

# Arno Strouwen

## Statistical Consultant

Curriculum Vitae  
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## Research Interest

**How to design informative experiments for biological systems with noisy dynamics and with incomplete knowledge of the model structure?**

## Research Experience

- 2022–current **Statistical Consultant**, Strouwen Statistics
- Scientific Computing consultancy in the Julia programming language.
  - Focused on optimal data gathering strategies.
- 2024–current **Research Scientist**, JuliaHub
- **Sensitivity analysis** of JuliaSimBatteries models to 4x reduce testing combinations of temperature and electrolyte concentrations to precisely characterize conductivity.
- 2022–2023 **Software Developer**, JuliaHub
- Made the **CI/CD** of <https://docs.sciml.ai> fully reproducible, ensuring that none of the examples in documentation can diverge.
  - Successfully onboarded several customers to the PumasQSP software.
- 2021–2022 **Postdoc Statistician**, The Janssen Pharmaceutical Companies of Johnson & Johnson
- **Model Based Design of Experiment**: designing **10x accelerated stability studies** to precisely predict the **shelf life** of pharmaceutical drugs and vaccines.
  - **Bayesian Optimization**: automizing **high-throughput experiments** to optimize the manufacturing conditions of pharmaceutical drugs and vaccines.
  - **Probabilistic Programming**: Bayesian Non-linear **mixed effect modelling** of powder flowability.
- 2016–2021 **Ph.D. Fellow**, KU Leuven Internal Research Fund
- **Metabolism of Pear During Hypoxia**: responsible for designing optimal experiments to study respiration and fermentation characteristics of pear fruit.
- 2016–2020 **Ph.D. Fellow Strategic Basic Research**, Research Foundation Flanders
- **Optimal Experimental Design for Dynamic Systems**: Developing novel robust experimental design methodology for dynamic systems with both measurement and process noise.

## Education

- 2022–2023 **Coursework Master of Statistics and Data Science**, UHasselt, Belgium
- **Deep Learning with Neural Networks**, Databases, Topological Data Analysis
- 2016–2021 **Ph.D. in Bio-science engineering**, KU Leuven, Belgium
- **Thesis**: "*Optimal Design of Dynamic Experiments in Bioscience Engineering*" under supervision of **Prof. Peter Goos** and **Prof. Bart Nicolaï**
- 2011–2016 **B.Sc.&M.Sc. in Bioscience-engineering**, Bio-systems engineering, magna cum laude, KU Leuven, Belgium
- **M.Sc. Thesis**: "*Towards a Coarse-Grained Model of the Acto-Myosin Cortex*"
  - **B.Sc. Thesis**: "*Mechanical Properties of Joly red, Jonagold and Kanzi apples*"

## Skills

- Programming **Julia**, JMP; *Basic knowledge: Python, SQL, R, Matlab*
- Statistics **Experimental Design**, Bayesian Statistics, Information Theory, Time Series Analysis, Regression, Generalized Linear Model, Ordinal Data, Anova, Blocked Experiment, Split-Plot experiment, Multivariate Statistics, Bayesian Filtering, Kalman Filtering, Uncertainty Quantification, Probabilistic Programming, Deep Learning, Neural Networks, Gaussian Processes, and Machine Learning
- Mathematics **Dynamic Systems**, Differential Equations, Optimization, Control Theory, Interval Arithmetic, Differentiable Programming, and Scientific Computing

## Peer Reviewed Publications

- 2023 **Adaptive and Robust Experimental Design for Linear Dynamical Models using Kalman filter.**  
Arno Strouwen, Bart Nicolaï and Peter Goos  
Statistical Papers, 64 (4).
- 2022 **Robust Dynamic Experiments for the Precise Estimation of Respiration and Fermentation Parameters of Fruit and Vegetables.**  
Arno Strouwen, Bart Nicolaï and Peter Goos  
PLOS Computational Biology, 18 (1).
- 2021 **D- and I-optimal design of multi-factor industrial experiments with ordinal outcomes.**  
Karel Van Brantegem, Arno Strouwen and Peter Goos  
Chemometrics and Intelligent Laboratory Systems, 221.
- 2019 **A Note on the Output of a Coordinate-Exchange Algorithm for Optimal Experimental Design**  
Arno Strouwen and Peter Goos  
Chemometrics and Intelligent Laboratory Systems, 192.
- 2019 **Optimizing Oxygen Input Profiles for Efficient Estimation of Michaelis-Menten Respiration Models.**  
Arno Strouwen, Bart Nicolaï and Peter Goos  
Food and Bioprocess Technology, 12 (5), 769-780.

## Selected Invited Presentations

- 2024 **Bayesian non-linear mixed effects model for safer powder storage.**  
JuliaCon 2024, Eindhoven, Netherlands  
ENBIS-24, Leuven, Belgium  
NCS 2024, Wiesbaden, Germany
- 2023 **Optimal Design for Model Autocompletion.**  
ENBIS-23, Valencia, Spain
- 2023 **Adaptive and Robust Experimental Design for Linear Dynamical Models using Kalman filter.**  
mODa 13, Southampton, United Kingdom
- 2022 **Model Based Experimental Design for Accelerated Small Molecule Stability Studies**  
Non-Clinical Statistics Conference, Louvain-la-Neuve, Belgium
- 2019 **Bayesian Filtering Techniques for Optimal Experimental Design**  
University of Southampton Seminar
- 2019 **Efficient Dynamical Experimentation for Post Harvest Storage**  
National Symposium of Applied Biological Sciences, Ghent, Belgium
- 2018 **Towards More Efficient Experimentation in Post Harvest Storage**  
Marine Research Institute, Spanish Research Council (IIM-CSIC) Seminar
- 2018 **Optimizing an Oxygen Input profile to Estimate Michaelis-Menten Respiration Parameters**  
ENBIS Spring Meeting, Florence, Italy
- 2017 **Optimal Design of Experiments for Non-Linear Models using JMP**  
KU Leuven Seminar

## Teaching Experience

- 2023-2025 **Substitute for Professor Goos, KU Leuven**  
Teaching the course Experimental Design in the Master of Statistics and Data Science
- 2022-2023 **Substitute for Professor Goos, KU Leuven**  
Teaching the course Experimental Planning and Data Modelling in the Master of Science in Food Technology
- 2022 **Daily Supervisor for summer PhD intern, Johnson & Johnson**  
Surrogate modelling for chemical reaction optimization
- 2020-2021 **Daily Supervisor for Master thesis, KU Leuven**  
Non-Linear Mixed Effect Respiration and Fermentation Models using **Pumas** software
- 2018-2019 **Daily Supervisor for Master thesis, Karel Van Brantegem, KU Leuven**  
Optimal Experimental Design Techniques for **Ordinal Data**
- 2017 **Daily Supervisor for Bachelor thesis, KU Leuven**  
Optimal Experimental Design Techniques for Michaelis-Menten Kinetics
- 2017-2019 **Teaching Assistant, KU Leuven**  
Computer exercise classes for the course **Univariate Data and Modelling in the R programming language**