

Curriculum Vitae

Phillipe R. Sampaio

Researcher at Veolia Research and Innovation

April 15, 2017

Personal data

Name: Phillipe Rodrigues Sampaio.

Nationality: Brazilian, born in Fortaleza (Ceará, Brazil) on November 29th, 1987.

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Professional address

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Educational history

- 2011 - 2015 **Ph.D. in Applied Mathematics** - University of Namur, Belgium
Thesis: A trust-region method for constrained derivative-free optimization and worst-case evaluation complexity of non-monotone gradient-related algorithms for unconstrained optimization
Keywords: *constrained nonlinear optimization, derivative-free optimization, complexity*
Advisor: Prof. Philippe L. Toint
- 2009 - 2011 **M.Sc. in Computer Science** - University of São Paulo, Brazil
Thesis: Theory, methods and applications of multiobjective optimization
Keywords: *multiobjective optimization, quadratic optimization*
Advisor: Prof. Ernesto G. Birgin
- 2005 - 2008 **B.Sc. in Computer Science** - Federal University of Ceará, Brazil
Keywords: *combinatorial optimization*

Professional history

- Oct 2016 - present **Researcher at Veolia Research and Innovation**, France
Desc: development of optimization algorithms and predictive models for projects on energy, water and waste management
- Sep 2015 - Sep 2016 **Postdoctoral researcher at INRIA-Saclay**, France
Desc: development of a benchmark platform for blackbox optimization solvers
- Oct 2015 - Dec 2015 **Teaching assistant at École Centrale de Paris**, France
Discipline: Introduction to Optimization (Master's level)
Main topics: complexity theory, greedy algorithms, dynamic programming, branch and bound, approximation algorithms and heuristics, gradient-based algorithms, stochastic optimization. Exercises in Python.

Professional expertise

Optimization, operations research, machine learning, software development, algorithms.

Skills

- **Computer:** C, C++, CPLEX, Python, MATLAB, GIT, SQL, PHP, ASP, Hadoop/MapReduce (basic knowledge), HTML, Linux, Windows.
- **Languages:** Portuguese (native), English (currently), French (currently), Spanish (basic) and Japanese (basic).

Softwares

- **DEFT-FUNNEL:** a Matlab solver for nonlinear optimization problems with general nonlinear constraints without using derivatives. It is a SQP trust-funnel method that makes use of surrogate models built from multivariate polynomial interpolation of the objective and constraint functions. Related papers are in the section **Published papers** below.

Co-author: Prof. Philippe L. Toint (University of Namur).

- **BLLS:** a Matlab solver for bound-constrained linear least-squares problems. The method is intended for small-dimensional problems. It is an active-set algorithm where the unconstrained problem is solved at each iteration in the subspace defined by the currently active bounds, themselves being determined by a projected Cauchy step.

Co-authors: Dr. Anke Tröltzsch (German Aerospace Center - DLR) and Prof. Philippe L. Toint (University of Namur).

Contributor to:

- **COCO:** a platform for Comparing Continuous Optimizers in a black-box setting. The platform is written in C with interfaces to various programming languages, such as Python, Matlab, Octave and Java. My contribution consisted in the design, implementation and documentation of its extension to constrained problems. URL: <http://coco.gforge.inria.fr/>

Work projects

- **Numerical Black-Box Optimization.** The project aims at the analysis, improvement and evaluation of numerical black-box optimizers through the development of a testbed for benchmarking black-box optimization algorithms. *Programming language used:* C. URL: <http://numbbo.gforge.inria.fr/>. INRIA-Saclay, France, 2015-2016.
- **Derivative-free optimization with general nonlinear constraints.** Design and implementation of a new SQP method for constrained derivative-free optimization in *Matlab*. Supervisor: Prof. Dr. Philippe L. Toint. Sponsors: UNAMUR-CERUNA, Belgium, 2011-2015.
- **Theory, methods and applications of multiobjective optimization.** Study of the theory and methods of multiobjective optimization and their application to portfolio optimization and compressed sensing. Also included the implementation of the methods in *C/C++* and comparisons between their performances on portfolio optimization problems. Supervisor: Prof. Dr. Ernesto G. Birgin. Sponsors: University of São Paulo - Coordination for the Improvement of Higher Education Personnel (CAPES), Brazil, 2009-2011.
- **Cutting plane algorithms for the optimization of capacitated telecommunications networks.** A Scientific Initiation-Operations Research Project for undergraduate students that aimed at the development and implementation of formulations and cutting plane algorithms in *C/C++* and *CPLEX* for combinatorial optimization problems such as the Degree-Constrained Minimum Spanning Tree (DCMST) problem. Supervisor: Prof. Dr. Rafael Castro de Andrade. Sponsors: Federal University of Ceará - National Council for Scientific and Technological Development (CNPq), Brazil, 2007-2008.

Published papers

1. Ph. R. Sampaio and Ph. L. Toint, “*Numerical experience with a derivative-free trust-funnel method for nonlinear optimization problems with general nonlinear constraints*”, *Optimization Methods and Software*, **31**(3), 511-534, (DOI) 10.1080/10556788.2015.1135919, 2016.
2. Ph. R. Sampaio and Ph. L. Toint, “*A derivative-free trust-funnel method for equality-constrained nonlinear optimization*”, *Computational Optimization and Applications*, **61**(1), 25-49, (DOI) 10.1007/s10589-014-9715-3, 2015.
3. C. Cartis, Ph. R. Sampaio, and Ph. L. Toint, “*Worst-case evaluation complexity of non-monotone gradient-related algorithms for unconstrained optimization*”, *Optimization*, **64**(5), 1349-1361, (DOI) 10.1080/02331934.2013.869809, 2015.

Reviewer for the following journals

- *Numerical Algorithms*, 2017.
- *Journal of Global Optimization*, 2016.
- *Computational Optimization and Applications*, 2016.
- *Optimization Methods and Software*, 2015-2016.
- *Pacific Journal of Optimization*, 2014.

Talks given

1. A derivative-free trust-funnel method for constrained nonlinear optimization, TAO Seminars, INRIA, Saclay, France, November 19th, 2015.
2. A derivative-free trust-funnel method for nonlinear optimization problems with general constraints, *22nd International Symposium on Mathematical Programming (ISMP)*, Pittsburgh, USA, July 13, 2015.
3. A derivative-free trust-funnel method for constrained nonlinear optimization (poster session), *DYSCO Study Day: Dynamical Systems, Control and Optimization 2014*, Ghent University, Belgium, November 12, 2014.
4. A derivative-free trust-funnel method for optimization problems with general inequality constraints, *Optimization 2014*, Guimares, Portugal, July 28, 2014.
5. A derivative-free trust-funnel method for optimization problems with general inequality constraints, *SIAM Conference on Optimization (SIOPT)*, San Diego, USA, May 21, 2014.
6. Equality-constrained derivative-free optimization, *4th International Conference on Continuous Optimization (ICCOPT)*, Lisbon, Portugal, July 31, 2013.
7. Equality-constrained derivative-free optimization, *19th Belgian Mathematical Programming Workshop*, La Roche-en-Ardenne, Belgium, March 8, 2013.
8. Constrained derivative-free optimization, Department of Mathematics, University of Namur, Belgium, December 19, 2012.
9. Theory, methods and applications of multiobjective optimization, *28o. Colóquio Brasileiro de Matemática*, Instituto Nacional de Matemática Pura e Aplicada - IMPA, Rio de Janeiro, Brazil, July 29, 2011.
10. Multiobjective optimization in Finance, Institute of Mathematics and Statistics - IME, University of São Paulo, São Paulo, Brazil, November 25, 2010.
11. Basic concepts on multiobjective optimization, Institute of Mathematics and Statistics - IME, University of São Paulo, São Paulo, Brazil, March 18, 2010.
12. An alternative formulation for the degree-constrained minimum spanning tree problem. *XXVII Scientific Initiation Congress of the Federal University of Ceará*, Ceará, Brazil, 2008.
13. Study of a branch-and-cut algorithm for the maximum stable set problem. *XXV Scientific Initiation Congress of the Federal University of Ceará*, Ceará, Brazil, 2006.

Hobbies

- Music (listening, composing and playing), drawing, reading, movies, football...