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Google Scholar, Lattes, LinkedIn, and Research Gate webpages

Summary

Assistant professor of Theoretical Computer Science in the Center for Mathematics, Computing, and Cognition of the Federal University of ABC, Santo André, Brazil. Appointments in the graduate programs of Mathematics and of Industrial and Systems Engineering. Ph.D. in Operations Research with an M.Sc. and a B.Sc. in Computer Science. Research and teaching level experience in Combinatorics, Computational Complexity, Optimization, and Theory of Boolean Functions and their extensions.

Employment

Federal University of ABC (Santo André, SP, Brazil)
Assistant Professor, Center for Mathematics, Computing, and Cognition — Apr/2017 – present

University of São Paulo (São Paulo, SP, Brazil)
Postdoctoral Researcher, Department of Computer Science — Mar/2015 – Mar/2017
Project: *Reformulations of Binary Optimization Problems: Algorithms and Complexity*

Rutgers, The State University of New Jersey (New Brunswick, NJ, USA)
Graduate Research Assistant, Rutgers Center for Operations Research
NSF Grant: *Graph Cut Algorithms for Domain-specific Higher-order Priors* — Sep/2012 – Aug/2014
NSF Grant: *Graph Cut Algorithms for Linear Inverse Systems* — Sep/2010 – Aug/2012

Pontifical Catholic University of São Paulo (São Paulo, SP, Brazil)
Adjunct Professor, Department of Computer Science — Oct/2001 – Jul/2006

UniFieo, The University of Osasco (Osasco, SP, Brazil)
Lecturer, Department of Computer Science and Engineering — Mar/2003 – Jul/2006

Anhembi-Morumbi University (São Paulo, SP, Brazil)
Lecturer, Departments of Computer Science and Business Administration — Mar/1999 – Jul/2003

Tendencies Consulting (São Paulo, SP, Brazil)
Part-time Consultant, Simulation, optimization, and software development — Aug/2000 – Mar/2003

Quasar Systems and Consulting (São Paulo, SP, Brazil)
Part-time Consultant, Database systems and software development — Mar/1999 – Jul/2000

Education

Rutgers, The State University of New Jersey (New Brunswick, NJ, USA)
Ph.D. in Operations Research — Oct/2014
Dissertation: *Algorithmic and Complexity Results for Boolean and Pseudo-Boolean Functions*

University of São Paulo (São Paulo, SP, Brazil)
M.Sc. in Computer Science — Feb/2001
Thesis: *Algorithms and Data Structures for Maintaining Minimum Spanning Trees in Dynamic Graphs*
B.Sc. (Hons) in Computer Science (summa cum laude) — Feb/1997
Research Experience for Undergraduates: *Parallel and Distributed Computing*

Complementary Education

National Science Foundation (NSF)/Rutgers workshop on *Responsible Conduct of Research*, comprising: Research Misconduct; Management of Data and Responsible Authorship; Mentoring and Peer Review; Collaboration and Conflict of Interest. New Brunswick, NJ, USA. Mar/2011

Fulbright Commission Enrichment Seminar: *From Lab to Industry*, San José, CA, USA. May/2007

Publications

E. Azevedo, A. Freire, C. Ferreira, A. Gruber, A. Vellozo, *An Exact Algorithm for a Problem on Allocating Indivisible Goods Under Min-Max Fairness Constraints* (in Portuguese), in Proceedings of the XXXVII Congress of the Brazilian Society for Computing, 2017, http://csbc2017.mackenzie.br/public/files/2-etc/artigos/9.pdf, **Best Paper Award runner-up**.

M. Anthony, E. Boros, Y. Crama, A. Gruber, *Quadratic Reformulations of Nonlinear Binary Optimization Problems*, in Mathematical Programming, Series A, vol. 162, Issues 1–2, March 2017, p. 115–144, DOI:10.1007/s10107-016-1032-4.

M. Anthony, E. Boros, Y. Crama, A. Gruber, *Quadratization of Symmetric Pseudo-Boolean Functions*, in Discrete Applied Mathematics, vol. 203, 2016, p. 1–12, DOI:10.1016/j.dam.2016.01.001.

A. Fix, A. Gruber, E. Boros, R. Zabih, *A Hypergraph-Based Reduction for Higher-Order Markov Random Fields*, in IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 37(7), 2015, p. 1387–1395, DOI:10.1109/TPAMI.2014.2382109.

E. Boros and A. Gruber, *Hardness Results for Pure Horn CNF Formulae Minimization*, in Annals of Mathematics and Artificial Intelligence, vol. 71(4), 2014, p. 327–363, DOI:10.1007/s10472-014-9415-9, **Invited paper**.

E. Boros and A. Gruber, *Hardness Results for Pure Horn CNF Formulae Minimization*, in the 12$^{\text{th}}$ International Symposium of Mathematics and Artificial Intelligence (ISAIM), Fort Lauderdale, FL, USA, January 9-11, 2012, 12 pages, **Best Student Paper Award**.

E. Boros and A. Gruber, *On Quadratization of Pseudo-Boolean Functions*, in the 12$^{\text{th}}$ International Symposium of Mathematics and Artificial Intelligence (ISAIM), Fort Lauderdale, FL, USA, January 9-11, 2012; arXiv:1404.6538, 11 pages.

A. Fix, A. Gruber, E. Boros, R. Zabih, *A New Graph Cut Technique for High Order Cliques*, in the 13$^{\text{th}}$ International Conference on Computer Vision (ICCV), Barcelona, Spain, November 6-13, 2011, 8 pages.

R. Lucindo, T. Witt, C. de Campos, A. Gruber, *jOptimum: Um Sistema de Otimização* (in Portuguese), Workshop de Educação em Computação, Anais do XXVI Congresso da SBC, Campo Grande, MS, Brazil, 2006, p. 158-167.

C. de Campos, A. Gruber, R. Lucindo, *Projeto BOCA* (in Portuguese), II TIDIA Workshop, São Paulo, SP, Brazil, 2005, p. 5-9.

A. Gruber and S. Song, *Sistema Cliente-Servidor para Controle de Acesso à PowerXPlorer* (in Portuguese), IV Simpóosio de Iniciação Científica da Universidade de São Paulo, São Carlos, SP, Brazil, 1996, v. 2. p. 274.

A. Gruber, *Algorithmic and Complexity Results for Boolean and Pseudo-Boolean Functions*, Ph.D. Dissertation, Rutgers University, New Brunswick, NJ, USA, 2015, DOI:10.7282/T3PZ5BHQ.

A. Gruber, *Algorithms and Data Structures for Maintaining Minimum Spanning Trees in Dynamic Graphs* (in Portuguese), M.Sc. Thesis, University of São Paulo, São Paulo, SP, Brazil, 2001.

Talks

An Optimization-based Primer on Flag Algebras, Dagstuhl Seminar 19211, Enumeration in Data Management; Schloss Dagsthul, Leibniz-Zentrun für Informatik, Wadern, Germany. May 23, 2019

Structure of Quadratizations of Pseudo-Boolean Functions, Escola Latino Americana de Matemática (ELAM) 2018, Universidade Federal do ABC, Santo André, SP, Brasil. Sep 05, 2018

Quadratizations of Pseudo-Boolean Functions, Center for Mathematics, Computing, and Cognition, University of ABC, Santo André, SP, Brazil. Jul 26, 2017

Quadratizations of Pseudo-Boolean Functions, Conference on Boolean Functions, Liblice, Central Bohemian, Czech Republic. Mar 15, 2017

Quadratizations of Pseudo-Boolean Functions, IBM Research, São Paulo, SP, Brazil. Aug 31, 2016

Quadratizations of Pseudo-Boolean Functions, Institute of Computing, University of Campinas, Campinas, SP, Brazil. Sep 25, 2015

Quadratizations of Pseudo-Boolean Functions, Institute of Mathematics and Statistics, University of São Paulo, São Paulo, SP, Brazil. Apr 24, 2015

Algorithmic and Complexity Results for Boolean and Pseudo-Boolean Functions, Rutgers Center for Operations Research (RUTCOR), Piscataway, NJ, USA. Oct 23, 2014

Hardness Results for Approximate Pure Horn CNF Formulae Minimization, International Symposium on Artificial Intelligence and Mathematics (ISAIM), Fort Lauderdale, FL, USA. Jan 11, 2012

Memberships in Research Projects

Data Structures and Algorithms, Project supported by the National Council for Scientific and Technological Development (CNPq), process #423833/2018-9. Principal investigator: Cristina G. Fernandes. Status: ongoing - from January 1, 2019.

Reformulations of Binary Optimization Problems: Algorithms and Complexity, Project supported by the São Paulo Research Foundation (FAPESP), process #14/23269-8. Principal investigators: Aritanan Gruber and Carlos E. Ferreira. Status: concluded – from March 1, 2015 to February 28, 2017.

Combinatorial structures, optimization, and algorithms in theoretical Computer Science, Project supported by the São Paulo Research Foundation (FAPESP), process #13/03447-6. Principal investigators: Carlos E. Ferreira, Ernesto Birgin, Yoshiharu Kohayakawa, and Yoshiko Wakabayashi. Status: concluded – from August 1, 2013 to July 31, 2017.

Graph Cut Algorithms for Domain-specific Higher Order Priors, Project supported by the National Science Foundation (NSF), process #IIS-1161476. Principal investigators: Endre Boros and Ramin Zabih. Status: concluded – from June 1, 2012 to May 31, 2016.

Graph Cut Algorithms for Linear Inverse Systems, Project supported by the National Science Foundation (NSF), process #IIS-0803444. Principal investigators: Endre Boros and Ramin Zabih. Status: concluded – from July 1, 2008 to June 31, 2012.

Students

W. S. Melo, *Integer/Mixed Linear Optimization with Discrete Stochastic Demands*, master thesis in computer science, Federal University of ABC, co-advised with C. Sato. 2017–

E. Erbert, *Partition Problems in Graphs*, research experience for undergraduates, Federal University of ABC. 2019–

M. F. da Fonseca, *Capsules in Deep Learning*, undergraduate thesis in computer science, Federal University of ABC. 2019–

N. G. N. Sampaio, *Submodular Functions: Structure, Algorithms, and Approximations*, undergraduate thesis in computer science, Federal University of ABC. 2019–

N. G. N. Sampaio, *Structural and Algorithmic Aspects of Submodular Functions*, research experience for undergraduates, Federal University of ABC. 2018–

L. M. Campo, *Quadratizations of Submodular Functions* (in Portuguese), research experience for undergraduates (financed by PIBIC-Jr./CNPq), Federal University of ABC. 2018–2019

V. H. P. Monteiro, *Deep Learning and Deep Networks: Models, Algorithms, and Applications* (in Portuguese), research experience for undergraduates, Federal University of ABC. 2017–2018

L. dos Santos, *Spectral graph theory and optimization: sparsifiers and expanders* (in Portuguese), research experience for undergraduates, Federal University of ABC, co-advised with C. Sato. 2016–2017

M. F. da Fonseca, *Deep Learning: theory and applications* (in Portuguese), research experience for undergraduates, Federal University of ABC, co-advised with C. Sato. 2016–2017

M. Brás and M. Gatto, *Genetic heuristics for the school timetable problem with precedence constraints* (in Portuguese), undergraduate thesis in computer science, Pontifical Catholic University of São Paulo. 2005

L. Martins and G. Henrique, *A web based solution to help manage and run political campaigns* (in Portuguese), undergraduate thesis in computer science, Pontifical Catholic University of São Paulo. 2005

Teaching

Federal University of ABC (Santo André, SP, Brazil)
Undergraduate-level courses: Automata and Formal Languages Theory, Complex Networks, Introduction to Computational Thinking, Information Processing and Computer Programming, Graph Theory.

Graduate-level course: Advanced Seminars in Industrial and Systems Engineering.

Pontifical Catholic University of São Paulo (São Paulo, SP, Brazil)
Undergraduate-level courses: Algorithms and Data Structures, Automata and Formal Languages Theory, Theory of Computing.

UniFieo, The University of Osasco (Osasco, SP, Brazil)
Undergraduate-level courses: Algorithms and Data Structures, Analysis of Algorithms, Automata and Formal Languages Theory, Compiler Construction, Introduction to Graph Theory, Linear Programming, Theory of Computing.

Anhembi-Morumbi University (São Paulo, SP, Brazil)
Undergraduate-level courses: Algorithms and Data Structures I & II, Analysis of Algorithms, Compiler Construction, Graph Algorithms, Introduction to Business Management, Object Oriented Programming, Principles of Operations Research, Software Engineering, Theory of Computing.

Member of the committee that restructured the Computer Science Curriculum in 2001–2002.

University of São Paulo (São Paulo, SP, Brazil)
Undergraduate level courses: Design and Analysis of Algorithms, Programming Challenges.

Teacher Assistant of undergraduate-level courses: Design and Analysis of Algorithms, Data Structures, Distributed Algorithms, Programming Challenges, Programming Laboratory, Software Engineering; of graduate-level courses: Analysis of Algorithms.

Member of the committee that restructured the Computer Science Curriculum in 1995–1996.

Evaluation Committees

C. L. Tho; *GREEDY ALGORITHMS* (in Portuguese); **Undergraduate thesis** in Computer Science; Center for Mathematics, Computing, and Cognition; Federal University of ABC; Aug/2019. Members: REY, M. L.; GRUBER, A. B. G.; DONADELLI JR., J. (chair); SANTOS, C. C.

V. S. Portella; *ONLINE CONVEX OPTIMIZATION: LEARNING, DUALITY, AND ALGORITHMS*; **Master thesis** in Computer Science; Institute of Mathematics and Statistics; University of São Paulo; May/2019. Members: SILVA, M. K. C.; GRUBER, A. B. G.; CARDONHA, C. E.; FERREIRA, C. E. (chair).

L. H. Valentini; *ALGORITHMS AND BOUNDS FOR THE INDEPENDENCE NUMBER IN DISTANCE GRAPHS*; **Master thesis** in Computer Science; Institute of Mathematics and Statistics; University of São Paulo; May/2019. Members: OLIVEIRA FILHO, F. M.; GRUBER, A. B. G.; MARTIN, D. M.; SILVA, M. K. C. (chair).

A. P. B. Centeno; *OPTIMIZING TASK SCHEDULING IN EMERGENCY DEPARTMENTS*; **PhD dissertation** in Computer Science; Graduate School–New Brunswick; Rutgers, The State University of New Jersey, USA; Jan/2019. Members: MARTIN, R. (chair); GRUBER, A. B. G.; KREMER, U.; NGUYEN, T.

A. S. S. da Silva; *RELATIVE ENTROPY OPTIMIZATION AND APPLICATIONS IN STATISTICAL LEARNING*; **Undergraduate thesis** in Applied Mathematics; Institute of Mathematics and Statistics; University of São Paulo; Jan/2019. Members: SILVA, M. K. C. (chair); GRUBER, A. B. G.; HAESER, G.

V. S. Portella; *ONLINE CONVEX OPTIMIZATION: ALGORITHMS, LEARNING, AND DUALITY*; **Master qualifying exam** in Computer Science; Institute of Mathematics and Statistics; University of São Paulo; Aug/2018. Members: SILVA, M. K. C. (chair); GRUBER, A. B. G.; MOLINARO. M. S.

M. S. de Lima; *PARKING PERMIT AND NETWORK LEASING PROBLEMS*; **PhD dissertation** in Computer Science; Institute of Computing; State University of Campinas; May/2018. Members: LEE, O. (chair); GRUBER, A. B. G.; MOLINARO. M. S.; PEDROSA, L. L. C.; XAVIER, E. C.

R. S. Coelho; *THE k-HOP CONNECTED DOMINATING SET PROBLEM: APPROXIMATION ALGORITHMS AND HARDNESS RESULTS*; **PhD dissertation** in Computer Science; Institute of Mathematics and Statistics; University of São Paulo; Jun/2017. Members: WAKABAYASHI, Y. (chair); GRUBER, A. B. G.; REY, M. L.; LEE, O.; CAMPELO NETO, M. B.

K. S. Awoki; *INTERLACING TREES OF POLYNOMIALS AND RAMANUJAN GRAPHS* (in Portuguese); **Master qualifying exam** in Computer Science; Institute of Mathematics and Statistics; University of São Paulo; Aug/2017. Members: SILVA, M. K. C. (chair); GRUBER, A. B. G.; COUTINHO, G. M.

L. H. Valentini; *APPROXIMATING INDEPENDENT SETS ON THE UNIT-DISTANCE GRAPH*; **Master qualifying exam** in Computer Science; Institute of Mathematics and Statistics; University of São Paulo; Jan/2017. Members: OLIVEIRA FILHO, F. M. (chair); GRUBER, A. B. G.; SILVA, M. K. C.

W. D Previero; *RESOLUTION STRATEGIES FOR THE FLEXIBLE JOB-SHOP PROBLEM* (in Portuguese); **PhD dissertation** in Computer Science; Institute of Mathematics and Statistics; University of São Paulo; Sep/2016. Members: FERREIRA, C. E. (chair); GRUBER, A.; MACULAN FILHO, N.; ARAUJO, S. A.; RONCONI, D. P.

S. V. Ravelo; *OPTIMAL COMMUNICATION SPANNING TREES: VARIANTS, COMPLEXITY, AND APPROXIMATIONS* (in Portuguese); **PhD dissertation** in Computer Science; Institute of Mathematics and Statistics; University of São Paulo; Feb/2016. Members: FERREIRA, C. E. (chair); GRUBER, A. B. G.; LEE, O.; SCHOUERY, R. C. S.; MEIRA, L. A. A.

Professional Service

Program Committee of UAI-2015, UAI-2016, UAI-2017, UAI-2018, UAI-2019, NIPS-2018, IJCAI-2016, FedCSIS/WCO-2018, FedCSIS/WCO-2019, AISTATS-2019. Referee for AISTATS-2016, IPCO-2019, *Discrete Applied Mathematics*, *International Journal of Approximate Reasoning*, and *Optimization Letters*.

I have worked independently as a consultant for some companies in the past. The nature of those works ranged from optimization and simulation to data analysis and inventory allocation to internet applications and database systems development.

I was a student member of SIAM (Society for Industrial and Applied Mathematics) from 2006 to 2012 and of ACM (Association for Computing Machinery) from 1999 to 2002, and am currently a member of the Brazilian Mathematical Society.

Fellowships, Honors, and Awards

Best Paper Award runner-up at the Theory track of the XXXVII Congress of the Brazilian Society for Computing Jul/2017

Best Student Paper Award at the International Symposium on Artificial Intelligence and Mathematics (ISAIM) Jan/2012

Louis Bevier Graduate Fellowship, Rutgers University (USA) Sep/2011 – Aug/2012

ACM International Collegiate Programming Contests

Six Gold, Three Silver, and Four Bronze Medals at Brazilian Regionals: 1998 – 2005

World Finals' Java Challenge Championship: 2002

World Finals' Latin America Championships: 1999, 2001

South America Championship: 2001

Brazilian Honorable Mentions: 1996, 1997

FAPESP Postdoctoral Fellowship (Brazil) Mar/2015 – Feb/2017

CAPES/Fulbright Graduate Fellowship (Brazil/USA) Sep/2006 – Aug/2010

CNPq Graduate Fellowship (Brazil) Mar/1997 – Feb/1999

CNPq Research Experience for Undergraduates Fellowship (Brazil) Aug/1995 – Jul/1996

Honored lecturer at Anhembi-Morumbi University in 2001 and at The University of Osasco in 2004.

Languages

English: fluent reading, listening, writing, and speaking.

Portuguese: native reading, listening, writing, and speaking.

Spanish: good reading and listening.

Academic References

Available upon request.