

# JOAO DANTAS

✉ jpdantas@gmail.com ☎ +55 (12) · 99133 · 5303  
🌐 joapadantas.com 🔗 linkedin.com/in/jpdantas  
🐙 github.com/jpadantas 🎓 Publications

## EDUCATION

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<b>Aeronautics Institute of Technology</b> , Sao Jose dos Campos, Brazil Ph.D. in Electronic and Computer Engineering Cum. GPA: 9.5 / 10.0	<i>Jan 2019 – Present</i>
<b>Carnegie Mellon University</b> , Pittsburgh, PA Ph.D. Exchange Program in Robotics	<i>Nov 2021 – Jan 2023</i>
<b>Aeronautics Institute of Technology</b> , Sao Jose dos Campos, Brazil M.Sc. in Electronic and Computer Engineering Cum. GPA: 8.5 / 10.0	<i>Aug 2016 – Dec 2018</i>
<b>Stony Brook University</b> , Stony Brook, NY One-year Undergraduate Exchange Program in Mechanical Engineering Cum. GPA: 3.93 / 4.00	<i>Jul 2014 – Jul 2015</i>
<b>Aeronautics Institute of Technology</b> , Sao Jose dos Campos, Brazil B.Sc. in Mechanical-Aeronautical Engineering Cum. GPA: 8.7 / 10.0	<i>Jan 2011 – Dec 2015</i>

## RESEARCH EXPERIENCE

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<b>Robotics Institute, Carnegie Mellon University</b> <i>Research Associate, AirLab</i>	<i>Nov 2021 – Jan 2023</i> <i>Pittsburgh, PA</i>
Working with <b>Prof. Dr. Sebastian Scherer</b> to develop an artificial intelligence system to keep autonomous unmanned aircraft, in conjunction with manned traffic, safely separated and behave as expected when entering and leaving the traffic/break/formation pattern.	
<b>Institute for Advanced Studies</b> <i>Research Engineer, Decision Support Systems Subdivision</i>	<i>Jan 2016 – Present</i> <i>Sao Jose dos Campos, Brazil</i>
Development of the <b>Aerospace Simulation Environment</b> , a custom-made object-oriented simulation framework that enables the modeling and simulation of military scenarios to support the development of tactics and procedures in the aerospace context for the Brazilian Air Force.	
<b>Stony Brook University</b> <i>Undergraduate Researcher, Department of Mechanical Engineering</i>	<i>May 2015 – Jul 2015</i> <i>Stony Brook, NY</i>
Worked with <b>Prof. Dr. Carlos Colosqui</b> on Brownian Motion and methodologies for modeling and numerical analysis of stochastic transport processes, focusing on the dynamics of colloidal particles of micro and nanoscale dimensions at liquid-fluid and liquid-solid interfaces.	
<b>National Council for Scientific and Technological Development</b> <i>Undergraduate Researcher</i>	<i>Aug 2011 – Jul 2013</i> <i>Sao Jose dos Campos, Brazil</i>
Worked with <b>Prof. Dr. Gilberto Petraconi</b> on the Scientific Initiation Scholarship Program to do research in plasmas, analyzing the effect of electron thermionic emission, and aerospace materials, researching composite materials used in ablative thermo-structural protective coatings for rocket engines.	

## PROFISSIONAL EXPERIENCE

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### Brazilian Air Force

*Research Engineer*

Jan 2013 – Present

*Sao Jose dos Campos, Brazil*

Captain Engineer Officer

Research on military **Modeling & Simulation**, **Machine Learning** and **Data Science** for developing decision support systems

### COC Educational System

*Mathematics Teacher and Scientific Olympiads Coordinator*

Feb 2017 – Jul 2021

*Sao Jose dos Campos, Brazil*

Responsible for the preparatory class for Scientific Olympiads

**158** medals and honorable mentions in **46** different national and international competitions

### Emerge Brazil

*Co-founder and Head of Communications*

Oct 2016 – Dec 2017

*Sao Paulo, Brazil*

Specialized in the development of science-based innovation through the link with cutting-edge science

More than **300** technologies are mapped, with **60** technologies already working in partnership with the Brazilian Industry.

## SKILLS

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### Natural Languages

Native Portuguese ◊ Advanced English

### Programming Languages

Python ◊ R ◊ SQL ◊ MATLAB ◊ L<sup>A</sup>T<sub>E</sub>X

### Deep Learning Framework

Tensorflow ◊ Keras ◊ Pytorch

### Python Toolkits

NumPy ◊ Pandas ◊ Matplotlib ◊ Scikit-Learn ◊ SciPy

## AWARDS AND HONORS

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**2023:** Travel award ( $\approx$  \$2,500) to participate at the Brazil at Silicon Valley 2023 in Santa Clara, CA

**2022:** Fundação Estudar Merit Scholarship for outstanding trajectory and academic potential (30 recipients out of 33,876 applicants)

**2021:** 3rd place in the 5th Brazilian Competition on Knowledge Discovery in Databases (KDD-BR)

**2021:** Military Bronze Medal received from the Brazilian Air Force

**2020:** Distinguished Fellowship Award for making significant contributions to the Fellows Community, Institute Four

**2019:** 6th place out of 39 competitors in the 3rd Brazilian Competition on Knowledge Discovery in Databases (KDD-BR)

**2019:** Ambassador Award of Excellence, International Youth Math Challenge

**2019:** 4th place in the Data Science Challenge at Engineering Education for the Future (EEF)

**2016:** Selected by Institute Four to participate at the Prolider Program (29 recipients out of 2,013 applicants)

**2015:** Honorable Mention in the Department of Humanities, Aeronautics Institute of Technology

**2014-2015:** Full scholarship from Brazil's Ministry of Education for one-year study program at Stony Brook University, College of Engineering and Applied Sciences ( $\approx$  \$75,000)

**2014:** Military Merit Award from the Brazilian Air Force (25% best military behavior grades among the Officer Candidates)

**2011-2013:** Fellowship of Scientific Initiation Scholarship Program for 24 months, National Council for Scientific and Technological Development

**2011:** 1st place overall out of 120 Officer Candidates, Brazilian Air Force Reserve Officer Training Corps (CPORAER-SJ)

**2011:** Approved in the Aeronautics Institute of Technology entrance exam, 120 recipients out of 7627 applicants

**2009:** Academic Merit Award from the Brazilian Air Force (25% best military grades)

**2007:** Bronze Medal, 10th Brazilian Olympiad of Astronomy and Astronautics (OBA) (187,726 competitors)

**2006:** Honorable Mention in the XIV Ceara Science and Biology Olympiad, a competition managed by the Federal University of Ceara, Brazil

**2006:** Gold Medal in the Internal Science Olympiads in the disciplines of Mathematics, Physics, Chemistry and Biology, Farias Brito High School, Brazil

**2004-2006:** Full scholarship for three years study program at Farias Brito High School, Brazil ( $\approx$  \$30,000)

**2003:** Honor to Merit for 2nd place for 3 times and 5th place for 1 time in the Internal Mathematics Olympiad, Christus Middle School

**2003:** 2nd place in the 3rd Christus Exhibition of Science and Technology (EXCETEC) in the area “Exact, Social and Commercial Sciences” with the project “Educational Exodus Study”, Christus Middle School, Brazil.

## PUBLICATIONS

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- [1] **Joao P. A. Dantas**, Marcos R. O. A. Maximo, and Takashi Yoneyama. Autonomous agent for beyond visual range air combat: A deep reinforcement learning approach. In *Proceedings of the 2023 ACM SIGSIM Conference on Principles of Advanced Discrete Simulation*, SIGSIM-PADS '23, Orlando, FL, USA, 2023. Association for Computing Machinery.
- [2] Ingrid Navarro, Jay Patrikar, **Joao P. A. Dantas**, Rohan Baijal, Ian Higgins, Sebastian Scherer, and Jean Oh. Learned tree search for long-horizon social robot navigation in shared airspace. In *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1–8, 2023 [submitted].
- [3] Andre N. Costa and **Joao P. A. Dantas**. Analysis of Sequential Parameter Optimization for Computer Simulation Optimization. *Available at SSRN 4328180*, 2022.
- [4] **Joao P. A. Dantas**, Andre N. Costa, Felipe L. L. Medeiros, Diego Geraldo, Marcos R. O. A. Maximo, and Takashi Yoneyama. Supervised Machine Learning for Effective Missile Launch Based on Beyond Visual Range Air Combat Simulations. In *Proceedings of the Winter Simulation Conference*, WSC '22, 2022.
- [5] **Joao P. A. Dantas**, Andre N. Costa, Victor C. F. Gomes, Andre R. Kuroswiski, Felipe L. L. Medeiros, and Diego Geraldo. ASA: A Simulation Environment for Evaluating Military Operational Scenarios. In *Proceedings of the 20<sup>th</sup> International Conference on Scientific Computing*, 2022.
- [6] Jay Patrikar, **Joao P. A. Dantas**, Sourish Ghosh, Parv Kapoor, Ian Higgins, Jasmine J. Aloor, Ingrid Navarro, Jimin Sun, Ben Stoler, Milad Hamidi, et al. Challenges in Close-Proximity Safe and Seamless Operation of Manned and Unmanned Aircraft in Shared Airspace. In *Aerial Robotics Workshop, International Conference on Robotics and Automation (ICRA) 2022*, 2022.
- [7] **Joao P. A. Dantas**, Marcos R. O. A. Maximo, Andre N. Costa, Diego Geraldo, and Takashi Yoneyama. Machine Learning to Improve Situational Awareness in Beyond Visual Range Air Combat. *IEEE Latin America Transactions*, 20(8), 2022.
- [8] Andre N. Costa, Felipe L. L. Medeiros, **Joao P. A. Dantas**, Diego Geraldo, and Nei Y. Soma. Formation control method based on artificial potential fields for aircraft flight simulation. *SIMULATION*, 98(7):575–595, 2022.
- [9] **Joao P. A. Dantas**, Andre N. Costa, Diego Geraldo, Marcos R. O. A. Maximo, and Takashi Yoneyama. Weapon Engagement Zone Maximum Launch Range Estimation Using a Deep Neural Network. In André Britto and Karina Valdivia Delgado, editors, *Intelligent Systems*, pages 193–207, Cham, 2021. Springer.

- [10] **Joao P. A. Dantas**, Andre N. Costa, Diego Geraldo, Marcos R. O. A. Maximo, and Takashi Yoneyama. Engagement decision support for beyond visual range air combat. In *Proceedings of the 2021 Latin American Robotics Symposium, 2021 Brazilian Symposium on Robotics, and 2021 Workshop on Robotics in Education*, pages 96–101, 2021.
- [11] **Joao P. A. Dantas**, Andre N. Costa, Marcos R. O. A. Maximo, and Takashi Yoneyama. Enhanced self-organizing map solution for the traveling salesman problem. In *Anais do XVIII Encontro Nacional de Inteligência Artificial e Computacional*, pages 799–802. SBC, 2021.
- [12] **Joao P. A. Dantas** and Caio Augusto de Melo Silvestre. Modelo de simulação aplicado às missões de transporte na região amazônica. *Aplicações Operacionais em Áreas de Defesa*, 21:10–15, 2020.
- [13] **Joao P. A. Dantas**. Apoio à Decisão para o Combate Aéreo Além do Alcance Visual: Uma Abordagem por Redes Neurais Artificiais. Master’s Thesis, Instituto Tecnológico de Aeronáutica, São José dos Campos, SP, Brazil, 2018.
- [14] **Joao P. A. Dantas**, Jelton Alexandre da Cunha, Jamesson Lira Silva, Alessandro Oliveira Arantes, and Vitor Conrado Faria Gomes. Análise Exploratória de Dados de Acidentes Aeronáuticos no Brasil. *Revista Conexão SIPAER*, 9(2):106–127, 2018.
- [15] **Joao P. A. Dantas**, Caio Augusto de Melo Silvestre, Daniel Alberto Pamplona, and Anibal Tavares de Azevedo. Modelo de simulação aplicado à logística aérea na região amazônica. In *Anais do III Encontro Regional de Pesquisa Operacional do Sudeste*, 2018.
- [16] **Joao P. A. Dantas** and Caio Augusto de Melo Silvestre. Teoria dos jogos aplicada ao combate BVR. *Aplicações Operacionais em Áreas de Defesa*, 20, 2017.
- [17] **Joao P. A. Dantas**. Hexacóptero para monitoramento de construção civil: montagem, testes e operação. Senior Thesis, Instituto Tecnológico de Aeronáutica, São José dos Campos, SP, Brazil, 2015.
- [18] **Joao P. A. Dantas** and Gilberto Petraconi Filho. Aquisição automática de dados em ensaios de materiais de barreira térmica realizados em túnel de plasma supersônico. In *Anais do XIX Encontro de Iniciação Científica e Pós-Graduação do ITA - XIX ENCITA*, 2013.
- [19] **Joao P. A. Dantas** and Gilberto Petraconi Filho. Estudo de uma descarga de catodo termiônico em baixa pressão. In *Anais do XVIII Encontro de Iniciação Científica e Pós-Graduação do ITA - XVIII ENCITA*, 2012.

## VOLUNTEERING

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### **International Astronomy and Astrophysics Competition**

Apr 2020 – Jul 2021

*Ambassador*

*Sao Jose dos Campos, Brazil*

Working to enable motivated students and supportive mentors to inspire youths for astronomy and astrophysics and to encourage them to participate in the competition

### **International Youth Math Challenge**

Jul 2019 – Jul 2021

*Ambassador*

*Sao Jose dos Campos, Brazil*

Working to inform schools and encourage students and youths to participate in the competition

### **Alpha Lumen Institute**

Jun 2012 – May 2013

*Mathematics Teacher*

*Sao Jose dos Campos, Brazil*

Teacher of mathematics in the preparatory class for the Aeronautics Institute of Technology entrance exam

## ADDITIONAL ACTIVITIES

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Competitive basketball player (2007-2009) – Brazilian Air Force Academy, Pirassununga, Brazil  
Amateur bodybuilder (2014-2015) – The National Physique Committee, New York, United States  
Hobbies: brazilian jiu-jitsu, hiking, cooking, traveling

May 2, 2023