

# Guilherme Vituri

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## PROFESSIONAL SUMMARY

Experienced data scientist and engineering leader with a strong background in **R, Julia and mathematics**. Experience in delivering quick impactful data solutions and contributing to open-source and academic communities. Skilled with interactive dashboards in R/Shiny, data pipelines, machine learning models and scientific research. Publishes about Topological Data Analysis (TDA) and geospatial analytics.

## EDUCATION

### PhD in Topological Data Analysis

Universidade Estadual Paulista (Unesp) / Ohio State University (OSU)

2016 – 2020

- Research on generalizing Vietoris-Rips and Cech constructions using motifs, resulting in new clustering methods for graphs/networks.
- Six-month research stay at OSU under Prof. [Facundo Mémoli](#).
- Dissertation: [Motivic constructions on graphs and networks with stability results](#).

### Master Degree – Algebraic Topology

Universidade Estadual Paulista (Unesp)

2014 – 2015

- Studied the Gottlieb group, a subgroup of the fundamental group.
- Dissertation: [Sobre os grupos de Gottlieb](#) (in Portuguese).

### Bachelor in Mathematics

Universidade Estadual Paulista (Unesp)

2010 – 2013

## WORK EXPERIENCE

### R/SHINY ENGINEER

[Appsilon](#) (Remote)

Feb 2025 – Present

Appsilon provides data science services to the biggest pharma companies in the world, focusing on R/Shiny and quick development.

- Contributed to [open source packages](#) and collaborated with Posit to feature apps in Connect Gallery.
- Delivered a proof-of-concept using AI/LLMs and R/Shiny to automate clinical trial data extraction, reducing processing time from weeks to hours.
- Developed and maintained R/Shiny applications using Rhino; fixed issues and reviewed PRs for other open packages.
- Contributed to internal knowledge bases and authored [blog posts](#).

# HEAD OF INTELLIGENCE

## Argus Solutions

Jan 2020 – Jan 2025

Argus provides solutions for fatigue and distraction detection, control towers, and telemetry in transport operations.

- Founded and led the Data team, growing it to 12+ members (developers, data scientists, engineers, mathematicians).
- Designed and implemented a MariaDB database on AWS, migrating from hundreds of Excel files.
- Automated daily/weekly reporting with RMarkdown and Sendgrid, saving more than 20 hours of human work daily.
- Built analytics dashboards and platforms for photo/video analysis using R Shiny.
- Developed a machine learning model to [predict driver drowsiness](#), leveraging ensemble methods with [tidymodels](#).
- Created a high-performance Julia webserver using [Oxygen.jl](#), reducing data ingestion time from 4 minutes (with R) to 5 seconds (with Julia).
- Led computer vision projects (cellphone, drowsiness, pothole, gesture detection) using Keras and YOLO in Python.
- Managed hiring, mentoring, and professional development for the team.

## TECHNICAL SKILLS

- **R:** Advanced – tidyverse, Shiny, geospatial, APIs, package development, optimization
- **Julia:** Advanced – TDA, performance, APIs, parallelism, documentation
- **SQL:** Advanced – MariaDB, database design, optimization, dbplyr in R
- **AWS:** Intermediate – EC2, S3, RDS, ECS, Docker, Rekognition
- **Python:** Intermediate – numpy, pandas, polars, scikit
- **Data Science:** Machine learning, computer vision, reporting, dashboards
- **Technical Writing:** Workshops, blog posts, papers

## SELECTED PROJECTS & OPEN SOURCE

- **JuliaTDA Organization:** Owner and main contributor. Developed [Mapper](#) and [Ball Mapper](#) and [ToMATo](#) algorithms in Julia.
- **TidierOrg:** Contributor to [TidierIteration.jl](#), a Julia version of R's purrr.
- **QuartoDocBuilder.jl:** Created a package to facilitate Julia documentation with Quarto ([docs](#)).
- **Blog:** [julia-for-r-users](#) and other posts on R, Julia, and data science. The online version of this CV is [here](#).

## PUBLICATIONS, TALKS & WORKSHOPS

- **Paper:** [Remote sensing to quantify potential aquifer recharge as a complementary tool for groundwater monitoring](#) (Hydrological Sciences Journal, 2024). Co-author; led R/terra analysis and data pipeline.
- **Workshop:** [Topological Data Analysis workshop](#) (at [XXIII Brazilian Topology Meeting](#), 2024), using Julia.
- **Talk:** [Topology meets the real world: how geometry can help us analyse finite metric spaces](#) (at [Workshop of Algebraic Topology and Applications](#), 2023).
- **Paper:** [Motivic clustering schemes for directed graphs](#) (arXiv, 2020, with Facundo Mémoli).

## ADDITIONAL INFORMATION

- **Languages:** Portuguese (native), English (fluent), basic Italian and Russian.
- **Writing:** Author of a forthcoming book, [Topological Data Analysis with Julia](#).
- **Interests:** Open source, R and Julia, Topological Data Analysis, algorithms and performance, technical writing, scientific communication, mentoring.