

# Rand Asswad

## PhD Student in Applied Mathematics

PhD candidate in control theory, specializing in the modeling, nonlinear control, and state estimation of dynamical systems, with applications in synthetic biology. Open to a broad range of postdoctoral opportunities in control theory and related areas. Currently seeking a position in the Grenoble area starting in 2026.

**Research interests:** Nonlinear control, observer design, state estimation, model predictive control, data-driven control, modeling, optimization.

## Experience

### PhD Student @ Microcosme (Inria - Université Grenoble Alpes)

October 2022 – September 2025

Nonlinear control and modeling of biological systems. Focus on algal-bacterial consortia in bioreactors, with mathematical modeling, qualitative analysis, simulations, state estimation, and robust feedback control design.

### Visiting Researcher @ IRT (Leibniz Universität Hannover)

September – November 2024

Exploration of data-driven control methods, including robust variants of Model Predictive Control accounting for modeling and measurement uncertainties.

### Teaching Assistant @ Université Grenoble Alpes

September 2022 – January 2024

Delivered lectures, tutorials, and lab sessions for undergraduate science programs. Courses taught:

- ▶ Fundamental Mathematical Tools (16h, L1 Life Sciences)
- ▶ Applied Mathematics for Image Processing (18h, L1 Computer Science)
- ▶ Scientific Computing Introduction (6h tutorials + 18h labs, L1 Computer Science)

### Research Intern @ L2S (Centralesupelec, CNRS)

November 2020 – June 2021

Worked on a bio-geometric sound reconstruction model based on the Heisenberg group and the Wilson-Cowan integro-differential equation.

### Research Intern @ Pixel (Inria - Université de Lorraine)

June – August 2019

Improved the C++ pipeline « Mind the Gap! » for generating hexahedral-dominant meshes from tetrahedral meshes.

## Education

### PhD in Applied Mathematics @ MSTII (Université Grenoble Alpes)

October 2022 – September 2025

Modeling, observation, and control of nonlinear microbiological systems. Key training:

- ▶ Nonlinear Systems Control (H. Khalil, EECI-IGSC)
- ▶ State Observers for Dynamical Systems (G. Besançon)
- ▶ Nonlinear Control (G. Besançon)
- ▶ Model Predictive Control (M. Fiacchini)



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## Skills

### Mathematics & Computer Science Theory

- ▶ Control & Estimation
- ▶ Signal Processing
- ▶ Numerical Analysis & Simulation
- ▶ Optimization & Metaheuristics
- ▶ Probability, Statistics & Data Analysis
- ▶ Multi-agent Systems & MARL

### Programming Languages

- ▶ **Familiar:** Fortran, Matlab/Octave, Prolog, Lisp, Mathematica, SQL, C#.
- ▶ **Experienced:** bash/shell, C, C++, Python, Julia, Java, JavaScript.
- ▶ **Markup:**  $\LaTeX$ / $\TeX$ , HTML+CSS, Markdown.

### Libraries & Frameworks

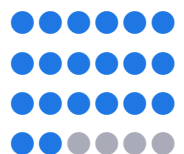
- ▶ **Numerical & ML:** numpy, scipy, matplotlib, scikit-learn, pandas.
- ▶ **Lexer & Parser Generators:** Lex+Yacc, GNU Flex+Bison, Antlr4.
- ▶ **WebDev:** Django (Python), Jekyll (Ruby).

### Software & Tools

- ▶ **OS:** GNU Linux (Arch, Debian), MS Windows.
- ▶ **Version Control:** Git, SVN.
- ▶ **Image Processing:** GIMP, Inkscape, Adobe Photoshop, Adobe Illustrator, Blender.

### Languages

French (TCF C1/C2)  
English (TOEIC 990/990)  
Arabic (native)  
German (B1.1 course)



## Higher Education Teaching Program @ Université Grenoble Alpes

November 2024 – June 2025

University-level pedagogy certification (Parcours Enseignement dans le Supérieur) focused on course design, delivery, and reflective teaching practices.

## Mathematical Engineering @ INSA Rouen Normandie

September 2014 – September 2021 (mention bien)

French graduate engineering program (Diplôme d'Ingénieur, MEng) with focus on applied mathematics and computer science, specialized in IA and Decision-Making.

## Theoretical & Applied Computer Science @ Université de Rouen Normandie

September 2019 – August 2020 (mention assez bien)

Research-oriented Master's program (M.Sc.) with focus on algebra and theoretical computer science.

## Syrian Scientific Baccalaureate

June 2013 (GPA: 92.17%)

## Publications

### Static and dynamic optimal control of vitamin-mediated algal-bacterial co-cultures under optogenetic regulation

Under review at Automatica journal

Rand Asswad, Walid Djema, Olivier Bernard, Jean-Luc Gouzé, Eugenio Cinquemani.

### Single- and multi-objective performance optimization of an algal-bacterial synthetic process

Under review at CDC25

Rand Asswad, Jean-Luc Gouzé, Eugenio Cinquemani.

### Optimization of microalgae biosynthesis via controlled algal-bacterial symbiosis

Published article in the CDC24 conference proceedings – doi.org/10.1109/CDC56724.2024.10886300

Rand Asswad, Walid Djema, Olivier Bernard, Jean-Luc Gouzé, Eugenio Cinquemani.

### Kalman-based approaches for online estimation of bioreactor dynamics from fluorescent reporter measurements

Published article in the ECC24 conference proceedings – doi.org/10.23919/ECC64448.2024.10591076

Rand Asswad, Eugenio Cinquemani, Jean-Luc Gouzé.

### An auditory cortex model for sound processing

Published article in the GSI2021 conference proceedings – doi.org/10.1007/978-3-030-80209-7\_7

Rand Asswad, Ugo Boscain, Giuseppina Turco, Dario Prandi, Ludovic Sacchelli.

## Miscellaneous

- ▶ Violin (Conservatory of Saint-Etienne du Rouvray, Orchestre Symphonique Universitaire de Grenoble, Seyssymphonique)
- ▶ Cinema and art
- ▶ Camping and hiking