Lucas Vasconcelos Vieira

Data Science · Operational Analytics · Statistical Modeling · Process Optimization · Decision Support Systems

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Applied Data Scientist with a Ph.D. in Agronomy (UNESP, Brazil) and an M.Sc. in Crop, Soil, and Environmental Sciences (University of Arkansas, USA), specializing in statistical modeling, operational analytics, and data-driven optimization of complex production systems. My work focuses on diagnosing inefficiencies, identifying loss drivers, and improving industrial processes through the integration of statistical modeling, data engineering, and applied analytics. I develop scalable analytical systems that transform industrial and operational data into measurable operational and financial outcomes, combining Python, R, SQL, and backend development experience to build automated models, analytical pipelines, monitoring frameworks, and decision-support solutions integrated into real operational workflows.

Languages: English • Portuguese

Programming & Data Stack: Python • R • SAS • Bash / Shell • SQL • PostgreSQL / PostGIS • JavaScript / HTML / CSS

Statistical & Analytical Methods: Statistical Inference & Hypothesis Testing • Regression & Multivariate Analysis • Experimental Design & Analysis • Mixed Models (LMM / GLMM) • Time Series Analysis • Dimensionality Reduction

Data Engineering & Systems: ETL/ELT Pipelines • Data Integration • Backend Systems • APIs • Data Quality

Applied Analytics & Modeling: KPI Design & Monitoring • Decision-Support Systems • Predictive Modeling • Operational Performance Analysis • Process Optimization • Anomaly Detection

Industrial & Applied Domain: Biomass & Energy Systems • Industrial Process Optimization • Thermal Efficiency & Energy Conversion • Operational Efficiency & Loss Analysis • Supply & Resource Optimization • GIS & Remote Sensing

EDUCATION

BS in Data Science and Information Technology — Aug 2022 – Aug 2026
Virtual University of the State of São Paulo (UNIVESP) — *São Paulo, Brazil*
Applied Predictive Analytics

PhD in Agronomy — Aug 2017 – Aug 2021
São Paulo State University (UNESP) — *São Paulo, Brazil*
Statistical Modeling

MSc in Crop, Soil, and Environmental Sciences — Aug 2014 – Aug 2016
University of Arkansas (UARK) — *Arkansas, United States*
Crop Systems and Nutrient Management

BS in Biology — Aug 2010 – Aug 2014
Vale do Acaraú State University (UVA) — *Ceará, Brazil*
Sustainable Agricultural Systems

EXPERIENCE

Senior Operational Performance Analyst — Apr 2026 – Present
Combio Energia — *Piracicaba, São Paulo, Brazil*

Lead data-driven initiatives focused on operational efficiency, mass and energy balance validation, and biomass-to-energy conversion performance across industrial steam generation units. Develop analytical frameworks to diagnose process inefficiencies, validate measurement systems, identify operational losses, and support tactical and operational decision-making through statistical modeling, industrial analytics, and data engineering. Responsibilities include analyzing inconsistencies between steam production, billing, and customer measurement systems; detecting mass and energy losses across different operational regimes; modeling operational efficiency and biomass consumption drivers; and developing predictive and anomaly detection models for steam demand, production behavior, and efficiency deviations. Develop analytical dashboards, operational indicators, benchmarking frameworks across industrial units, automated calculation pipelines, and operational alert systems to support KPI monitoring, efficiency improvement, cost decomposition analyses, and loss reduction initiatives. Build analytical solutions integrating the full operational chain (biomass moisture, calorific value (PCI), combustion efficiency, steam generation, thermal losses, and operational costs), translating industrial process data into measurable operational and financial insights.

Data Science Analyst Out 2025 – Apr 2026

Centro de Tecnologia Canavieira (CTC) *Piracicaba, São Paulo, Brazil*

I worked as a Data Scientist supporting Sugarcane R&D at CTC (Centro de Tecnologia Canavieira), where I led the application of advanced statistical and experimental methodologies across large-scale field trials and research programs, enabling data-driven decision-making in genetic improvement, biotechnology development, and seed production systems. My work focused on multi-location and multi-year field trials, addressing complex experimental structures with hierarchical and unbalanced designs and enabling the evaluation of genotypes across diverse environments. I developed and deployed advanced statistical modeling frameworks, including linear and generalized linear mixed models and extensions for non-normal responses and heterogeneous variance structures, driving the modeling of disease resistance, yield components, and key agronomic traits and translating outputs into decision-oriented insights for breeders and agronomy teams. In parallel, I established reproducible, production-grade analytical pipelines spanning data processing, model development, and result synthesis, and designed analytical dashboards and reporting layers to operationalize insights, support real-time monitoring of key metrics, and directly inform strategic and operational decision-making across R&D programs.

Data Science Analyst Jul 2024 – Out 2025

World Resources Institute (WRI) Brazil *São Paulo, São Paulo, Brazil*

I worked as a Data Scientist in the Forests, Land Use, and Agriculture Program at WRI Brasil, where I developed and implemented data engineering solutions within the Data Management and Monitoring team. My work focused on structuring, processing, and analyzing complex datasets, including both geospatial and tabular data, to develop tools and methodologies that supported data-driven decision-making in forest restoration, sustainable land use, and environmental monitoring. I was responsible for designing and maintaining APIs and ETL pipelines optimized for geospatial data processing. This included developing spatial models, performing advanced analyses, and optimizing PostgreSQL/PostGIS queries to improve performance and scalability. I worked with multiple government data sources, including SICAR, MMA, FUNAI, PRODES, Global Forest Watch (GFW), SIGEF/INCRA, and IBGE, ensuring proper integration, standardization, and effective use of these datasets. In addition, I developed scalable REST APIs to enable real-time access and integration of geospatial data across different platforms. I built geospatial solutions using GeoServer, GIS technologies, and Python, leveraging libraries such as GeoPandas, Shapely, Rasterio, and Fiona to design data pipelines, perform spatial analyses, and support environmental monitoring and management initiatives.

Data Science Researcher Jan 2024 – Jun 2024

Fundação Osvaldo Cruz (Fiocruz) *Eusébio, Ceará, Brazil*

Worked as a Data Science Researcher at Fiocruz Ceará, contributing to epidemiological surveillance and genomic monitoring initiatives focused on high-impact pathogens affecting the Brazilian population. Developed analytical pipelines and predictive modeling solutions for genomic data analysis and outbreak monitoring, supporting data-driven public health surveillance and epidemiological research. Integrated statistical and machine learning models with genomic and epidemiological datasets to support outbreak prediction, surveillance workflows, and scientific analysis based on real-time and large-scale health data.

Data Analyst Jul 2023 – Dez 2023

Doce Barreira (MBM Comércio de Doces e Frutas) *Barreira, Ceará, Brazil*

Worked as a Data Analyst at Doce Barreira, leading analytical and automation initiatives to support operational management, business performance monitoring, and administrative decision-making across commercial operations. Managed end-to-end data workflows involving data structuring, integration, analysis, and reporting to improve operational visibility and business process efficiency. Designed and implemented centralized data management and reporting solutions integrating inventory, sales, and cash flow information, enabling real-time monitoring of key business metrics and improving data consistency across operational processes. Developed automation tools and analytical workflows using Python, Bash, Excel/VBA, and Linux-based environments to reduce manual workloads, streamline administrative routines, and support scalable business operations.

Data Scientist Out 2022 – Jun 2023

Bradesco S/A (INOVA Talentos Fellowship) *Osasco, São Paulo, Brazil*

Worked as a Data Scientist at Bradesco S/A through the INOVA Talentos program, developing analytical and automation solutions to support operational efficiency, process optimization, and strategic decision-making within large-scale banking operations. Contributed to operational restructuring initiatives by identifying process bottlenecks, defining KPI frameworks, and supporting performance analysis across business units. Developed automation tools and analytical workflows to reduce manual operational workloads, improve productivity, and support data-driven operational management. Collaborated with cross-functional teams to implement analytical solutions aligned with organizational and operational objectives.

Doctoral Researcher Ago 2017 – Jul 2021

São Paulo State University (UNESP) *Botucatu, São Paulo, Brazil*

Conducted advanced statistical research at São Paulo State University (UNESP) focused on mixed models, quantitative genetics, and experimental data analysis in agronomic and biological systems. Designed and analyzed complex experimental studies involving unbalanced hierarchical structures, applying mixed linear models, multiple imputation, and maximum likelihood estimation to evaluate genetic parameters and genotypic performance. Developed covariance structures for genetic breeding programs and contributed to statistical modeling frameworks used in agronomic research and experimental evaluation, with emphasis on quantitative analysis, experimental design, and advanced statistical inference.

Graduate Researcher Ago 2014 – Jul 2016

University of Arkansas (UARK) *Fayetteville, Arkansas, United States*

Conducted experimental research at the University of Arkansas focused on crop systems, nutrient management, and agronomic performance under different nitrogen fertilization strategies and planting dates in winter wheat production. Designed, managed, and analyzed field and greenhouse experiments to evaluate crop productivity, agronomic responses, and management practices across different production conditions. Supported wheat breeding and crop improvement programs through experimental evaluation, phenotyping, and agronomic data analysis, contributing to the optimization of crop management strategies and agricultural productivity through data-driven research and statistical analysis.

Research Assistant Ago 2013 – Jul 2014

Brazilian Agricultural Research Corporation (Embrapa) *Sobral, Ceará, Brazil*

Conducted agricultural research at the Brazilian Agricultural Research Corporation (EMBRAPA) focused on sustainable agricultural systems, soil management, and organic fertilization practices in semi-arid environments. Evaluated the agronomic performance of organic compost derived from small ruminant production residues in maize and agroforestry systems, analyzing crop development, biomass production, chlorophyll responses, and soil chemical properties under different fertilization strategies. Supported experimental research activities involving agronomic evaluation, soil and plant analysis, and data collection to assess the effects of organic and mineral fertilization on crop productivity and soil management practices.

Research Assistant Jan 2011 – Dec 2011

Universidade Estadual do Vale do Acaraú (UVA) *Sobral, Ceará, Brazil*

Conducted undergraduate research focused on agroforestry systems, ecological restoration, and sustainable land management in semi-arid environments within the Caatinga biome of Northeastern Brazil. Designed and conducted field and greenhouse experiments to evaluate native species performance, carbon stock dynamics in secondary succession areas, and restoration strategies for degraded lands. Contributed to research involving native forage and woody species, seed evaluation and conservation, and the assessment of sustainable agricultural and agroforestry practices adapted to semi-arid ecosystems.

Research Assistant Aug 2010 – Dec 2010

Núcleo de Biotecnologia de Sobral (NUBIS) *Sobral, Ceará, Brazil*

Performed laboratory activities related to genomics and proteomics, including reagent preparation, RNA/DNA extraction, protein separation and identification, electrophoresis, real-time PCR (qPCR), and molecular biology procedures.

TEACHING EXPERIENCE

Applied Programming for Experimental Statistics in SAS.

School of Agricultural Sciences (FCA) - São Paulo State University (UNESP), 2018.

Graduate-level course taught with a focus on applied statistical programming and experimental data analysis using SAS.

Soil Fertility and Plant Mineral Nutrition.

Master's Program in Animal Science - Vale do Acaraú State University (UVA), 2016.

Academic training focused on soil fertility, nutrient management, and agronomic interpretation applied to crop production systems.

TRAINING

Cambridge Intensive English Program.

English Center, Vancouver, Canada, 2013.

Intensive academic English training focused on advanced communication and Cambridge examination preparation.

TOEFL and Academic English Preparation Program.

English Center, Vancouver, Canada, 2013.

Advanced English training focused on academic communication, TOEFL preparation, and professional language development.

PUBLICATIONS

- **Different Sources of Nitrogen Fertilizer in Rainfed Maize in a Semiarid Environment.**
  Arid Land Research and Management - Taylor & Francis, 2023.
- **Parametric Models of Covariance Matrices for Repeated Measures.**
  Journal of Agricultural Science - Canadian Center of Science and Education, 2021.
- **Principal Component Analysis for Identification of Superior Castor Bean Hybrids.**
  Journal of Agricultural Science - Canadian Center of Science and Education, 2019.
- **Association Mapping Reveals Loci Associated with Multiple Traits in Soft Winter Wheat.**
  Euphytica - Springer, 2017.
- **Fertilidade do solo de sistemas agroflorestais em região semiárida..**
  Embrapa Caprinos e Ovinos, 2017.
- **Use of Organic Compost Containing Waste from Ruminants in Corn Production.**
  Revista Brasileira de Ciência do Solo, 2016.
- **Determination of Optimum Fall and Spring Nitrogen Rates for Maximizing Soft Red Winter Wheat Yield Sown at Variable Planting Dates..**
  In: Synergy in Science: Partnering for Solutions, Minneapolis, USA. SSSA Division: Nutrient Management and Soil and Plant Analysis., 2015.
- **Dose econômica e eficiência agronômica de composto orgânico proveniente de resíduos da criação e abate de pequenos ruminantes e de adubo nitrogenado na produção de grãos de milho em Luvissolo Háplico, no semiárido cearense..**
  Embrapa Caprinos e Ovinos, 2015.