

## Hugo V. V. Braga

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### CONTACT INFORMATION

D.Sc. in Computer Science  
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### RESEARCH INTERESTS

**Internet of Things and Combinatorial Optimization and Graph Theory.**

### EDUCATION

**University of São Paulo**, São Paulo, SP, Brazil

D.Sc., Computer Science, December 2018 [O1]

- Thesis Topic: *Exact algorithms for spanner problems in graphs (in Portuguese)*
- Supervisor: Professor Yoshiko Wakabayashi
- Area of Study: Combinatorial Optimization and Graph Theory

**Federal University of Bahia**, Salvador, BA, Brazil

M.Sc., Mechatronics, October 2012 [O2]

- Thesis Topic: *Algorithms for the Directed k-Spanner with Minimum Degree Steiner Tree Problem*
- Supervisor: Professor Flávio Assis
- Area of Study: Mechatronics, Algorithms and Graph Theory

PgCert, Distributed Systems, December 2009

- Final Project Topic: *Medium Access Control Protocols for Wireless Sensor Networks (in Portuguese)*
- Supervisor: Professor Flávio Assis
- Area of Study: Medium Access Control, Algorithms

B.Sc., Computer Science, December 2008

- Final Project Topic: *Design and Implementation of a Monitoring Mechanism for a QoS Distributed Provider (in Portuguese)*
- Supervisor: Professor Sérgio Gorender
- Area of Study: Quality of Service, Real-Time Systems

### PUBLICATIONS

- [P1] H. Braga. “Minimum Weight Tree Spanner Problem”. *II Encontro de Teoria da Computação (ETC 2017) - XXXVII CSBC*. Sociedade Brasileira de Computação, 2017.
- [P2] H. Braga and F. Assis. “A Topology Control Algorithm for Interference and Energy Efficiency in Wireless Sensor Networks”. *Ad-hoc, Mobile, and Wireless Networks*. Ed. by H. Frey, X. Li, and S. Ruehrup. Vol. 6811. Lecture Notes in Computer Science. Springer Berlin Heidelberg, 2011, pp. 86–99. DOI: 10.1007/978-3-642-22450-8\_7. URL: [http://dx.doi.org/10.1007/978-3-642-22450-8\\_7](http://dx.doi.org/10.1007/978-3-642-22450-8_7).

### OTHER PUBLICATIONS

- [O1] H. Braga. “Algoritmos exatos para problemas de spanner em grafos”. PhD thesis. University of São Paulo, 2018.
- [O2] H. Braga. “Algorithms for the Directed k-Spanner with Minimum Degree Steiner Tree Problem”. MA thesis. Federal University of Bahia, 2012.
- [O3] H. Braga and R. Macêdo. “Design and Implementation of a Monitoring Mechanism for a QoS Distributed Provider”. *IX Research and Graduate Seminar XXVII Student Research Seminar PRPPG*. in Portuguese. UFBA. Nov. 2008.

## GRANTS

- [G1] Graduate Fellowship, University of São Paulo, *Spanners in Graphs* (in portuguese), granted (#2013/22875-9) by The State of São Paulo Research Foundation (FAPESP) for the Ph.D. position, March, 2014 to February, 2018.
- [G2] Graduate Fellowship, Federal University of Bahia, granted by Brazilian Federal Agency for the Improvement of Higher Education (Capes) for the Ph.D. position (ranked 1<sup>st</sup> in the Ph.D. selection), March, 2012 to April, 2013. Interrupted.
- [G3] Graduate Fellowship, Federal University of Bahia, granted by Capes for the Master position, March, 2010 to February, 2012.
- [G4] Undergraduate Fellowship, Federal University of Bahia, *Models for Fault-Tolerant Hybrid and Adaptive Distributed Systems* (in portuguese), granted by The State of Bahia Research Foundation (FAPESB) for the scientific initiation position, August, 2007 to July, 2008.
- [G5] Undergraduate Scholarship, Federal University of Bahia, granted by Foundation for Support of Research and Extension (FAPEX), January, 2007 to May, 2007.

## TEACHING EXPERIENCE

### **Federal University of Bahia**, Salvador, BA, Brazil

*Assistant Lecturer* for MATA86: Computer Networks **August 2011 to December 2011**

- Graduate-level and Undergraduate-level course in algorithms for Wireless Sensor Networks

### **Federal Institute of Education, Science and Technology of Bahia (IFBa)**, Salvador, BA, Brazil

*Guest Lecturer* for Advanced Topics in Computer Science course **August 2011**

- Undergraduate-level course
- Lecture: “Topology control algorithms for Wireless Sensor Networks”

## PROFESSIONAL EXPERIENCE

### **Amazonas Court of Justice (TJAM)**, Manaus, Brazil

*Project Manager* **December 2022 up to now**

- Project Contract Management.
- Streamlining Process Flow.
- Overseeing Software Factory Projects.
- Managing Remote Teams.
- Leading Internal Project Development.

*Analyst - Software Engineer* **August 2020 up to now**

- Ranked 2<sup>o</sup> in the public service entrance exam for Analyst position - Speciality: Software Engineer.
- Member of the Information and Communication Technology Division (DVTIC).

### **University of São Paulo**, São Paulo, SP, Brazil

Institute of Mathematics and Statistics

Computer Science Department

Combinatorics and Combinatorial Optimization Research Group

*Graduate Researcher* **[P1, O1]** **August 2013 to December 2018**

- Funding: [G1]
- Supervisor: [Professor Yoshiko Wakabayashi](#)
- Research: Combinatorial Optimization and Graph Theory.

- Proposal of the first two ILP formulations for the *Minimal Weight Tree t-Spanner Problem*.
- Proposal of an ILP formulation for the *Minimal Weight t-Spanner Problem* (MWSP).
- Presentment of some computational results on the implementation of a branch and price algorithm for MWSP based on an ILP formulation proposed by Sigurd and Zachariasen (2004).

**Federal University of Bahia**, Salvador, BA, Brazil

Computer Science Department  
Distributed Systems Laboratory (LaSiD)

*Graduate Researcher* [P2, O2]

**March 2010 to April 2013**

- Funding: [G2, G3]
- Supervisor: **Professor Flávio Assis**
- Description of a localized topology control algorithm which is very efficient in terms of interference while minimizing energy efficiency.
- Development of a new interference metric for Wireless Sensor Networks and evaluation of some topology control algorithms based on this metric.
- Proposal of a new problem in graph theory literature to address the spanner property and degree minimization called *Directed k-Spanner with Minimum Degree Steiner Tree Problem* (DSMDStP).
- Development of an approximation algorithm and a heuristic for DSMDStP problem.

*Undergraduate Researcher* [O3]

**August 2007 to July 2008**

- Funding: [G4]
- Supervisor: **Professor Sérgio Gorender**
- Designed and implemented a monitoring mechanism for a QoS Distributed Provider using C language and SNMP protocol, and the mechanism was applied in Xenomai Real-Time Operating System and the Expedited Services of Cisco routers.

**Data Processing Company of the State of Bahia (Prodeb)**, Salvador, Brazil

*Software Engineer*

**February 2009 to February 2010**

- Development web services using PHP language.
- Co-development a calendar system using PHP language along with Postgres DB and script languages.
- Wrote (English) tutorials for the open source community as well as documentation for the developed systems.

**Federal University of Bahia**, Salvador, BA, Brazil

Polytechnic school  
Geotechnical Laboratory

*Programmer*

**January 2007 to May 2007**

- Funding: [G5]
- Maintenance and development of a system in DELPHI for sample management and calculation of soil tests called LabGeo.
- Support the development of a web system for a weather station using PHP and MySQL languages.

PROFESSIONAL  
MEMBERSHIPS

- **Brazilian Network of Smart and Human Cities - RBCIH** (05/2020–today)
- **The Internet of Things Brazilian Association - IoT Connection** (04/2020–today)
- **Combinatorics and Combinatorial Optimization Research Group** (08/2013–12/2018)
- **Distributed Systems Laboratory (LaSiD)** (08/2007–12/2008; 03/2010–06/2013)
- **Brazilian Computer Society (SBC)** (2007–2009)

OTHER MEETING ATTENDANCE	<ul style="list-style-type: none"> <li>• Sebrae - Startup Day, May 22, 2021</li> <li>• IoT 2020 Brasil Summit, June 03, 2020</li> <li>• II Meeting of Theory of Computing (XXXVII CSBC), July 03–04, 2017</li> <li>• I Paulista Workshop on Optimization, Combinatorics and Algorithms, June 16–18, 2017</li> <li>• NICTA 3rd International Optimisation Summer School, January 11–16, 2015</li> <li>• Workshop in Bioinformatics and Algorithms, March 25–26, 2014</li> <li>• 26<sup>th</sup> International Symposium on Distributed Computing, October 16–18, 2012</li> <li>• 10<sup>th</sup> International Free Software Forum, June 24–27, 2009</li> <li>• VIII Computer Regional School of Bahia, Alagoas and Sergipe (ERBASE), April 14–18, 2008</li> <li>• IX Research and Graduate Seminar – XXVII Student Research Seminar/PRPPG – UFBA, Salvador, Brazil, November 12–14, 2008</li> <li>• GTER 20 and GTS 11 joint meetings, May 31–June 1, 2008</li> <li>• XI Internal Workshop of LaSiD – Wola, November 27, 2007</li> <li>• XXII National Meeting of Computer Science Students, 2004</li> </ul>
SKILLS	<p>Languages</p> <ul style="list-style-type: none"> <li>• Portuguese (Native)</li> <li>• English (advanced speaking and writing skills - TOEFL iBT: 101, taken on December 2012)</li> <li>• Basic French</li> </ul> <p>Program/Script Languages</p> <ul style="list-style-type: none"> <li>• C/C++, Java, Python, Shell Script, PHP</li> </ul> <p>Scientific Softwares</p> <ul style="list-style-type: none"> <li>• ILP Solver: CPLEX</li> <li>• Simulator/Emulator: The ONE, Omnet++, Castalia, SMPL</li> <li>• Real-Time: Xenomai, Diffserv (Cisco Routers)</li> <li>• Others: SNMP, Lemon (c++)</li> </ul>
REFERENCES AVAILABLE TO CONTACT	<p><b>Prof. (Dr.-Ing) Flávio Assis</b> (e-mail: fassis@ufba.br)</p> <ul style="list-style-type: none"> <li>• Associate Professor, Department of Computer Science, Federal University of Bahia</li> <li>★ <i>Dr. Assis was my MSc. thesis supervisor.</i></li> </ul> <p><b>Prof. (Dr. rer. nat.) Yoshiko Wakabayashi</b> (e-mail: yw@ime.usp.br)</p> <ul style="list-style-type: none"> <li>• Full Professor, Department of Computer Science, University of São Paulo</li> <li>★ <i>Dr. Wakabayashi was my PhD. thesis supervisor.</i></li> </ul> <p><b>Prof. (PhD.) Raimundo J. A. Macêdo</b> (e-mail: macedo@ufba.br)</p> <ul style="list-style-type: none"> <li>• Full Professor, Department of Computer Science, Federal University of Bahia</li> <li>★ <i>Dr. Macêdo is the head of LaSiD.</i></li> </ul> <p><b>Prof. (Dr.) Sérgio Gorender</b> (e-mail: gorender@ufba.br)</p> <ul style="list-style-type: none"> <li>• Associate Professor, Department of Computer Science, Federal University of Bahia</li> <li>★ <i>Dr. Gorender was my B.Sc. supervisor. I did my Scientific Initiation under his supervisor.</i></li> </ul>
MORE INFORMATION	<p>More information and auxiliary documents can be found at <a href="http://hugobraga.io">http://hugobraga.io</a>.</p>