

# Curriculum Vitae 2024

## 1 Personal Data

Name: Fernando Roa

E-mail: froao at unal.edu.co

## 2 Chronology

- In 2016 as a postdoc I wrote a shiny app to show chromosomal numbers and genome size of plant species, and also some statistical analyses such as regressions (9.2).
- Around 2019 also as a postdoc, I wrote a shiny app to plot idiograms which are representations of chromosomes (10.4).
- In 2021 I took the Data Science 'ds4a' course from CorrelationOne. See 10.2 and 16.2
- Starting 2022 I worked 16 months for Appsilon; one year of it I worked for an important pharmaceutical, adding features and resolving bugs in their shiny apps (6.1).
- The rest of the time in Appsilon, I worked in a biological app with maps of distributions of species in the project mbaza and I also refactored a Natural Language Processing app, that I had developed previously in a data science course, to use modules and to show it in the Appsilon Conference (10.2).
- Recently I worked on several R personal projects, such as, ShinyInvoice (10.1) and gbif Taxon Distribution

## 3 Summary

I have worked as a contractor (B2B) building R-Shiny Apps for 1.5 years, including apps that generate reports from SQL data (mostly pharmaceutical - 6.1).

In addition, I have developed R-Shiny apps and packages related to biological research (Doctorate, Postdoc), including: idiogramFISH (10.4), CytoEvo (10.3) and Rmarkdown related (shinyInvoice - 10.1), more recently.

I have worked in genetics and plant and human cytogenetics. Having extensive wet experience in techniques such as estimation of genomic size by cytometry, sister chromatids exchange, G-banding, FISH, NGS read processing. I also have experience with molecular cytogenetic protocols such as DNA extraction, Nick translation, restriction reactions and PCR. Other techniques were applied in practical courses such as RNA extraction and microsatellites.

I also applied these and other tools to DNA analysis, such as: Galaxy-based servers, Next Generation Sequencing (RepeatExplorer) reads processing and more specifically, phylogeny and DNA software such as geneious, mafft, iqtree, revBayes (6.4).

I speak English (see TOEFL), Portuguese (lived > 10 y. in Brazil), Spanish (Native - Colombia) and some German (german highschool) (8.1, 8.2, 8.3).

## 4 Personal links

linkedIn: [fernando-roa-422bb614](#)

Curriculum: [curriculumpu](#)

CV-Lattes: [3239984208140922](#)

Gitlab: [ferroao](#)

Github: [fernandoroa](#)

ORCID: [0000-0001-5940-4374](#)

## 5 Skill Development Period

### 5.1 Python 2024

Libraries: math, itertools

Challenges: [github h\\_rank\\_challenges](#)

Platform: Hacker\_Rank

Begin: 02-2024 End: present

### 5.2 R 2024

Libraries: dplyr, fs, ggplot2, gridExtra, gtools, jsonlite, knitr, latex, lazyeval, lubridate, magrittr, quantmod, readr, rhino, rjson, rlang, Rmarkdown, rsconnect, scales, shiny modules, shinyAce, shinyjs, stats, stringr, tibble, tidyr, tidyselect

Products: [github invoice-public](#), [gitlab dotsViolin](#), [github gbif\\_map\\_shiny](#)

Begin: 06-2024 End: present

### 5.3 JavaScript 2023

Libraries: express, method-override, multer, nunjucks, pg-promise, pg, gulp

Challenges: [github foodfy\\_rs\\_challenge](#), [github async\\_rs\\_challenge](#)

Platform: Rocketseat

Begin: 07-2023 End: 11-2023

## 6 Professional experience

### 6.1 B2B - Full-time Shiny Developer - Home-Office - Appsilon 2022-2023

Main roles: Shiny Interfaces and Backend

Projects: - Shiny Apps using Shiny modules

- Backend and Frontend development for production of .pdf .docx reports, from SQL queries (support/fixes and adding features)

Technologies: docker, Jenkins, SQL, sass, Quarto

Company: B2B -> Appsilon -> Pharmaceutical

Begin: feb-2022 End: may-2023

## 6.2 Freelance R tutor

2020-2021

Main activity: R Teaching, Support

Platform: superprof.com.br

Begin: feb-2020 End: dec-2021

## 6.3 Freelance Translator

2020-2021

Main activity: Translation

Platform: proz.com

Begin: feb-2020 End: dec-2021

## 6.4 Post-doc

2014-2020

Main activity: Research in Plant molecular cytogenetics; Teaching in undergraduate and post-graduate

Scholarship:  
CAPES

(5 years on scholarship + 1 year voluntary)

Projects: - Plant cytogenetics database of Cerrado

- Reconstruction of ancestral characters in the phylogeny of Fabaceae and *Callisia* -  
Genome size of plants of Cerrado

Technologies: R, iqtree, revBayes, RepeatExplorer, mongoddb

Inst. contact: +55-62-3521-1688

Begin: feb-2014 End: jan-2020

## 6.5 School teacher

2013

Main activity: Sciences

Institution: INEM Francisco de Paula Santander, Bogotá - SED

Inst. contact: +57-1-3241000

Begin: may-2013 End: jan-2014

# 7 Main Degrees

## 7.1 Doctorate

2007-2011

Title: Plant Biology

Emphasis: Systematics

Diploma date: jul-02-2012

Scholarship: CNPq - Research funding agency - Brazil

Universidade Federal de Pernambuco, Recife, Brazil

Thesis: Analysis of the distribution of 5S and 45S rDNA sites in plant karyotypes

Keywords: database, ribosomal DNA, FISH, molecular cytogenetics. Supervisor: Marcelo Guerra

Language: portuguese

Grade average: 4.3 (from 0.0 to 5.0)

## 7.2 Master

2006-2007

Title: Plant Biology

Emphasis: Sistematics

Diploma date: jul-05-2010

Scholarship: CAPES - Education funding agency - Brazil

Universidade Federal de Pernambuco, Recife, Brazil

Thesis: Molecular citotaxonomy of genus *Callisia* (Commelinaceae) Supervisor: Marcelo Guerra

Keywords: Molecular cytogenetics, FISH. Language: portuguese

Grade average: 4.0 (from 0.0 to 5.0)

Distinctions: Theses - aproved with distinction

### 7.3 College

1997-2005

Title: Biology

Emphasis: Genetics

Diploma date: sept-15-2005

Universidad Nacional de Colombia

Thesis: Cytogenetic analysis with 4MV X-radiation of cells of early onset Alzheimer patients and controls (Instituto de Genética Humana, PUJ) Supervisor: Gloria Osorio, Marta Lucía Bueno

Keywords: cytogenetics, Alzheimer. Language: spanish

Grade average: 4.0 (from 0.0 to 5.0)

Distinctions: with honors, tuition payment exemption

### 7.4 High-School

Title: High school graduate

Emphasis: Sciences

Diploma date: jul-15-1995

German School, Bogota

Language: spanish-german

Grade average: 8.1 (from 0.0 to 10.0)

## 8 Language proficiency

### 8.1 English

2018; 2012

TOEFL-ITP; TOEFL

657/677; 103/120

C1; C1

### 8.2 Portuguese

2011

CELPE-BRAS

Higher intermediate

B2

### 8.3 German

1995

Sprachdiplom II

Passed

B2-C1

## 9 Articles

9.1 Heterochromatic patterns of Citrus revisited: a new look at species origins and karyotype evolution

2023

Montenegro, Claudio; Roa, Fernando; dos Santos Soares Filho, Walter; Barros e Silva, Ana Emília. Tree Genetics & Genomes. v19. p36

doi [10.1007/s11295-023-01610-0](https://doi.org/10.1007/s11295-023-01610-0)

9.2 The Cerrado (Brazil) plant cytogenetics database

2017

Roa, Fernando; Telles, Mariana Pires de Campos. Comparative Cytogenetics. v11. p285-297

Repo(s): [gitlab cerradocytomu](#)

Web-page: [shinyapps.io](https://shinyapps.io)

doi [10.3897/CompCytogen.11\(2\).11395](https://doi.org/10.3897/CompCytogen.11(2).11395)

9.3 Non-Random Distribution of 5S rDNA Sites and Its Association with 45S rDNA in Plant Chromosomes 2015

Roa, Fernando; Guerra, Marcelo. Cytogenetic and Genome Research. v146. p243-249

doi 10.1159/000440930

9.4 Distribution of 45S rDNA sites in chromosomes of plants: structural and evolutionary implications. 2012

Roa, Fernando; Guerra, Marcelo. BMC Evolutionary Biology. v12. p225

doi 10.1186/1471-2148-12-225

9.5 Karyotype differentiation in three species of Tripogandra Raf. (Commelinaceae) with different ploidy levels 2010

Marques, André; Roa, Fernando; Guerra, Marcelo. Genetics and Molecular Biology. v33. p731-738

doi 10.1590/S1415-47572010005000085

9.6 Cytotaxonomy of diploid and polyploid Aristolochia (Aristolochiaceae) species based on the distribution of CMA/DAPI bands and 5S and 45S rDNA sites 2009

Berjano, Regina; Roa, Fernando; Talavera, Salvador; Guerra, Marcelo. Plant Systematics and Evolution. v280. p219-227

doi 10.1007/s00606-009-0184-6

## 10 Software: packages, scripts, pages

10.1 shinyInvoice: Shiny App - Generate a Pdf Invoice with 'Rmarkdown'

R package/ Shiny App

Repo(s): [github invoice-public](#), [CRAN shinyInvoice](#)

Web-page: [shinyapps.io](#)



10.2 NLP for classifying community feedback

Python/R code; Shiny-App

Repo(s): [gitlab nlpfeedback](#), [github NLPShiny\\_rhino\\_mod](#)



10.3 Cytogenetics characteristic evo modeling

Shiny-App

Repo(s): [gitlab cytoevopri](#)

Web-page: [shinyapps.io](#)



10.4 idiogramFISH: plot Idiograms and Karyotype indices

R-package; Shiny-App

Repo(s): [gitlab idiogramFISH](#), [CRAN idiogramFISH](#)

Web-page: [shinyapps.io](#)

Docs: [gitlab.io](#)



## 10.5 Curriculum

Rmarkdown

Repo(s): [gitlab curriculumpu](#)

Web-page: [gitlab.io](#)



## 10.6 Reading databases

R Scripts

Repo(s): [gitlab getdatabase](#)



## 10.7 linkScraping: Creating a .bib library from journal html pages

Python/R scripts

Repo(s): [gitlab linkscraping](#)



## 11 Courses taught

### 11.1 Cytogenetics

Level: Graduate

Universidade Federal de Goiás. Language: portuguese

2015.I

40h

### 11.2 Cytogenetics

Level: College

Universidade Federal de Goiás. Language: portuguese

2014.I

64h

## 12 Mentoring

### 12.1 Undergraduate research

Student: Daniella Rezende

Institution: Universidade Federal de Goiás

01-08-2014 - 31-07-2015

## 13 Short Courses taught

### 13.1 Evolution of cytogenetic characters in the phylogenetic context

21/05/2019

VI Brazilian Meeting of Cytogenetics and Cytogenomics, Goiânia

5h

Language: portuguese

### 13.2 Molecular and classic Cytogenetics in plants

18-20/11/2014

XXV Week of ICB, Universidade Federal de Goiás

6h

Language: portuguese

## 14 Talks in Events

### 14.1 Poliploidy and genome duplication Brazilian legumes

25-10-2019

70 Congresso Nacional de Botânica. Language: portuguese

Technologies: R, iqtree, revBayes, MAFFT, StableTraits

Maceió, AL, Brazil

- 14.2 Cytogenetics for resolving evolutionary questions 27-04-2018  
 Encontro da liga acadêmica de genética. Language: portuguese  
 Technologies: R, iqtree, MAFFT  
 UFG. Goiânia, Brasil
- 14.3 Reconstruction of ancestral states of cytogenetic characters in Leguminosae 20-10-2017  
 XI Workshop de Genética da PUC Goiás. Language: portuguese  
 Technologies: R, iqtree, revBayes, MAFFT, StableTraits  
 PUC. Goiânia, Brasil
- 14.4 Database of Plant Cytogenetics. Current situation of the field 08-12-2016  
 Reunião de citogenética do Brasil Central. Language: portuguese  
 Technologies: R, mongoDB  
 PUC. Goiânia, Brasil
- 14.5 Distribution of 5S and 45S rDNA sites and implications 28-05-2012  
 II Simposio de Genética. Language: spanish  
 Technologies: R  
 Universidad del Quindío. Armenia, Colombia
- 14.6 Trends on the distribution of the 45S ribosomal DNA in plants 02-07-2010  
 Society for Experimental Biology Main Meeting  
 Technologies: R  
 Prague, Czech Republic
- 14.7 Cytogenetics and Molecular cytotaxonomy of species of genus Callisia Loeft. (Commelinaceae) 17-08-2007  
 II simposio Latinoamericano de citogenética y evolución. Language: spanish  
 UN, Palmira, Colombia

## 15 Abstracts in Annals

- 15.1 Splitting is the answer. Cytogenetics and systematics analyses of Callisia Loeft. (Commelinaceae) Poster  
 Roa F, Pellegrini MOO, Vaio M, Guerra M 21-24 05/2019  
 VI Reunião Brasileira de Citogenética e Citogenômica. Goiânia  
 Technologies: R, mongoDB, MAFFT, iqtree, revBayes, StableTraits, FISH
- 15.2 The Cerrado Plant cytogenetics database Poster  
 Roa, F; Telles, MPC 08-11/11/2016  
 IV Congresso Brasileiro de Recursos Genéticos. Curitiba  
 Technologies: R, mongoDB, cytometry  
 Anais do IV Congresso Brasileiro de Recursos Genéticos. Language: portuguese

- 15.3 Genome size and chromosome counts in Brazilian Cerrado spermatophytes Poster  
 Roa, F; Antunes, AM ; Souza, LGR ; Telles, MPC 26-29 05/2015  
 4 Reunião Brasileira de Citogenética. Atibaia  
 Technologies: R, cytometry  
 Trabalhos da 4ta RBC. Language: portuguese
- 15.4 Distribution of 5S and 45S rDNA sites in plant chromosomes Talk  
 Guerra M, Roa F 23-25 04/2012  
 Gatersleben Research Conference. IPK Gatersleben, Germany  
 Technologies: R  
 Annals of the Gatersleben Research Conference. p: 53
- 15.5 Trends on the distribution of the 45S ribosomal DNA in plants Talk  
 Roa F, Guerra M 30-03 07/2010  
 Society for Experimental Biology Main Meeting. Prague, Czech Republic  
 Technologies: R  
 Annals of the SEB Meeting. p: 262
- 15.6 Preferential position of 5S ribosomal RNA genes in plant genomes Poster  
 Roa F, Guerra M 31-03/04/2009  
 II Brazilian Symposium of Molecular genetics. Búzios, Brasil  
 Technologies: R  
 Annals of the II Brazilian Symposium of Molecular genetics. p: 180. Language: portuguese
- 15.7 Chromosomal variation of heterochromatin and 5S and 45S rDNA in species of Aristolochia Poster  
 Roa F, Berjano R, Guerra M 02-05/09/2007  
 53 Brazilian congress of genetics. Aguas de Lindóia, Brasil  
 Annals of the 53 Brazilian congress of genetics. p: 56. Language: portuguese
- 15.8 Cytogenetics and molecular cytotaxonomy of species of genus Callisia Loeft. (Commelinaceae) Talk  
 Roa F, Guerra M 15-18/08/2007  
 II Latin-American symposium of cytogenetics and evolution. Palmira, Colombia  
 Technologies: FISH  
 Annals of the II Latin-American symposium of cytogenetics and evolution. p: 217. Language: portuguese
- 15.9 Cytogenetics of a spontaneous tetraploid of Nothoscordum pulchellum Kunth (Alliaceae) Poster  
 Roa F, Guerra M 06-10 11/2006  
 57 National congress of Botany. Gramado, Brasil  
 Technologies: FISH  
 Language: portuguese



15.10 Contrasting chromosome patterns in three species of genus *Callisia* Poster  
Roa F, Guerra M 03-09/09/2006

52 Brazilian congress of genetics. Foz do Iguaçu, Brasil

Technologies: FISH

Annals of the 52 Brazilian congress of genetics. p: 1107. Language: portuguese

15.11 Transport of biomass by *Atta laevigata* Smith (Formicidae) in the eastern plains Poster

Velasco P, Roa F 06-10/10/2003

III Scientific meeting of biology students. Bogotá, Colombia

Acta Biológica Colombiana, Vol. 8 No. 2. p: 117. Language: spanish

## 16 Courses and Workshops Taken

16.1 Mathematics for Data Science and Machine Learning using R 05 2024  
udemy - Eduonix 10h

Theoretical and Practical Course

16.2 Data Science for All (ds4a) 20/05-10/09 2021  
Correlation One 375h

Focused on python libraries, and also using Jupyter notebooks, making data visualizations for exploratory data analysis and database management. The course also included the use of AI, natural language processing, Decision Trees, k-nearest neighbors and convolutional neural networks among others. My certificate was honorific and my group's project involved NLP and was among the 10 best (from 90 groups).

Theoretical and Practical Course

16.3 Flow cytometry 30/11 - 02/12 2015  
Universidade Federal de Pernambuco, Recife, Brasil 15h

Theoretical and Practical Course

16.4 Isolation of cells by Splitt and acoustofluidics 28/01 - 08/02 2013  
Universidad Nacional de Colombia. Centro Internacional de Física 32h

Theoretical Course. Language: Spanish

16.5 Engativa Wetlands 2013 30/09 - 30/11 2013  
Jardín Botánico de Bogotá 60h

Course. Language: Spanish

16.6 2nd Biological evolution workshop 16/11 - 18/11 2009  
Universidade Federal de Rio Grande do Sul, Porto Alegre, Brasil 24h

Workshop

16.7 Identification and characterization of gene function in plants and microorganisms Universidade Federal Rural de Pernambuco, Recife, Brasil Theoretical Course. Language: Portuguese	28/07 - 01/08 2008 20h
16.8 Stem cells, facts, fiction and future 53 Brazilian congress of genetics, Águas de Lindóia, Brasil Congress Course. Language: Portuguese	02/09 - 05/09 2007 3h
16.9 Cytogenetics in the diagnosis and genetic counseling of recurrent abortion II Latin-American symposium of cytogenetics and evolution, Palmira, Colombia Congress Course. Language: Spanish	15/08 - 18/08 2007 4h
16.10 Chromosomes and phylogeny: The use of cladistics in cytogenetics 52 Brazilian congress of genetics, Foz de Iguaçu, Brasil Congress Course. Language: Portuguese	03/09 - 09/09 2006 3h
16.11 Physical mapping and positional cloning in plants 52 Brazilian congress of genetics, Foz de Iguaçu, Brasil Congress Course. Language: Portuguese	03-09 - 09/09 2006 3h
16.12 Basic and molecular cytogenetics Instituto de Genética Humana, Bogotá, Colombia Training. Language: Spanish	15/09 - 15/12 2002 2520h
16.13 Animal cell culture Instituto Nacional de Salud, Bogotá, Colombia Theoretical and Practical Course. Language: Spanish	04/06 - 14/07 2001 84h
16.14 Transgenic plants Universidad Nacional de Colombia, Bogotá, Colombia Theoretical Course. Language: Spanish	23/06 - 24/06 2000 19h

## 17 Personal references

17.1 Oriol Senan

Workplace: Appsilon

17.2 Michal Parkola

Workplace: Appsilon (previously)