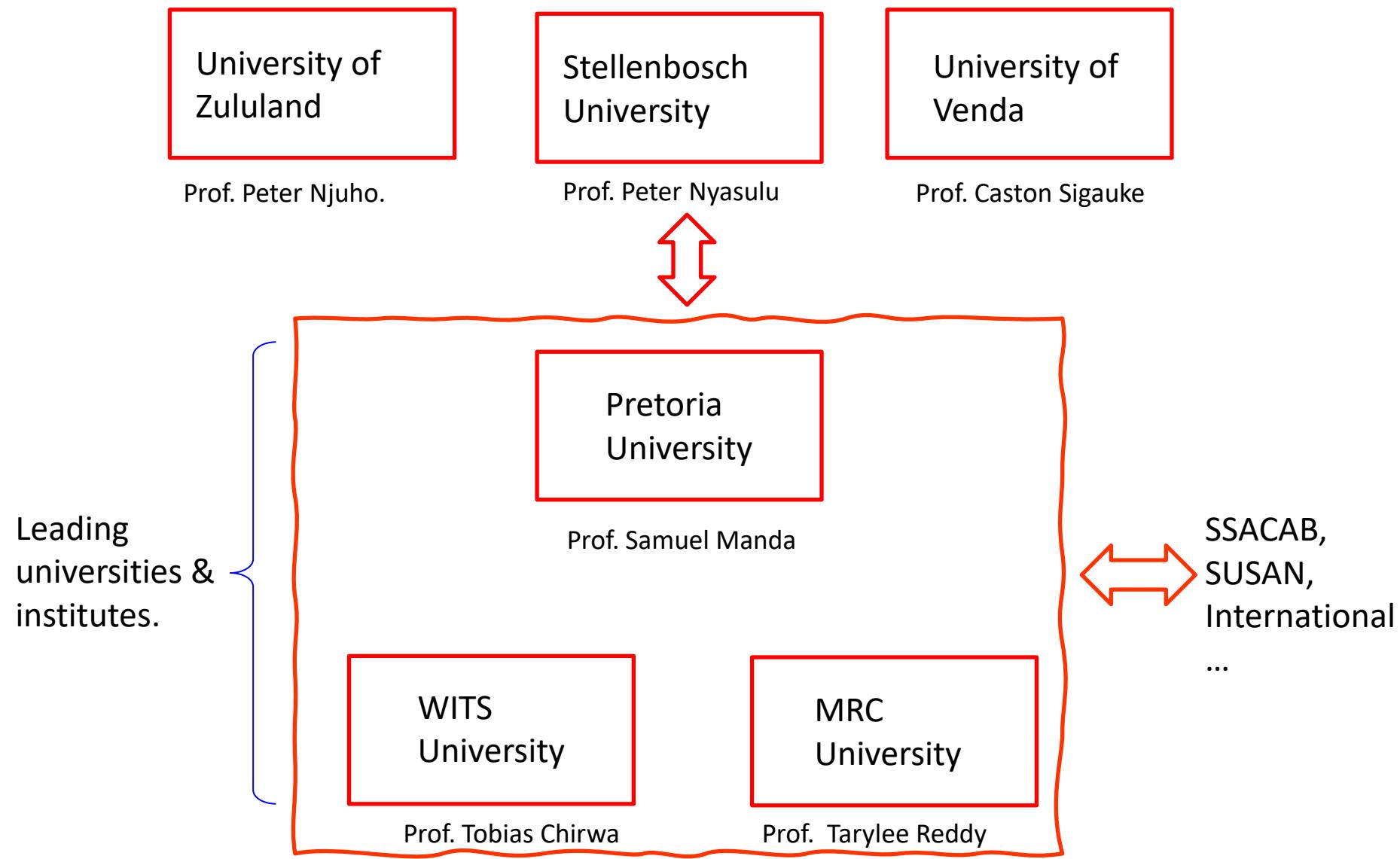
Collaborators network (Kenya)



Collaborators network (Ethiopia)



Collaborators network (South Africa)

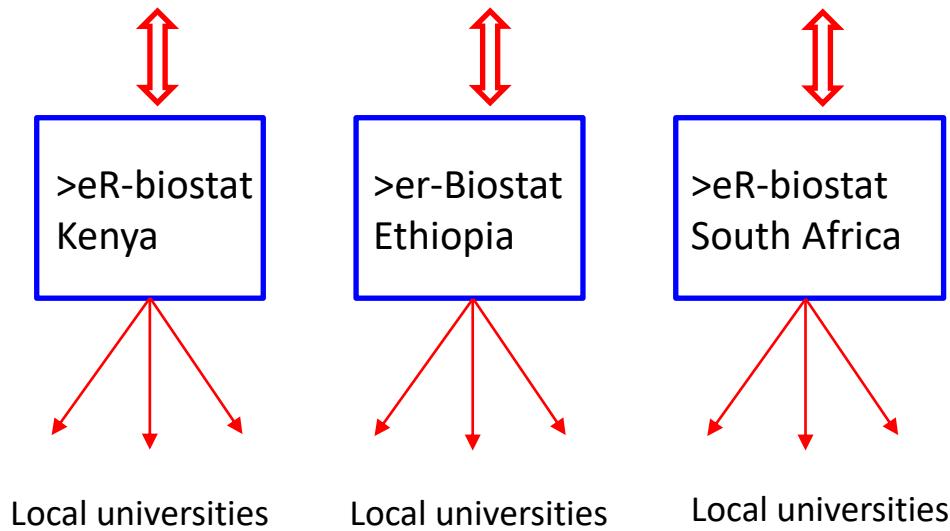


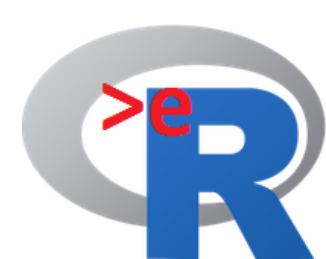
Collaborators network (International)

- Existing collaboration links among partners:



Online structure





The >eR-BioStat platform: a short introduction and main concepts

Our new website

<https://erbiostat.wixsite.com/erbiostat>

Motivation

- Low capacity in some developing countries in education in biostatistics/statistics.
- Reasons:
 - Young teaching stuff (usually with master degrees).
 - Small number of PhD holders.
 - Lack of high quality materials for master programs.
 - Academic staff is not always updated in the current methods/software available.
- Result:
 - Difficult to maintain the level education programs at a high level.

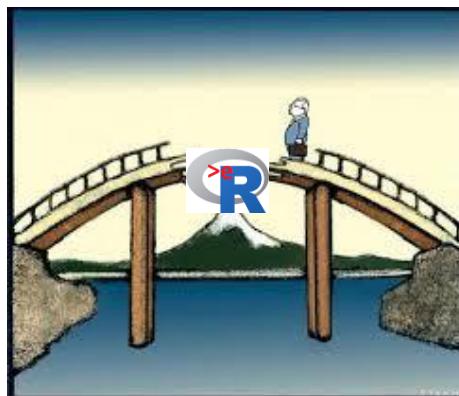
Digital education & E-learning

- We **DO NOT** develop online education program but we develop **online materials for on campus** education.
- The E-learning Initiative aims to **support on campus programs** by:
 - Develop accessible course materials in (bio)statistics.
 - Focus on **all education levels**:
 - Undergraduate & master programs, PhD schools.
 - Statisticians & non statisticians.
 - Bring students and teachers costs to minimum by providing **free, high quality and applied** course materials.

We >^eR a community

- Build up communities (in south & north).
- Create a bridge between communities:

Academic staff and students in the south.



Development of E-learning capacity

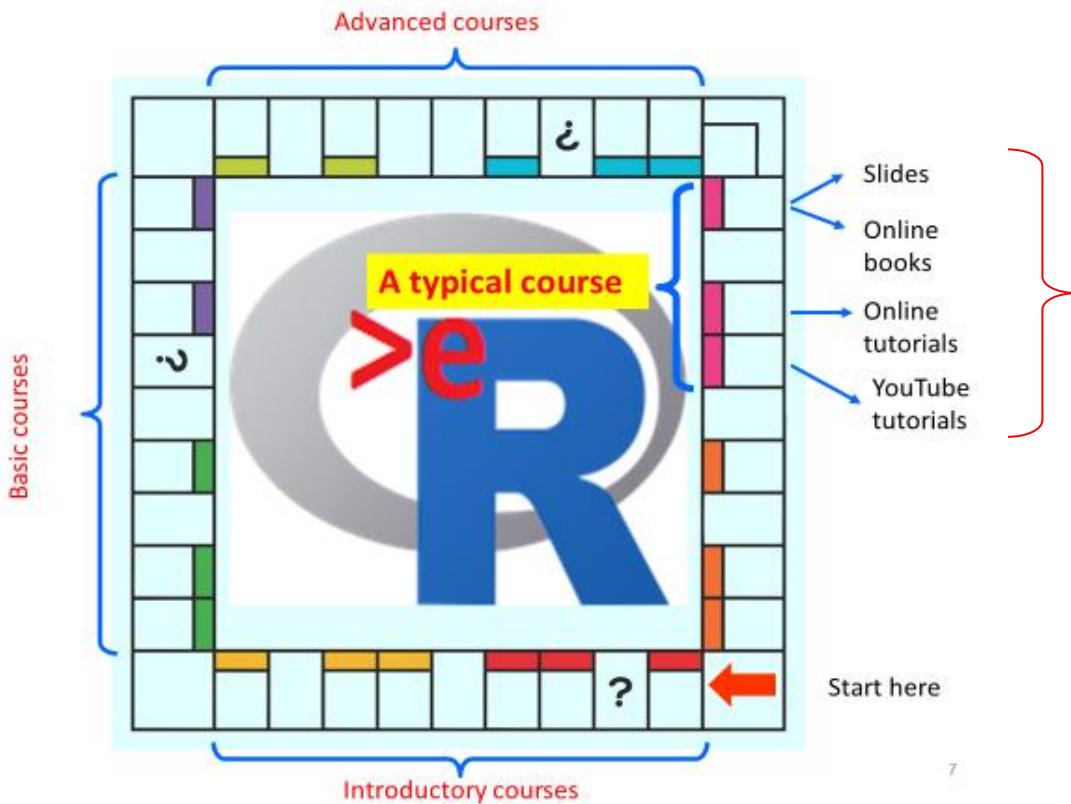
Academic staff in the north.

Concepts

- The E-learning system consists of few components:
 1. All course materials are available to the students/teachers online to download.
 - Can be used **online or offline.**
 2. Selected courses were/will be developed.
 3. Courses can be used either as a complete course or a part of a course.
 4. Courses developed up to a class level, i.e. courses are ready to be given in the class.

Typical course structure

- Courses in three levels: introductory, basic & advanced.
- What does it means “fully develop a course...” ?



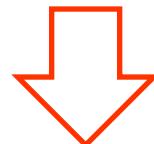
- Course materials are ready to be used in class.
- **Open source policy !!!**

Our approach (1): **free and publically available**

- Reduce costs to zero !!!
- Use publicly available products:
 - Storage course materials: GitHub (<https://github.com/>).
 - Website development: WIX (<https://www.wix.com/>).
 - Software: mostly publicly available software.
 - For example:
 - R (<https://www.r-project.org/>).
 - Python (<https://www.python.org/>).



All publicly
available
products.

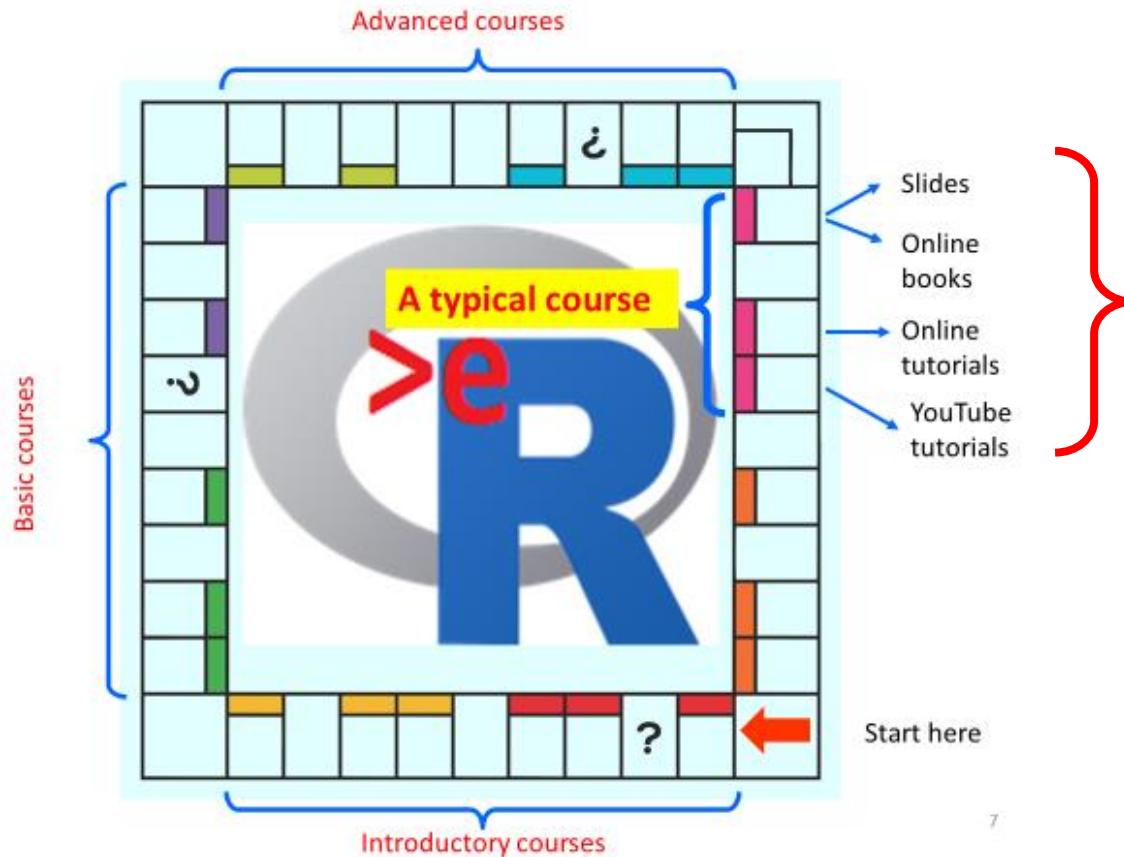


- Free for users(=students/teachers in the south):
 - No password.
 - No registration.

Our approach (2): open source

- For a given course, everything is available for free:
 - Slides for the class (pdf).
 - Source files to make the slides (PP, Tex, Rmd...) !!!
 - YouTube tutorials.
 - Software programs for the examples in the course.
 - Free for users:
 - No password.
 - No registration.
- 
- All publicly available.

Our approach (3): Communities



- All source materials are available for **FRRE** online.
- Everybody can download and use.
- Course materials **can be adapted** by the users for the local needs.

- Communities of users: students & teachers in the south &
- Communities of developers: in both south & north.

Concepts

- The E-learning system consists of few components:
 1. All course materials are available to the students/teachers online to download.
 2. Selected courses were developed.
 3. Courses will be either a complete course or a part of a course.

Few points to think about

- Communication:
 - How to deliver the course ?
 - Online/Offline ?
- Where to store the course materials ?
- How to get the course materials: a website ?
- For data analysis: which software ?
- Who will pay for the platform ?
- Who will develop a course ?

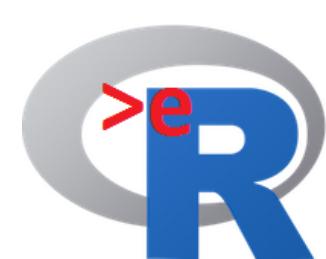
Our approach: free and publically available

- Reduce costs to zero !!!
 - Storage course materials: GitHub (<https://github.com/>).
 - Website: WIX (<https://www.wix.com/>).
 - Software: R (<https://www.r-project.org/>).
 - Free for users:
 - No password needed.
 - No registration.
- 
- All publically available products.

>eR-Biostat courses

(updated: 05/09/2021)

| | introductory | Basic | Modeling 1 | Modeling 2 | Inference | Data analysis |
|----------------|--|--------------------------------|-----------------------------------|--|-------------------------|---|
| R | Introduction to R | Statistical computing and EDA | | | | EDA for multivariate data Computer intensive methods and bootstrap |
| Modeling | 1. One-way ANOVA 2. Simple regression 3. Logistic regression | 1. Linear regression using R. | 1. Categorical analysis 2. GLM | 1. Survival analysis (two courses) 2. LDA | | |
| Inference | | Inference (1) Inference (2) | | | Sample size calculation | |
| In the future: | | | | | | |
| R | | | | | | |
| Modeling | | | Linear models | | Inference | Multivariate analysis |
| Inference | Introduction for applied statistics | | | | CPS ? | |

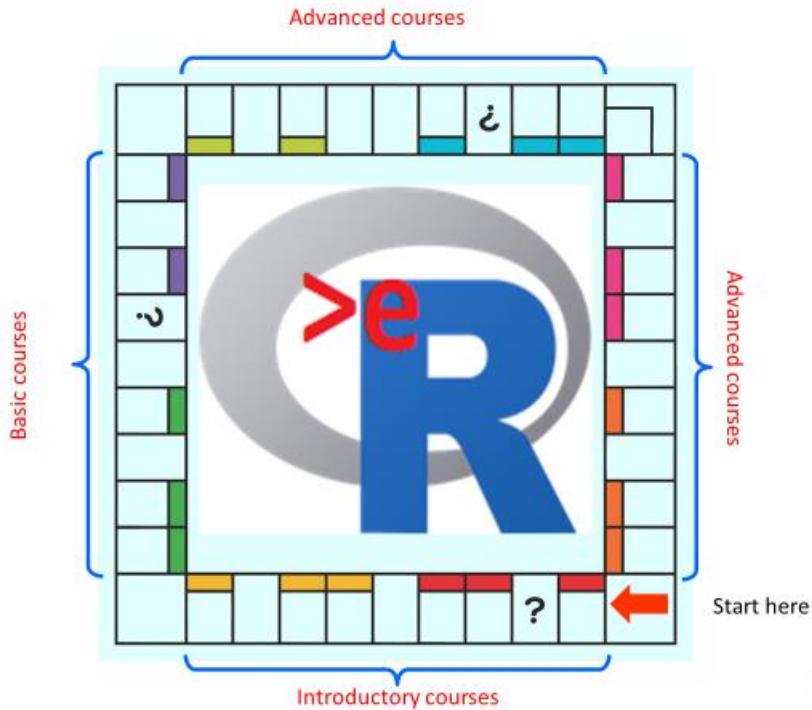


The >eR-BioStat platform: What do we offer ?

Our new website

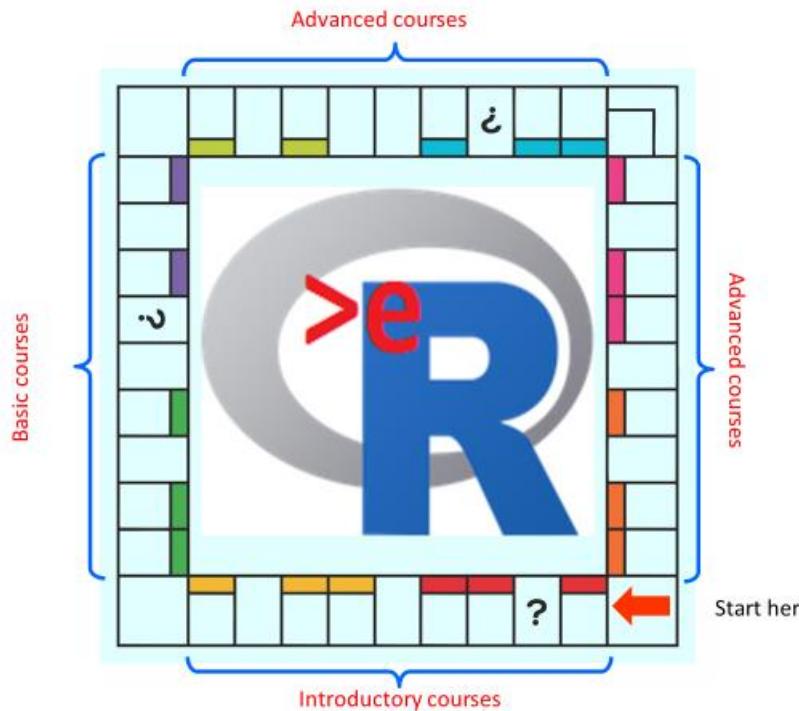
<https://erbiostat.wixsite.com/erbiostat>

Introductory courses



- Software and visualization:
 - Introduction to R.
 - Basic skills in visualization.

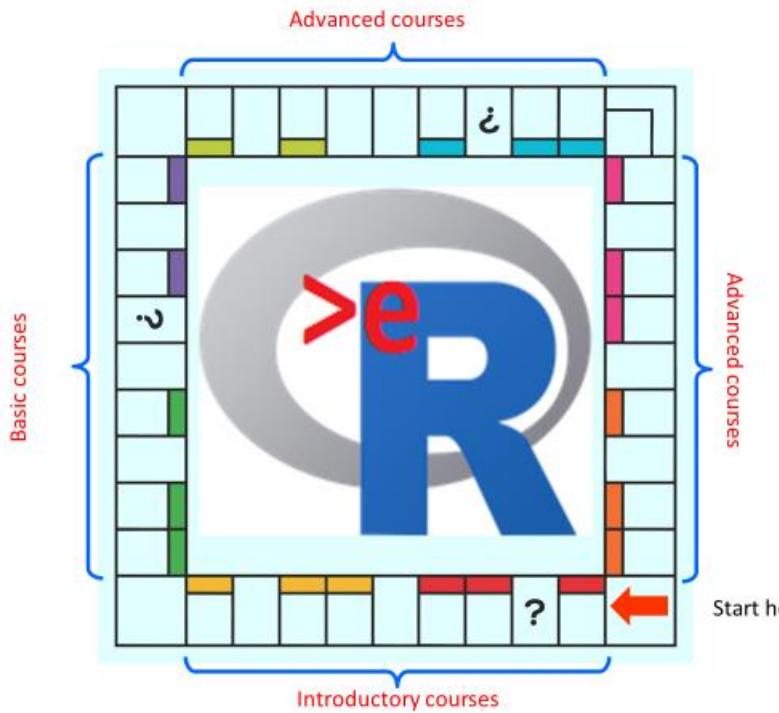
Introductory courses



- Modeling:
 - Introduction to statistical modeling using R.

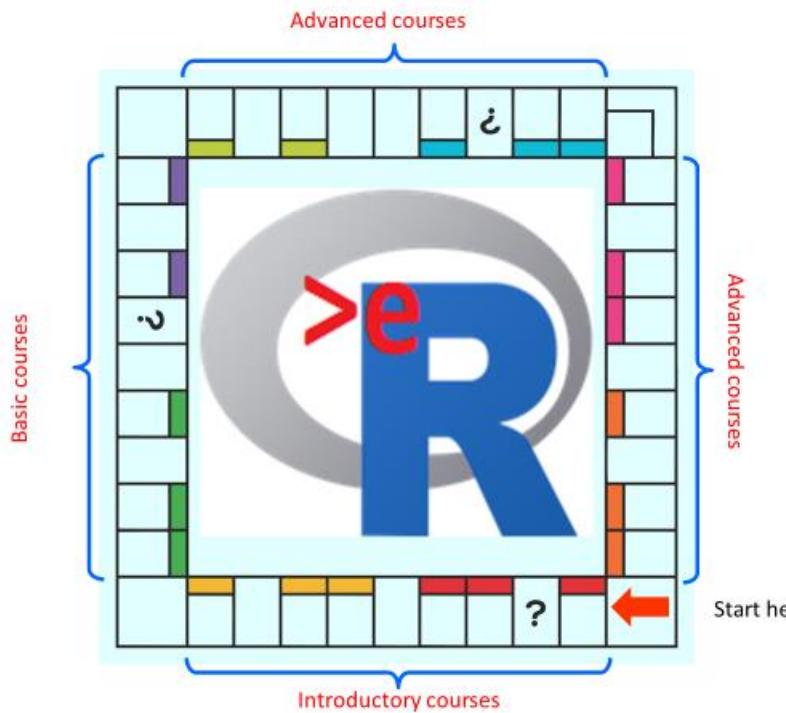


Advanced courses

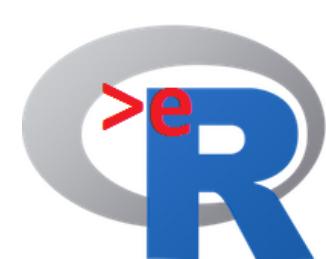


- Developed at a master level:
 - GLM.
 - Modeling binary data.
 - LDA.
 - Survival analysis.
 - Resampling based methods (bootstrap).
 - Sample size calculation.
 - EDA for multivariate data.

Basic courses



- Developed at an undergraduate level:
 - Basic inference.
 - Linear models.



The >eR-BioStat :

The >eR-BioStat : where to find us and what do we offer ?

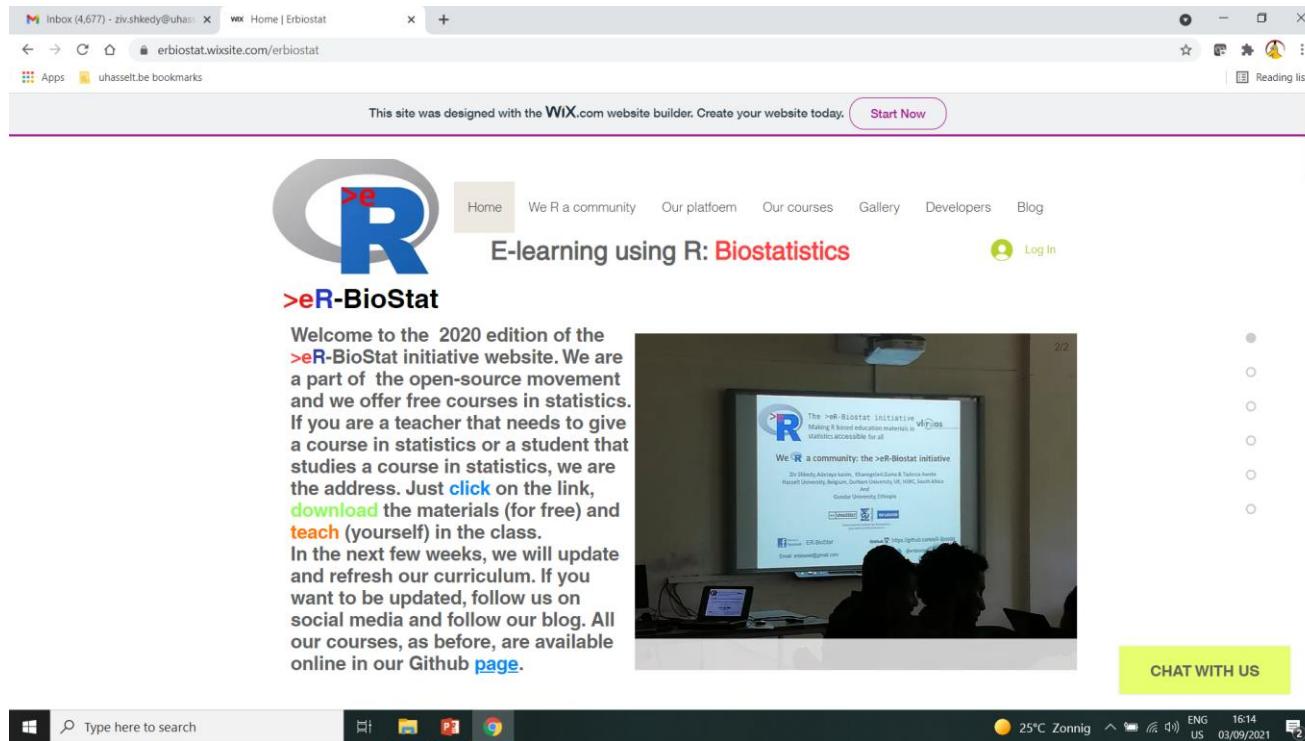
Our new website

<https://erbiostat.wixsite.com/erbiostat>

We R online

- We provide **an online and free** platform:

<https://erbiostat.wixsite.com/erbiostat>



Open source

The screenshot shows a web browser window with the URL erbiostat.wixsite.com/erbiostat. The page title is "Our platform".

Our courses: A blue circular icon with a computer monitor containing a graduation cap, labeled "Online Courses".

Courses' structure: A chart titled "Life Expectancy of Selected Countries in East Africa" showing life expectancy trends from 1960 to 2010 for Kenya, Tanzania, Uganda, Rwanda, and Burundi.

Open source: A graphic illustrating the concept of open source with various terms like "CONTENT", "CODE", "INTERNET", "DESIGNERS", "APPROPRIATION", "PRODUCER", "LICENSE", "PEER", and "EARTHERING".

Open source policy details:

- Our **open source policy** means that course materials, slides, programs for the examples discussed in the courses, are available for you. In some courses, source files for the presentations/course notes are available in PowerPoint or markdown files. Our aim is to have, as much as it is possible, a complete open source curriculum by the end of 2022.
- Courses marked with red sticker are fully open source.
- Courses marked with blue sticker are under development and not presented in their final version.

CHAT WITH US

At the bottom, the Windows taskbar shows the Start button, a search bar, pinned icons for File Explorer, Mail, and Google Chrome, and system status indicators for weather (25°C Zonnig), battery (ENG US 03/09/2021), and network.

- We provide the source files for the courses:
 - PPT/Tex/Rmds for slides.
 - Rmds and R programs.

Our courses

This screenshot shows a Wix website for 'Erbiostat' with a purple header bar. Below the header, a message from WIX.com encourages users to create their own website. The main content area features two sections: 'Introductory' and 'Advanced'. Each section contains a list of course titles, some of which are marked with blue or red dots. A green button at the bottom right says 'CHAT WITH US'.

Our courses

| Introductory | Advanced |
|--|---|
| Introduction to R | Applied Generalized Linear Models (GLM) using R |
| Statistical modeling: Linear regression using R | Modelling Binary Data using R |
| Statistical modeling: One-way ANOVA using R | Longitudinal data analysis (LDA) using R |
| Statistical modeling: Logistic regression using R | Linear models using R |
| Vizualizing data using R: an introduction | Survival Analysis using R |
| Introductory Statistics for the Life and Biomedical Sciences | An introduction to bootstrap using R |
| | Sample size calculation using R |

CHAT WITH US

- Courses are ready to be given in class.
- To select a course: click on the course name.

Example: introduction to R

This screenshot shows a Wix website for 'Erbiostat' featuring a course catalog for R programming.

The page includes a header with a 'Start Now' button and a note about the site being built with WIX.com. A green box highlights a note about courses being in development.

Our courses

Introductory

- Introduction to R
- Statistical modeling: Linear regression using R
- Statistical modeling: One-way ANOVA using R
- Statistical modeling: Logistic regression using R
- Vizualizing data using R: an introduction
- Introductory Statistics for the Life and Biomedical Sciences

Advanced

- Applied Generalized Linear Models (GLM) using R
- Modelling Binary Data using R
- Longitudinal data analysis (LDA) using R
- Linear models using R
- Survival Analysis using R
- An introduction to bootstrap using R
- Sample size calculation using R

CHAT WITH US

At the bottom, the Windows taskbar shows the search bar, pinned apps (File Explorer, Microsoft Edge, Powerpoint), system icons (battery, signal, volume), and the date/time (16/05/2022, 14:39).

Example: introduction to R

This site was designed with the **WIX.com** website builder. Create your website today. [Start Now](#)

Introduction to R
>eR-BioStat

Home About Topics Online book Contact

This course is an introductory course to R and can be given as a one/two-days workshop or as a course of 2-3 classes (3 hours per class). All topics in the course are presented at a basic level. Only a limited knowledge in R is required. Topics covered in the course include:

- Two sample t-test.
- Basic plots
- Basic programming in R: objects in R
- Reading external datasets
- Basic plots functions
- Programming in R: a for loop
- Statistical modeling in R: simple linear regression
- Statistical modeling in R: one-way ANOVA
- Statistical modeling in R: logistic regression
- Programming in R: user functions
- Two-way ANOVA
- Application of a for loop: bootstrap.
- The tidyverse package.

The course was developed as a **introductory level** course.

R version 3.6.1 (2019-05-16) -- "Good Sport"
Copyright (C) 2019 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/v4.0 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.
R is a trademark of The R Foundation for Statistical Computing.
Type 'citation()' for further information on R.
Type 'demo()' for some demos, 'help()' for on-line help,
'RFAQ()' for an frequently asked questions list,
Type 'q()' to quit R. R will never forget to hold its breath.

Errors had occurred for regular number (file may be corrupt)
in file 'airquality.RData'. Error in readBin(file, what = "double", n = 1, size = 8) :
file 'airquality.RData' has magic number '4D3F'
Use 'readBin(file, what = "double", n = 1, size = 8)' to
deprecate. During startup - Warning message:
In readBin(file, what = "double", n = 1, size = 8) :
 file 'airquality.RData' is corrupt (bad magic number)

R Graphics Device 2 (ACTIVE)

Scatter plot showing 'ozone' vs 'Wind'.

Rfig

Windows Taskbar: Type here to search, File, Folder, Run, Google, Chrome, etc.

System tray: 25°C Zonnig, Battery, WiFi, ENG US, 16:20, 03/09/2021, 2 notifications.

<https://erbiostat.wixsite.com/rintro>

Slide format

- The course in a usual slides format.
 - Slides.
 - R program to produce the results presented in the slides.

The image displays three screenshots of a course website built with WIX.com, illustrating various slide formats:

- Topics Page:** Shows a slide titled "The course is organized in 4 chapters:" with a bulleted list:
 - A quick start.
 - Basic programming in R.
 - First steps in statistical modeling in R.
 - Selected topics in modeling.Below this is a section titled "R functions that are used for illustrations include:" with a list of R functions and two small screenshots of RStudio showing histograms and scatter plots.
- Quick start Page:** Shows a slide titled "Quick start" with a bulleted list:
 - Sampling from a normal distribution.
 - Working with data: the cars data.
 - Two sample t-test.
 - Basic plots.A green button at the bottom right is circled in red.
- Modeling 2 Page:** Shows a slide titled "Modeling 2" with a bulleted list:
 - Two-way ANOVA.
 - Advance topics about linear regression.A blue button at the bottom right is highlighted.
- Basic programming in R Page:** Shows a slide titled "Basic programming in R" with a bulleted list:
 - Basic programming in R: objects in R
 - Reading external datasets
 - Programming in R: for loop
 - Programming in R: user functions
 - Application of a for loop: bootstrap.A green button at the bottom right is highlighted.
- Data sets Page:** Shows a slide titled "Data sets" with a blue button at the bottom right.

Slide format

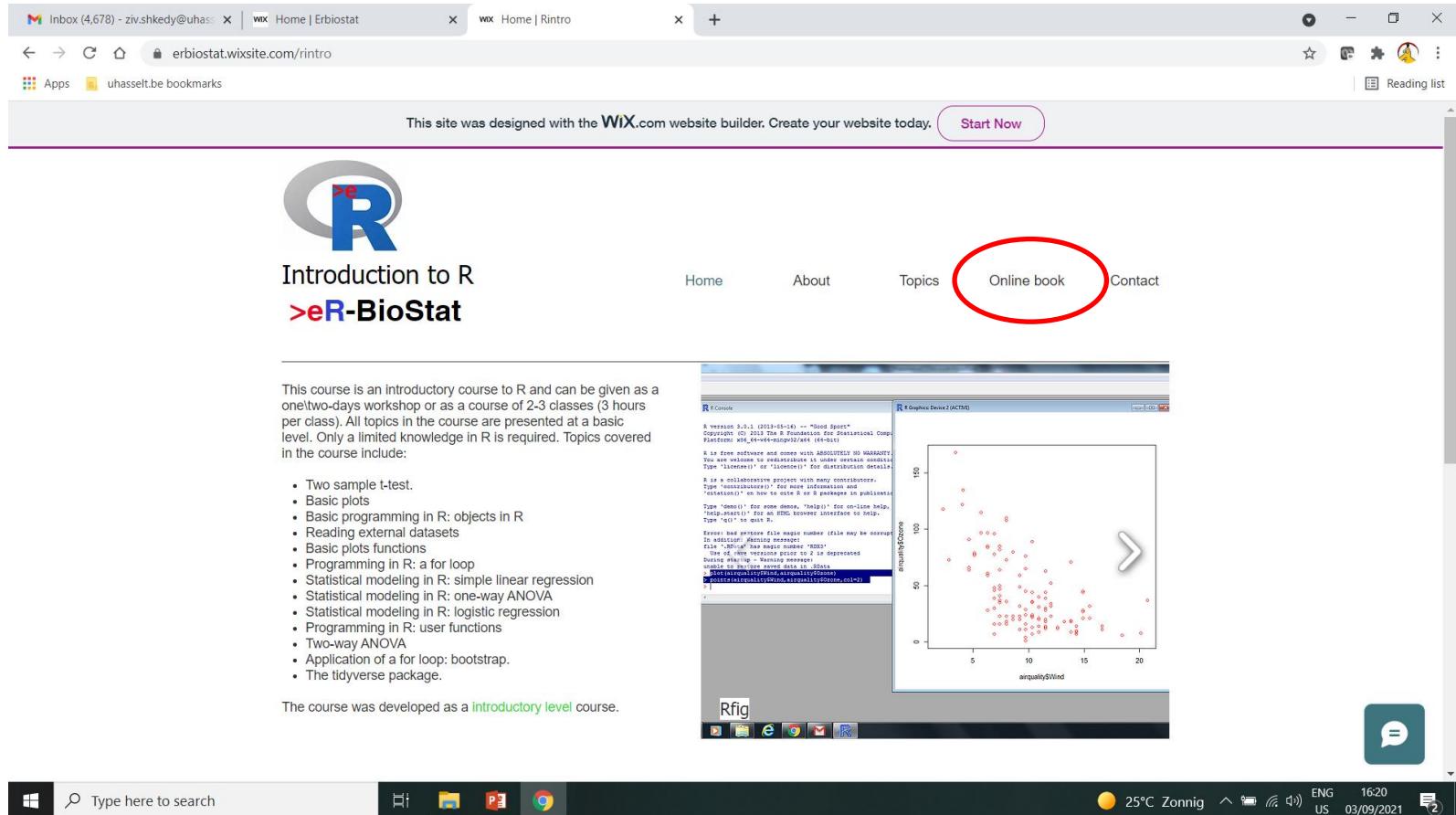
The screenshot shows a Microsoft Edge browser window with the following details:

- Address Bar:** github.com/eR-Biostat/Courses/blob/master/Introductory%20Courses/Introduction%20to%20R/Slides/eR-Biostat_An%20Introduction%20to%20R_2017_QuickStart.pdf
- Tab Bar:** Home | Erbiostat, Topics | Rintro, Courses/eR-Biostat_An Introducti... (active tab)
- Content Area:**
 - Logo:** A large logo featuring a blue 'R' with a red '>e' preceding it.
 - Text:** The >eR-Biostat initiative
Making R based education materials in statistics accessible for all
 - Title:** An introduction to R: Short Version (2017)
 - Section:** Part 1: a quick start
 - Text:** Developed by Dan Lin (Hasselt University) and Ziv Shkedy (Hasselt University)
 - Text in a red-bordered box:** LAST UPDATE: 15/10/2017
- Taskbar:** Shows the Windows Start button, a search bar with "Type here to search", and icons for File Explorer, Microsoft Word, and Google Chrome.
- System Tray:** Shows battery level (19%), temperature (19°C), weather (Zonnig), signal strength, and system status (ENG US 11:14 06/09/2021).

Introduction to R

- Contents:
 - Basic R:
 - Basic programming in R.
 - Introduction to statistical modeling in R.
 - Modern R:
 - R Studio.
 - R Markdown.
 - The ggplot2 package.
 - The tidyverse package.
- 
- Rudradev's course today

Online book



This site was designed with the **WIX.com** website builder. Create your website today. [Start Now](#)

Introduction to R

>eR-BioStat

Home About Topics **Online book** Contact

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R version 3.6.1 (2019-05-16) -- "Good Sport"
Copyright (C) 2019 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/v4.0 (64-bit)
R is free software and comes with ABSOLUTELY NO WARRANTY.
You should consider carefully what you ask for.
Type 'license()' or 'licence()' for distribution details.
R is a collaborative effort with many contributors.
Type 'contributors()' for more information and 'citation()' on how to cite R or R packages in publications.
Type 'demo()' for some demos, 'help()' for on-line help,
'reproducible()' for the code for R examples and 'download.packages()' for how to download packages.
Type 'q()' to quit R. To stick forever type 'stop()'.
Errors had occurred for regular number (file may be corrupt)
in file 'airquality.RData' (read-only)
file 'airquality.RData' has magic number '4D3F'
Use 'rm_rf()' to remove file 'airquality.RData' (depreciated)
During startup - Warning message
 * Using deprecated function 'rm_rf'
 * Using deprecated function 'rm_rf'

Rfig

Windows Taskbar: Type here to search, File Explorer, File History, Task View, Taskbar settings, Start button, Edge, File Explorer, Mail, Google Chrome, R icon, Volume icon, 25°C Zonnig, ENG US, 16:20, 03/09/2021, 2 notifications

Online book

The screenshot shows a Microsoft Edge browser window displaying an online book titled "Introduction to R: basic programming". The left sidebar contains a table of contents with chapters 1 through 3 and a summary section. Chapter 1 includes sections for slides, code, and tutorials, as well as R help and slides. Chapter 2 covers YouTube tutorials, vectors, factors, index vectors, data frames, and matrices. Chapter 3 covers basic plots, graphical functions, and law school data. The summary section includes a bio for Ziv Shkedy, a link to his GitHub profile, and a timestamp from May 2020. The main content area shows the first chapter's introduction and its sub-sections. A code block in the introduction shows a warning message about the mvtnorm package. The chapter 1 section on slides contains a code block for loading the bootstrap library. The browser's address bar shows the URL of the book's page on GitHub.

- Available in
 - HTML.
 - PDF.
 - Rmd to reproduce the book on your laptop.

Online book

The screenshot shows a Microsoft Edge browser window displaying an online book titled "Introduction to R: basic programming". The left sidebar contains a table of contents with chapters like 1 Introduction, 2 R Objects, and 3 Basic plots in R. The main content area shows code snippets and text. Two specific sections are circled in red: "Slide for this part of the course are available online in the >eR-BioStat website. See [RcourseProgramming](#)." and "For a short YouTube introduction, by Mike Marin, about objects in R see [YToobjects1](#)." A large callout box on the right side of the page states: "Links to the course slides and YouTube tutorials from the book."

library(bootstrap)

1.3 Slides

Slide for this part of the course are available online in the >eR-BioStat website. See [RcourseProgramming](#).

2 R Objects

2.1 YouTube tutorial: objects in R

For a short YouTube introduction, by Mike Marin, about objects in R see [YToobjects1](#).

2.2 Introduction

R works with objects. An object in R could be a scalar, for example

```
x<-1
```

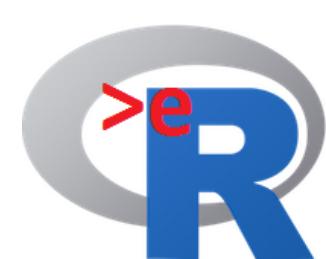
We can print the object x :

```
print(x)
```

```
## [1] 1
```

The object x can be a vector defined using the R function c()

Links to the course slides and YouTube tutorials from the book.



The >eR-BioStat :
The >eR-BioStat : open source approach

Our new website

<https://erbiostat.wixsite.com/erbiostat>

Open source policy

- Open source means:
 - Our task is to develop free high quality educational products in statistics and data science.
 - All education levels:
 - Under graduate.
 - Graduate.
 - PhD.
 - Zero costs for users and developers.
 - We also provide supporting resources, such as slides, programs for the examples, videos, and more.
-

Example: Introduction to R

This site was designed with the **WIX**.com website builder. Create your website today. [Start Now](#)

[Slides \(PDF, part 1\): A quick start](#)

Basic programming in R

In this chapter we discuss basic topics in R programming from a user point of view. This part is developed to give you the basic skills that you need for an advanced usage of R. The topics that we cover in this chapter include:

- Basic programming in R: objects in R
- Reading external datasets
- Programming in R: a for loop
- Programming in R: user functions
- Application of a for loop: bootstrap.

[Slides \(PDF, part 2\): basic programing in R](#)

Modeling 1

The first chapter about statistical modelling presents, at a very basic level, the topics of

- Simple linear regression.
- One-way ANOVA.
- Logistic regression.

The R functions lm(), glm() and aov() are used to fit the models. We assume that you studies a basic course in statistics and you familiar with the three models above.

[Slides \(PDF, part 3\): statistican modeling 1](#)

R program for the course

R program that contains the code to produce all the results discussed in the course.

[R program](#)



Datasets

External datasets that we use in the course.

[External Datasets](#)

Slides for the course in PP

For the slides of the course in PowerPoint format, click on the blue button below.

To download the slides: click on the button below and then click on "download" button in the Github page (at the right side of the screen).

[Slides in PowerPoint format](#)



The R program for the course

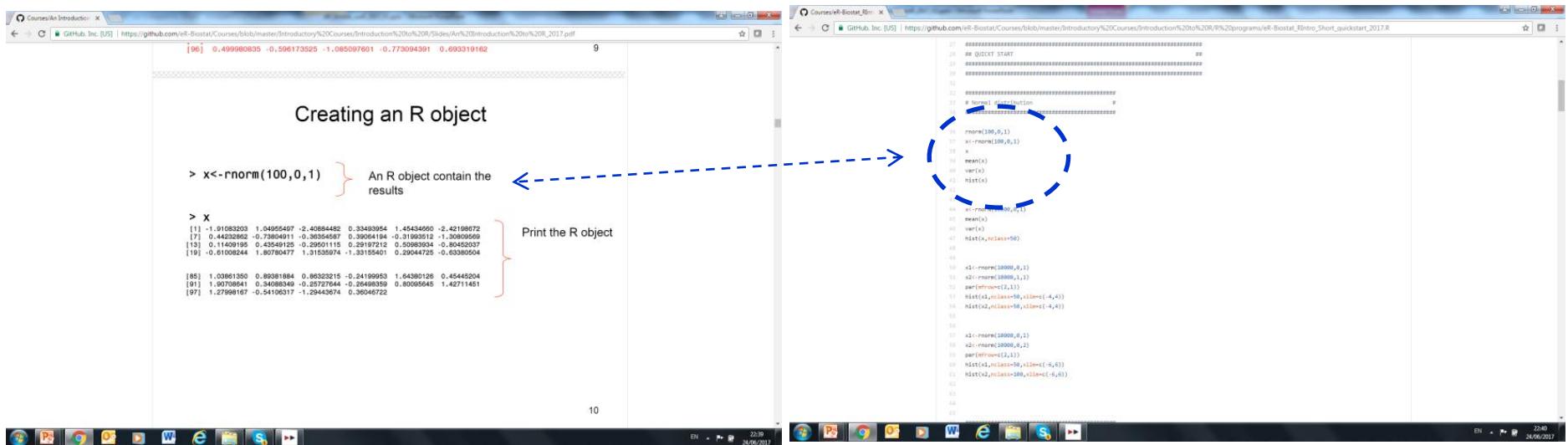
A screenshot of a web browser displaying an R script on GitHub. The browser has multiple tabs open, including 'Home | eR-Biostat', 'Topics | Rintro', and 'Courses/introductory Courses/'. The main content area shows the file 'eR-Biostat_Rintro_Short_quickstart_2017.R' with the following code:

```
1 #####  
2 #####  
3 # An introduction to R  
4 # Developed by  
5 # Ziv Shkedy and Dan Lin  
6 # Hasselt University  
7 # >eR-Biostat initiatve (2017)  
8 #####  
9 #####  
10 #####  
11 #####  
12 #####  
13 #####  
14 #####  
15 # External datasets used in this course:  
16 #####  
17 #####  
18 #####  
19 spwh3<-read.table('c:\\\\projects\\\\wseda\\\\spwh3.txt', header=FALSE,na.strings="NA", dec=".")  
20 cashdat<-read.table('c:\\\\projects\\\\wseda\\\\Rintro\\\\cashdat.txt', header=FALSE,na.strings="NA", dec=".")  
21 sero<-read.table('c:\\\\projects\\\\wseda\\\\Rintro\\\\sero1.txt', header=FALSE,na.strings="NA", dec=".")  
22 spwh2<-read.table('c:\\\\projects\\\\wseda\\\\spwh2.txt', header=FALSE,  
23 na.strings="NA", dec=".")  
24 #####  
25 #####  
26 #####  
27 #####  
28 ## QUICKT START  
29 #####  
30 #####  
31 #####  
32 #####
```

An introduction to R: slides and R program

Example of a Slide

R program on line



- All materials in the slides are reproducible using the code in the program.

Example: Introduction to R

This site was designed with the **WIX**.com website builder. Create your website today. [Start Now](#)

[Slides \(PDF, part 1\): A quick start](#)

Basic programming in R

In this chapter we discuss basic topics in R programming from a user point of view. This part is developed to give you the basic skills that you need for an advanced usage of R. The topics that we cover in this chapter include:

- Basic programming in R: objects in R
- Reading external datasets
- Programming in R: a for loop
- Programming in R: user functions
- Application of a for loop: bootstrap.

[Slides \(PDF, part 2\): basic progrming in R](#)

Modeling 1

The first chapter about statistical modelling presents, at a very basic level, the topics of

- Simple linear regression.
- One-way ANOVA.
- Logistic regression.

The R functions lm(), glm() and aov() are used to fit the models. We assume that you studies a basic course in statistics and you familiar with the three models above.

[Slides \(PDF, part 3\): statistican modeling 1](#)

R program for the course

R program that contains the code to produce all the results discussed in the course.

[R program](#)

Datasets

External datasets that we use in the course.

[External Datasets](#)

Slides for the course in PP

For the slides of the course in PowerPoint format, click on the blue button below.

To download the slides: click on the button below and then click on "download" button in the Github page (at the right side of the screen).

[Slides in PowerPoint format](#)



© 2020 by >eR-BioStat. Proudly created with Wix.com

Type here to search

11:12
ENG
8/02/2024

Storage on GitHub

The screenshot shows a GitHub repository for 'eR-Biostat/Courses' containing various introductory courses. The 'Slides' folder is selected in the sidebar. A red arrow points to the file 'eR-Biostat_An Introduction to R_2017.ppt' in the list of files.

PowerPoint presentation contains all course slides.

The >eR-Biostat initiative

Introduction to R: Slides

Most of the examples presented in the slides are based on datasets available in R (for example the cars or the sleep datasets). Some examples use external datasets which are available in the data directory.

Example: Introduction to R (online book)

The screenshot shows a Microsoft Edge browser window displaying the 'Introduction to R: basic programming' online book. The page title is 'Introduction to R: basic programming'. On the left, there is a dark sidebar with a red header 'Introduction to R: basic programming' containing a table of contents:

- 1 Introduction
 - 1.1 Slides, code and tutorials
 - 1.2 R ?
 - 1.3 Slides
- 2 R Objects
 - 2.1 YouTube tutorial: objects in R
 - 2.2 Introduction
 - 2.3 Scaler
 - 2.4 vectors
 - 2.5 Factors
 - 2.6 index vectors
 - 2.7 Data frame
 - 2.8 Matrix
- 3 Basic plots in R
 - 3.1 Introduction
 - 3.2 Graphical functions (I)
 - 3.3 Graphical functions (II): the law school data
- 4 Summary statistics

Below the sidebar, the user information 'Ziv Shkedy' from Hasselt University, Belgium, is shown along with the date 'May, 2020'. The main content area starts with 'First steps of programming in R (July 2020)'. It includes a warning message: '## Warning: package 'mvtnorm' was built under R version 3.6.2'. The first chapter is titled '1 Introduction' with a sub-section '1.1 Slides, code and tutorials'. The text explains that the book contains all R code used in the course's slides, including YouTube tutorials and links to relevant tutorials. The second chapter is titled '1.2 R ?' and states that no previous knowledge of R is required, starting from a user approach. It mentions datasets used for illustrations and the need to install the 'bootstrap' package. The third chapter is titled '1.3 Slides'. At the bottom of the screen, the Windows taskbar shows the search bar, pinned apps (File Explorer, Google Sheets, Powerpoint, Chrome), system tray icons (battery, signal, volume), and the date/time (03/09/2021, 16:21).

- Available in
 - HTML.
 - PDF.
 - Rmd to reproduce the book on your laptop.

The source program for the online book

This site was designed with the **WIX**.com website builder. Create your website today. [Start Now](#)

Ziv Shkedy
Hasselt University, Belgium
May 14, 2020

Histogram of the ozone.
hist(airquality\$Ozone)

skills for advanced usage of the software.

All the materials are available in html, .Rmd and PDF formats. Practical sessions and exercises are available below

Online interactive book (chapter 1-3) | Rmd & PDF files of the book (chapter 1-3) | The tidyverse package: an introduction (r 4)

Source file (in R) that can be used to produce the book in your laptop.

EXAMPLES: To run the code you can copy and paste the code to R or to use the R markdown program of the book that is available online as well.

Online book (html): programming | Online book 1 (Rmd) | Online book 1 (PDF)
Online book (html): simple linear regression | Online book 2 (Rmd) | Online book 2 (PDF)
Online book (html): One Way ANOVA | Online book 3 (Rmd) | Online book 3 (PDF)

Online book 4 (html): the tidyverse | Online book 4 (PDF) | Online book 4 (Rmd)
The Tidyverse: pdf for the slides | The Tidyverse: Rmd for slides

Practical sessions and exercises

Online book (html): practical sessions | Online book (Rmd): practical sessions



The source program for the online book

Universiteit Hasselt - UHasselt × | Inbox (6,582) - ziv.shkedy@uhasselt.be × | wx Home | Erbiostat × | wx Online book | Rintro × | Courses/Introductory Courses/i × +

github.com/eR-Biostat/Courses/blob/master/Introductory%20Courses/Introduction%20to%20R/Onlinebook/Rintro_Prog(html)_V1.Rmd

uhasselt.be bookmarks | All Bookmarks

Files

master

Go to file

Basic courses

Coordination

Data Analysis

ICP Workshop

ITP workshop

Inference

Introductory Courses

Introduction to R

Data

Onlinebook

libs

README.md

Rintro_AOV(html)_V1.Rmd

Rintro_AOV-html-_V1.html

Rintro_AOV-pdf-_V1.pdf

Rintro_PracticalS(html)_V2a.R...

Rintro_PracticalS-html-_V2a...

Rintro_Prog(html)_V1.Rmd

Rintro_Prog-html-_V1.html

Rintro_Prog-pdf-_V1.pdf

Rintro_Reg(html)_V1.Rmd

Rintro_Reg-html-_V1.html

Rintro_Reg-pdf-_V1.pdf

Rintro_Tidy(html)_V1.Rmd

Courses / Introductory Courses / Introduction to R / Onlinebook / Rintro_Prog(html)_V1.Rmd

Code Blame 764 lines (491 loc) • 18.7 KB Code 55% faster with GitHub Copilot

Raw ▾

```
41 library(e1071)
42 library(lattice)
43 library(ggplot2)
44 library(mvtnorm)
45 ``
46 
47 
48 \newpage
49 
50 # Introduction
51 
52 ## Slides, code and tutorials
53 
54 This chapter of the interactive book contains all R code that was used to produce the results and output presented in chapter 2 (programming) in the course's slides. We include YouTube tutorials as a part of the chapter 8
55 
56 ## R ?
57 No previous knowledge about R is required. We start from the basic and follow a user approach and not a programmer approach. The datasets used for illustrations are available in R, one of them (the law school data) is par
58 
59 ````{r}
60 library(bootstrap)
61 ````

64 
65 ## Slides
66 Slides for this part of the course are available online in the >eR-Biostat website. See [RcourseProgramming](https://github.com/eR-Biostat/Courses/blob/master/Introductory%20Courses/Introduction%20to%20R/Slides/eR-Biostat_Slides.html).
67 
68 
69 # R Objects
70 
71 ## YouTube tutorial: objects in R
72 
73 For a short YouTube introduction, by Mike Marin, about objects in R see [YTobjects1](https://www.youtube.com/watch?v=UYc1mg1_KLk).
74 
75 
76 ## Introduction
77 
78 R works with objects. An object in R could be a scalar, for example
79 
80 ````{r}
81 x<-1
```

Type here to search

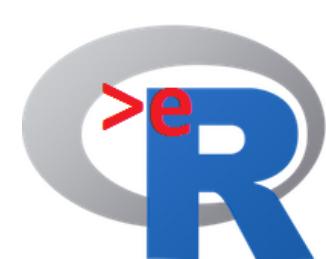
12:03 14/02/2024 ENG

The source program for the online book

A screenshot of a GitHub repository interface. The left sidebar shows a tree view of files: 'master' (Basic courses, Coordination, Data Analysis, ICF Workshop, ITF workshop, Inference, Introductory Courses, Introduction to R, Data, Onlinebook, lib). The main area displays the content of 'Rintro_Prog.html_V1.Rmd'. The code includes R code for lattice plots, a 'Viewpage' section, and a 'Slides' section. A note at the bottom states: 'This chapter of the interactive book contains all R code that was used to produce the results and output presented in chapter 2 (programming) in the course's slides. We include YouTube tutorials as a part of the chapter.' Below the code, there are sections for 'R Objects' and 'YouTube tutorial: objects in R'. A warning message at the bottom says: '# Warning: package 'mvtnorm' was built under R version 3.6.2.'

- Source file (in R) that can be used to produce the book in your laptop.
- But can be also updated and produce a more relevant content...

A screenshot of a web browser window showing the generated content from the R Markdown file. The title is 'Introduction to R: basic programming'. The main content is organized into sections: '1 Introduction', '1.1 Slides, code and tutorials', '1.2 R?', '1.3 Slides', '2 R Objects', '2.1 YouTube tutorial: objects in R', '2.2 Introduction', '2.3 Scalar', '2.4 vectors', '2.5 Factors', '2.6 index vectors', '2.7 Data frame', '2.8 Matrix', '3 Basic plots in R', '3.1 Introduction', '3.2 Graphical functions (I)', '3.3 Graphical functions (II): the law school data'. A note at the bottom of the first section says: 'This chapter of the interactive book contains all R code that was used to produce the results and output presented in chapter 2 (programming) in the course's slides. We include YouTube tutorials as a part of the chapter.' Below the note, a warning message says: '# Warning: package 'mvtnorm' was built under R version 3.6.2.'. A code editor window shows the R code: 'library(bootstrap)'. The footer of the browser window shows the URL 'https://github.com/eR-Biostat/Courses/blob/master/Introductory%20Courses/Introduction%20to%20R/Onlinebook/Rintro_Prog.html_V1.html'.



The >eR-BioStat platform: Our users

Our new website

<https://erbiostat.wixsite.com/erbiostat>

R course users in the last 365 days

10/09/2020-10/09/2021

Inbox (4,693) - ziv.shkedy@uhasselt.be | wix Dashboard | Wix.com

manage.wix.com/dashboard/56903fff-37f1-44c5-a038-af35caa1ae05/analytics/overviews/traffic?referralInfo=sidebar

Apps uhasselt.be bookmarks

Wix Rintro Explore Help Hire a Professional

Search... 1 3 ziv.shkedy@uhasselt.be

Set Up Your Site
2 steps left

Dashboard

Ascend by Wix

Contacts

Inbox

CRM Tools

Marketing & SEO

Analytics & Reports

Traffic Overview

Sales Overview

People Overview

Reports

Insights

Benchmarks

Site Speed

Alerts

Email Updates

Upgrade

Traffic Overview

Last 365 days (Sep 10, 2020 - Today) compared to previous period (Sep 11, 2019 - Sep 9, 2020)

Site Sessions: 1,926 ↑ 2249% Unique Visitors: 478 ↑ 635% Avg. Session Duration: 3m 21s ↑ 99%

Sessions over Time

Selected period Previous period

Top Traffic Sources by Sessions

| Traffic Source | Change (%) | Sessions |
|--------------------------|------------|----------|
| Direct | 16,250% | 1,308 |
| blackboard.uantwerpen.be | | 277 |
| bb.uhasselt.be | | 171 |
| Unknown | 176% | 94 |
| wix.com | 92% | 25 |

See full report

Top Pages by Sessions

| Page | Change (%) | Sessions |
|---------------------|------------|----------|
| /rintro/online-book | 4,948% | 1,262 |

16°C Zonnig ENG 09:14 US 09/09/2021

How and what our users use the website ? (of R introduction)

The screenshot shows the Wix Analytics Dashboard with various metrics and a sidebar menu.

Traffic Overview: A line chart showing traffic from September 10 to August 16. The Y-axis ranges from 0 to 20. A legend indicates the Selected period (blue line) and Previous period (light blue line).

New vs Returning Visitors: A donut chart showing Unique Visitors (478) and Site Sessions (1,926). A legend indicates New (dark blue) and Returning (light blue).

Sessions by Device: A donut chart showing Site Sessions (1,926) broken down by Desktop (1,845), Mobile (75), and Tablet (6).

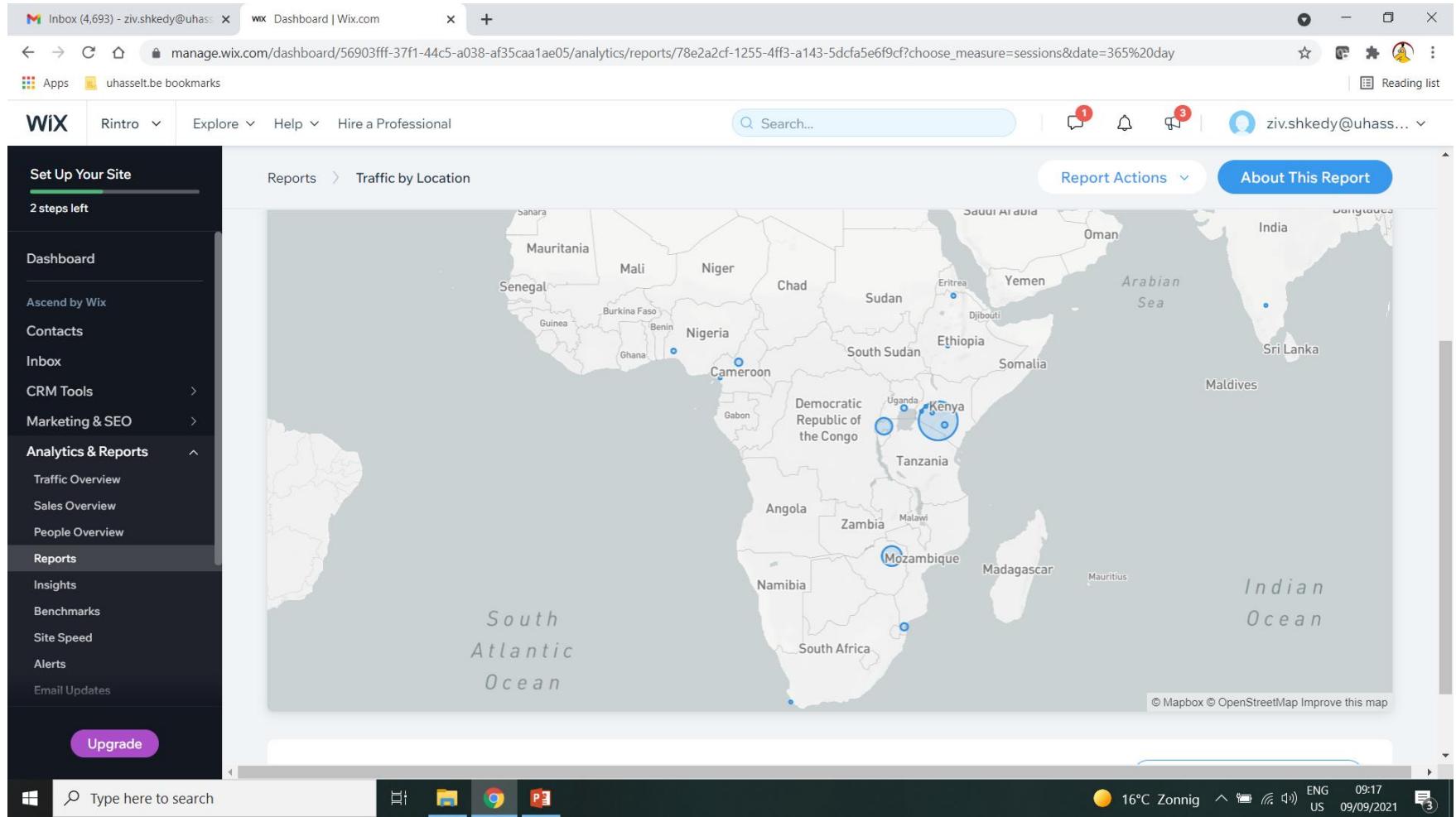
Top Pages by Sessions: A table listing the top pages and their session growth percentage and count.

| Page | Growth (%) | Sessions |
|--------------------|------------|----------|
| /intro/online-book | 4,948% | 1,262 |
| /intro | 1,112% | 982 |
| /intro/topics | 4,181% | 685 |
| /intro/about | 1,438% | 246 |
| / (Homepage) | - | 88 |

Annotations: Red arrows point to the "What?" section in the Top Pages by Sessions card and the Sessions by Device card. Red text overlays "What?" and "How?" are placed over the respective cards.

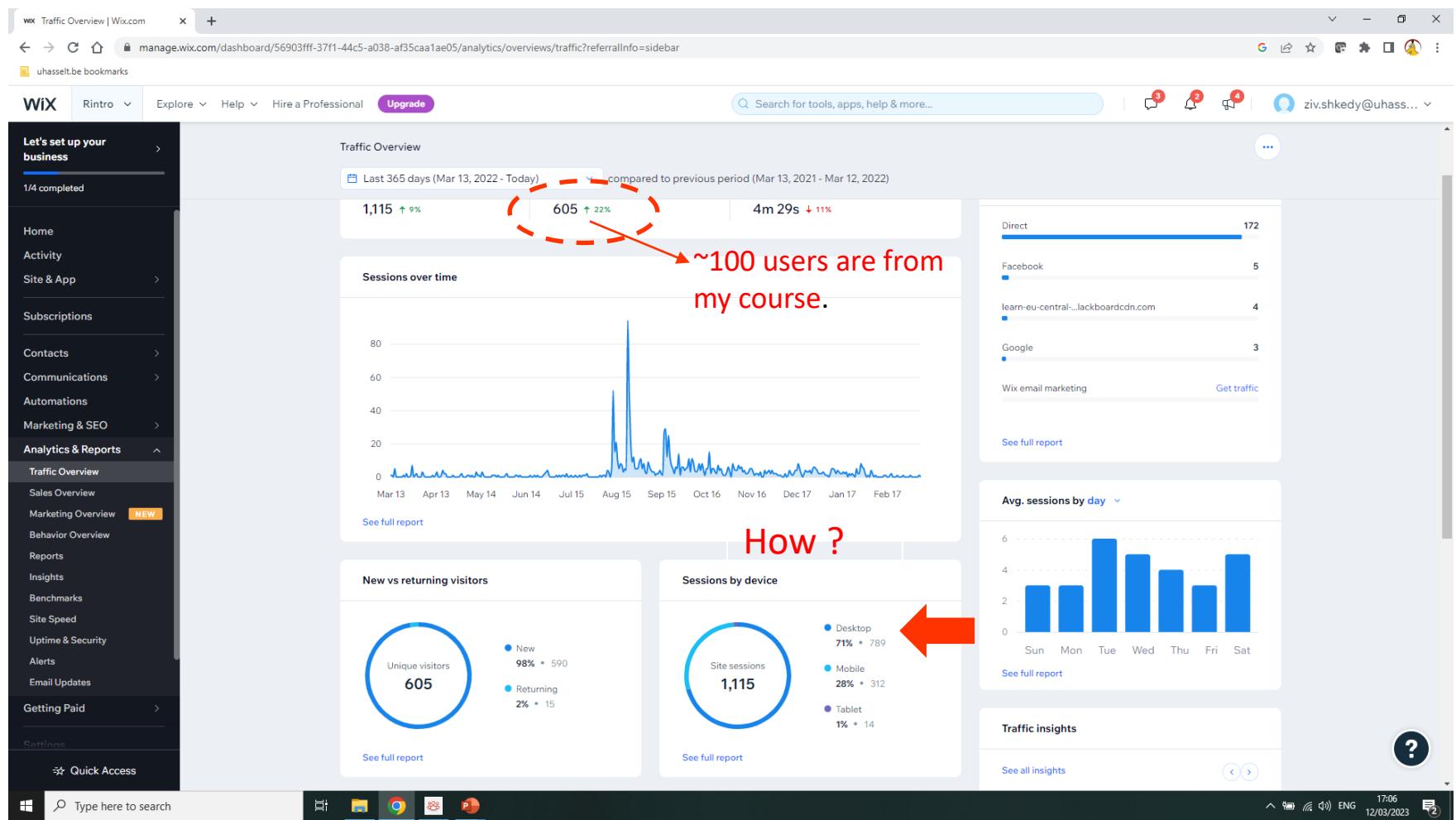
Who are our users in Africa ? (of R introduction)

10/09/2020-10/09/2021



R course: users in the last 365 days

13/03/2022-12/03/2023:605 users.



Who are our users? (Introduction to R)

13/03/2022-12/03/2023

wix Reports | Wix.com

manage.wix.com/dashboard/56903fff-37f1-44c5-a038-af35caa1ae05/analytics/reports/78e2a2cf-1255-4ff3-a143-5dcfa5e6f9cf?date=365+day&referralInfo=traffic-overview-page

uhasselt.be bookmarks

WiX Rintro Explore Help Hire a Professional Upgrade

Search for tools, apps, help & more...

Done viewing the report? Go back to traffic overview

Find out where visitors to your site come from. View report definitions

Time period: Mar 13, 2022 - Today

Country Map City Map Table

Save Report View

Time period: Last 365 Days Select a measure: Unique visitors Country: is any value Group by: City More + 25

just now

Country Map

City Map

Table

Analytics & Reports

Traffic Overview

Sales Overview

Marketing Overview NEW

Behavior Overview

Reports

Insights

Benchmarks

Site Speed

Uptime & Security

Alerts

Email Updates

Getting Paid

Quick Access

49

1

Map showing visitor locations worldwide. A legend indicates 49 unique visitors. The map highlights visitor activity in Europe, North America, and Africa.

© Mapbox © OpenStreetMap Improve this map

Windows Type here to search

17:09 ENG 12/03/2023

Who are our users? (Introduction to R)

09/02/2023-09/02/2024

wix Traffic Overview | Wix.com

manage.wix.com/dashboard/56903fff-37f1-44c5-a038-af35caa1ae05/analytics/overviews/traffic?referralInfo=sidebar

uhasselt.be bookmarks All Bookmarks

WIX Rintro Explore Help Hire a Professional Upgrade

Search for tools, apps, help & more...

Let's set up your business 1/4 completed

Setup Home Site & App Subscriptions Contacts Communications Automations Marketing & SEO Analytics & Reports Traffic Overview Real-time Sales Overview Marketing Overview Behavior Overview Reports Insights Benchmarks Site Speed Uptime & Security Alerts Email Updates Billing & Payments Quick Access

Traffic Overview Last 365 days (Feb 9, 2023 - Today) compared to previous period (Feb 9, 2022 - Feb 8, 2023)

Unique visitors 309 95% * 295 Returning 5% * 14

Site sessions 728 95% * 692 Mobile 5% * 36

See Full Report See Full Report

See Full Report

See Full Report

Sum Mon Tue Wed Thu Fri Sat Sun

See Full Report

Traffic insights

The most popular page visitors navigate to is: /online-book

See All Insights

Sessions by country

Countries

| Countries | Visitors |
|------------------|----------|
| Belgium > | 313 |
| United States > | 68 |
| Kenya > | 57 |
| United Kingdom > | 37 |
| Netherlands > | 32 |
| Ethiopia > | 21 |
| Ghana > | 19 |

1 2 3 4 5 6 7 >

Type here to search

11:33 ENG 8/02/2024



The >eR-BioStat :
local version: an example of the implementation in Gondar
University, Ethiopia

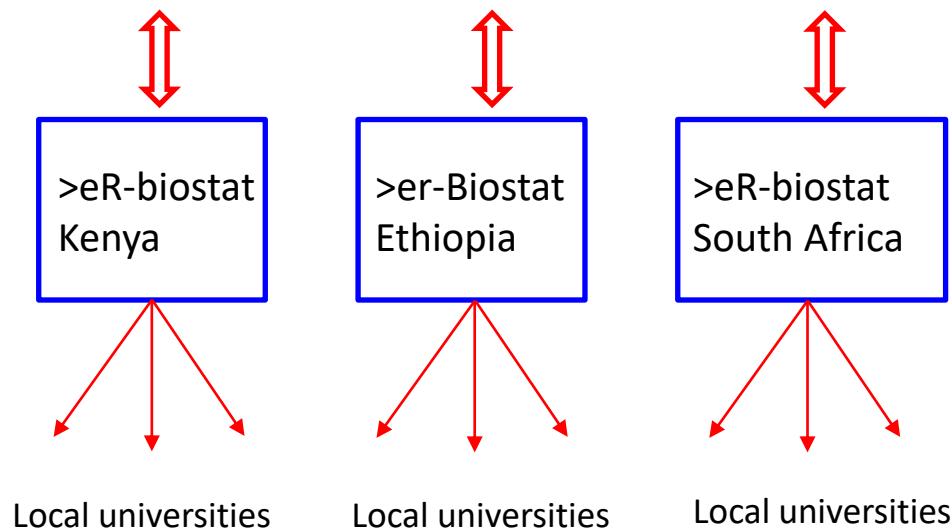
Our new website

<https://erbiostat.wixsite.com/erbiostat>

Local >eR-BioStat platform

- Why local ?
- A local platform:
 - Better internet connection.
 - Allows to add specific courses of (local) interest.

Online structure



How to tailor the >eR-BioStat platform to your program ?

- Example: MSc in biostatistics in Gondar University.
- March 2020: Due to COVID-19 outbreak, Gondar university shifted to online teaching.
- A website for (a part of) the program with links to >eR-Biostat courses.
- Example how you can use the >eR-BioStat as a part of your education program.

Example: the master in Biostatistics & epidemiology in Gondar university

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University of Gondar - Collage of Medicine and Health Sciences

E-learning system:
Biostatistics

Welcome to the 2020 edition of the E-learning system in Biostatistics/statistics of the Collage of Medicine and Health Sciences, Institute of Public Health in the University of Gondar, Ethiopia. This website provides course materials for MSc students in Biostatistics and MSc and PhD students in Epidemiology and Public health.

This website was developed as a part of the >eR-BioStat initiative.

UNIVERSITY OF GONDAR

22°C Zonnig ENG US 12:08 06/09/2021

<https://erbiostat.wixsite.com/gondarel2>

Online course materials

This site was designed with the **WIX**.com website builder. Create your website today. [Start Now](#)

University of Gondar - Collage of Medicine and Health Sciences

E-learning system:
Biostatistics

MSc's courses

The flowing courses and parts of the MSc program
and are available online:

- Introduction and basic programming in R.
- Linear models.
- Generalized linear models (GLMs).
- Longitudinal data analysis.
- Survival analysis.

MSc in BioStatistics.

- Program director: Dessie Abebaw (dessieabebaw96@gmail.com)
- E-Learning program coordination and development: Tadesse Awoke (tawoke7@mail.com), Adetayo Kasim (a.s.kasim@durham.ac.uk) and Ziv Shkedy (ziv.shkedy@uhasselt.be)

22°C Zonnig 12:10 06/09/2021

- Selected courses in Biostatistics from the >eR-BioStst website.
- All courses in the cuticulum of the master in Gondar.

Online course materials

The screenshot shows a web browser window with three tabs open:

- wix My Sites | Wix.com
- wix MSc BioStat | GondarEL2
- Courses/Statistical modeling (1) | Courses/Statistical modeling (1)

The main content area displays a Wix website for "Courses/Statistical modeling (1)". The header includes a "Start Now" button and a banner image of people.

Basic programming in R

In this course we discuss basic topics in R programming from a user point of view. This part is developed to give you the basic skills that you need for an advanced usage of R. The topics that we cover in this chapter include:

- Basic programming in R: objects in R
- Reading external datasets
- Programming in R: a for loop
- Programming in R: user functions
- Application of a for loop: bootstrap

Teacher in 2020/2021: this is a self learning course.

[Basic programing in R](#)

Linear models

This course introduces simple and multiple linear regression models to model relationship between predictor(s) a continuous response variable. In this course, you will learn the fundamental theory behind linear regression and, through data examples, learn to fit, examine, and utilize regression models to examine relationships between multiple variables, using the free statistical software R and RStudio.

Teacher in 2020/2021: Prof. Dr. Bisrat Misganaw (bisratcsa@gmail.com).

Survival analysis

This course in survival analysis (also known as the analysis of event-time data) introduces the main ideas in non-parametric and semi-parametric regression for censored event-time data. Background theory is covered as well, but the emphasis is on applications. The course was developed by David Harrington and the material are organized into both standard lectures and interactive lab sessions. All computing will be done using R. Lectures and labs will include both output and code..

Teacher in 2020/2021: name name (email@gmail.com).

[Survival Analysis](#)

Course Title

Text about the course.....The second chapter about statistical modeling presents the topics of

- Two-way ANOVA.
- Advance topics about linear regression.

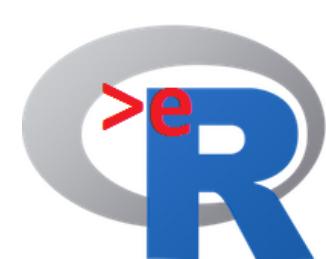
Teacher in 2020/2021: name name (email@gmail.com).

Windows taskbar at the bottom:

- Type here to search
- Icons for File Explorer, Google Chrome, and Powerpoint
- System tray icons for battery, signal, and volume
- Language: ENG US
- Date and time: 12:10 06/09/2021
- Notification icon for 2 messages

Challenges and lessens learned

- Implementation without training will not be successful.
- Training:
 - Teachers:
 - How to work with the system.
 - What is available.
 - Students:
 - How the materials are related to their courses ?
 - How to use ?



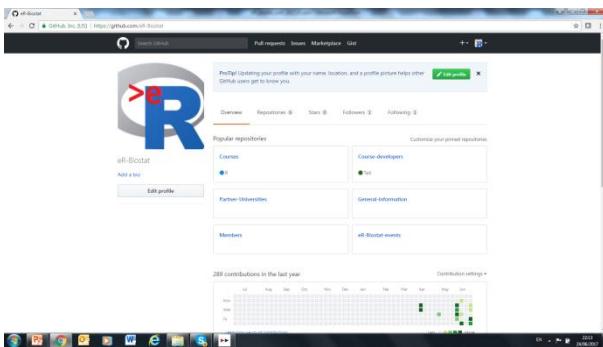
The >eR-BioStat :
The >eR-BioStat : where can you find us online ?

Our new website

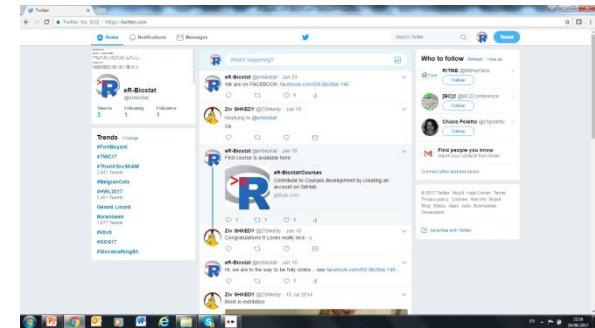
<https://erbiostat.wixsite.com/erbiostat>

We >R an online community

The community online:



<https://github.com/eR-Biostat>



ER-BioStat

@erbiostat

- GitHub page with course materials .
- Information about activities.
- Communication teachers/students in the south.
- Information about course materials.
- Information about activities.



Inbox (4,800) - ziv.shkedy@uhasselt.be | ER-BioStat | Facebook

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Business Suite

- Inbox • 1 new message & 17 new comments
- Planner
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Home

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Type here to search

16°C Zonnig 12:52 27/10/2021 ENG US

E-learning system using R Biostatistics

ER-BioStat @eRBiostat • 5 (10 reviews) · Education

+ Add a Button

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Get Started

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facebook.com/ERBioStat

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+ Add a Button Promote ...

Create Live Event Job Offer ...

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Get Started

Create Ad See all

How would you like to grow your business?

- Create New Ad
- Boost a Post

Automated Ads

Get personalized ads that adjust over time to help you get better results.

835 People reached 36 Engagements - Distribution Score Boost Post

15 Likes 6 Shares

Comment as ER-BioStat

ER-BioStat September 5, 2020

Our new course "Basic skills in bootstrap using R" is available online in our website. More courses will be ready in September.

835 People reached 36 Engagements - Distribution Score Boost Post

15 Likes 6 Shares

Comment as ER-BioStat

ER-BioStat August 26, 2020

Do not miss our new course "Longitudinal data analysis using R", written by Prof. Tadesse Awoke Ayele from Gondar University, Ethiopia, is now available online in our website: <https://erbiostat.wixsite.com/erbiostat>.

Materials available free online for the course include: Slides, R program, Datasets, Online examples and R code. ... See More

16°C Zonnig ENG US 12:52 27/10/2021



Inbox (4,800) - ziv.shkedy@uhasselt.be X [eR-Biostat \(@erbiostat\) / Twitter](#) X +

← eR-Biostat 86 Tweets

```
data(galaxies)
galaxies <- galaxies/1000
plot(x = c(0, 40), y = c(0, 0.3), type = "n", bty = "1",
xlab = "velocity of galaxy (km/s)", ylab = "density")
rug(galaxies)
lines(density(galaxies, width = 3.25, n = 200), lty = 1)
lines(density(galaxies, width = 2.56, n = 200), lty = 3)
```

>eR-Biostat
@erbiostat

The eR-Biostat initiative is focused on education programs in (Bio)statistics developing countries and aim to develop new E-learning system publicly available

① Hasselt University, belgium ② erbiostat.wixsite.com/erbiostat
Joined June 2017

2 Following 223 Followers

Tweets Tweets & replies Media Likes

Don't miss what's happening People on Twitter are the first to know.

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Log in Sign up Close

Windows Type here to search 16°C Zonnig ENG US 12:55 27/10/2021 2

Website

Click Download & Teach

The screenshot shows a web browser window with two tabs open. The active tab is for the >eR-BioStat website, which is built with WIX.com. The URL in the address bar is <https://erbiostat.wixsite.com/erbiostat>. A red circle highlights the address bar area.

This site was designed with the **WIX**.com website builder. Create your website today. [Start Now](#)

Home We R a community Our platform Our courses Gallery Developers Blog

E-learning using R: Biostatistics

>eR-BioStat

Welcome to the 2020 edition of the >eR-BioStat initiative website. We are a part of the open-source movement and we offer free courses in statistics. If you are a teacher that needs to give a course in statistics or a student that studies a course in statistics, we are the address. Just **click** on the link, **download** the materials (for free) and **teach** (yourself) in the class. In the next few weeks, we will update and refresh our curriculum. If you want to be updated, follow us on social media and follow our blog. All our courses, as before, are available online in our Github [page](#).

The >eR-BioStat initiative Making R based education materials in statistics accessible for all

We R a community: the >eR-BioStat initiative

Zy Shkedy, Adetayo Kasim, Kharegani Zuma & Tadesse Awiye
Hasselt University, Belgium, Durham University, UK, HSMC, South Africa
Anoosha Suleiman
Gondar University, Ethiopia

UNIVERSITY OF HASSELT ER BioStat GITHUB https://github.com/eR-School Email: erbiostat@gmail.com

Two people are visible in silhouette in front of a large screen displaying the website content.

CHAT WITH US

Type here to search

25°C Zonnig ENG 16:23 US 03/09/2021

<https://erbiostat.wixsite.com/erbiostat>

We >R (an online) community

A screenshot of a Google search results page. The search query 'er-biostat' is entered in the search bar. A red circle highlights the search bar and the Google logo. Below the search bar, there are filters for 'All', 'Images', 'Videos', 'Maps', 'News', 'More', 'Settings', and 'Tools'. The search results show approximately 5,730,000 results found in 0.44 seconds. The results include:

- eR BioStat**
https://er-biostat.github.io › Courses ▾
An >R-Biostat event in HSRC, Pretoria, South Africa. Posted on July 11, 2018. Ziv Shkedy, University of Hasselt (CenStat) [Read More]. Tags: **eR-BioStat** event, ...
You've visited this page many times. Last visit: 8/20/19
- eR-Biostat (erbiostat) · GitHub**
https://github.com › eR-Biostat ▾
Making R based education materials in statistics accessible - **eR-Biostat**
You've visited this page many times. Last visit: 4/7/19
- eR-Biostat/Courses - GitHub**
https://github.com › eR-Biostat › Courses ▾
Contribute to **eR-Biostat/Courses** development by creating an account on GitHub.
You've visited this page many times. Last visit: 4/2/19
- ER-BioStat | Facebook**
https://www.facebook.com › Pages › Businesses › Education › ER-BioStat ▾
ER-BioStat - - Rated 5 based on 6 Reviews "Great initiative, promising and will be very useful to the Biostatistics and the R community."
- eR-Biostat (@erbiostat) | Twitter**
https://twitter.com › erbiostat ▾
The latest Tweets from **eR-Biostat (@erbiostat)**. The **eR-Biostat** initiative focuses on education programs in (Bio)statistics developing countries and aim to ...

For links: make google search

website

GitHub

Facebook

Twitter

Course materials

Communication

The diagram uses curly braces to group elements: one brace groups 'website' and 'GitHub' under the heading 'Course materials'; another brace groups 'Facebook' and 'Twitter' under the heading 'Communication'.

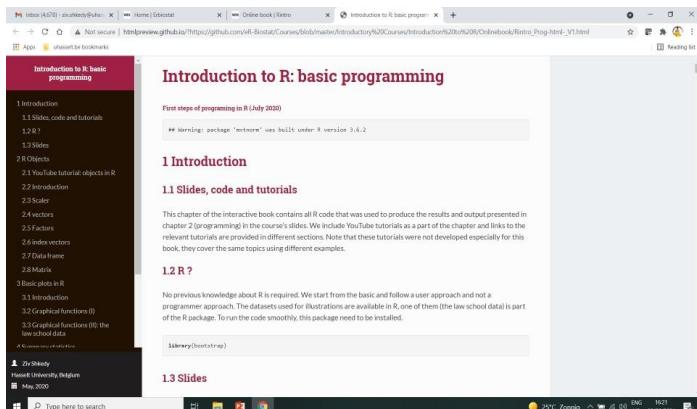
Short discussion: who do we support ?

- Students in statistics: all levels.
- Students in other disciplines: all levels.
- Academic staff : all levels.
- Main concepts:
 - Download and use in class.
 - Website/courses: not password protected.
 - Use as a complete course (i.e., a credit course within a program curriculum) or as a part of existing course.
- Network of users.

The workshop 20/02-21/02

- My course:
 - Development of products for an E-learning platform using R:
 - Today: introduction of the >eR-BioStat ITP project.
 - **Tomorrow: how to use R to develop education products for an online system (example of a linear regression course).**

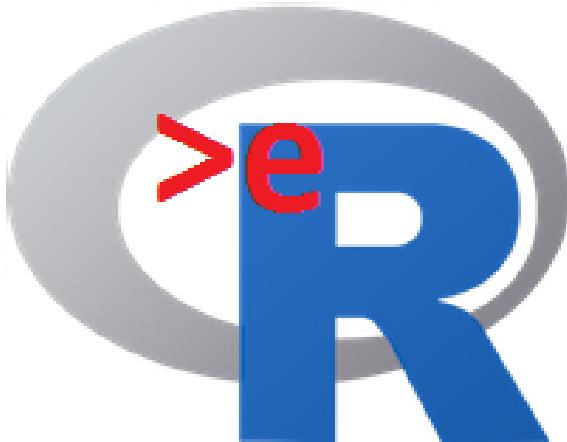
Example: Introduction to R (online book)



- Available in
 - HTML.
 - PDF.
 - Rmd to reproduce the book on your laptop.



How to create content with R markdown.....



The >eR-Biostat initiative
E-learning system using R
Biostatistics

Thank you vey much !!

<https://erbiostat.wixsite.com/erbiostat>



ER-BioStat

 <https://github.com/eR-Biostat>

 @erbiostat

Extra slides:
Storage of the R course on GitHub

Example of a course: An introduction to R

- Online course materials :

The screenshot shows a GitHub repository page for 'eR-Biostat/Courses'. The repository has 249 commits, 1 branch, 0 releases, and 1 contributor. A red circle highlights the commit 'Introductory Courses' (Delete eR-Biostat_Statistical_Computing_2017_V1.pdf), which was made 5 days ago. A red arrow points from this commit to a bulleted list of three items:

- An introduction to R:
 - A part of the introductory courses.
 - Train students to use R in data analysis.
 - The students are not expected to study anything new in statistics.

The repository page also features a section for the 'eR-Biostat initiative' and a statement about making R-based education materials assessable for all.

No description, website, or topics provided.
Add topics

249 commits 1 branch 0 releases 1 contributor

Branch: master New pull request Create new file Upload files Find file Clone or download

| File | Action | Time |
|----------------------|---|------------|
| Core - 1 | Update README.md | 3 days ago |
| Introductory Courses | Delete eR-Biostat_Statistical_Computing_2017_V1.pdf | 5 days ago |
| RFADME.md | Update README.md | 8 days ago |
| README.md | | |

Latest commit 7cd0cac 3 days ago

The >eR-Biostat initiative
Making R based education materials assessable for all

The E-learning system, developed as a part of the >eR-Biostat initiative, offers free online course materials for master students in biostatistics/statistics in developing countries. For each course, the materials are publicly available and consist of several types of course materials:

Example of a course: An introduction to R

- A part of the introductory courses:

The screenshot shows a GitHub repository page for 'eR-Biostat' containing introductory R courses. A red circle highlights the 'Introduction to R' folder in the file list, and another red circle highlights the 'Available courses in this group:' section in the main content area.

eR-Biostat committed on GitHub Delete eR-Biostat_Statistical_Computing_2017_V1.pdf Latest commit 1911720 a day ago

..

Basic concepts in exploratory data analysis ... Delete eR-Biostat_Statistical_Computing_2017_V1.pdf a day ago

Introduction to R Update README.md 4 days ago

Introduction to statistical modeling using R Update README.md 2 days ago

README.md Update README.md 2 days ago

README.md

The >eR-Biostat initiative

Making R based education materials assessable for all

Introductory courses

This group of courses are developed at an introductory level. Only basic level knowledge of statistics is required. The courses DO NOT aim to teach the student new topics in statistics but to train the students to use R in data analysis.

Available courses in this group:

- Introduction to R (<https://github.com/eR-Biostat/Courses/tree/master/Introductory%20Courses/Introduction%20to%20R>).
- Basic concepts in exploratory data analysis and computational statistics in R (<https://github.com/eR-Biostat/Courses/tree/master/Introductory%20Courses/Basic%20concepts%20in%20exploratory%20data%20analysis%20and%20computational%20statistics>).
- Introduction to statistical modeling using R (will be available online in 2018).

Example of a course: An introduction to R

- Online course materials :

The screenshot shows a GitHub repository page for 'eR-Biostat / Courses'. The repository has 0 issues, 0 pull requests, 0 projects, and 0 wiki pages. It has 0 stars and 0 forks. A red circle highlights the 'Data', 'R programs', and 'Slides' folders in the file list. A red arrow points from the 'Datasets' section in the text below to the circled folder names.

Branch: master ▾ Courses / Introductory Courses / Introduction to R /

eR-Biostat committed on GitHub Update README.md Latest commit ec9cfcb 4 days ago

| 📁 Data | Create README.md | 15 days ago |
|--------------|----------------------|-------------|
| 📁 R programs | Add files via upload | 15 days ago |
| 📁 Slides | Add files via upload | 15 days ago |
| 📄 README.md | Update README.md | 4 days ago |

The >eR-Biostat initiative

- Datasets, if not a part of R, are available online as well.

Introduction to R

This course is an introductory course to R and can be given as a two-days workshop or as a course of 3-4 classes (3 hours per class). All topics in the course are presented at a basic level and do not intend to introduce new materials. Only a limited knowledge in R is required. Topics covered in the course include:

- Two sample t-test.
- Basic plots

94 EN 22:38 24/06/2017