

# Álan Crístopher e Sousa



## Personal Data

33 years old, Brazilian

## Contact

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## Languages

Portuguese (native)  
English (C1)  
German (C1)  
French (B1)

## Skills

System Analysis and Control,  
Android Development,  
Frontend, Backend,  
Embedded, Automation,  
Robotics

## Summary

**Ph.D. Student** and **Master of Science** in Electrical Engineering, in the field of **Control Theory**, and **Mechatronic Engineer** with experience in **system analysis and control** and **programming**. Has worked in two scientific initiations building a platform that interfaces with hardware for system analysis and control objectives and learning Model Predictive Control.

## Experience

- 2016–2016 **Acal BFi** Dietzenbach, Hessen, Germany  
*Intern*  
During this internship, I developed a platform to measure the power loss inside the kernel of the inductor used in a PFC circuit.
- 2010–2013 **Corpo de Bombeiros Militar de Minas Gerais** Divinópolis, Minas Gerais, Brazil  
*Soldier*  
As a firefighter I was entitled to work as a first-aider and diver, being the first response in all sorts of accidents, from fire in the wilds to car accidents and industrial and natural disasters.

## Education

- 2021– **Ph.D. in Industrial Automation** Université de Reims Champagne-Ardenne, France  
I'm working on attack detection and mitigation on cyber-physical systems.
- 2020–2020 **Master in Electrical Engineering** CEFET-MG/UFSJ, Brazil  
I developed a switching-rule for constrained switched systems based on Region of Attraction under the supervision of Prof. Dr. Valter Leite and co-supervision of Prof. Dr. Walter Lucia.
- 2013–2019 **Mechatronic Engineering** Centro Federal de Educação Tecnológica de Minas Gerais, Brazil  
Since my first semester, I helped other students from graduation, master and Ph.D. with their projects, especially with programming. In my last year, I became the student representative in the Graduation Council
- 2015–2016 **Student Exchange** Frankfurt University of Applied Sciences, Germany  
I studied as an exchange student through the Brazilian government's program Ciências Sem Fronteiras (Science Without Borders).
- 2015–2015 **Student Exchange** Université Grenoble Alpes, France  
I studied as an exchange student through the partnership between UGA and CEFET-MG. There I worked in the robotics laboratory helping the team which won the second place in the National Instruments MyRIO Paris competition.

## Interests

**System Analysis and Control Theory** I worked with constrained switched systems and MPC. I studied non-linear and robust control, positive polynomials in control and complex networks. Now I'm working with attack detection on cyber-physical systems, researching the applicability of functional observers and time-scale systems for this end.

**Programming** C/C++, Python, Julia, Kotlin, Rust, Ruby, MATLAB... Languages are just tools in the belt. I can program using structured, object oriented and functional paradigms. I always try to use design patterns to make the code more organized and maintainable.

## Extracurricular

2023	<b>Travaux Pratiques</b> Tutored a TP class entitled 'AUTO31 Practical Works on Linear State Space Control' where I tutored students with the use of MATLAB and Simulink for linear system analysis and synthesis of controllers and observers.	Tutor
2022	<b>Travaux Pratiques</b> Tutored a TP class entitled 'SY32: Practical Works on Linear State Space Control' where I tutored students with the use of MATLAB and Simulink for linear system analysis and synthesis of controllers and observers.	Tutor
2021	<b>Travaux Pratiques</b> Tutored a TP class entitled 'Mobile Programming' where I tutored students with Android application development.	Tutor
2019	<b>BIC-Jr</b> Cosupervised a junior scientific initiation entitled 'Control of a coupled tanks system'.	Cosupervisor
2019	<b>BIC-Jr</b> Cosupervised a junior scientific initiation entitled 'Modelling of an oven with space-distributed parameters'.	Cosupervisor
2018	<b>BIC-Jr</b> Cosupervised a junior scientific initiation entitled 'System modelling for process control'.	Cosupervisor
2017 & 2018	<b>Python mini-course</b> I ministered a Python mini-course at my university. The textbook (in Portuguese) is freely available at <a href="https://acristoffers.me/Python3.pdf">https://acristoffers.me/Python3.pdf</a>	Presenter
2017	<b>Semana C&amp;T - Week of Science and Technology</b> My project got the first place in the 13rd workshop at my university.	1st Place
2015	<b>National Instruments MyRIO Competition, Paris</b> I helped the team that got the second place in the competition. I was responsible for the code interfacing with the camera and recognizing colors.	2nd Place
2014	<b>Latin American Robotics Competition</b> I was part of the team that got the third place in the competition. I was responsible for the circuitry and programming of one of the robots.	3rd Place
2014	<b>Programming Tutoring</b> I tutored students, helping them with assignments and teaching.	Tutor

## Publications

- 2022 E SOUSA, ÁLAN C.; MESSAI, NADHIR; MANAMANNI, NOUREDINNE (2022). **SAFEProcess 2022: False Data Injection Detection in Cyber-Physical System.**
- 2022 E SOUSA, ÁLAN C.; MESSAI, NADHIR; MANAMANNI, NOUREDINNE (2022). **International Journal of Critical Infrastructure Protection: Load-altering attack detection on smart grids using functional observers.**
- 2021 E SOUSA, ÁLAN C.; LEITE, VALTER J. DE S.; LUCIA, WALTER; SILVA, LUÍS F. P. (2021). **Journal of Control, Automation and Electrical Systems: Command Governor strategy based on region of attraction.**
- 2020 E SOUSA, ÁLAN C.; SILVA, LUÍS F. P.; LUCIA, WALTER; LEITE, VALTER J. DE S. (2020). **XXIII Congresso Brasileiro de Automática: Command Governor strategy based on region of attraction control switching.**
- 2020 FILHO, MARCIO R. O.; E SOUSA, ÁLAN C.; LEITE, VALTER J. DE S.; COSTA, EMERSON S. (2020). **XLI CILAMCE: Control Of An Oven With Space-Distributed Sensors.**
- 2019 FILHO, MARCIO R. O.; E SOUSA, ÁLAN C.; COSTA, EMERSON S.; LEITE, VALTER J. DE S. (2019). **XL IBERO-LATIN AMERICAN CONGRESS ON COMPUTATIONAL METHODS IN ENGINEERING: Prototype Modelling for Real Systems.**
- 2018 E SOUSA, ÁLAN C.; LEITE, VALTER J. S.; RUBIO SCOLA, IGNACIO. **Affordable Control Platform with MPC Application. Studies in Informatics and Control**, v. 27, p. 265-274, 2018.
- 2017 LOPES, A. N. D.; LEITE, V. J. S.; SILVA, L. F. P.; e Sousa, Álan. **ESTABILIZAÇÃO LOCAL DE SISTEMAS NÃO-LINEARES VIA MODELAGEM FUZZY TAKAGI-SUGENO DISCRETA NO TEMPO. In: Simpósio Brasileiro de Automação Inteligente (SBAI), 2017, Porto Alegre - RS. XIII Simpósio Brasileiro de Automação Inteligente, 2017.**