

Curriculum Vitae 2024

1 Personal Data

Name: Fernando Roa

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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 16.1
- 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, 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: Systematics

Diploma date: jul-05-2010

Scholarship: CAPES - Education funding agency - Brazil

Universidade Federal de Pernambuco, Recife, Brazil

Thesis: Molecular cytogenetics 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

TOEFL-ITP; TOEFL

657/677; 103/120

C1; C1

2018; 2012

8.2 Portuguese

CELPE-BRAS

Higher intermediate

B2

2011

8.3 German

Sprachdiplom II

Passed

B2-C1

1995

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. 19. 36

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

[journal link](#)

9.2 The Cerrado (Brazil) plant cytogenetics database 2017

Roa, Fernando; Telles, Mariana Pires de Campos. Comparative Cytogenetics. 11. 285-297

doi [10.3897/CompCytogen.v11i2.11395](https://doi.org/10.3897/CompCytogen.v11i2.11395)

[journal link](#)

Repo. links: [gitlab cerradocytotu](#)

Web-page: shinyapps.io

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. 146. 243-249

doi [10.1159/000440930](https://doi.org/10.1159/000440930)

[journal link](#)

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

Roa, Fernando; Guerra, Marcelo. BMC Evolutionary Biology. 12. 225

doi [10.1186/1471-2148-12-225](https://doi.org/10.1186/1471-2148-12-225)

[journal link](#)

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. 33. 731-738

doi [10.1590/S1415-47572010005000085](https://doi.org/10.1590/S1415-47572010005000085)

[journal link](#)

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. 280. 219-227

doi [10.1007/s00606-009-0184-6](https://doi.org/10.1007/s00606-009-0184-6)

[journal link](#)

10 Software: packages, scripts, pages

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

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

Web-page: shinyapps.io



10.2 Python/R code; Shiny-App: NLP for community feedback

Repo. links: [gitlab nlpfeedback](#), [github NLPShiny_rhino_mod](#)



10.3 Shiny-App: Cytogenetics characteristic evo modeling

Repo. links: [gitlab cytoevopri](#)

Web-page: shinyapps.io



10.4 R-package; Shiny-App: idiogramFISH: plot Idiograms and Karyotype indices

Repo. links: [gitlab idiogramFISH](#), [CRAN idiogramFISH](#)

Web-page: shinyapps.io

Docs: [gitlab.io](#)



10.5 Rmarkdown: Curriculum

Repo. links: [gitlab curriculumpu](#)

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



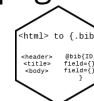
10.6 R Scripts: Reading databases

Repo. links: [gitlab getdatabase](#)



10.7 Python/R scripts: linkScraping: Creating a .bib library from journal html pages

Repo. links: [gitlab linkscraping](#)



11 Courses taught

11.1 Cytogenetics

Level: Graduate

Universidade Federal de Goiás. Language: portuguese

40h

2015.I

11.2 Cytogenetics

Level: College

Universidade Federal de Goiás. Language: portuguese

64h

2014.I

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

5h

VI Brazilian Meeting of Cytogenetics and Cytogenomics, Goiânia

21/05/2019

Language: portuguese

13.2 Molecular and classic Cytogenetics in plants

6h

XXV Week of ICB, Universidade Federal de Goiás

18-20/11/2014

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, Alagoas, 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
 Reunião de citogenética do Brasil Central. Language: portuguese
 Technologies: R, iqtree, revBayes, MAFFT, StableTraits
 UCG. 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
 UCG. 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
ROA, F; Antunes, AM ; Souza, LGR ; Telles, MPC 26-29 05/2015^{Poster}
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. Page: 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. Page: 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. Page: 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. Page: 56. Language: portuguese
- 15.8 Cytogenetics and molecular cytotaxonomy 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. Page: 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. Page: 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. Page: 117. Language: spanish

16 Taken Courses and Workshops

16.1 Data Science for All (ds4a) 375h

Correlation One 20/05-10/09 2021

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

16.2 Flow cytometry 15h

Universidade Federal de Pernambuco, Recife, Brasil 30/11-02/12 2015

Theoretical and Practical Course

16.3 Isolation of cells by Splitt and acoustofluidics 32h

Universidad Nacional de Colombia. Centro Internacional de Física 28/01-08/02 2013

Theoretical Course. Language: Spanish

16.4 Engativa Wetlands 2013 60h

Jardín Botánico de Bogotá 30/09-30/11 2013

Course. Language: Spanish

16.5 2nd Biological evolution workshop 24h

Universidade Federal de Rio Grande do Sul, Porto Alegre, Brasil 16/11-18/11 2009

Workshop

16.6 Identification and characterization of gene function in plants and microorganisms 20h

Universidade Federal Rural de Pernambuco, Recife, Brasil 28/07-01/08 2008

Theoretical Course. Language: Portuguese

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

17 Personal references

17.1 Oriol Senan
 Workplace: Appsilon

17.2 Michal Parkola
 Workplace: Appsilon (previously)