MARTA SOFIA PIMENTEL CAVALEIRO

NATIONALITY: Portuguese
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EDUCATION

PhD, Operations Research - Rutgers University, New Brunswick, NJ, USA **2020**
- Dissertation title: "*Simplex-like Methods for Spherical Enclosure of Points and Spheres - Algorithms and Applications*"; Advisor: Prof. Farid Alizadeh.

MSc, Mathematics - University of Coimbra, Coimbra, Portugal **2011**
- Thesis title: "*On Optimization Methods for Sparse Nonlinear Recovery*"; Advisor: Prof. Luís Nunes Vicente.

BSc, Mathematics - University of Coimbra, Coimbra, Portugal **2010**

RESEARCH EXPERIENCE

Doctoral Researcher **2013 - 2019**
RUTCOR, Rutgers University, New Brunswick, NJ, USA
- Devised novel mathematical optimization algorithms for computational geometry problems, outperforming state-of-the-art commercial solvers (code available on GitHub page):
  - Designed an algorithm for computing the smallest hypersphere that encloses a given set of hyperspheres, employing a pivoting scheme resembling the Simplex method for linear programming.
  - Designed a branch-and-bound algorithm for the NP-hard problem of finding a hypersphere with smallest radius that contains at least *k* of *m* given points.
  - Improved the computational time complexity of an existing algorithm that finds the smallest hypersphere that encloses a given set of points.

Master's Student **2010 - 2011**
University of Coimbra, Coimbra, Portugal
- Collaborated in the development of an optimization algorithm to solve nonlinear inverse problems with sparsity arising in Electrical Impedance Tomography.

Intern Fellow Researcher **2008 - 2010**
Center for Mathematics of University of Coimbra, Coimbra, Portugal
- Collaborated in the research of numerical methods for the solution of partial differential equations arising in image segmentation problems.

TEACHING EXPERIENCE

Senior University Lecturer **2020 - 2023**
Martin Tuchman School of Management, NJIT, Newark, NJ, USA
- Developed and taught university-level courses on decision support tools, data analytics, and databases with SQL.
- Developed a fully online course on databases for business using state-of-the-art online teaching and active-learning practices. This course is still being used in the BSc Online Program in Business.
- Steered innovation in the Management Undergraduate Program as a member of the committee tasked with evaluating faculty proposals aimed at program enhancements.

Lecturer **2015 - 2020**
Rutgers Business School, New Brunswick, NJ, USA
- Taught university-level courses on operations research models, machine learning using R, and databases.
- Successfully overcame the challenges of teaching to classes with as many as 400 students, by employing a meticulous and structured course organization and effective communication strategies.
- Managed teams of teaching assistants and graders, coordinating and overseeing their assignments on a weekly basis according to the topics taught that week.

Teaching Assistant **2013 - 2015**
Rutgers Business School, New Brunswick, NJ, USA
- Taught lab classes and graded assignments and exams.

PEER-REVIEWED PUBLICATIONS

- M. Cavaleiro, F. Alizadeh, "*A Branch-and-Bound algorithm for the minimum radius k-enclosing ball problem*", Operations Research Letters (2022).
- M. Cavaleiro, F. Alizadeh, "*A dual Simplex-type algorithm for the smallest enclosing ball of balls and related problems*", Computational Optimization and Applications (2021).
- M. Cavaleiro, F. Alizadeh, *"A faster dual algorithm for the Euclidean minimum covering ball problem*", Annals of Operations Research (2018).

SELECTED CONFERENCE PRESENTATIONS

- "*A Simplex-like algorithm for the problem of finding the infimum point with respect to the Second-Order cone*" at the International Symposia on Mathematical Programming, 2018, Bordeaux, France; and at the SIAM Conference on Optimization, 2017, Vancouver, Canada.
- "*Branch-and-Bound approach to the minimum k-enclosing ball*" at the INFORMS Annual Meeting, 2015, Philadelphia, PA, U.S.A.; and at the International Symposia on Mathematical Programming, 2015, Pittsburgh, PA, U.S.A..
- "*Splitting Methods Applied to Image Segmentation Algorithms*" at the Workshop on Imaging Sciences and Medical Applications, 2010, Coimbra, Portugal.

TECHNOLOGICAL SKILLS

- **Data analytics:** R programming, Tableau, MS Excel, IBM SPSS, JMP Pro.
- **Mathematical Optimization:** Gurobi, Mosek, Xpress Mosel.
- **Databases:** Relational databases, MySQL, MS Access.
- **Programming:** Proficient in R and Matlab. Experience with Python, C, Java, and Julia.

LANGUAGE SKILLS

- **English**: Full professional proficiency.
- **Italian**: Upper-intermediate level (level B2/C1).
- **Portuguese**: Native language.

HONORS & AWARDS

- **Meritorious Award for Part-Time Lecturer Teaching,** Rutgers Business School, 2018.
- **Dean's Fund Summer Research Grant,** Rutgers Business School, 2014.
- **Excellence Doctoral Fellowship,** School of Graduate Studies, Rutgers University - Fellowship to pursue doctoral studies at Rutgers University for 2011-2013.
- **Renato Pereira Coelho Prize,** University of Coimbra - Student with the highest GPA obtaining a MSc degree in Mathematics in 2011.
- **Fellowship for Initiation to Research**, Portuguese Science and Technology Foundation - Fellowship awarded to promising students to initiate scientific research during their BSc studies, 2008.