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Formal Education

06/2011 – ongoing
Ongoing Ph.D. in Aeronautics and Astronautics, GPA: 5.00/5.00
Thesis title: Dynamic execution of temporal plans with sensing actions and bounded risk.
Advisor: Prof. Brian Williams.
Massachusetts Institute of Technology, MA, USA.

08/2008 – 02/2011
M.Sc. in Electrical Engineering, GPA: 5.00/5.00
Fellowship from the Brazilian NSF (CNPq).
Thesis title: Stochastic filtering for hybrid systems and its applications to aerial robotics.
Advisors: Profs. Geovany Borges and João Ishihara.
University of Brasília, DF, Brazil.

03/2004 – 07/2008
B.Sc. in Control and Automation Engineering, GPA: 4.94/5.00
Top Student in Class Award.
Final project: Conception of a quadrotor unmanned aerial vehicle.
Advisor: Prof. Geovany Borges.
University of Brasília, DF, Brazil.

Awards and Honors

- *Outstanding paper award* at the 26th International Conference on Automated Planning and Scheduling (ICAPS16). 2016.

- *SUTD-MIT* Graduate Fellowship, sponsored by the Singapore University of Technology and Design. 2014.

- *Fellowship* from the Department of Aeronautics and Astronautics, Massachusetts Institute of Technology. 2011.

- *Fellowship* from the Control and Dynamical Systems Program, California Institute of Technology. 2011.

- *International Fulbright Science & Technology Award for Outstanding Foreign Students (Fulbright S&T)*, sponsored by the Bureau of Educational and Cultural Affairs (ECA) of the U.S. Department of State. 2010.

- *Scholarship for Master's Degree*, sponsored by the National Council for Scientific and Technological Development (CNPq). 2009.

- *Top Student in Class Award* for the highest GPA in the University of Brasília's Control and Automation Engineering Class of Fall'08. 2009.

- 3rd *Place in the* 1st *Young Inventors Award*, sponsored by the Federal District's Foundation for Research Support, Brasilia, Brazil. 2008.

- *Top 10* in the Brazilian National Physics Olympics. 2003.

Selected skills

Languages	English (fluent); French (advanced); Portuguese (native); Spanish (advanced).
Programming	C++; Python (Cython); C; Java; Common Lisp; Matlab.
Robotics&ML	Robust sensor fusion and active sensing; automated hybrid model learning; risk-aware planning and scheduling under uncertainty; machine vision; real-time, embedded GNU/Linux systems; Robot Operating System (ROS).

Invited Talks

- **03/2016**: *Risk-bounded, Dynamic Execution of Plans Under Uncertainty*, IBM T.J. Watson Research Center, Yorktown Heights, NY. Host: Dr. Jeff Kephart.

- **02/2016**: *Dynamic Plan Execution Under Uncertainty*, Mitsubishi Electric Research Lab, Cambridge, MA. Host: Dr. Daniel Nikovski.

- **09/2015**: *Towards Risk-Aware, Resilient Autonomous Systems*, University of Pennsylvania, Philadelphia, PA. Host: Prof. Jonathan M. Smith.

- **08/2015**: *Building Resilient Autonomous Systems*. Host: Group of Brazilian Researchers and Students in Boston (PUB-Boston).

- **03/2015**: *Achieving Resilience through Hybrid Filtering and Risk-Bounded Temporal Planning*, Nanyang Technological University, Singapore. Host: Prof. Bo An.

- **12/2014**: *Hybrid Filtering and Risk-Bounded Temporal Planning for Resilient Robotic Systems*, Jet Propulsion Lab, Pasadena, CA. Host: Dr. Masahiro Ono.

- **03/2013**: *First Steps Towards Risk-Aware Execution of Temporal Plans with Sensing Actions*, University of Brasília, Brazil. Host: IEEE RAS Student Chapter.

Teaching Experience

- **Modeling the Systems World**, *Singapore University of Technology and Design.*

  01/2015 – 05/2015 Co-instructor in a mathematical modeling and convex optimization course for over 300 undergraduate students. Developed new material aimed at introducing students to computational tools used for numerical optimization and ODE simulation.

- **English as a Second Language (ESL)**, *Massachusetts Institute of Technology.*

  06/2013 – 12/2014 Voluntary English tutor for MIT employees who are not native speakers.

- **Middle East Entrepreneurs of Tomorrow (MEET)**, *Massachusetts Institute of Technology.*

  08/2013 – 10/2014 Co-President of the Student Group at MIT.

  07/2012 – 08/2013 VP of Instructor Training.

  06/2012 – 07/2012 Software engineering instructor.

- **Department of Aeronautics and Astronautics**, *Massachusetts Institute of Technology.*

  08/2012 – 12/2012 Teaching assistant in Principles of Autonomy & Decision Making, a mix graduate and undergraduate course in artificial intelligence. Responsible for about half the lectures, in addition to weekly recitations and office hours.

- **Department of Electrical Engineering**, *University of Brasília*

  03/2008 – 07/2008   Teaching assistant in Digital Control.

  09/2007 – 12/2007   Teaching assistant in Digital Systems II.

- **Department of Computer Science**, *University of Brasília*

  03/2006 – 07/2006   Teaching assistant in Digital Circuits I.

- **Department of Mathematics**, *University of Brasília*

  03/2005 – 07/2005   Teaching assistant in Calculus II.

  08/2004 – 12/2004   Teaching assistant in Calculus I.

Research & Industrial Experience

- **Mechatronics Department, Aerospace and Vehicle System Group**,*Advanced Technology R&D Center*
  Mitsubishi Electric Corporation, Amagasaki, Hyogo, Japan.

  01/2016   Effective human-robot coordination through dynamic execution of chance-constrained, conditional temporal plans.

- **The Optimization Group**, *National ICT Australia (NICTA), Canberra.*

  01/2014 – 04/2014   Power supply restoration (PSR) in partially observable domains.

- **Model-based Embedded and Robotic Systems group (MERS)**, *Massachusetts Institute of Technology.*

  2014 – ongoing   Power supply restoration (PSR) in partially observable domains.

  2013 – ongoing   Hybrid model learning with probabilistic, guarded transitions.

  2012 – ongoing   Exploiting submodularity for active sensing applications.

  2011 – ongoing   Robust data fusion for real-time target tracking.

- **Automation and Robotics Laboratory (LARA)**, *University of Brasília.*

  2010 – 2011   Hybrid filtering for robot localization.

  2009 – 2011   Development of a self-stabilizing, unmanned quadrotor platform for visual control.

  2008 – 2009   Hardware and software development for an autonomous, self-stabilizing, unmanned helicopter for power lines inspection. (funded by the Plena Transmissoras Group)

  2008 – 2009   Development of a real-time GNU/Linux experimental platform for control and identification of Networked Control Systems (NCSs).

  2007 – 2008   Development of a quadrotor type, self-stabilizing, unmanned aerial platform capable of remote operation (Undergraduate final project).

- **SEAT - Sistemas Eletrônicos de Atendimento**

  01/2008 – 07/2008   Design of electronic equipment for client service. Software and firmware development in C, Java, Assembly (PIC® Microcontroller family), and Delphi programming languages.

- **FPT Fiat Powertrain Technologies**

  08/2006 – 09/2006   Development of quality control activities and familiarization with the whole production process.

Ph.D. Thesis

- P.H.R.Q.A. Santana, «*Dynamic Plan Execution With Sensing Actions and Bounded Risk*», Ph.D. thesis, Dept. of Aeronautics and Astronautics, Massachusetts Institute of Technology (MIT), 2016. (in progress)

M.Sc. Thesis

- P.H.R.Q.A. Santana, «*Filtragem Estocástica para Sistemas Híbridos e suas Aplicações em Robótica Aérea*» (*Stochastic Filtering for Hybrid Systems and its Applications to Aerial Robotics*), Master's thesis, Dept. of Electrical Engineering, University of Brasília (UnB), Feb. 2011. (in Portuguese)

Book chapters

- P. Santana, R. Lopes, and B. Williams, «*A Hybrid Data Fusion Approach for Robust Attitude Estimation*», in Recent Advances on Multisensor Attitude Estimation: Fundamental Concepts and Applications, CRC Press (Taylor & Francis Group), *Devices, Circuits and Systems* series (in press).

- R.V. Lopes, P.H.R.Q.A. Santana, G.A. Borges, and J.Y. Ishihara, «*Model Predictive Control applied to tracking and attitude stabilization of a VTOL quadrotor aircraft*», ABCM Symposium Series in Mechatronics, pp. 175-185, Vol. 5, 2013.

Peer-reviewed conferences

- P. Santana, T. Vaquero, C. Toledo, A. Wang, C. Fang, and B. Williams, «*PARIS: a Polynomial-time, Risk-Sensitive Scheduling Algorithm for Probabilistic Simple Temporal Networks with Uncertainty*», 26th International Conference on Automated Planning and Scheduling, ICAPS, Jun. 2016.

- F. Trevizan, S. Thiébaux, P. Santana, and B. Williams, «*Heuristic Search in Dual Space for Constrained Stochastic Shortest Path Problems*», 26th International Conference on Automated Planning and Scheduling, ICAPS, Jun. 2016. (**Outstanding Paper Award**)

- P. Santana, S. Thiébaux, and B. Williams, «*RAO**: an Algorithm for Chance-Constrained POMDP's*», 30th Conference on Artificial Intelligence, AAAI, Feb. 2016.

- S. Thiébaux, F. Trevizan, P. Santana, and B. Williams, «*Heuristic Search in Dual Space for Constrained Stochastic Shortest Path Problems*», INFORMS Annual Meeting, Nov. 2015.

- P. Santana and B. Williams, «*Dynamic Execution of Temporal Plans with Sensing Actions and Bounded Risk*», 24th International Joint Conference on Artificial Intelligence (Doctoral consortium), IJCAI, Jul. 2015.

- P. Santana, S. Lane, E. Timmons, B. Williams, and C. Forster, «*Learning Hybrid Models with Guarded Transitions*», 29th Conference on Artificial Intelligence, AAAI, Jan. 2015.

- P. Santana, R. Lopes, B. Amui, G. Borges, J. Ishihara, and B. Williams, «*A New Filter for Hybrid Systems and its Applications to Robust Attitude Estimation*», 53rd IEEE Conference on Decision and Control, CDC, Dec. 2014.

- P.H.R.Q.A. Santana and B.C. Williams, «*Chance-Constrained Consistency for Probabilistic Temporal Plan Networks*», 24th International Conference on Automated Planning and Scheduling, ICAPS, Jun. 2014.

- C.H.Q. Forster, P.H.R.Q.A. Santana, and B.C. Williams, «*Camera Selection based on Robust Invariant Features for a Test Bed of Human-Robot Collaboration*», SBAI-DINCON 2013.

- P.H.R.Q.A. Santana and B.C. Williams, «*Chance-Constrained Strong Controllability of Temporal Plan Networks with Uncertainty*», 27th Conference on Artificial Intelligence, AAAI, Jul. 2013.

- H.M. Menegaz, P.H.R.Q.A. Santana, J.Y. Ishihara, G.A. Borges, «*Scaled Minimum Unscented Multiple Hypotheses Mixing Filter*», American Control Conference, ACC, Jun. 2013.

- P.H.R.Q.A. Santana, B.C. Williams, «*A Bucket Elimination Approach for Determining Strong Controllability of Temporal Plans with Uncontrollable Choices*», 26th Conference on Artificial Intelligence, AAAI, Jul. 2012.

- R.V. Lopes, P.H.R.Q.A. Santana, G.A. Borges, and J.Y. Ishihara, «*Model Predictive Control applied to tracking and attitude stabilization of a VTOL quadrotor aircraft*», 21st International Congress of Mechanical Engineering, COBEM, Oct. 2011.

- P.H.R.Q.A. Santana, H.M. Menegaz, G.A. Borges, and J.Y. Ishihara, «*Multiple Hypotheses Mixing Filter for Hybrid Markovian Switching Systems*», 49th IEEE Conference on Decision and Control, CDC, Dec. 2010.

- P.H.R.Q.A. Santana, G.A. Borges, and J.Y. Ishihara, «*Hybrid Data Fusion for 3D Localization Under Heavy Disturbances*», IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS, Oct. 2010.

- P.H.R.Q.A. Santana, L.F.C. Figueredo, E.S. Alves, J.Y. Ishihara, G.A. Borges, and A. Bauchspiess, «*Stability of Networked Control Systems with Dynamic Controllers in the Feedback Loop*», 18th IEEE Mediterranean Conference on Control and Automation, MED, Jun. 2010.

- L.F.C. Figueredo, P.H.R.Q.A. Santana, E.S. Alves, J.Y. Ishihara, G.A. Borges, and A. Bauchspiess, «*Robust Stability of Networked Control Systems*», 7th IEEE Conference on Control and Automation, ICCA, Dec. 2009.

- P.H.R.Q.A. Santana, B.G.R. Amui, G.A. Borges, and J.Y. Ishihara, «*Uma Abordagem Híbrida para Estimação Robusta de Atitude*», (*A Hybrid Approach to Robust Attitude Estimation*), X Simpósio Brasileiro de Automação Inteligente, SBAI, Sep. 2011. (in Portuguese)

- P.H.R.Q.A. Santana, G.A. Borges, and J.Y. Ishihara, «*Métodos Híbridos de Fusão de Dados para Localização sob Condições Adversas*» (*Hybrid Methods for Data Fusion Under Unfavorable Conditions*), VI Simpósio Brasileiro de Engenharia Inercial, SBEIN, Oct. 2010. (in Portuguese)

- L.F.C. Figueredo, P.H.R.Q.A. Santana, E.S. Alves, J.Y. Ishihara, G.A. Borges, and A. Bauchspiess, «*Estabilidade e Estabilização de Sistemas de Controle em Rede com Incertezas e Atrasos Variantes no Tempo*» (*Stability and Stabilization of Networked Control Systems with Time-Varying Uncertainties and Delays*), XVIII Congresso Brasileiro de Automática, CBA, Sep. 2010. (in Portuguese)

- P.H.R.Q.A. Santana and G.A. Borges, «*Modelagem e Controle de Quadrirrotores*» (*Modeling and Control of Quadrotors*), IX Simpósio Brasileiro de Automação Inteligente, SBAI, Sep. 2009. (in Portuguese)

- P.H.R.Q.A. Santana, B.G. Amui, F.B. Cavalcanti, G.G. Scandaroli, and G.A. Borges. *«Building a real-time Debian distribution for embedded systems»*. 2010.

- P.H.R.Q.A. Santana, G.G. Scandaroli, F.B. Cavalcanti, and G.A. Borges. *«How to install a RTAI extension in Linux 2.6.24 Kernel»*. 2009.

April 14, 2016