

# Silvio Cabral Patricio

## Contact

Belo Horizonte/MG  
Brazil

+55 27 999 994 009

email

## Languages

**Portuguese** | Understand well, speak well, write well and read well

**English** | Understands well, speaks reasonably, writes reasonably and reads well

**French** | Understands little, speaks reasonably, writes little and reads reasonably

## Interests

Data science  
Deep learning  
Demography  
High dimensional data  
Image processing  
Machine Learning  
Mortality Modeling  
Probability  
Statistical Inference  
Statistical Learning

## Networks

Git  
Google Scholar  
Kaggle  
LinkedIn

## Education

- 2012 - 2017 **Bachelor's degree in Statistics** Espíto Santo, Brazil  
Federal University of Espíto Santo  
Title: Segregated regression for auto correlated data  
Advisor: Fabio A. F. Molinares (fabio.fajardo@gmail.com)  
Co Advisor: Alessandro J. Q. Sarnaglia (alessandro.sarnaglia@gmail.com)
- 2018 - 2020 **Master's degree in Statistics** Minas Gerais, Brazil  
Federal University of Minas Gerais  
Title: Statistical Properties of the Mortality Modeling  
Advisor: Fredy W. Castellares Cáceres (fwcc29@gmail.com)  
Co Advisor: Bernardo Lanza Queiroz (blanza@gmail.com)
- 2019 - 2019 **Short Course in Population, Health and Data Science** Rostock, Germany  
Max-Planck-Gesellschaft zur Förderung der Wissenschaften  
Winter course - 2-13 December 2019 in Rostock, Germany  
Fellowships for Winter 2019 course on Digital and Computational Demography Lab
- 2020 - 2020 **Short Course in Data Visualization** Rostock, Germany  
International Max Planck Research School for Population, Health and Data Science
- 2020 - 2021 **PhD Student** Barcelona, Spain  
Autonomous University of Barcelona  
European Doctoral School of Demography

## Skills and Competencies

### Statistics

multivariate analysis, analysis of discrete and counting data, inference in graphs

### Statistical modeling

mixture models, social network modeling, generalized linear models, regression analysis, regression methods for classification, discriminant analysis

### Machine learning

KNN, k-means and hierarchical clustering, high-dimensional regression (shrinkage methods), decision trees, bagging, random forest, boosting, dimensionality reduction (PCA and factorial analysis)

### Learning based on neural networks

Convolutional Networks, Recurrent Neural Networks, Recursive Neural Networks, Long Short-Term Memory, Autoencoders (dimensionality reduction)

### Optimization

genetic algorithm and linear programming

### Programming

solid knowledge in programming, and languages R (7 years of experience) and Python (Pandas, NumPy, Scikit-Learn, TensorFlow and Keras)

### Others

Market research, statistical quality control, operational research

## Experience

- 2018 - Now **Rn00bs** Minas Gerais, Brasil  
*Founder and tutor*  
The rn00bs is a community created in 2018 by three post-graduate students in Statistics from the Federal University of Minas Gerais, to disseminate and teach applied and theoretical statistics, machine learning and data science to people unfamiliar with the programming language R

|             |   |                        |
|-------------|---|------------------------|
| 2019 - 2019 | <b>Tenbu</b><br>(company specializing in decision support solutions)<br><i>Resident Data scientist</i>  | Minas Gerais, Brazil   |
|             | <ul style="list-style-type: none"> <li>• Industrial process modeling using machine learning</li> <li>• Missing data imputation using statistical learning</li> <li>• Prediction of metallurgical process failure</li> <li>• Business model to data science problems</li> <li>• Time series modeling for fault detection</li> <li>• Handling large</li> </ul>  |                        |
| 2017 - 2018 | <b>CONSTAT - Consultoria Estatística</b><br>(statistical consulting)<br><i>Founder and project director</i>   | Espírito Santo, Brazil |
|             | <ul style="list-style-type: none"> <li>• Exploitation of statistical databases through the extraction of information through modeling techniques and non-parametric statistical inference, aiming at decision-making</li> <li>• Sample planning, questionnaire design and data analysis, aimed at market research to aid decision making</li> <li>• Training in programming logic and statistical methods in R and Excel</li> <li>• Creation and analysis of indices / indicators</li> <li>• Statistical modeling for pattern recognition</li> <li>• Preparation of reports, charts and tables</li> </ul> |                        |
| 2017-2018   | <b>Pré-vestibular Dandara</b><br>(social project for underprivileged youth)<br><i>Volunteer teacher</i><br>Math teacher in probability and statistics   | Espírito Santo, Brazil |
| 2012 - 2013 | <b>NUMES – Núcleo de Modelagem Estocástica</b><br>(Stochastic Modeling lab)<br><i>Junior Research Fellow</i><br>Research in Estimation in replicate processes with application in time series<br>Advisor: Valderio Anselmo Reisen (valderioanselmoreisen@gmail.com)   | Espírito Santo, Brazil |
| 2015 - 2015 | <b>LCAD – Laboratório de Computação de Alto Desempenho</b><br>(High Performance Computing Lab)<br><i>Junior Research Fellow</i><br>Research in Diagnostic, formative and summative evaluation of programming learning<br>Advisor: Marcia Gonçalves de Oliveira (clickmarcia@gmail.com)  | Espírito Santo, Brazil |
| 2014-2018   | <b>LECON – Laboratório de Estatística e Computação Natural</b><br>(Laboratory Of Statistics And Natural Computing)<br><i>Junior Research Fellow</i><br>Title: Research in Statistical analysis of linear and non-linear time series<br>Advisor: Fabio Alexander Fajardo Molinares (fabio.fajardo@gmail.com)   | Espírito Santo, Brazil |
| 2017 - 2018 | <b>UFES – Universidade Federal do Espírito Santo</b><br>(Federal University of Espírito Santo)<br><i>Junior Research Fellow</i><br>Title: Research in Segregated regression for auto correlated data.<br>Advisor: Alessandro José Queiroz Sarnaglia (alessandro.sarnaglia@gmail.com)  | Espírito Santo, Brazil |
|             | <i>Undergraduate teaching assistant</i><br>Title: Undergraduate teaching assistant in Statistical programming languages<br>Advisor: Fabio Alexander Fajardo Molinares (fabio.fajardo@gmail.com)   |                        |
|             | <i>Undergraduate teaching assistant</i><br>Title: Undergraduate teaching assistant in Probability and statistics<br>Advisor: Fabio Alexander Fajardo Molinares (fabio.fajardo@gmail.com)  |                        |

## Awards

- 2018 **Data Battle - Health** Itaú - São Paulo, Brazil  
*Project: SALUS*  
70% of surgical procedures would not need to be performed. Salus proposes a decision-making aid system for managers of public hospitals regarding the prioritization and choice of breast cancer treatments ([verification link](#))

## Personal projects in machine learning & data science

- 2020 **Modeling and forecasting of COVID-19 cases in Brazil** Project in progress  
This project came up with the first case of coronavirus in Brazil. In it I use statistical and machine learning techniques to model and predict the number of cases and deaths for the main Brazilian states. These methods have made it possible to measure the impact of social isolation on the number of cases, and have also provided excellent results in predicting the numbers of cases and deaths. The results are being released on twitter.
- 2019 **Music modeling using spectrogram and Convolutional Neural network** Project in progress  
I use the music spectrum to extract features from songs, so I use CNN to create a classifier for my favorite Spotify songs. The idea is to try other approaches to achieve better model accuracy and generalize to predict the Spotify's top 10.
- 2018 **Interpretable statistical methods for image segmentation** Project completed  
Gaussian mix models are used for modeling the image histogram. From this, a hypothesis test was derived to define how many segments the image has.
- Breast Cancer Treatment Value Prediction Learning Machine** Project completed  
In this project, I used radiographic images to segment the tumor and take features from the images. Hence, estimating whether the tumor is benign or malignant, the risk of treatment for the patient's life, and the cost of treatment. That way allowing the manager to better manage resources.

## Scholarly Publications

- 2020 Theoretical Population Biology  
CASTELLARES, F.; **PATRICIO, S. C.**; LEMONTE, A; QUEIROZ, B. L. . On closed-form expressions to Gompertz–Makeham life expectancy. ([link](#))
- 2019 Anais do IV Seminário Internacional de Estatística com R  
**PATRICIO, S. C.** ; PANARO, R. V. ; LIMA, A. S. ; SILVA, P. V. . Change Point Estimation in Segmented Regression Model Using Rstan: An Application to Exercise Physiology Data. In: Anais do IV Seminário Internacional de Estatística com R, v. 4, ISSN: 2526-7299, 2019. ([link](#))
- Anais do IV Seminário Internacional de Estatística com R  
PANARO, R. V. ; LIMA, A. S. ; **PATRICIO, S. C.** . Semiparametric Survival Analysis via Bernstein Polynomials. In: Anais do IV Seminário Internacional de Estatística com R, v. 4, ISSN: 2526-7299, 2019. ([link](#))
- Anais do IV Seminário Internacional de Estatística com R  
LIMA, A. S. ; **PATRICIO, S. C.** ; SILVA, L. A. C. ; PANARO, R. V. . Classificador Ensemble: uma abordagem não-paramétrica aplicada à detecção de diabetes (Ensemble Classifier: A Nonparametric Approach Applied to Diabetes Detection). In: Anais do IV Seminário Internacional de Estatística com R, v. 4, ISSN: 2526-7299, 2019. ([link](#))
- 2018 Anais da Jornada de Iniciação Científica da UFES  
**PATRICIO, S. C.** ; SARNAGLIA, A. J. Q. . Análise de regressão segmentada para dados autocorrelacionados com aplicação a determinação do platô do VO2 (Segmented regression analysis for autocorrelated data with VO2 plateau determination application). In: Anais da Jornada de Iniciação Científica, v. 9, ISSN: 2357-7746, 2018. ([link](#))

2012

Anais da Jornada de Iniciação Científica da UFES

**PATRICIO, S. C.** ; REISEN, V. A. . Estimação em processos replicados com aplicações em séries reais (Estimation in replicated processes with real series applications). In: Anais da Jornada de Iniciação Científica, v. 3, 2012, ISSN: 2357-7746. (link)

## Accepted for publication

2020

Statistics and Probability Letters

CASTELLARES, F.; **PATRICIO, S. C.**; LEMONTE, A. . On gamma-Gompertz life expentacy.

## Submitted papers

2020

Computational Statistics and Data Analysis

**PATRICIO, S. C.**; Queiroz, A. J; Molinares, F. F. . The plateau of oxygen uptake in exercise physiology: a segmented regression estimation for autocorrelated data.

## Papers in progress

2020

**PATRICIO, S. C.**; CASTELLARES, F. ; QUEIROZ, B. L.; LEMONTE, A.. Modeling the mortality force in old age using the mixture models

**PATRICIO, S. C.**; PANARO, R. V. . The mortality plateau: a model for its estimation

**PATRICIO, S. C.**; CASTELLARES, F. ; LEMONTE, A.. Gompertz-Makeham distribution: Inference and Application to lifetime data and Actuarial Science

## Academic & Scientific Poster Presentation

2019

2nd Conference on Statistics and Data Science

PANARO, R. V. ; **PATRICIO, S. C.** . C. ; MAYRINK, V. ; COSTA, M. . Predictive modeling of economic and financial monitoring of the Brazilian electricity regulatory agency (ANEL). In: 2nd Conference on Statistics and Data Science (CSDS 2019), 2019, Salvador, BA. Conference on Statistics and Data Science, 2019.

ESTE - Escola de Séries Temporais e Econometria

PANARO, R. V. ; LIMA, A. S. ; **PATRICIO, S. C.** ; SILVA, P. V. . Modelagem e Previsão da Inflação Anual Efetiva medida pelo IPCA (Modeling and Forecasting Effective Annual Inflation Measured by IPCA). In: ESTE - Escola de Séries Temporais e Econometria, 2019, Gramado, RS. ESTE - Escola de Séries Temporais e Econometria, 2019.

2018

XIII Semana de Estatística: A Estatística na Sociedade e na era Big Data

**PATRICIO, S. C.** ; SARNAGLIA , A. J. Q. ; FAJARDO, F. A . Análise de Regressão Segmentada para Dados Autocorrelacionados com Aplicação à Determinação do Platô do VO2 (Segmented regression analysis for autocorrelated data with VO2 plateau determination application). In: XIII Semana de Estatística: A Estatística na Sociedade e na era Big Data, 2018, Vitória, ES. XIII Semana de Estatística: A Estatística na Sociedade e na era Big Data, 2018.

2016

XII Semana de Estatística

**PATRICIO, S. C.** . ; INABA, F. K. ; CORNEJO, M. L. ; FAJARDO, F. A . Regressão linear com regularização: Um estudo comparativo (Linear Regression with Regularization: A Comparative Study). In: XII Semana de Estatística, 2016, Vitória-ES. XII Semana de Estatística, 2016.

2014

XI Semana de Estatística

**PATRICIO, S. C.** ; FAJARDO, F. A . Sobre o uso do periodograma de segunda ordem em processos bilineares (On the use of the second order periodogram in bilinear processes). In: XI Semana de Estatística, 2014, Vitoria. XI Semana de Estatística, 2014.

2012

SINAPE - Simpósio Nacional de Probabilidade e Estatística

**PATRICIO, S. C.** ; COTTA, H. ; REISEN, V. A. . Estimação do modelo ARFIMA através de métodos paramétricos e testes de raízes baseados em ranks (Estimation of the ARFIMA model through parametric methods and rank-based root tests). In: SINAPE, 2012, João Pessoa. Simpósio Nacional de Probabilidade e Estatística, 2012.

X Semana de Estatística

**PATRICIO, S. C.** ; PESCA, F. C. ; LOPES, R. B. ; BARBOSA, E. F. ; MEDEIRO, P. C. F. . A poluição da Orla da Curva da Jurema, pela percepção de seus usuários (The pollution of the Curve of Jurema, by the perception of its users.). In: X Semana de Estatística, 2012, Vitória, ES. X Semana de Estatística, 2012.

## Academic references

1st ref

**Fredy Castellares Cáceres**

master's advisor

*Adjunct Professor at the Department of Statistics at the Federal University of Minas Gerais (Brazil), since 2006*

1st email adress: fwcc29 at gmail.com

2nd email adress: fredy at est.ufmg.br

2nd ref

**Bernardo Lanza Queiroz**

master's co-advisor

*Associate Professor at the Department of Demography and a researcher at CEDEPLAR at the Federal University of Minas Gerais (Brazil), since 2006*

1st email adress: blanza at gmail.com

2nd email adress: lanza at cedeplar.ufmg.br

3rd ref

**Alessandro Queiroz Sarnaglia**

undergraduate advisor

*Adjunct Professor at the Department of Statistics at the Federal University of Espírito Santo (Brazil), since 2010*

1st email adress: alessandro.sarnaglia at gmail.com

2nd email adress: alessandro.sarnaglia at ufes.br