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 R-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 R-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, 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 disctinction

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

9.2 The Cerrado (Brazil) plant cytogenetics database 2017

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

Repo(s): gitlab cerradocytopu

Web-page: shinyapps.io

doi 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 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 Cytogenenetics 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 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

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 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 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 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 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
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)