


# Curriculum Vitae

## Alessia Andò

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### 1 Positions

3. 01/07/2023–present. **Postdoctoral researcher** (MAT/o8), Department of Mathematics, Computer Science and Physics, U. Udine.
2. 01/09/2021–30/06/2023. **Postdoctoral researcher** (MAT/o8), Area of Mathematics, Gran Sasso Science Institute, L'Aquila.
1. 01/09/2020–31/08/2021. **Postdoctoral researcher** (MAT/o8), Department of Mathematics, Computer Science and Physics, U. Udine.

### 2 Education background

#### 2.1 Qualifications

4. 12/03/2020. **PhD** in Computer Science, Mathematics and Physics, Università di Udine, thesis *Collocation methods for complex delay models of structured populations*, supervisor D. Breda, cum laude.
3. 16/12/2016. **Master** in High Performance Computing, SISSA/ICTP Trieste, thesis *Characterization of Generali customers as a network and profiling of its communities*, supervisor S. Cozzini, completed with merit.
2. 23/07/2014. **MSc** in Mathematics, University of Udine, thesis *The Ramsey theorem and the rainbow Ramsey theorem in second-order arithmetic*, supervisor A. Marcone, 110/110 cum laude.
1. 17/07/2012. **BSc** in Mathematics, University of Udine, thesis *Giochi di parità: una prospettiva logica*, supervisor G. D'Agostino, 110/110 cum laude.

#### 2.2 PhD education

8. 09/2019. Periodic orbits of dynamical systems - part 2 (B. Krauskopf and H. Osinga, University of Auckland, NZ).
7. 07/2019. Periodic orbits of dynamical systems - part 1 (D. Breda, University of Udine).
6. 09/2018. Medvedev and Muchnik degrees (P. Shafer, University of Leeds, UK).
5. 02/2018–05/2018. Numerical methods for differential equations (R. Vermiglio, University of Udine).
4. 11/2017. Computable analysis (V. Brattka, Technische Universität München, DE).
3. 03/2017–05/2017. Theory of distributions (F. Zanolin, University of Udine).
2. 02/2017–05/2017. Applied dynamical systems (D. Breda and R. Vermiglio, University of Udine).
1. 01/2017. Temporal Logics: Satisfiability Checking, Model Checking and Synthesis (A. Montanari, M. Reynolds, University of Western Australia, AUS).

#### 2.3 Complimentary education

4. 11/2017. Research funding opportunities, 2 hours.
3. 06/2017. Public speaking, 8 hours.
2. 02/2017–05/2017. English for academic purposes, 40 hours.
1. 02/2017. Basic workplace safety, 4 hours.

## 2.4 Schools

5. 18–23/06/2023. 18th Dobbiaco Summer School, Dobbiaco (BZ).  
Topic: **Data-driven Methods for the Computational Sciences.**  
Lecturers: N. Kutz, K. Urban.
4. 05–09/09/2022. CIME Summer School, Cetraro (CZ).  
Topic: **Mathematical modeling for epidemiology: analysis, simulation and forecasting.**  
Lecturers: T. Britton, O. Diekmann, C. Donnelly, M. Falcone.
3. 06–10/09/2021. CIME Summer School, Cetraro (CZ).  
Topic: **Recent stability issues for linear dynamical systems. Matrix nearness problems and eigenvalue optimization.**  
Lecturers: N. Gillis, N. Guglielmi, C. Lubich, V. Mehrmann, B. Vandereycken.
2. 25–29/11/2019. CISM Advanced School on **delay**, Udine (UD).  
Topic: **Controlling Delayed Dynamics: Advances in Theory, Methods and Applications.**  
Lecturers: D. Breda, T. Insperger, B. Krauskopf, W. Michiels, S. I. Niculescu, S. Verdyun Liunel.
1. 03–07/07/2017. CIME-EMS Summer School on **splines and PDEs**, Cetraro (CZ).  
Topic: **Recent advances from Approximation Theory to Structured Linear Algebra.**  
Lecturers: A. Kunoth, T. Lyche, S. Serra-Capizzano, G. Sangalli.

## 3 Research

### 3.1 Publications

12. A. ANDÒ, R. VERMIGLIO, *Exponential time integration for delay differential equations via pseudospectral discretization*, IFAC-PapersOnLine 58:27 (2024), pp. 190–195 DOI: 10.1016/j.ifacol.2024.10.322
11. A. ANDÒ, R. VERMIGLIO, *Exponential RungeKutta methods for delay equations in the sunstar abstract framework*, Discrete Contin. Dyn. Syst. Ser. B (2024). DOI: 10.3934/dcdsb.2024139.
10. A. ANDÒ, R. EDWARDS, N. GUGLIELMI, *Nonuniqueness phenomena in discontinuous dynamical systems and their regularizations*, SIAM J. Appl. Dyn. Syst. 23:2 (2024). DOI: 10.1137/23M1587488.
9. A. ANDÒ, D. BREDÀ, *Piecewise orthogonal collocation for computing periodic solutions of coupled delay equations*, App. Numer. Math., 200 (2024), pp. 58–79 DOI: 10.1016/j.apnum.2023.05.010.
8. A. ANDÒ, D. BREDÀ, *Piecewise orthogonal collocation for computing periodic solutions of renewal equations*, Adv. Comput. Math. 49:93 (2023). DOI: 110.1007/s10444-023-10094-4.
7. A. ANDÒ, S. DE REGGI, D. LIESSI, F. SCARABEL, *A pseudospectral method for investigating the stability of linear population models with two physiological structures*, Math. Biosci. Eng., 20 (2022), pp. 4493–4515, DOI: 10.3934/mbe.2023208.
6. A. ANDÒ, D. BREDÀ, D. LIESSI, S. MASET, F. SCARABEL, R. VERMIGLIO, *15 years or so of pseudospectral collocation methods for stability and bifurcation of delay equations*, in G. Valmorbida, W. Michiels and P. Pepe, eds., Accounting for Constraints in Delay Systems, Adv. Delays Dyn., Springer, Cham (2022), pp. 127–149, DOI: 10.1007/978-3-030-89014-8\_7.
5. A. ANDÒ, *Convergence of collocation methods for solving periodic boundary value problems for renewal equations defined through finite-dimensional boundary conditions*, Comp and Math Methods (2021), e1190, DOI: 10.1002/cmm4.1190.
4. A. ANDÒ, D. BREDÀ, *Convergence analysis of collocation methods for computing periodic solutions of retarded functional differential equations*, SIAM J. Numer. Anal., 58 (2020), pp. 3010–3039, DOI: 10.1137/19M1295015.
3. A. ANDÒ, D. BREDÀ, G. GAVA, *How fast is the linear chain trick? A rigorous analysis in the context of behavioral epidemiology*, Math. Biosci. Eng., 17 (2020), pp. 5059–5084, DOI: 10.3934/mbe.2020273.

2. A. ANDÒ, D. BREDÀ, F. SCARABEL, *Numerical continuation and delay equations: A novel approach for complex models of structured populations*, *Discrete Contin. Dyn. Syst. Ser. S*, 13 (2020), pp. 2619–2640, DOI: 10.3934/dcdss.2020165.
1. A. ANDÒ, D. BREDÀ, *Collocation techniques for structured populations modeled by delay equations*, in M. Aguiar, C. Braumann, B. W. Kooi, A. Pugliese, N. Stollenwerk and E. Venturino, eds., *Current Trends in Dynamical Systems in Biology and Natural Sciences*, SEMA SIMAI Springer Ser. 21, Springer, Cham (2020), pp. 43–62, DOI: 10.1007/978-3-030-41120-6.

## 3.2 Conferences

### 3.2.1 Posters

3. 10–12/04/2019. **Computing periodic solutions for complex models in population dynamics**, Italian-Romanian Colloquium on Differential Equations and Applications, U. Udine (I).
2. 03–06/02/2019. **Computing periodic solutions for complex models in population dynamics**, 10th Workshop DSABNS - Dynamical Systems Applied to Biology and Natural Sciences, U. Naples (I).
1. 23–27/07/2018. **Pseudospectral methods for the stability of periodic solutions of delay equations**, ECMTB - European Conference on Mathematical and Theoretical Biology, Lisbon (P).

### 3.2.2 Talks

21. 25–27/09/2024. **Exponential time integration for delay differential equations via pseudospectral discretization**, invited talk at session *Recent advances in the numerical treatment of time delay systems*, IFAC TDS 2024 18th IFAC Workshop on Time Delay Systems, Udine (I).
20. 29–02/08/2024. **Collocation methods for periodic boundary value problems of state-dependent delay differential equations**, invited talk at Minisymposium *Current topics in delay equations*, Dynamic Days Europe, Bremen (D).
19. 27–29/01/2024. **Metodi di integrazione esponenziali per equazioni funzionali con ritardo**, at workshop *Integrated Mathematical approaches to Socio-Epidemiological Dynamics*, Trento (I).
18. 04–09/09/2023. **Numerical computation of periodic solutions of renewal and delay differential equations**, invited talk at Minisymposium *S10: Sistemi dinamici e metodi numerici per le equazioni differenziali*, XXII UMI Conference, Pisa (I).
17. 18–19/05/2023. **Numerical investigation of the stability of two-structured linear population models: the method**, at Workshop MSE - Modellistica Socio-Epidemiologica, Napoli (I).
16. 27–30/09/2022. **On the numerical computation of periodic solutions of renewal and delay differential equations**, invited talk at Minisymposium *Numerical methods for time delay systems* IFAC TDS 2022 17th IFAC Workshop on Time Delay Systems, Montréal (CA).
15. 25–29/07/2022. **On the computation of periodic solutions of delay equations through piecewise orthogonal collocation**, invited talk at Minisymposium *Numerical Advances in Differential Equations* SciCADE 2022 International Conference on Scientific Computation and Differential Equations, University of Iceland, Reykjavík (IS).
14. 05–08/07/2022. **Convergence of the piecewise orthogonal collocation for periodic solutions of delay equations**, invited talk at Minisymposium *Numerical Advances in Differential Equations* FAATNA 20>22 Functional Analysis, Approximation Theory and Numerical Analysis, Matera (I).
13. 27–29/06/2022. Invited talk **Continuazione numerica di orbite periodiche di sistemi con ritardo e applicazioni**, Convegno del Gruppo Nazionale di Calcolo Scientifico, Montecatini Terme (I).

12. 07–10/06/2022. **Numerical investigation of the stability of two-structured linear population models**, eleventh Strucutral Dynamical Systems: Computational Aspects (SDS 2022) meeting, Rosa Marina (I).
11. 26–27/05/2022. **Convergence of the piecewise orthogonal collocation for periodic solutions of delay equations**, First UMI meeting of Ph.D. students at 100 UMI - 800 UniPD, Padova (I).
10. 07–09/07/2021. **Convergence of the piecewise orthogonal collocation for periodic solutions of retarded functional differential equations**, invited talk at Minisymposium *Recent advances in time numerical integration of evolutive problems* YIC 2021 VI ECCOMAS Young Investigators Conference.
9. 12–15/10/2020. **Pseudospectral methods for the stability of linear periodic delay models**, invited talk at Minisymposium *Young researchers in numerics for evolutionary problems* ADENA 2020 International Conference on Advances in Differential Equations and Numerical Analysis.
8. 01–02/10/2020. Invited talk **Pseudospectral methods for the stability of linear periodic delay models**, Online Delay Days, HasseltUtrechtBerlin.
7. 23–25/01/2020. **Periodicity, delays and numerical methods in biomathematics: a recent account**, STRUCTAPP workshop, L’Aquila (I).
6. 17–21/06/2019. Contributed talk **Convergence analysis of collocation methods for the computation of periodic solutions of delay systems**, 11th QTDE Colloquium on the Qualitative Theory of Differential Equations, Szeged (H).
5. 21–23/11/2018. Contributed talk **Collocation methods for the computation of periodic solutions of complex delay systems**, 2nd DECOD Workshop Delays and Constraints in Distributed Parameter Systems, Toulouse (F).
4. 27–29/08/2018. Invited talk **Collocation methods for the computation of periodic solutions of complex delay systems**, LIAM-IRC-MfPH Symposium - Structured population models: Theory, Numerics and Applications, Toronto (CDN).
3. 28–30/06/2018. Contributed talk **Improving numerical continuation for complex delay models of structured populations**, 14th IFAC Workshop on Time Delay Systems, Budapest (H).
2. 07–09/02/2018. Contributed talk **Improving numerical continuation for complex delay models of structured populations**, 9th workshop DSABNS Dynamical Systems Applied to Biology and Natural Sciences, U. Torino (I).
1. 11–15/09/2017. **Pseudospectral methods for the stability of linear periodic delay models**, invited talk in Minisymposium *Numerics, dynamics and models of delay equations* at SciCADE 2017 International Conference on Scientific Computation and Differential Equations, U. Bath (UK).

### 3.2.3 Organization of conferences and conference sessions

- 18th IFAC Workshop on Time Delay Systems, U. Udine (I), 24–27 September 2024, session *Software tools for delay equations*, co-organizer Davide Liessi. Member of the International program committee and of the Local organising committee for the conference.

### 3.3 Visits

3. 26/05/2024–01/06/2024. Visit to Jan Sieber, University of Exeter (UK).  
Topic: **Periodic solutions of state-dependent delay differential equations.**
2. 15/09/2019–14/11/2019. Visit to Alberto D’Onofrio, iPRI (Dardilly, France).  
Topic: **Models and numerical methods for Behavioral Epidemiology.**
1. 26/08/2018–01/09/2018. Visit to Jianhong Wu, York University (Toronto, Canada).  
Topic: **Structured population models.**

### 3.4 Projects

10. **MONDI – Modellistica numerica e data-driven per innovazione sostenibile** (U. Udine, MUR DM 737, NextGeneration EU, CUP G25F21003390007), principal investigator Dimitri Breda (U. Udine), member.
9. **GNCS 2024: Analisi numerica di problemi di evoluzione complessi: stabilità, conservazione e tecniche data-driven**, coord. C. Scalone (U. L'Aquila), member.
8. **PRIN 2020 (No. 2020JLWP23): Integrated Mathematical Approaches to Socio-Epidemiological Dynamics**, (Unit of Udine, CUP: G25F22000430006), principal investigator Andrea Tosin (U. Torino), member.
7. **GNCS 2023: Sistemi dinamici e modelli di evoluzione: tecniche funzionali, analisi qualitativa e metodi numerici**, coord. F. V. Difonzo (U. Bari), member.
6. **Finanziamento GNCS Giovani Ricercatori 2020/2021: Approssimazione numerica e continuazione di orbite periodiche di sistemi con ritardo e applicazioni alla dinamica di popolazioni**, grant recipient.
5. **GNCS 2020: Analisi numerica di sistemi evolutivi complessi**, coord. D. Breda (DMIF, U. Udine), member.
4. **GNCS 2019: Problemi di evoluzione e loro discretizzazione: questioni di stabilità lineare e non lineare**, coord. R. D'Ambrosio (U. L'Aquila), member.
3. **GNCS 2018: Approssimazione numerica di problemi di evoluzione: aspetti deterministici e stocastici**, coord. R. D'Ambrosio (U. L'Aquila), member.
2. **PRID 2017: Sistemi Dinamici e Applicazioni**, coord. F. Zanolin (DMIF, U. Udine), member.
1. **GNCS 2017: Analisi e sviluppo di metodologie numeriche per certi tipi non classici di sistemi dinamici**, coord. S. Maset (U. Trieste), member.

### 3.5 Seminars

5. 29/05/2024. **Nonuniqueness phenomena in discontinuous dynamical systems and their regularizations**, Department of Mathematics and Statistics, U. Exeter (UK).
4. 13/01/2022. **Limit solution of regularized piecewise-smooth dynamical systems**, Computational Dynamics Laboratory (CDLab), U. Udine.
3. 07/01/2021. **Periodic boundary value problems for renewal equations defined through finite-dimensional boundary conditions**, Computational Dynamics Laboratory (CDLab), U. Udine.
2. 22/02/2019. **Two BVP formulations for periodic solutions of DDEs**, Computational Dynamics Laboratory (CDLab), U. Udine.
1. 23/02/2018. **Collocation methods for complex delay models of structured populations**, Computational Dynamics Laboratory (CDLab), U. Udine.

### 3.6 Other

- 07/2021. Recipient of postdoctoral Grant from **GNCS – Gruppo Nazionale per il Calcolo Scientifico** <https://www.altamatematica.it/gncs/>. Needed to decline due to incompatibility with postdoctoral position at **GSSI – Gran Sasso Science Institute**.
- 12/2017–present. Member of **CDLab – Computational Dynamics Laboratory** <http://cdlab.uniud.it/> (DMIF, U. Udine).
- 01/2017–present. Member of **GNCS – Gruppo Nazionale per il Calcolo Scientifico** <https://www.altamatematica.it/gncs/>.
- 11/2019–07/2020. Percorso formativo 24 CFU (D.M.616/2017), U. Udine (I), courses: Pedagogia speciale (L. Cottini), Didattica dell'inclusione (D. Fedeli), Psicologia generale (A. Marini), Psicologia dello sviluppo e dell'educazione (C. Urgesi).

- Programming oriented to Numerical Analysis: skills in **MATLAB/Octave** acquired during MSc and PhD courses, skills in **Python** acquired during the Master in HPC.
- Other programming experience: **C, C++**, parallel programming with **OpenMP, MPI, CUDA**.

## 4 Teaching

### 4.1 Advanced teaching

- 07/2024. *Exponential integration methods*, PhD in Computer Science, Mathematics and Physics, U. Udine, 3 hours.
- 11/2023. **Laboratory sessions** for the advanced course *Delays and structures in dynamical systems: Modeling, analysis and numerical methods* in collaboration with Davide Liessi and Tedi Ramaj, CISM – International Centre for Mechanical Sciences, Udine, 5 hours.
- 04–05/2021. *Dynamical systems*, SUPE and PhD in Computer Science, Mathematics and Physics, U. Udine, 2 hours.

### 4.2 Other

- 03–06/2024. *Mathematics*, BSc in Architectural Sciences, U. Udine, 40 hours.
- 03–06/2021. **Teaching assistant for *Mathematical Analysis II***, BSc in Industrial Engineering for Environmental Sustainability, U. Udine, 25 hours.
- 12/2019–08/2020. **High school teacher of *Mathematics and Physics***, I.S.I.S. Paschini-Linussio, Tolmezzo (I).
- 03–05/2019. **Teaching assistant for *Introduction to MATLAB***, complimentary course for BSc and MSc in Engineering, U. Udine, 20 hours.
- 03–05/2019. **Teaching assistant for *Scientific computing***, BSc in Computer science, U. Udine, 8 hours.
- 10–12/2018. **Introduction to MATLAB for *Approximation theory and methods***, MSc in Mathematics, U. Udine, 6 hours.
- 10–12/2017. **Teaching assistant for *Scientific computing***, BSc in Computer science, U. Udine, 8 hours.
- 10–12/2017. **Introduction to MATLAB for *Approximation theory and methods***, MSc in Mathematics, U. Udine, 8 hours.

## 5 Language skills

Italian	Native
<b>English</b>	<b>C2</b> (Cambridge 2023)
French	B2 (DELF 2024)
German	B1
Spanish	A2
Danish	Basic reading and writing
Dutch	Basic reading and writing