Raquel de Souza Borges Ferreira

CONTACT INFORMATION	Intel Corporation 5000 W Chandler Blvd Chandler, AZ 85226 USA

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EDUCATION

Purdue University, West Lafayette, IN

Ph.D., Statistics, May, 2019
- Thesis: *Interpretable Machine Learning for Additive Manufacturing*
- Advisor: Arman Sabbaghi

M.S., Mathematical Statistics, May 2018

Universidade Federal de Minas Gerais, Minas Gerais, Brazil

M.S., Statistics, January 2014
- Dissertation: *Survival Analysis with Unknown Classification Errors*
- Advisors: Magda Carvalho Pires and Enrico Antônio Colosimo

Universidade Federal de Juiz de Fora, Minas Gerais, Brazil

B.S., Statistics, November 2011
- Monography: *Association Between Depression and Cognitive Abilities in the Elderly*
- Advisor: Alfredo Chaoubah

EMPLOYMENT

Intel Corporation, Chandler, AZ

Data Scientist **August 2019 – Present**

REFEREED PUBLICATIONS

[1] Ferreira R., Sabbaghi A., Huang Q. (2019) Automated geometric shape deviation modeling for additive manufacturing systems via Bayesian neural networks. *IEEE Transactions on Automation Science and Engineering* (to appear).

[2] Kegele C., Oliveira J., Magrani T., Ferreira A., Ferreira R., Sabbaghi A., Ferreira A., Brandão A., Raposo N., Polonini H. (2019) A randomized trial on the effects of CitrusiM® (Citrus sinensis (L.) Osbeck dried extract) on body composition. *Clinical Nutrition Experimental* 27: 29–36.

[3] Wang Y., Ferreira R., Wang R., Qiu G., Li G., Qin Y., Ye P.D., Sabbaghi A., Wu W.(2019) Data-driven and probabilistic learning of the process-structure-property relationship in solution-grown tellurene for optimized nanomanufacturing of high-performance nanoelectronics. *Nano Energy* 57: 480–491.

[4] Quirino I. G., Dias C. S., Vasconcelos M. A., Poggiali I. V., Gouvea K. C., Pereira, A. K., Paulinelli G. P., Moura A. R., Ferreira R. S., Colosimo E. A., Simões e Silva, A.C., Oliveira, E.A. (2014) A predictive model of chronic kidney disease in patients with congenital anomalies of the kidney and urinary tract. *Pediatric Nephrology* 29: 2357–2364.

IN PREPARATION

[1] Ferreira R., Sabbaghi A. (2019) Predictive comparisons for screening and interpreting inputs in machine learning (Winner of the 2018 INFORMS QSR Best Student Paper Competition, and Finalist of the 2018 INFORMS Data Mining Best Theoretical Paper Competition).

[2] Ferreira R., Sabbaghi A., Prates, M. O. (2019) Generalized predictive comparisons for interpreting complex models.

PATENTS APPLICATIONS	System and Method for Automated Geometric Shape Deviation Modeling for Additive Manufacturing. Number 16/411,035. Submitted in May 2019.

INVITED TALKS

[1] Ferreira R., Sabbaghi A. "Predictive Comparisons for Input Screening and Interpreting Complex Machine Learning Models". In: *INFORMS 2018 Annual Meeting*. November 4, 2018.

[2] Ferreira R., Sabbaghi A., Huang Q. "Automated Geometric Shape Deviation Modeling for Cyber-Physical Additive Manufacturing Systems via Bayesian Neural Networks". In: *Second Foundation of Accuracy Control for Additive Manufacturing Workshop (FACAM 2018)*. February 8, 2018.

[3] Ferreira R., Sabbaghi A., Huang Q. "Automated Geometric Shape Deviation Modeling for Additive Manufacturing Systems via Bayesian Neural Networks". In: *INFORMS 2017 Annual Meeting*. October 24, 2017.

CONTRIBUTED TALKS

[1] Ferreira R., Sabbaghi A. "Predictive Comparisons for Screening and Interpreting Inputs in Machine Learning". In: *Intel's Statistics and Data Science Summit*. September 24, 2019.

POSTERS

[1] Ferreira R., Sabbaghi A., Huang Q. "Automated Learning of Geometric Shape Deformation Models in Additive Manufacturing". In: *2017 IMS/ASA Spring Research Conference*. May 17 to 19, 2017.

[2] Ferreira R. S. B., Ferreira C. S. Confecção de uma biblioteca em R para modelos lineares assimétricos. In: *Semana de Iniciação Científica da Universidade Federal de Juiz de Fora*. December, 2010.

[3] Ferreira R. S. B., Ferreira C. S. Confecção de uma biblioteca em R para modelos lineares assimétricos. In: *IX Encontro Mineiro de Estatística*. September, 2010.

[4] Ferreira R. S. B., Ferreira C. S. Confecção de uma biblioteca em R para modelos lineares assimétricos. In: 19° *SINAPE – Simpósio Nacional de Probabilidade e Estatística*. July, 2010.

PROFESSIONAL EXPERIENCE

Purdue University, West Lafayette, IN

Research Assistant   **July 2016 – May 2019**

- Work supported by the U.S. National Science Foundation under Grant No. CMMI-1544841 as part of the NSF/DHS/DOT/NASA/NIH Cyber-Physical Systems Program.
- Developed appropriate statistical and machine learning methodologies, under a Bayesian framework, for automated deformation model building of 3D printed geometric shapes that do not require detailed knowledge of the underlying system.
- Created a cloud-based learning app for the dynamic and efficient re-calibration of cyber-physical additive manufacturing systems.

Intel Corporation, Chandler, AZ

Data Science Intern   **May 2017 – August 2017**

- Responsible for consulting with all areas of the Technology and Development department to apply statistical theory and methods to solve engineering problems.
- Developed machine learning models to predict yield loss using key process indicators from initial process module.

- Developed new statistical methodologies for metrology repeatability, reproducibility, and matching for high dimensional datasets.
- Pulled large amounts of process data from multiple databases using SQL or other data extraction tools.

Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil

Research Assistant – INFOSAS   **March 2013 – July 2014**

- Direct Advisors: Renato M. Assunção and Marcos O. Prates.
- Worked with a team of computer scientists and statisticians to develop and implement statistical techniques for times series data to detect anomalies and possible frauds in Brazil's health system. Used R for the implementation, analysis, and visualization of the results.
- Adapted methods to work with a large and heterogeneous dataset, unnameable to a single typical time series model.
- Communicated statistical concepts to government officials without domain knowledge, and used their expertise in order to create coherent algorithms and validate the fraud detection tool's results.

Research Assistant   **August 2012 – December 2012**

- Made a survival model for chronic kidney disease more interpretable to help doctors make intelligent decisions for patients.

Universidade Federal de Juiz de Fora, Juiz de Fora, Minas Gerais, Brazil

Research Assistant   **August 2009 – July 2011**

- Converted and improved functions in MATLAB to R, to develop a library for skew scale mixtures of normal distributions.

PROFESSIONAL SERVICE

Invited reviewer for IISE Transactions.

Organizer and chair of a data mining invited session entitled "Practical Data Science with Applications in Industry" at the 2019 INFORMS Annual Meeting.

Member of Purdue University's STATCOM from 2014 to 2016.

Member of Junior Enterprise Mais from 2009 to 2010.

President of the Interact Club of Santos Dumont from 2006 to 2007.

Member of the Interact Club of Santos Dumont from 2004 to 2006.

PROFESSIONAL MEMBERSHIPS

Institute for Operations Research and the Management Sciences (INFORMS)

TEACHING EXPERIENCE

Purdue University, West Lafayette, IN

Course Writer   **August 2015 – May 2016**

- Statistics 301: Elementary Statistical Methods
  - Wrote course assignments used by over $1,000$ students per semester. Identified and utilized articles of interest, relevant questions, and ensured assignments follow the curriculum.
  - Communicated with 23 teaching assistants and 10 instructors to ensure quality and coherence of material.

Instructor   **Summer 2015**

- Statistics 301: Elementary Statistical Methods
  - Prepared and taught class material, wrote and administered quizzes, graded assignments, and held office hours for an introductory statistics course for non-science students.

Teaching Assistant   **August 2014 – December 2015**

- Statistics 301: Elementary Statistical Methods
- Statistics 113: Statistics And Society

AWARDS

Winner of the QSR Section Best Student Paper Award
Awarded by the Quality, Statistics, Reliability (QSR) Section of INFORMS (2018)
Awarded to the top researchers who submitted papers for consideration of the QSR Section Best Student Paper Award at the INFORMS 2018 Annual Meeting.

Finalist for the Data Mining Section Best Theoretical Paper Award
Awarded by the Data Mining Section of INFORMS (2018)
Awarded to the top four researchers who submitted papers for consideration of the Data Mining Section Best Theoretical Paper Award at the INFORMS 2018 Annual Meeting.

DIMACS and P&G Scholarship
Awarded by Organizers of the 2017 IMS/ASA Spring Research Conference (2017)
Awarded to student researchers attending the 2017 IMS/ASA Spring Research Conference.

Purdue University Graduate Teaching Award
Awarded by Purdue University (2017)
Awarded yearly to selected graduate students with teaching responsibilities from across campus for their dedication to Purdue students and their outstanding teaching contributions.

PRF Summer Research Grant
Awarded by the Purdue University (2015)
Awarded to pre-doctoral students for effort devoted to the development of new research projects or the continuation of ongoing research projects.

CNPq Fellowship
Awarded by CNPq (2012-2013)
Awarded to graduate students support their graduate studies.

Dr. Marcel de Toledo Vieira Merit Award in Sampling
Awarded by Dr. Marcel de Toledo Vieira (2010)
Awarded to top student enrolled in Dr. Marcel de Toledo Vieira's survey sampling course.

BIC/UFJF Grant
Awarded by Universidade Federal de Juiz de Fora (August 2009 – July 2011)
Grant awarded by Universidade Federal de Juiz de Fora to support research project.