

PhD Position in Operations Research and Design of Experiments

KU Leuven. Belgium. 2019-2023

Looking for a communicative and goal oriented PhD candidate with background in Operations Research and/or Statistics

INTRODUCTION

The Biostatistics research group within the MeBioS division of the Faculty of Bioscience Engineering at KU Leuven focuses on the use of statistics for product and process development and improvement. Much of the research done involves design of experiments, and implements operations research techniques such as integer linear and nonlinear programming and metaheuristics within the field of statistics. The research group is one of the strongest worldwide and publishes in leading statistics journals, operations research journals and engineering journals. The practical relevance of the work is witnessed by the activities of the group at <http://www.experimental-design.eu>.

PROJECT

The Biostatistics research group within the MeBioS division of the Faculty of Bioscience Engineering at KU Leuven has a vacancy for full-time Ph.D. scholarships from February 1, 2019 till January 31, 2023.

The main topic of the research consists in the exploration of advanced integer programming (IP) techniques like symmetry reduction techniques (Margot (2010)), distributed computing (Linderoth et al. (2009)) and their application in discovering novel and efficient industrial response surface experiments. This topic involves the application of Operation Reserach optimization techniques to Design of Experiments. Design of Experiments (DoE) is a field of combinatorial nature, which makes it prone to be tackled with IP techniques. At the same time, DoE is widely used in industry, so this PhD project potentially combines both theory and practice.

In part due to the extraordinary advances of the different integer linear and nonlinear programming commercial and open source solvers, successful applications of IP in statistics (Sartono et al. (2015), Bertsimas et al. (2016), Núñez Ares and Goos (2018)) have appeared in recent years. Indeed, the combination of these two disciplines has great potential to produce relevant work.

This project requires knowledge of statistical in general and DoE in particular and IP optimization techniques, such as linear and nonlinear integer programming, metaheuristics, etc. Within the PhD program there is room for specialized training.

We aim to present the project results at international conferences and to publish in top journals in statistics and operations research. The final product of the projects should be a Ph.D. degree.

PROFILE

- The candidate should hold a master degree in statistics, operations research, business engineering, mathematics, computer science or any related discipline.
- Ideally, the candidate's master degree has been awarded by an institution from one of the countries of the European Economic Area or Switzerland, at most two years ago.
- The candidate should have excellent programming skills. Familiarity with Matlab, Python, Julia, C or C++ is a must.
- Working knowledge of one of the mathematical programming software (Gurobi, CPLEX, XPRESS, SCIP, COIN-OR) is a big plus.
- The candidate should have excellent communication skills in spoken and written English.
- Curiosity, creativity and commitment are always helpful when pursuing a PhD.

OFFER

We offer an employment as full-time doctoral scholar. The initial appointment will be for 1 year, but, conditional on a positive evaluation, the appointment is renewable until a maximum duration of 4 years has been reached.

INTERESTED?

For more information please contact Prof. dr. Peter Goos at peter.goos@kuleuven.be. You can apply for this Ph.D. position until December 22, 2018 via the online application tool at

<https://www.kuleuven.be/personeel/jobsite/jobs/54950635?hl=en&lang=en>

References

- Bertsimas, D., King, A., Mazumder, R., et al. (2016). Best subset selection via a modern optimization lens. *The Annals of Statistics*, 44(2):813–852.
- Linderot, J., Margot, F., and Thain, G. (2009). Improving bounds on the football pool problem by integer programming and high-throughput computing. *INFORMS Journal on Computing*, 21(3):445–457.
- Margot, F. (2010). Symmetry in integer linear programming. In *50 Years of Integer Programming 1958-2008*, pages 647–686. Springer.
- Núñez Ares, J. and Goos, P. (2018). Enumeration and multi-criteria selection of orthogonal minimally aliased response surface designs. *Technometrics*.
- Sartono, B., Goos, P., and Schoen, E. (2015). Constructing general orthogonal fractional factorial split-plot designs. *Technometrics*, 57(4):488–502.