

Age	31	Email	<a href="mailto:matteo.dellarossa@uclouvain.be">matteo.dellarossa@uclouvain.be</a>
Nationality	Italian		

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## Education and Career

- '11-'15 Bachelor in Mathematics - University of Udine / Italy
- '15-'17 Master in Mathematics (110/110 cum laude) - University of Udine / Italy  
Thesis's Title: *Esistence And Uniqueness Results in Nonlinear Analysis*  
Under the diretion of Prof. *Fabio Zanolin*
- '17-'20 Ph.D. in Automatic Control - University of Toulouse, INSA  
& Laboratory for Analysis and Architecture of Systems (LAAS-CNRS) / Toulouse, France  
Thesis's Title: *Non-Smooth Lyapunov Functions for Stability Analysis of Hybrid Systems*  
Under the direction of Dr. *Aneel Tanwani* and Prof. *Luca Zaccarian*  
2-months visiting period at Imperial College London, London / UK  
Under the direction of Prof. *David Angeli*
- Nov '20 - May '23 Université Catholique de Louvain - *Louvain-La-Neuve / Belgium*  
*Postdoc / ICTEAM*  
Part of the Project of the European Research Council (ERC) under the *European Union's Horizon 2022 research and innovation program*, grant agreement No 864017 - L2C.  
Principal Investigator: Prof. *Raphaël M. Jungers*.
- Jun '23- Università degli Studi di Udine - *Udine / Italy*  
*Postdoc / Assegnista di Ricerca*  
"Nonlinear evolution problems and applications to optimal control of epidemic models."  
"Problemi di evoluzione nonlineari e applicazioni al controllo ottimo di epidemie"  
Principal Investigator: Prof. *Lorenzo Freddi*.

## Research Papers

### Journal (published)

1. Della Rossa, M. and Tanwani, A. and Zaccarian, L. (2020). Max-min Lyapunov functions for switched systems and related differential inclusions. *Automatica*, vol. 120, 109123.
2. Della Rossa, M. and Goebel, R. and Tanwani, A. and Zaccarian, L.(2021). Piecewise structure of Lyapunov functions and densely checked decrease conditions for hybrid systems. *Math. Control Signals Syst.* , vol. 33, pp. 123-149.
3. Della Rossa, M. and Tanwani, A. and Zaccarian, L. (2021). Non-pathological ISS-Lyapunov functions for interconnected differential inclusions. *IEEE Transactions on Automatic Control*, vol. 67, no. 8, pp. 3774-3789.
4. Della Rossa, M. and Tanwani, A. (2022). Instability of dwell-time constrained switched nonlinear systems. *Systems & Control Letters*, vol. 162, 105164.
5. Della Rossa, M. and Pasquini, M. and Angeli, D. (2022). Continuous-time switched systems with switching frequency constraints: Path-complete stability criteria. *Automatica*, vol. 137, 110099.
6. Debauche, V. and Della Rossa, M. and Jungers, R. (2022) Comparison of path-complete Lyapunov functions via template-dependent lifts. *Nonlinear Analysis: Hybrid Systems*, vol. 46, 101237.

7. Della Rossa, M. and Jungers, R. (2023) Interpretability of Path-Complete Techniques and Memory-Based Lyapunov Functions *IEEE Control Systems Letters*, vol. 7, 781 - 786.
8. Della Rossa, M. and Egidio, L. N. and Jungers, R. (2023) Stability of switched affine systems: arbitrary and dwell-time switching *SIAM Journal on Control and Optimization*, Vol. 61, Iss. 4.
9. Nayak S.P. and Egidio, L. N. and Della Rossa M. and Schmuck A.-K. and Jungers, R. (2023) Context-Triggered Abstraction-Based Control Design *IEEE Open Journal of Control Systems*, Vol. 2, pp. 277-296.
10. Della Rossa, M. and Alves Lima, T and Jungers, M. and Jungers, R. (2024). Graph-based conditions for feedback stabilization of switched and LPV systems. *Automatica*, vol. 160, 111427.
11. Della Rossa, M. (2024) Converse Lyapunov Results for Switched Systems with Lower and Upper Bounds on Switching Intervals. *Automatica*, vol. 163, 111576.
12. Della Rossa, M. and Alves Lima, T. and Girard, A (2024) Feedback Stabilization of Discrete-Time Switched Systems Under Büchi-Constrained Signals. *IEEE Control Systems Letters*.
13. Della Rossa, M. and Jungers, R. (2024) Multiple Lyapunov Functions and Memory: A Symbolic Dynamics Approach to Systems and Control *SIAM Journal on Control and Optimization*, Vol. 62, Iss. 5.

#### Journal (submitted)

1. Della Rossa, M. and Freddi, L. and Goreac, D. (n.d.) Optimality of vaccination for an SIR epidemic with an ICU constraint
2. Breda, D. and Della Rossa, M. and Freddi, L. (n.d.) Viability and control of a delayed SIR epidemic with an ICU state constraint
3. Della Rossa, M. and Tanwani, A. (n.d.) Converse Lyapunov Results for Stability of Switched Systems with Average Dwell-Time

#### International Conferences (published)

1. Della Rossa, M. and Tanwani, A. and Zaccarian, L. (2018). Max-min Lyapunov functions for switching differential inclusions. *IEEE 57th Conference on Decision and Control (CDC)*, pages. 5664-5669.
2. Della Rossa, M. and Tanwani, A. and Zaccarian, L. (2019). Smooth approximation of patchy Lyapunov functions for switched systems. *11th IFAC Symposium on Nonlinear Control Systems (NOLCOS)*, pages. 2405-8963.
3. Della Rossa, M. and Goebel, R. and Tanwani, A. and Zaccarian, L. (2019). Almost everywhere conditions for hybrid Lipschitz Lyapunov functions. *IEEE 58th Conference on Decision and Control (CDC)*, pages. 8148-8153.
4. Della Rossa, M. and Pasquini, M. and Angeli, D. (2020). Path-complete Lyapunov functions for continuous-time switching systems. *IEEE 59th Conference on Decision and Control (CDC)*, pages. 3279-3284.
5. Debauche, V. and Della Rossa, M. and Jungers, J. (2021). Template-dependent lifts for path-complete stability criteria and application to positive switching systems. *7th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS)*, pages. 151-156.
6. Della Rossa, M. and Wang, Z. and Egidio, L.N. and Jungers, R. (2021). Data-driven stability analysis of switched affine systems. *IEEE 60th Conference on Decision and Control (CDC)*, pages. 3204-3209.
7. Debauche, V. and Della Rossa, M. and Jungers, R. (2022) Necessary and sufficient conditions for template-dependent ordering of path-complete Lyapunov methods. *25th ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*
8. Della Rossa, M. and Jungers, R. (2022) Almost sure Stability of Stochastic Switched Systems: Graph lifts-based Approach *IEEE 61th Conference on Decision and Control (CDC)*
9. Alves Lima, T. and Della Rossa, M. and Gouaisbaut, F. and Jungers, M. and Tarbouriech, S. (2022) Switched systems approach to stability of systems with both constant and time-varying delays *IEEE 61th Conference on Decision and Control (CDC)*

## Teaching Assistant

- Jan '19 - Basic Mathematics  
Jun '19 IUT-GMP Toulouse-Université Toulouse III Paul Sabatier, 64h  
Doctorant Chargé d'Enseignement/ PhD teaching assistant
- Sep '19 - Tutorial in Linear Algebra and Analysis  
Jan '20 INSA Toulouse- Génie Mathématique et Modélisation, 18h  
PhD teaching assistant
- Sep '21 - LINMA2380 - Matrix Computations  
Jan '22 Université catholique de Louvain (UCLouvain), Louvain-La-Neuve, Belgium, 20h  
Teaching assistant
- Sep '22 - LINMA2380 - Matrix Computations  
Jan '23 Université catholique de Louvain (UCLouvain), Louvain-La-Neuve, Belgium, 20h  
Teaching assistant
- Sep '23 - Basic Calculus (Analisi)  
Jan '24 Università degli Studi di Udine, Civil and Electronic Engineering/Computer Science, 1st year (70h)  
Teaching assistant
- Sep 24 ' - Basic Calculus (Analisi Matematica I)  
Jan'25 Università degli Studi di Udine, Industrial Engineering (Ingegneria Industriale per l'Energia), 1st year (96h)  
Adjunct professor (Incarico di insegnamento)

## Reviewer and Editorial activities

I have been a reviewer for several journals in optimization and automatic control fields, such as *SIAM Journal on Control and Optimization*, *Automatica*, *IEEE Transactions on Automatic Control*, *Systems and Control Letters*, *IEEE Control Systems Letters*, *Nonlinear Analysis: Hybrid Systems*, and for international conferences relevant to the sector, such as *IEEE Conference on Decision and Control*, *IFAC World Congress*.

## Awards

### 2023 Nonlinear Analysis: Hybrid Systems Paper Prize

Awarded to the Paper: “*Comparison of path-complete Lyapunov functions via template-dependent lifts*” joint work with V. Debauche and R. M. Jungers”.  
Consigned at IFAC World Congress 2023, Yokohama, Japan

## Invited Lectures

- 05/09/2019 Title: “Smooth Approximation of Patchy Lyapunov Functions for Switched Systems”  
*11th IFAC Symposium on Nonlinear Control Systems (NOLCOS)*, Vienna, Austria
- 12/12/2019 Title: “Almost Everywhere Conditions for Hybrid Lipschitz Lyapunov Functions”  
*IEEE 58th Conference on Decision and Control (CDC)* Nice, France
- 09/11/2020 Title: “Path-complete techniques and continuous-time systems, recent developments”  
*ICTEAM, Cyber-Physical systems research group weekly meeting*, Louvain-La-Neuve, Belgique

- 16/12/2020 Title: “Path-complete Lyapunov functions for continuous-time switching systems”  
*IEEE 59th Conference on Decision and Control (CDC) (Virtual)*
- 15/12/2021 Title: “Data-Driven Stability Analysis of Switched Affine Systems”  
*IEEE 60th Conference on Decision and Control (CDC) (Virtual)*
- 09/06/2022 Title: “Dwell-time stability analysis for switched systems:  
from linear to (very structured) non-linear subsystems”  
*Séminaire d'Automatique du Plateau de Saclay, L2S, CentraleSupélec, Paris-Saclay, France*
- 07/12/2022 Title: “Almost sure Stability of Stochastic Switched Systems: Graph lifts-based Approach”  
*IEEE 61th Conference on Decision and Control (CDC), Cancun, Mexico)*
- 26/01/2023 Title: “Dwell-time stability analysis for switched systems:  
from linear to (very structured) non-linear subsystems”  
*Centre Automatique et Systèmes (CAS), Paris, Mines Paris Tech, France*
- 13/03/2024 Title: “Viability and control of a delayed SIR epidemic with an ICU State Constraint”  
*Dipartimento di Scienze Matematiche, Informatiche e Fisiche, Università degli Studi di Udine, Italia*

## Languages

	English	French	Portuguese (BR)	Italian
Speaking	Excellent	Excellent	Good	Mother tongue
Writing	Excellent	Very Good	Beginner	
Reading	Excellent	Excellent	Very Good	
Listening	Excellent	Excellent	Very Good	

## General Skills

### ■ Programming Languages

*MatLab*

### ■ Miscellaneous

*Google Apps*

*Office Package*

*LaTeX*

Driver's license “B”

## Referees

- **Prof. Luca Zaccarian**  
*Professor* (Google Scholar, Homepage)  
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- **Dr. Aneel Tanwani**  
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31400 Toulouse, France  
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- **Prof. Raphaël M. Jungers**  
*Professor* (Google Scholar, Homepage)  
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