



Vittorio De Iuliis

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Google Scholar: <https://scholar.google.it/citations?user=6t-XmzsAAAAJ>

Gender: Male **Date of birth:** 03/08/1987 **Nationality:** Italian

ABOUT ME

Assistant Professor at the University of L'Aquila. Research interests: Systems and Control Theory, Systems Identification and Data Analysis, Time-delay systems, Positive systems, Machine Learning applications in Control Theory.

WORK EXPERIENCE

[01/08/2019 – Current] **Assistant Professor**

University of L'Aquila

City: L'Aquila

Country: Italy

Main activities and responsibilities:

Researcher (RTDa) under PON Ricerca & Innovazione 2014-2020 (AIM1877124-Attività 1) funding.

February 2021 - July 2021: visiting researcher at the **ICTEAM Institute, Université catholique de Louvain**, Prof. Raphaël Jungers' group.

[01/02/2018 – 31/07/2019] **Postdoctoral Researcher**

University of L'Aquila

Address: L'Aquila, Italy

Main activities and responsibilities:

Project title: Model Identification of large-scale Cyber Physical Systems
Supervisors: Prof. Costanzo Manes and Alessandro D'Innocenzo, PhD.

[10/2014 – Current] **Teaching**

University of L'Aquila

Address: L'Aquila, Italy

Main activities and responsibilities:

Teaching:

"Teoria dei sistemi" ("Systems Theory"), 30 hours (3 CFU), years: 2019 - ...

"Systems Identification and Data Analysis", 30 hours (3 CFU), years: 2019 - ...

Teaching assistant of:

"Teoria dei sistemi" ("Systems Theory"), Prof. Costanzo Manes (years: 2014-2019)

"Robotica Industriale" ("Industrial Robotics"), Prof. Costanzo Manes (years: 2015-2016, 2016-2017, 2018-2019)

"Identificazione dei sistemi e analisi dei dati" ("Systems identification and data analysis"), Prof. Alfredo Germani (years: 2015-2016, 2016-2017, 2018-2019)

"Complementi di automatica" ("Advanced Control Systems"), Prof. Alfredo Germani (years: 2015-2016, 2016-2017, 2018-2019)

"Systems Biology" (taught in English), Prof. Pasquale Palumbo (year 2015-2016)

EDUCATION AND TRAINING

[01/11/2014 – 14/05/2018] **Ph.D. in Information and Communication Technology**

University of L'Aquila

Address: L'Aquila, Italy

Level in EQF: EQF level 8

Main subject / occupational skills covered:

Research interests: Systems and control theory, with focus on the stability of time-delay systems; System Identification.

Thesis: "Internally Positive Representations and Stability Analysis of Linear Delay Systems"

Advisor: Prof. Costanzo Manes, Co-advisor: Prof. Alfredo Germani.

[09/2010 – 24/07/2014] **Master Degree in Computer and Control Systems Engineering**

University of L'Aquila

Address: L'Aquila, Italy

Level in EQF: EQF level 7

Main subject / occupational skills covered:

Score: 110/110 cum Laude and Honors

Thesis: "Filtraggio polinomiale di sistemi nonlineari mediante output injection" ("Polynomial filtering of nonlinear systems by output injection")

Advisor: Prof. Alfredo Germani.

University of L'Aquila

Address: L'Aquila, Italy

Level in EQF: EQF level 6

Main subject / occupational skills covered:

Score: 107/110

Thesis: "Pianificazione del moto di un robot in presenza di ostacoli" ("Robot motion planning and obstacle avoidance")

Advisor: Prof. Costanzo Manes.

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

English

LISTENING C1 READING C2 WRITING C2

SPOKEN PRODUCTION C1 SPOKEN INTERACTION C1

PUBLICATIONS

Peer-reviewed articles in journals

- S. M. Mattenet, V. De Luliis, M. A. Gomez, W. Michiels, R. M. Jungers, "An improved finiteness test and a systematic procedure to compute the strong H2 norm of differential algebraic systems with multiple delays". *Automatica* (2022).
- F. Cacace, M. d'Angelo, V. De Luliis, A. Germani, "Filtering discrete-time systems with multiplicative noise in L2 spaces with applications". *IEEE Control System Letters* 6 (2021), pp. 734-739.
- V. De Luliis, A. D'Innocenzo, A. Germani, C. Manes, "Stability analysis of coupled differential-difference systems with multiple time-varying delays: a positivity-based approach". *IEEE Transactions on Automatic Control* 66.12 (2021), pp. 6085-6092.
- V. De Luliis, A. D'Innocenzo, A. Germani, C. Manes, "Stability conditions for linear discrete-time switched systems in block companion form". *IET Control Theory & Applications* 14.19 (2020), pp. 3107-3115.
- F. Smarra, G.D. Di Girolamo, V. De Luliis, A. Jain, R. Mangharam, A. D'Innocenzo, "Data-driven switching modeling for MPC using Regression Trees and Random Forests". *Nonlinear Analysis: Hybrid Systems* 36 (2020). **Invited**.
- V. De Luliis, A. Germani, C. Manes, "Internally Positive Representations and Stability Analysis of Coupled Differential-Difference Systems with Time-Varying Delays". *IEEE Transactions on Automatic Control* 64.6 (2019), pp. 2514-2521.
- V. De Luliis, A. D'Innocenzo, A. Germani, C. Manes, "Internally Positive Representations and Stability Analysis of Linear Differential Systems with Multiple Time-Varying Delays". *IET Control Theory & Applications* 13.7 (2019), pp. 920-927. **Special Issue** on Positive Systems.

Peer-reviewed conferences and workshops

International conferences

- V. De Luliis, F. Smarra, C. Manes, A. D'Innocenzo, "On the Stability of Switched ARX Models, with an Application to Learning via Regression Trees". *IFAC-PapersOnLine* 54.5 (2021). *7th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS 2021)*, pp. 61-66. **Invited.**
- V. De Luliis, G.D. Di Girolamo, F. Smarra, A. D'Innocenzo, "A Comparison of Classical Identification and Learning-Based Techniques for Cyber-Physical Systems". *29th Mediterranean Conference on Control and Automation (MED 2021)*. **Invited.**
- V. De Luliis, A. D'Innocenzo, A. Germani, C. Manes, "On the stability of discrete-time linear switched systems in block companion form". *IFAC-PapersOnLine* 53.2 (2020). *21th IFAC World Congress*, pp. 2033–2038.
- V. De Luliis, A. D'Innocenzo, A. Germani, C. Manes, "On the stability of coupled differential-difference systems with multiple time-varying delays: a positivity-based approach", *2019 IEEE 58th Conference on Decision and Control (CDC 2019)*, pp. 37-42.
- V. De Luliis, A. Germani, C. Manes, "Identification of Forward and Feedback Transfer Functions in Closed-Loop Systems with Feedback Delay". *IFAC-PapersOnLine* 50.1 (2017). *20th IFAC World Congress*, pp. 12847–12852.
- V. De Luliis, A. Germani, C. Manes, "Internally Positive Representations and Stability Analysis of Linear Difference Systems with Multiple Delays". *IFAC-PapersOnLine* 50.1 (2017). *20th IFAC World Congress*, pp. 3099–3104.

International workshops

- V. De Luliis, A. D'Innocenzo, C. Manes, "Recent results on the analysis and estimation of linear switched models by their equivalence to delay systems". *3rd DECOD Workshop — DELays and CONstraints in Distributed parameter systems 23rd–26th November 2021, CentraleSupélec, Gif-sur-Yvette, France*. **Invited.**
- V. De Luliis, A. Germani, C. Manes, "Stability Analysis of Linear Delay Systems via Internally Positive Representations: an overview", *1st DECOD: DELays and Constraints in Distributed Parameter Systems 22-24 November 2017, Gif-sur-Yvette, France*. **Invited.**

National conferences

- V. De Luliis, A. D'Innocenzo, A. Germani, C. Manes, "A comparison approach for the stability of some classes of delay and switched systems", *Automatica.it, Cagliari 2020* (virtual edition), Italy.
- F. Smarra, V. De Luliis, G.D. Di Girolamo, A. D'Innocenzo, "Learning and control of smart cities via Regression Trees", *Automatica.it, Cagliari 2020* (virtual edition), Italy.
- F. Conte, V. De Luliis, A. Germani, C. Manes, "Internally Positive Representations and Stability Analysis of Linear Delay Systems", *Automatica.it, Milano 2017*, Italy.

Peer-reviewed book chapters

- V. De Luliis, A. D'Innocenzo, C. Manes, "Recent results on the analysis and estimation of linear switched models by their equivalence to delay systems". *To appear in a forthcoming book for the Springer Advances in Delays and Dynamics series*. **Invited.**
- V. De Luliis, A. Germani, C. Manes, "Stability Analysis of Linear Delay Systems via Internally Positive Representations: an overview". In: *G. Valmorbida, W. Michiels, P. Pepe (eds) Accounting for constraints in time-delay systems (Advances in Delays and Dynamics series)*. Springer (2022), pp. 25–50. **Invited.**
- F. Conte, V. De Luliis, C. Manes, "Internally Positive Representations and Stability Analysis of Linear Delay Systems with Multiple Time-Varying Delays". In: *F. Cacace, L. Farina, R. Setola, A. Germani (eds) Positive Systems: Theory and Applications. POSTA 2016. (Lecture Notes in Control and Information Sciences series)*. Springer (2017), pp. 81–93.

DRIVING LICENCE

Cars: B

PROJECTS

Role in projects

- PON Ricerca & Innovazione 2014-2020 (AIM1877124-Attività 1). **Assistant professor**, on-going;
- INCIPICT, Innovating City Planning through Information & Communications Technology (<http://incipict.univaq.it/>). **Postdoctoral researcher**.
- SAFECOP, Safe Cooperating Cyber-Physical Systems using Wireless Communication (<http://www.safecop.eu/>). **Postdoctoral researcher**.
- AQUAS, Aggregated Quality Assurance for Systems (<http://aquas-project.eu/>). **Postdoctoral researcher**.

TALKS

Talks in conferences and seminars

- "Recent results on the analysis and estimation of linear switched models by their equivalence to delay systems". *Conference: 3rd DECOD Workshop — DELays and COstraints in Distributed parameter systems 23rd–26th November 2021, CentraleSupélec, Gif-sur-Yvette, France. Invited.*
- "On the Stability of Switched ARX Models, with an Application to Learning via Regression Trees", *Conference: 7th IFAC Conference on Analysis and Design of Hybrid Systems, Brussels, July 2021 (virtual edition). Invited*
- "A comparison of classical identification and learning-based techniques for cyber-physical systems", *Conference: 29th IEEE Mediterranean Conference on Control and Automation, Bari, June 2021 (virtual edition). Invited.*
- "A positivity-based approach to stability and learning", *Seminar: UCLouvain (Raphael Jungers' research group), virtual, February 2021*
- "A comparison approach for the stability of some classes of delay and switched systems", *Conference: Automatica.it, Cagliari (virtual) September 2020*
- "On the stability of discrete-time linear switched systems in block companion form". *Conference: 21th IFAC World Congress, Berlin, July 2020 (virtual edition)*
- "On the stability of coupled differential-difference systems with multiple time-varying delays: a positivity-based approach", *Conference: 2019 IEEE 58th Conference on Decision and Control (CDC), Nice, France, 2019*
- "The importance of being positive: a System-Theoretic perspective", *Seminar: New Faculty Seminars @ DISIM, L'Aquila, 2019.*
- "Internally Positive Representations and Stability Analysis of Linear Differential Systems with Multiple Time-Varying Delays". *Conference: IFAC World Congress 2017, Toulouse, July 2017*
- "Identification of Forward and Feedback Transfer Functions in Closed-Loop Systems with Feedback Delay". *Conference: IFAC World Congress 2017, Toulouse, July 2017*
- "Internally Positive Representations and Stability Analysis of Linear Delay Systems", *Conference: Automatica.it, Milan, September 2017*
- "Internally Positive Representations and Stability Analysis of Linear Delay Systems with Multiple Time-Varying Delays". *Conference: International Symposium on Positive Systems (POSTA 2016), Rome, September 2016*

Editorial activity

- 30th IEEE Mediterranean Conference on Control and Automation (MED 2022): **Associate Editor**
- 7th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS 2021): **Program Committee member** (Repeatability Evaluation), **co-organizer** and **co-chair** of the **Invited Session** "Data-driven methods for hybrid systems"
- 29th IEEE Mediterranean Conference on Control and Automation (MED 2021): **Associate Editor** and **co-chair** of the session "Data Mining and Control Tools Applications for Complex Systems"
- 58th IEEE Conference on Decision and Control (CDC 2019): **Co-chair** of the session "Delay Systems I"

I served as a **referee** for a number of leading journals in the field of Systems and Control Theory and Applications, such as: *IEEE Transactions on Automatic Control*, *Automatica*, *Systems and Control Letters*, *Nonlinear Analysis: Hybrid Systems*, *IET Control Theory & Applications*, *SIAM Journal on Control and Optimization*, *IEEE Control Systems Letters*, *International Journal of Control*, *Hindawi Mathematical Problems in Engineering*; and for the most relevant conferences in the same fields, such as: *IFAC World Congress*, *CDC*, *ECC*, *NecSys*, *MED*, *IECON*, *POSTA*.

SUPERVISED THESIS

Supervised thesis

Bachelor theses:

- A. D'Addario, "Applicazioni alla guida autonoma del Model Predictive Control", University of L'Aquila, 2022. **Supervised.**
- M. Palumbo, "Approssimazione del massimo comun divisore tra polinomi e applicazione all'identificazione di sistemi a ciclo chiuso", University of L'Aquila, 2020. **Supervised.**
- L. Oddis, "Modello e controllo di esoscheletri" (Supervisor: Prof. C. Manes), University of L'Aquila, 2015. **Co-supervised.**
- D. Iessi, "Analisi della stabilità di sistemi positivi e di rappresentazioni internamente positive con applicazione a sistemi con ritardo" (Supervisor: Prof. C. Manes), University of L'Aquila, 2016. **Co-supervised.**
- S. Tedeschini, "Stima dello stato di sistemi lineari mediante osservatori intervallari" (Supervisor: Prof. C. Manes), University of L'Aquila, 2017. **Co-supervised.**
- D. Finocchi, "Modellazione e analisi della dinamica di reti sociali" (Supervisor: Prof. C. Manes), University of L'Aquila, 2017. **Co-supervised.**
- F. Di Felice, "Parcheggio automatico di autoveicoli con predizione di impatto" (Supervisor: Prof. C. Manes), University of L'Aquila, 2018. **Co-supervised.**
- D. Malascorta, "L'esoscheletro: generalità e simulazione applicata al modello di un arto superiore" (Supervisor: Prof. C. Manes), University of L'Aquila, 2018. **Co-supervised.**
- A. Di Francesco, "Tecniche di generazione di traiettorie in tempo reale per robot ridondanti" (Supervisor: Prof. C. Manes), University of L'Aquila, 2018. **Co-supervised.**

Master theses:

- V. Mattei, "Machine Learning methods for System Identification", University of L'Aquila, 2020. **Supervised.**
- F. Marcella, "Autonomous multi-robot coverage control" (Supervisor: Prof. C. Manes), University of L'Aquila, 2015. **Co-supervised.**
- D. Costantini, "Identificazione su sottospazi di una classe di sistemi non lineari" (Supervisor: Prof. C. Manes), University of L'Aquila, 2017. **Co-supervised.**

CERTIFICATIONS AND COURSES

Certifications and courses

- PhD school HYCON-EECI on "Hybrid Control Design" (Prof. Ricardo G. Sanfelice), L'Aquila, May 2019.
- PhD school "Model Predictive Control" (Prof. Alberto Bemporad), IMT Lucca, March-April 2019.
- PhD school "Introduction to Machine Learning" (Prof. Marcello Restelli), Gran Sasso Science Institute, L'Aquila, February 2019.
- PhD school HYCON-EECI on "Time-Delay and Sampled-Data Systems" (Proff. Emilia Fridman and Pierdomenico Pepe), L'Aquila, February 2017.
- PhD school "Formal Methods for the Control of Large-scale Networked Nonlinear Systems with Logic Specifications" (various lecturers), L'Aquila, May 2017.
- PhD summer school SIDRA 2016 "Robust and Distributed Control" (various lecturers), Bertinoro, July 2016.
- PhD English course, University Language Center (Prof. R. G. Begley), L'Aquila, March-June 2016. Acquired Level: C2.
- PhD school "Introduction to Stochastic Hybrid Dynamical Systems" (Prof. A. R. Teel), Trento, May 2016.
- PhD school HYCON-EECI on "Cyber-Physical systems control: Algebraic and Optimization techniques" (Prof. R. Jungers), L'Aquila, April 2016.
- PhD school HYCON-EECI on "Tools for nonlinear control, Lyapunov functions, positivity, applications" (Prof. F. Mazenc), L'Aquila, March 2016.
- PhD school "The LMI/BMI Approach to Optimal Control" (Prof. R. D. Braatz), Pavia, September 2015.
- MathWorks "Introductory course on Matlab and Simulink for Signal Processing", Pescara, 2009.

AUTHORIZATION TO USE DETAILS

Authorization to use details

In compliance with the Italian legislative Decree no. 196 dated 30/06/2003, I hereby authorize you to use and process my personal details contained in this document, moreover I declare the truthfulness of the information contained in this Curriculum Vitae.