

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, tidyverse, 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
(5 years on scholarship + 1 year voluntary)

Scholarship:
CAPES

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, mongodb

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 Emilia. 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.cerradocytogenetics.org/cerradocytogenetics/cerradocytogenetics

Web-page: shinyapps.io/cerradocytogenetics/

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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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

2015.I

Level: Graduate

40h

Universidade Federal de Goiás. Language: portuguese

11.2 Cytogenetics

2014.I

Level: College

64h

Universidade Federal de Goiás. Language: portuguese

12 Mentoring

12.1 Undergraduate research

Student: Daniella Rezende

01-08-2014 - 31-07-2015

Institution: Universidade Federal de Goiás

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

15 Abstracts in Annals

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

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 cyt taxonomy of species of genus Callisia Loefl. (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 <i>Nothoscordum pulchellum</i> 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 Iguaçú, 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 Poster
eastern plains

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

17 Personal references

- 17.1 Oriol Senan
- Workplace: Appsilon
- 17.2 Michal Parkola
- Workplace: Appsilon (previously)