

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, 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	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 <i>Callisia</i> -	
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: Sistematics
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

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 Emilia. 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 cerradocytotpu](https://gitlab.cerradocytotpu)
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](https://github.com/invoice-public), [CRAN shinyInvoice](https://CRAN.R-project.org/package=shinyInvoice)
Web-page: shinyapps.io



10.2 Python/R code; Shiny-App: NLP for community feedback
Repo. links: [gitlab nlpfeedback](https://gitlab.com/nlpfeedback), [github NLPSHINY_rhino_mod](https://github.com/NLPSHINY/rhino_mod)



10.3 Shiny-App: Cytogenetics characteristic evo modeling
Repo. links: [gitlab cytoevopri](https://gitlab.com/cytoevopri)
Web-page: shinyapps.io



10.4 R-package; Shiny-App: idiogramFISH: plot Idiograms and Karyotype indices
Repo. links: [gitlab idiogramFISH](https://gitlab.com/idiogramFISH), [CRAN idiogramFISH](https://CRAN.R-project.org/package=idiogramFISH)
Web-page: shinyapps.io
Docs: [gitlab.io](https://gitlab.com/idiogramFISH)



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 40h

Level: Graduate 2015.I

Universidade Federal de Goiás. Language: portuguese

11.2 Cytogenetics 64h

Level: College 2014.I

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 5h

VI Brazilian Meeting of Cytogenetics and Cytogenomics, Goiânia 21/05/2019

Language: portuguese

13.2 Molecular and classic Citogenenetics 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 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 Reunião de citogenética do Brasil Central. Language: portuguese Technologies: R, iqtree, revBayes, MAFFT, StableTraits UCG. 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 UCG. 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)	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 Loefl. (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
 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

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 Iguaçú, 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 Iguaçú, 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)