AGUSTÍN GABRIEL YABO

Industrial Automation and Control Engineer
PhD Candidate at Inria Sophia Antipolis

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ACADEMIC EXPERIENCE

PhD Candidate

Biocore / McTao, Inria Sophia Antipolis - Méditerranée

Sep 2018 – Dec 2021 Nice, France

- Investigated optimal control strategies for synthesizing artificial metabolites in bacteria through growth rate regulation [1, 2, 3, 4], and designed model-predictive control loops for its production in industrial setups [5]. Examples in the ct-gallery.
- Different applications of computer science and systems theory to biological problems [6, 7, 8, 9]. Examples in the ct-gallery.
- DCME activities: teaching and supervising the practical sessions (TD) of the courses
  - Statistics and R (MAM3)
  - Time series (MAM4)

  of the *Applied mathematics and modeling* engineering degree at *Polytech Nice Sophia* (Sophia Antipolis, France).

Intern

Ctrl-A, Inria Grenoble - Rhône Alpes

Feb 2018 – Jun 2018 Grenoble, France

- Design and validation of control-oriented system models for autonomic computing and self-management of High Performance Computing systems [10].
- Explore novel control strategies for autonomic resource management through optimal and predictive control approaches in real grid computing systems [11].

Research assistant

Science & Technology Department, National University of Quilmes

July 2014 – Jul 2017 Buenos Aires, Argentina

- Developed real-time computer vision algorithms for vehicle tracking, measuring traffic flow parameters and detecting traffic jams in Python [12].
- Implemented machine learning techniques for vehicle classification and statistical analysis of traffic flow [13].
- Worked on dynamical modeling and numerical simulation of arthropods' visual motion-sensitive neurons for studying and controlling their visuomotor behaviours [15, 14].

Teaching assistant

Neural Networks / Control Systems, National University of Quilmes

Mar 2015 – Jul 2017 Buenos Aires, Argentina

Prepared class exercises and activities focused on:

- automatic control systems design, modelling and simulation of dynamical systems and signal processing using MATLAB.
- solving clustering, regression and classification problems through machine learning techniques using MATLAB/Python.

WORK EXPERIENCE

Project Engineer

R&D Department, G&L Group S.A.

2015 – 2017 Buenos Aires, Argentina

- Provided IT solutions (e.g. machine learning, computer vision, automation, control systems and IT infrastructure) and consulting services to companies and clients.
- Participated in domestic non-profit technological projects in cooperation with the Ministry of Science, Technology and Productive Innovation (Argentina).

Industrial Automation Engineer

Automation Department, Secin S.A.

2013 – 2014 Buenos Aires, Argentina

- Developed, implemented, tested and troubleshooted automation systems and control loops through Siemens programmable controllers.
- Acquired an overall understanding of manufacturing processes, as well as industrial instrumentation equipment.

Platform Analyst

IT Department, ICBC Argentina S.A.

2012 – 2013 Buenos Aires, Argentina

- Designed and programmed algorithms and scripts for automating IT processes.
- Acquired general knowledge of big-scale IT infrastructures, and implemented automated tasks on repetitive processes.

INTERESTS

Control systems | Systems biology | Optimal control | Computer vision | Machine learning | Coding

SKILLS

Python | Julia | Matlab | C | C++ | Latex | Assembler | SQL | Java | OpenCV | PHP | Smalltalk | LUA | JS | VBScript

PUBLICATIONS

Journal Articles

[1] • **Yabo, A.**, J.B. Caillau, and J.L. Gouzé. “Optimal bacterial resource allocation: metabolite production in continuous bioreactors”. In: *Mathematical Biosciences and Engineering* 17.6 (2020), pp. 7074–7100.

[6] • N. Augier and **Yabo, A.** “Time-optimal control of piecewise affine bistable gene-regulatory networks (submitted)”. In: *International Journal of Robust and Nonlinear Control* (2021).

[7] • **Yabo, A.**, J.B. Caillau, J.L. Gouzé, Hidde de Jong, and Francis Mairet. “Dynamical analysis and optimization of a generalized resource allocation model of microbial growth (submitted)”. In: *SIAM Journal on Applied Dynamical Systems* (2021).

[14] • J. Carbone, **Yabo, A.**, and D. Oliva. “Characterization and modelling of looming-sensitive neurons in the crab Neohelice”. In: *Journal of Comparative Physiology A* (2018), pp. 1–17.

Conference Proceedings

[2] • **Yabo, A.** and J.L. Gouzé. “Optimizing bacterial resource allocation: metabolite production in continuous bioreactors”. In: *21th IFAC World Congress (Berlin, Germany)*. 2020.

[3] • **Yabo, A.**, J.B. Caillau, and J.L. Gouzé. “Singular regimes for the maximization of metabolite production”. In: *The 58th Conference on Decision and Control (IEEE CDC 2019) (Nice, France) (accepted for publication)*. 2019.

[4] • **Yabo, A.**, J.B. Caillau, and J.L. Gouzé. “Bacterial growth strategies as Optimal Control problems: maximizing metabolite production”. In: *The 19th French-German-Swiss conference on Optimization (FGS’2019) (Nice, France)*. 2019.

[5] • **Yabo, A.**, J.B. Caillau, and J.L. Gouzé. “Hierarchical MPC applied to bacterial resource allocation and metabolite synthesis (submitted)”. In: *The 60th IEEE conference on Decision and Control (Austin, Texas, USA)*. 2021.

[8] • N. Augier and **Yabo, A.** “Time-optimal control of piecewise affine bistable gene-regulatory networks: preliminary results”. In: *7th IFAC Conference on Analysis and Design of Hybrid Systems (Brussels, Belgium)*. 2021.

[9] • C. Djuikem, **Yabo, A.**, F. Grognard, and S Touzeau. “Mathematical modelling and optimal control of the seasonal coffee leaf rust propagation”. In: *7th IFAC Conference on Analysis and Design of Hybrid Systems (Brussels, Belgium)*. 2021.

[10] • E. Stahl, **Yabo, A.**, O. Richard, B. Bzeznik, B. Robu, and E. Rutten. “Towards a control-theory approach for minimizing unused grid resources”. In: *The 1st Autonomous Infrastructure for Science Workshop (AI-Science’18) (Tempe, AZ, United States)*. 2018.

[11] • **Yabo, A.**, O. Richard, B. Bzeznik, B. Robu, and E. Rutten. “A control-theory approach for cluster autonomic management: maximizing usage while avoiding overload”. In: *The 3rd IEEE Conference on Control Technology and Application (IEEE CCTA 2019) (Hong Kong, China)*. 2019.

[12] • D. Oliva, **Yabo, A.**, L. Garcıa, S. Arroyo, and F. Safar. “Implementation of a traffic flow measurement and traffic jam detection system in highways”. In: *Argentine Symposium on Artificial Intelligence (ASAI 2015)-JAIIO 44 (Rosario, Argentina)*. 2015.

[13] • **Yabo, A.**, S. Arroyo, F. Safar, and D. Oliva. “Vehicle classification and speed estimation using computer vision techniques”. In: *XXV Argentine Congress on Automatic Control (AADECA 2016) (Buenos Aires, Argentina)*. 2016.

[15] • Agustin Gabriel Yabo, Julia Carbone, Santiago Ibañez, Daniel Tomsic, and Damian Oliva. “Wide-field stimulation system for measuring of visuomotor behaviors in arthropods”. In: *XXIX Annual Meeting of the Argentine Society for Research in Neuroscience (SAN 2014) (Córdoba, Argentina)*. 2014.

GRANTS

2018 **EDSTIC PhD funding**
PhD funding (10 grants per year).
Granted by Université Côte d’Azur (Nice, France).

2017 **LabEx PERSYVAL-Lab**
Master M2 scholarship program (10 grants per year).
Granted by LabEx PERSYVAL-Lab and Université Grenoble Alpes (Grenoble, France).

2016 **University and Transport**
Merit-based research scholarship for research assistants.
Granted by the Ministry of Education National University of Quilmes (Buenos Aires, Argentina).

2015 **SAI Research Subsidy Program**
Research support subsidy for undergraduate students.
Granted by National University of Quilmes (Buenos Aires, Argentina).

2014 **Santander Ibero-American Grants**
Exchange scholarship for a 1 semester stay in Spain.
Granted by Santander Bank (Spain) and National University of Quilmes (Buenos Aires, Argentina).

2013 **CONAHEC Student Exchange Program**
Short-stay exchange scholarship.
Granted by CONAHEC and National University of Quilmes (Buenos Aires, Argentina).

LANGUAGES

English ●●●●●
Fluent - IELTS Band 7.5

Spanish ●●●●●
Mother tongue

French ●●●●●
Fluent

Chinese ●●○○○
HSK Level 2