

VERSION Full – December 14, 2023

PERSONAL INFORMATION **Dimitri BREDÀ**

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Gender male | Date of birth 9 October 1974

Nationality italian



POSITIONS AND EDUCATION

December 2017 – today **founder and head of CDLab – Computational Dynamics Laboratory**

Department of Mathematics, Computer Science and Physics – University of Udine

link <http://cdlab.uniud.it/>

national scientific habilitation **Full Professor**

scientific area 01/A5 Numerical Analysis

since 28 March 2017

indicators papers 29/11, citations 491/110, *h*-index 11/7

December 2016 – today **Associate Professor**

Department of Mathematics, Computer Science and Physics – University of Udine

scientific sector MAT/08 Numerical Analysis

since 1 December 2016

national scientific habilitation **Associate Professor**

scientific area 01/A5 Numerical Analysis

since 16 December 2013

indicators norm. papers 22/14, norm. citations 22.91/6.06, *h*-index 7/4

October 2007 – November 2016 **Assistant Professor**

Department of Mathematics and Computer Science – University of Udine

scientific sector MAT/08 Numerical Analysis

since 23 October 2007

confirmed on 23 October 2010

March 2006 – October 2007 **Post-Doc fellow**

Department of Mathematics – University of Trento

scientific sector MAT/08 Numerical Analysis

supervisor Mimmo IANNELLI

title Modellizzazione e analisi di popolazioni strutturate

December 2004 – November 2005 **Post-Doc fellow**
 Department of Mathematics and Computer Science – University of Trieste
scientific sector MAT/08 Numerical Analysis
supervisor Stefano MASET
title Trattamento numerico di modelli differenziali con ritardo

December 2003 – November 2004 **Post-Doc fellow**
 Department of Mathematics and Computer Science – University of Udine
scientific sector MAT/08 Numerical Analysis
supervisor Rossana VERMIGLIO
title Metodi numerici per lo studio della stabilità di sistemi differenziali con ritardo ed applicazioni

2000–2003 **PhD in Computational Mathematics**
 University of Padua
cycle XVI
scientific sector MAT/08 Numerical Analysis
supervisor Rossana VERMIGLIO
co-supervisor Stefano MASET
thesis Numerical computation of characteristic roots for delay differential equations
defended on 5 February 2004

1993-1998 **Laurea in Mechanical Engineering (MSc)**
 University of Udine
specialization energetics
thesis Analisi di stabilità e simulazione di un sistema di compressione industriale con controllo attivo del pompaggio
advisor Pietro GIANNATTASIO
co-advisor Franco BLANCHINI
defended on 17 December 1998
final evaluation 110/110 cum laude

1988-1993 **Istituto Tecnico Industriale**
 I.T.I.S. "A. Malignani", Udine
specialization aeronautics
final evaluation 60/60

SCIENTIFIC INDICATORS

scopus	documents	65	<i>h-index</i>	19	total citations	1249	most cited	221	
	WOS	documents	66	<i>h-index</i>	17	total citations	1079	most cited	180
Google Scholar	documents	98	<i>h-index</i>	23	total citations	2153	most cited	325	
national scientific habilitation	simulation based on 2008/2013/2018-2023 (personal/required)								
	full professor:	<i>papers</i>	27/13	<i>citations</i>	732/160	<i>h-index</i>	16/7		
	commissioner:	<i>papers</i>	27/22	<i>citations</i>	732/405	<i>h-index</i>	16/12		

simulation based on 2009/2014/2019-2024 (personal/required)

full professor:	papers 26/13	citations 707/160	h-index 15/7
commissioner:	papers 26/22	citations 707/160	h-index 15/12

RESEARCH

summary Carried out mostly in the area of numerical analysis and computational mathematics, especially related to dynamical systems, it extends to nonlinear and functional analysis with main applications in population dynamics and control engineering. Most recently oriented also to data-driven and deep-learning techniques, as well as to the numerical analysis of stochastic delay equations.

main lines

- reduction of infinite dimensional dynamical systems (functional evolution equations) to finite dimensional dynamical systems (ordinary differential equations) through collocation techniques: theoretical implications and use of the approximating system for stability and bifurcation analysis;
- analysis and numerical computation of characteristic values and other stability indicators (e.g., Lyapunov exponents) for complex functional equations (differential or not; with autonomous, periodic or generic coefficients, retarded, neutral or mixed): structured population dynamics, epidemiological models, partial differential equations of evolution type, problems with stochastic delays;
- development of efficient methods and relevant software for analyzing stability of equilibria, periodic orbits, chaotic attractors and computing bifurcation diagrams and stability maps; efficient continuation techniques for complex models;
- theoretical analysis of the locus of characteristic roots in the complex plane for functional equations and relevant implications on the dynamics;
- numerical approximation of R_0 as spectral radius of infinite-dimensional operators for structured and retarded models in population dynamics;
- Floquet theory and Poincaré maps for dynamical systems generated by functional equations of differential and renewal type; numerical computation of periodic solutions and Floquet multipliers;
- deep interest in the dynamical analysis of biological models and systems biology in general;
- combination of numerical collocation with data-driven and deep-learning techniques to analyze the dynamics of delay equations and structured populations;
- numerical techniques for stochastic delay equations: time-integration, stability and bifurcation analysis, data-driven approaches for investigating models in view of sustainable innovation.

projects indicated by “type, funding entity and period: **title**, coordinator (coordinator affiliation)”

national funded

1. DM 737 Univ. Udine 2023: **MOdellistica Numerica e Data-driven per l’Innovazione sostenibile – MONDI**, D. Breda (Univ. Udine);
2. GNCS 2023: **Sistemi dinamici e modelli di evoluzione: tecniche funzionali, analisi qualitativa e metodi numerici**, F. Difonzo (Univ. Bari);
3. GNCS 2022: **Metodi numerici avanzati per l’analisi di sistemi dinamici**, D. Breda (Univ. Udine);
4. PRIN 2020: **Integrated Mathematical Approaches to Socio-Epidemiological Dynamics**, A. Tosin (Pol. Torino)
5. GNCS 2020: **Analisi numerica di sistemi evolutivi complessi**, D. Breda (Univ. Udine);
6. GNCS 2019: **Problemi di evoluzione e loro discretizzazione: questioni di stabilità lineare e non lineare**, R. D’Ambrosio (Univ. L’Aquila);
7. GNCS 2018: **Approssimazione numerica di problemi di evoluzione: aspetti deterministici e stocastici**, R. D’Ambrosio (Univ. L’Aquila);

8. proposer PRID 2017: **Sistemi Dinamici e Applicazioni**, F. Zanolin, Univ. Udine;
9. GNCS 2017: **Analisi e sviluppo di metodologie numeriche per certi tipi non classici di sistemi dinamici**, S. Maset (Univ. Trieste);
10. local coordinator PRIN 2015 proposal: **Innovative methods in the analysis of epidemic models and data**, A. Pugliese (Univ. Trento);
11. GNCS 2016: **Analisi numerica di certi tipi non classici di equazioni di evoluzione**, S. Maset (Univ. Trieste);
12. GNCS 2015: **Analisi numerica di sistemi dinamici infinito-dimensionali e non regolari**, N. Guglielmi (Univ. L'Aquila);
13. Spanish Internship 2014 for J. Sánchez Sanz (BCAM Bilbao), D. Breda (Univ. Udine);
14. GNCS 2014: **Analisi numerica di problemi differenziali infinito-dimensionali e discontinui**, N. Guglielmi (Univ. L'Aquila);
15. GNCS 2013: **Metodi numerici per sistemi evolutivi: equazioni funzionali infinito dimensionali ed equazioni differenziali discontinue**, N. Guglielmi (Univ. L'Aquila);
16. GNCS 2011: **Simulazione numerica di equazioni integrali funzionali di Volterra con ritardo con applicazioni ai modelli di dinamica di popolazione**, R. Vermiglio (Univ. Udine);
17. GNCS 2010: **Metodi numerici e stabilità di equazioni differenziali funzionali**, M. Zennaro (Univ. Trieste);
18. GNCS - Giovani Ricercatori 2009: **Calcolo degli esponenti di Lyapunov per equazioni differenziali con ritardo**, D. Breda (Univ. Udine);
19. Third-party convention: **Tecniche di simulazione numerica e virtualizzazione nella progettazione di stampi per materiali a base polimerica**, F. Blanchini (Univ. Udine);
20. GNCS - Giovani Ricercatori 2008: **Calcolo degli esponenti di Lyapunov per equazioni differenziali con ritardo**, D. Breda (Univ. Udine);
21. MIUR/PRIN 2007: **Metodi numerici per sistemi evolutivi di equazioni differenziali funzionali ordinarie ed alle derivate parziali**, A. Bellen (Univ. Trieste);
22. FIRB 2004: **Metodi dell'analisi matematica in biologia, medicina e ambiente**, E. Beretta (Univ. Urbino);
23. MIUR/PRIN 2004: **Metodi numerici per equazioni differenziali funzionali**, M. Zennaro (Univ. Trieste);
24. Intergruppo INdAM 2004: **Metodi numerici e software matematico per problemi di evoluzione**, M. Zennaro (Univ. Trieste);
25. Intergruppo INDAM 2004 **Integrazione di Sistemi Complessi in biomedicina: modelli, simulazione, rappresentazione**, A. Quarteroni (Polit. Milano - EPFL);
26. GNCS 2003: **Problematiche di interfacciamento tra metodologie numeriche per equazioni differenziali ordinarie e equazioni alle derivate parziali**, M. Zennaro (Univ. Trieste);
27. Intergruppo INdAM 2003: **Metodi e modelli matematici nella dinamica di popolazione**, M. Iannelli (Univ. Trento).

international funded

1. SPADISCO 2016 (F) **Systèmes à Paramètres Distribués avec Contraintes**, CNRS International Research Network, G. Valmorbida (L2S, CentraleSupélec) – local coordinator;

unfunded proposals

1. PRIN 2022: **Stochastic numerical modelling for sustainable innovation**, R. D'Ambrosio (Univ. L'Aquila): positively evaluated but not funded;
2. FISR 2020 (I): **ICAR0: Interface for Computing and Analyzing R0**, D. Breda (Univ. Udine);
3. ERC 2017 (NL): **Delay Equations: Theory, Tools and Applications – DETTA**, O. Diekmann (Univ. Utrecht);
4. PRIN 2017: **Analysis of disease dynamics through structured population models**, A. Pugliese (Univ. Trento);
5. NSF 2015 (USA) **Approximation of Infinite Dimensional Dynamics**, E. Van Vleck (Univ. Kansas);
6. FIRB 2010 (I): **Pi-Square: Software for the Qualitative-Quantitative Stability analysis of Population dynamics**, D. Breda (Univ. Udine);
7. GALILEO 2009 (I-F) **Simulation of complex systems in ecology and epidemiology**, M. Iannelli (Univ. Trento), M. Langlais (Univ. Bordeaux 2);
8. TOP GO 2009 (NL) **The interplay within-host immunology and population-level transmission of infectious disease**, O. Diekmann (Univ. Utrecht);

9. PIRE 2009 (USA) **Controlling multi-scale delay-critical engineered and biological networks**, R. Sipahi (Northeastern Univ.);
10. STREP 2007 (UE) **DELIS - Delays in interconnected systems**, S.-I. Niculescu (Univ. Paris Sud 11).

current research groups indicated by “*name* (affiliation, **coordinator**), with members” (note: see also “memberships” for larger groups and societies)

1. *CDLab – Computational Dynamics Laboratory* (Univ. Udine, **D. Breda**), with A. Andò, E. Bozzo, S. De Reggi, D. Liessi, S. Maset, F. Scarabel, M. Tanveer, R. Vermiglio;
2. *Metodi numerici per equazioni differenziali e sistemi dinamici* (Univ. Udine, **R. Vermiglio**), with A. Andò, S. De Reggi, D. Liessi, M. Tanveer, R. Vermiglio;
3. *Sistemi dinamici e applicazioni* (Univ. Udine, **F. Blanchini**), with A. Andò, D. Dikranjan, S. De Reggi, G. Feltrin, A. Giordano Bruno, G. Gorni, D. Liessi, G. Panti, D. Papini, M. Tanveer, R. Toader, R. Vermiglio, F. Zanolin;
4. *GNCS 2023 Sistemi dinamici e modelli di evoluzione: tecniche funzionali, analisi qualitativa e metodi numerici* (Univ. Bari, **F. Difonzo**), with A. Andò, E. Bozzo, R. D’Ambrosio, N. Del Buono, S. Di Giovacchino, C. Elia, F. Esposito, A. Farooq, N. Guglielmi, D. Liessi, L. Lopez, S. Maset, A. Pugliese, F. Scarabel, R. Vermiglio.

collaborations indicated by “period: venue, possible collaborator(s) (collaborator affiliation(s), subject), **title** of possible seminar (by myself if outgoing, by guest otherwise)”

1. 17/01/23: CRO (Aviano), R. Spizzo, S. Franceschi (CRO), M. Piana (Univ. Genova, medical imaging), **Presentation of CDLab**;
2. 25/11/22: Department of Mathematics, Universität Klagenfurt (Austria), C. Pötzsche (dynamical systems), **An overview of numerical methods for infinite-dimensional dynamical systems from delay equations**;
3. 15-17/11/22: Department of Mathematics, Computer Science and Physics, Univ. Udine (I), R. D’ambrosio (Univ. L’Aquila, stochastic delay differential equations);
4. 26/04/21: Department of Mathematics, Computer Science and Physics, Univ. Udine (I), G. Rozza (SISSA, model order reduction), **Metodi di riduzione computazionale in fluidodinamica numerica: stato dell’arte e sviluppi verso applicazioni industriali**;
5. 08/11/19: Department of Mathematics, Computer Science and Physics, Univ. Udine (I), M. Nonino (SISSA, model order reduction), **Overcoming slowly decaying Kolmogorov n-width by transport maps: application to model reduction of fluid dynamics and fluid-structure interaction problems**;
6. 09-13/09/19: Department of Mathematics, Computer Science and Physics, Univ. Udine (I), B. Krauskopf, H. Osinga (Univ. Auckland, delay equations, dynamical systems, numerical continuation and bifurcation), **A space-filling pancake in crochet and steel**, “i mercoledì del DMIF”;
7. 04/07/19: Department of Mathematics, Computer Science and Physics, Univ. Udine (I), F. Scarabel (Univ. York, pseudospectral reduction of nonlinear delay equations), **Back to ODE: a numerical approach for periodic solutions of delay equations**;
8. 25/08-01/09/18: Department of Mathematics and Statistics, Univ. York (Toronto, Canada), J. Wu (applications of delay differential and renewal equations to population dynamics and infectious diseases);
9. 26-27/07/18: Department of Mathematics, Computer Science and Physics, Univ. Udine (I), J. Wu (Univ. York, applications of delay differential and renewal equations to population dynamics and infectious diseases), **Estimating the spectrum of the Poincaré map of delay equations with periodic development delays: models, threshold dynamics and vector-borne disease risk prediction**, “i mercoledì del DMIF”;
10. 06-11/05/18: Department of Mathematics, Computer Science and Physics, Univ. Udine (I), J. Ripoll (Univ. Girona, computation of the basic reproduction number in population dynamics), **Asymptotic behaviour of ecological models: reproduction number vs Malthusian parameter**;
11. 21-26/04/17: Department of Mathematics, Univ. Utrecht (The Netherlands), O. Diekmann, S. Verduyn-Lunel, (delay differential and renewal equations, their evolution operators and characteristic equations);
12. 17-18/11/16: Department of Mathematics, Univ. Trento, M. Iannelli, A. Pugliese (population dynamics), **Looking into the dynamics of structured populations**;

13. 15-19/05/16: Department of Mathematics, Univ. Utrecht (The Netherlands), O. Diekmann, S. Verduyn-Lunel, Y. Kuznetsov, M. Gyllenberg, H. Metz (retarded differential and renewal equations and relevant methods for the study of population dynamics);
14. 29/02-02/03/16: Department of Mathematics and Applications, Univ. Napoli Federico II (I), B. Buonomo (models and methods of behavioral epidemiology), **Looking into the dynamics of structured populations;**
15. 11/05-31/07/15: Department of Mathematics and Computer Science, Univ. Udine (I), F. Scarabel (Univ. Helsinki, discretization of nonlinear retarded functional equations and population dynamics);
16. 15-19/12/14: Department of Mathematics and Computer Science, Univ. Udine (I), F. Scarabel (Univ. Helsinki, discretization of nonlinear retarded functional equations and population dynamics);
17. 01/09-30/11/14: Department of Mathematics and Computer Science, Univ. Udine (I), J. Sánchez Sanz (BCAM Bilbao, computation of eigenvalues for linear retarded functional equations, both differential and not);
18. 01-31/07/14: Department of Mathematics and Computer Science, Univ. Udine (I), F. Scarabel (Univ. Helsinki, discretization of nonlinear retarded functional equations and population dynamics);
19. 10-11/04/14: Department of Mathematics and Computer Science, Univ. Udine (I), O. Diekmann (Univ. Utrecht, delay differential equations and population dynamics);
20. 03-14/09/13: Department of Mathematics and Computer Science, Univ. Udine (I), J. Sánchez Sanz (BCAM Bilbao, computation of eigenvalues for linear retarded functional equations, both differential and not);
21. 18-30/03/12: Department of Mathematics, Univ. Utrecht (The Netherlands), O. Diekmann (delay differential equations and population dynamics), **Computing Lyapunov exponents for systems with delay;**
22. 17-22/05/11: Department of Mathematics, Kansas Univ. (Lawrence, Kansas), E. Van Vleck (computation of Lyapunov exponents for delay differential equations), **Numerics for stability analysis of delay systems and population dynamics;**
23. 19-22/11/08: School of Mathematics, GeorgiaTech (Atlanta, Georgia), L. Dieci (computation of Lyapunov exponents for delay differential equations);
24. 9-19/11/08: Department of Mathematics, Kansas Univ. (Lawrence, Kansas), E. Van Vleck (computation of Lyapunov exponents for delay differential equations), **On computing the spectrum of mixed-type functional differential equations;**
25. 02/05/07: Dipartimento di Matematica, Univ. Trento (I), M. Iannelli (population dynamics), **Delay, population and population with delay: robust approaches to asymptotic stability;**
26. 28/12/05: Dipartimento di Matematica e Informatica, Univ. Trieste, S. Maset (discussion research fellowship), **Pseudospectral techniques for stability computation of linear time delay systems;**
27. 18-24/09/05: Mechanical Engineering Department, Univ. of Connecticut (Storrs, Connecticut), N. Olgac (delay models, robust asymptotic stability of steady states and efficient determination of stability charts), **Pseudospectral approximation of eigenvalues of derivative operators with non-local boundary conditions and Linear time delay systems: from characteristic roots to stability charts;**
28. 14-30/04/05: Department of Mathematics and Statistics, McGill Univ. (Montreal), A.R. Humphries (nonlinear discrete Shroedinger equations, asymptotic stability of travelling waves solutions, retarded-advanced equations), **Linear time delay systems: from characteristic roots to stability charts and Pseudospectral approximation of eigenvalues of derivative operators with non-local boundary conditions;**
29. 08-09/03/05: Dipartimento di Matematica, Univ. Trento, M. Iannelli and C. Cusulin (age-structured populations dynamics, asymptotic stability of steady states);
30. 11/08-05/09/03: Department of Computer Science, K.U. Leuven (Leuven), D. Roose, T. Luzyanina and K. Verheyden (numerical approximation of characteristic roots and multipliers for delay differential equations), **Infinitesimal generator approximation for the computation of characteristic roots for DDEs and Use of pseudospectral differencing methods for the discretization of the solution operator semigroup of linear DDEs.**

Besides those above cited, past and current scientific collaborations are mentioned with Andò A. (Univ. Udine), Beretta E. (CIMAB, Univ. Milano), Blanchini F. (Univ. Udine), Bozzo E. (Univ. Udine), Conte D. (Univ. Salerno), Conzatti F. (Univ. Udine), D'Ambrosio R. (Univ. L'Aquila), De Graaf W. (Univ. Utrecht), De Reggi S. (Univ. Udine), Demo N. (SISSA), Esseni D. (Univ. Udine), Florian F. (Univ. Zurich), Franceschetti A. (Univ. Trento), Gava G. (Univ. Udine), Getto P. (Univ. Dresden), Giordano G. (Univ. Trento), Gyllenberg M. (Univ. Helsinki), Ji X. (Univ. Michigan), Kuniya T. (Univ. Kobe), Liessi D. (Univ. Udine), Liu S. (Harbin Inst. Tech.), Maset S. (Univ. Trieste), Menegon G. (Univ. Udine), Michiels W. (K.U.Leuven), Nakata Y. (BCAM), Nazzi F. (Univ. Udine), Orosz G. (Univ. Michigan), Palestri P.P. (Univ. Udine), Pausa A. (Univ. Udine), Pecile A. (Univ. Udine), Pugliese A. (Univ. Trento), Ripoll J. (Univ. Girona), Rozza G. (SISSA), Sadeghpour M. (Univ. Michigan), Santaniello I. (Univ. Salerno), Selmi L. (Univ. Udine), Sipahi R. (Northeastern Univ.), Specogna R. (Univ. Udine), Tanveer, M (Univ. Udine), Tezzele M. (Austin, Texas), Trevisan F. (Univ. Udine), Vermiglio R. (Univ. Udine), Visetti D. (Univ. Trento).

- conferences attended indicated by “congress type (I=International, N=National, C=Conference, W=Workshop) period, **congress title** (venue)”
1. IW 20/05-01/06/23, **Math 2 Product – M2P** (Taormina);
 2. NW 18-19/05/23, **Modellistica Socio-Epidemiologica** (Napoli);
 3. IW 26/10/20, **Virtual Thematic Workshop in Math Sciences: Nonlinear Dynamical Systems and Delay Equations** (zoom);
 4. IW 1-2/10/20, **Online Delay Days** (meet);
 5. NC 22/06/20, **Modellistica e Covid-19 Giornata di studio online** (zoom);
 6. NW 20/11/19, **Workshop on Joint Spectral Radius** (Udine);
 7. IW 8-11/11/16, **Numerical Analysis of Evolution Equations** (Innsbruck);
 8. NW 29/05/15, **Mini Workshop on Dynamical Systems** (Udine);
 9. IW 15-19/04/13, **Mathematics and Biology: a Roundtrip in the Light of Suns and Stars** (Leiden);
 10. IW 06-09/09/10, **Dolomites Research Week on Approximation** (Alba di Canazei).
 11. NW 27-28/09/07, **Workshop on Topics in dynamical systems** (Udine);
 12. IW 20-23/10/04, **Workshop on Exponential Integrators** (Innsbruck);
 13. IW 08-10/09/04, **5th IFAC Workshop on Time Delay Systems** (Leuven);
 14. IW 10/06/04, **Seminar on Numerical Analysis and Geometric Integration** (Ljubljana);
 15. NC 09-11/02/04, **Convegno Nazionale GNCS** (Montecatini Terme);
 16. IW 08-12/09/03, **Delay equations and their applications** (Bristol);
 17. IW 22-24/01/03, **CNRS-NSF workshop on Advances in time-delay systems** (Paris);
 18. IW 01-04/07/01, **Structural dynamical systems in linear algebra and control, computational aspects** (Capitolo);
 19. IW 05-06/02/01, **High performance scientific computing** (Bologna).
- contributed indicated by “congress type (I=International, N=National, C=Conference, W=Workshop) contribution type (CT=Contributed Talk, IT=Invited Talk, IS=Invited Speaker, CP=Contributed Poster, ITU=Invited TUtorial, IP=Interatcive Paper) period, **congress title** (venue) in possible MS=minisymposium, SS=special session: *contribution title*”
1. NC IT 14-16/09/23, **Seminario Nazionale dei Licei Matematici** (Fisciano): *Dalla bisezione ai frattali di Newton*;
 2. NC IT 04-09/09/23, **XXII Congresso U.M.I.** (Pisa) in SS “S10 Sistemi dinamici e metodi numerici per le equazioni differenziali”: *tecniche data-driven per equazioni differenziali con ritardo*;
 3. NW IT 13/03/23, **Datascience meetup** (CRO Aviano): *numerical analysis of population dynamics*;
 4. IW IT 27-30/09/22, **17th IFAC Workshop on Time Delay Systems** (Montreal): *data-driven methods for delay differential equations*;
 5. IW IT 05-08/07/22, **FAATNA** (Matera): *numerical computation of R_0* ;
 6. NC IT 27-29/06/22, **Convegno Nazionale GNCS** (Montecatini Terme): *analisi numerica di sistemi evolutivi complessi*;

7. NW IT 06-08/04/22, **CALCOLO SCIENTIFICO E MODELLI MATEMATICI: alla ricerca delle cose nascoste attraverso le cose manifeste** (Roma): *numerical computation of the basic reproduction number*;
8. IW IT 22-26/11/21, **DElay and COstraints in Distributed parameter systems** (Gif-sur-Yvette): *computational approaches for periodic solutions of time delay systems and their stability: an experimental comparison*;
9. IW CT 03/05/21, **Italy meets Switzerland @CDLab** (online): *CDLab: a dynamical systems approach*;
10. IW CT 04-07/02/20, **Eleventh Workshop on Dynamical Systems Applied to Biology and Natural Sciences** (Trento): *periodicity, delays and numerical methods in biomathematics: a recent account*;
11. NW IT 23-24/01/20, **A two-day workshop on structure-preserving approximation of evolutive problems and applications** (L'Aquila): *periodicity, delays and numerical methods in biomathematics: a recent account*;
12. NW IT 02-07/09/19, **XXI Congresso U.M.I.** (Pavia) in SS "Sistemi dinamici e metodi numerici per le equazioni differenziali": *Sulle orbite periodiche di sistemi dinamici su spazi di Banach*;
13. IW IT 17-21/06/19, **11th colloquium on the qualitative theory of differential equations** (Szeged): *stability of periodic solutions of renewal equations*;
14. IW CT 03-06/02/19, **Tenth Workshop on Dynamical Systems Applied to Biology and Natural Sciences** (Napoli): *How fast is the linear chain trick?*;
15. IW IT 28-30/06/18, **14th IFAC Workshop on Time Delay Systems** (Budapest): *Pseudospectral approximation of characteristic roots and multipliers: how multiplicities affect convergence* - MS "Spectral Methods for Rightmost Roots in LTI Time Delay Systems";
16. IW CT 28-30/06/18, **14th IFAC Workshop on Time Delay Systems** (Budapest): *Delay in population dynamics: challenges and opportunities* - organizer MS "Numerical analysis for delay equations in population dynamics";
17. NC CT 14-16/02/18, **Convegno Nazionale GNCS** (Montecatini Terme): *Metodi numerici per l'analisi di stabilità di popolazioni strutturate*;
18. IW CT 07-09/02/18, **Ninth Workshop on Dynamical Systems Applied to Biology and Natural Sciences** (Torino): *Improving numerical continuation for complex delay models of structured populations*;
19. IW CT 07-09/02/18, **Ninth Workshop on Dynamical Systems Applied to Biology and Natural Sciences** (Torino): *Pseudospectral methods for delay equations in population dynamics*;
20. NW IT 05-07/02/18, **Workshop on Dynamical Systems** (Udine): *Numerical methods for infinite-dimensional dynamical systems from delay equations: a survey on the activities of the CDLab*;
21. IW IT 22-24/11/17, **DElay and COstraints in Distributed parameter systems** (Gif-sur-Yvette): *15 years or so of pseudospectral methods for delay equations*;
22. IC CT 11-15/09/17, **SciCADE** (Bath) in MS "Numerics, dynamics and models of delay equations" *Delay equations and characteristic roots: stability (and more) from a single curve*;
23. IW IS 04-05/07/17, **Populations in epidemics and ecology – Modeling and numerical simulations** (BCAM - Bilbao): *numerical analysis of delay equations for structured populations*;
24. IW IT 21-24/06/16, **Stability and Discretization Issues in Differential Equations - (SDIDE)** (Trieste): *approximating the dynamics of delay models by pseudospectral methods: infinitesimal generator for the linear case*;
25. NC IT 07-12/09/15, **XX Congresso U.M.I.** (Siena) in SS "Metodi numerici per le equazioni differenziali ordinarie": *Dalle equazioni differenziali funzionali con ritardo alle equazioni differenziali ordinarie*;
26. IW IS 19-22/05/15, **Short Thematic Program on Delay Differential Equations - Structured Delay Systems** (Toronto): *Structured populations: how challenging is Daphnia?* and CP: *Dynamics of Host-Parasitoid Interactions and Coexistence of Different Hosts*;
27. IC IT 07-11/07/14, **10th AIMS Conference on Dynamical Systems, Differential Equations and Applications** (Madrid) in SS "Delay equations applied to population dynamics": *Numerical analysis for eigenvalues of structured population dynamics: the Daphnia model*;
28. IW IS 03-05/07/14, **Investigating Dynamics in Engineering and Applied Science (IDEAS)** (Budapest): *Pseudospectral projection of nonlinear delay differential equations: back to the ordinary world*;

29. IW IS 10-11/12/13, **Dynamical Systems and Applications** (BCAM Bilbao): *From delay differential equations to ordinary differential equations (through partial differential equations)*;
30. IW CT 16/07/13, **Time Delay Systems – Stability & Control in Applications** (Zurigo): *From delay differential equations to ordinary differential equations*;
31. IW IS 04-08/06/12, **Recent trends in DDEs** (Cortona): *Computing Lyapunov exponents for systems with delay*;
32. IW IT 19-21/12/11, **MIMMO.BIO** (Trento): *Numerical approaches for structured population dynamics*;
33. NC CT 12-17/09/11, **XIX Congresso U.M.I.** (Bologna): *Discretizzazione numerica di famiglie di evoluzione per equazioni differenziali con ritardo non autonome*;
34. IC CT 18-22/07/11, **ICIAM** (Vancouver): in MS “Stability in delay differential equations”: *On addressing stability for delay differential equations*;
35. IC IT 18-22/07/11, **ICIAM** (Vancouver) in MS “Numerical analysis for delay differential equations”: *Numerical discretization of evolution families for nonautonomous delay differential equations*;
36. IW IS 14-16/06/11, **Delay Differential Equations in Applications** (Vancouver): *A numerical approach to the stability analysis of structured population dynamics*;
37. IC CT 22-26/05/11, **SIAM conference on Applications of Dynamical Systems** (Snowbird): *Evolution families and Lyapunov exponents for retarded dynamical systems*;
38. IW IS 22-26/03/11, **workshop on New Developments in Dynamical Systems from Biosciences** (Columbus): *Numerics for stability analysis of delay systems and population dynamics*;
39. IW CT 25/11/10, **workshop on Semigroups and Evolution** (Udine): *Numerical stability analysis of evolution models*;
40. IW CT 07-09/06/10, **9th IFAC Workshop on Time Delay Systems** (Praga): *On roots and charts of delay equations with complex coefficients*;
41. IW CP 07-09/06/10, **9th IFAC Workshop on Time Delay Systems** (Praga): *Characteristic roots of DDEs: is this the end?*;
42. IW CT 03-05/06/09, **White Workshop on Mathematical Biology** (Trento): *Numerical stability analysis of structured population models*;
43. IW IS 12-16/10/09, **State-dependent delay equations** (Dresda): *Numerical computation of Lyapunov exponents for delay differential equations*;
44. IW CP 12-16/10/09, **State-dependent delay equations** (Dresda): *Characteristic roots of DDEs: is this the end?*;
45. IW IS 07-09/09/09, **Delay differential equations: from theory to applications** (Bristol): *Numerical computation of Lyapunov exponents for delay differential equations*;
46. IW CT 03-05/06/09, **Trends in bifurcation analysis: methods and applications** (Milano): *Numerical computation of Lyapunov exponents for delay differential equations*;
47. IW CT 23-25/04/09, **Numerics of Dynamical systems** (Helsinki): *Numerical computation of Lyapunov exponents for delay differential equations*;
48. IW CT 15-17/12/08, **wANPE08: workshop on Analysis and Numerics of Population dynamics and Epidemics models** (Udine): *Stability analysis of the Gurtin-MacCamy model*;
49. NC IT 04-06/09/08, **IX SIMAI** (Roma) in MS “Innovative Numerical Methods for Evolutionary Problems”: *Numerical stability analysis of infinite-dimensional dynamical systems*;
50. IW CT 17-20/06/08, **Structural Dynamical Systems: computational aspects** (Capitolo): *Numerical stability analysis of infinite-dimensional dynamical systems*;
51. IW CT 13/06/08, **Seminar on Numerical Analysis and Geometric Integration** (Ljubljana): *Stability analysis of the Gurtin-MacCamy model*;
52. NC CT 04-06/02/08, **Convegno Nazionale GNCS** (Montecatini Terme): *Analisi di stabilità del modello di Gurtin-MacCamy*;
53. IW IS 01-05/11/07, **AARMS-CRM workshop on Recent Advances in Functional and Delay Differential Equations** (Halifax): *Computation of characteristic values for partial retarded functional differential equations*;
54. IC IT 16-20/07/07, **6th International Congress on Industrial and Applied Mathematics ICIAM** (Zurigo) in MS “Nonlinear eigenvalue problems”: *Pseudospectral computation of characteristic values for partial retarded functional differential equations*;

55. IW CT 17-19/04/07, **49th British applied mathematics colloquium** (Bristol) in MS
“Delay equations”: *Numerical computation of stability for time delay systems*;
56. IW ITU 10-15/09/06, **Innovative integrators for differential and delay equations**
(Innsbruck): *Trace-DDE: Tool for Robust Analysis and Characteristic Equation of
Delay Differential Equations*;
57. IW CT 10-15/09/06, **Innovative integrators for differential and delay equations**
(Innsbruck): *An algorithm for efficient computation of level curves of surfaces*;
58. IW IT 10-12/07/06, **6th IFAC Workshop on Time Delay Systems** (L'Aquila): *Numerical
computation of characteristic multipliers for linear time periodic coefficients delay
differential equations*;
59. NC CT 09-10/06/06, **Convegno FIRB “Metodi dell’Analisi Matematica in Biologia,
Medicina e Ambiente”** (Montecatini Terme): *Un metodo numerico per analizzare
la dinamica del modello di Gurtin-MacCamy*;
60. NC CT 14-16/02/06, **Convegno Nazionale GNCS** (Milano): *Numerical approximation of
characteristic multipliers of delay differential equations with time periodic
coefficients*;
61. IC IP 12-16/12/05, **44th IEEE Conference on Decision and
Control and European Control Conference CDC-ECC** (Siviglia):
Pseudospectral techniques for stability computation of linear time delay systems;
62. IC CT 12-16/12/05, **44th IEEE Conference on Decision and
Control and European Control Conference CDC-ECC** (Siviglia): *Complete
stability depiction of first order neutral type multiple time delay systems*;
63. IC IT 24-28 09/05, **ASME International Design Engineering Technical Conferences
& Computers and Information In Engineering Conference IDETC-CIE** (Long
Beach, California): *Efficient computation of stability charts for linear time delay
systems*;
64. IW IT 25/04/05, **One Day Workshop on Analysis and Computation of Lattice,
Delay and Functional Differential Equations** (Montreal): *Pseudospectral
approximation of eigenvalues of derivative operators with nonlocal boundary
conditions*;
65. NW CT 22-24/11/04, **Modellistica e Calcolo Scientifico MOX** (Bergamo): *Metodi di
differenziazione pseudospettrali per radici caratteristiche di dinamiche di
popolazione con struttura*;
66. IC CT 18-21/05/04, **The Third International Conference on the Numerical Solution
of Volterra and Delay Equations** (Tempe, Arizona): *Pseudospectral
approximation of eigenvalues of derivative operators with non-local boundary
conditions*;
67. IC CT 30/06-04/07/03, **Scientific computation and differential equations - SciCADE**
(Trondheim): *Numerical computation of characteristic roots for delay differential
equations*;
68. IC CT 26-29/06/02, **Conference on Scientific Computation** (Ginevra): *Numerical
computation of characteristic roots for delay differential equations*;
69. IC CP 03-09/06/02, **BIOCOMP: Topics in biomathematics and related computational
problems, the beginning of the third millennium** (Vietri sul Mare): *Numerical
computation of characteristic roots for delay differential equations*;
70. NC CT 27-31/05/02, **VI SIMAI** (Chia Laguna): *Numerical computation of characteristic
roots for delay differential equations*;
71. IW CT 08-10/12/01, **3rd IFAC Workshop on Time Delay Systems** (Santa Fe, New
Mexico): *Numerical computation of characteristic roots for delay differential
equations*.

organized indicated by “congress type (I=International, N=National, C=Conference,
W=Workshop) organization type (MS=minisymposium, IS=invited session)
period, **congress title** (venue): possible MS/IS *title* with possible co-organizers”

1. IW 25-27/09/24, **18th IFAC Workshop on Time Delay Systems** (Udine): D. Breda
general chair, R. Vermiglio co-chair and CDLab as local organizing committee;
2. IW 04-08/03/24, **Towards rigorous results in state-dependent delay equations**
(Lorentz Center, Leiden) with J.P. Lessard, B. de Wolff;
3. IW IS 20/05-01/06/23, **Math 2 Product – M2P** (Taormina): *Numerical modelling for
sustainable innovation* with R. D’Ambrosio, D. Conte;
4. NW 18-19/05/23, **Modellistica Socio-Epidemiologica** (Napoli) with B. Buonomo,
F. Diele, A. Pugliese, C. Soresina, M. Zanella;

5. IW IS 27-30/09/22, **17th IFAC Workshop on Time Delay Systems** (Montreal): *Numerical Methods for Time Delay Systems* with K. Sieber;
6. IW 03/05/21, **Italy meets Switzerland @CDLab** (online) with J. Canci, R. D'Ambrosio;
7. IC MS 11-15/09/17, **SciCADE** (Bath): *Numerics, dynamics and models of delay equations* with T. Humphries, J. Sieber, R. Vermiglio;
8. IW 16/07/13, **ECC Workshop on Time Delay Systems - Stability & Control in Applications** (Zurich) with F. Atay, W. Michiels, S.I. Niculescu, H. Ozbay, R. Sipahi;
9. IC MS 18-22/07/11, **7th International Congress on Industrial and Applied Mathematics ICIAM** (Vancouver): *Stability in Delay Differential Equations* with E. Van Vleck;
10. IC MS 22-26/05/11, **SIAM Conference on Applications of dynamical systems** (Snowbird): *Approximation of stability spectra*;
11. IW IS 07-09/06/10 co-organization of invited session, **9th IFAC workshop on time delay systems** (Praga): *Analysis and numerics of the spectrum of time delay systems, Part I - Analysis and computation; Part II - Synthesis and parametric studies* with W. Michiels, R. Vermiglio;
12. IW 15-17/12/08, **Workshop on Analysis and numerics of population dynamics and epidemics models – wANPE** with M. Iannelli, R. Vermiglio.

special seminars and lectures indicated by “period, **event** (venue), *title* with possible co-authors”

1. 02/12/22, **IFAC TDS webinar series** (zoom): *back and forth between the infinite and the finite: a numerical view of time delay systems*;
2. 02/07/21, **Systems Biology** (Udine): *A coffee at CDLab: chatting about dynamic systems*;
3. 26/03/21, **Systems Biology** (Udine): *Beestability. An adventurous journey on the edge between biology and mathematics* with F. Nazzi;
4. 24/02/21, **ESFM doctorate Presentation Days** (Trieste): *mathematical modeling of a complex reality: an interdisciplinary journey from monotone systems to honey bee colony losses*.

supervision **PhD** indicated by “cycle candidate **thesis title**, PhD, role (possible co-roles), possible defense date”

1. XXXVIII M. Tanveer **Data-driven approaches for structured populations**, PhD in Mathematical and Physical Sciences (Univ. Udine), supervisor (co-supervisor R. Vermiglio) – PNRR;
2. XXXVII S. De Reggi **Numerical analysis of multi-structured populations models**, PhD in Mathematical and Physical Sciences (Univ. Udine), supervisor (co-supervisor R. Vermiglio);
3. XXXII A. Andò **Collocation methods for complex delay models of structured populations**, PhD in Computer Science and Mathematics and Physics (Univ. Udine), supervisor, defended on 12/03/20;
4. XXX D. Liessi **Pseudospectral methods for the stability of periodic solutions of delay models**, PhD in Computer Science and Mathematics and Physics (Univ. Udine), supervisor, defended on 26/02/19.

post-doc indicated by “candidate period, **project title** (venue), role”

1. D. Liessi 16/11/23-15/11/24, **Numerical analysis of complex dynamical systems** (Univ. Udine), supervisor;
2. A. Andò 01/09/20-31/08/21, **Numerical Approximation and continuation of periodic orbits of delay systems and applications to population dynamics** (Univ. Udine), supervisor;
3. D. Liessi 01/04/18-31/03/19, **Floquet theory for renewal equations and applications to population dynamics** (Univ. Udine), supervisor.

internship indicated by “candidate degree (affiliation) period, **project title** (venue), role”

1. J. Sánchez Sanz PhD (BCAM, Bilbao) 01/09/14-29/11/14, **Numerical methods for computing the eigenvalues of the Daphnia model** (Univ. Udine), supervisor.

advanced courses and schools indicated by “role (L=Lecturer, I=invited, O=Organizer) period, **course title**, school title (venue) with possible co-organizers (lecturers or possible co-lecturers)” (note: SUPE stands for “Scuola Superiore di Topo Wassermann” of Univ. Udine)

1. L 04-06/24, **Mathematics for machine learning**, SUPE and PhD in Mathematical and Physical Sciences (Udine) with E. Bozzo and P. Vidoni (G. Orosz);
2. O 20-24/11/23, **Delays and structures in dynamical systems: modeling, analysis and numerical methods**, CISM advanced school (Udine) with J. Wu (A. Andò, O. Diekmann, T. Humphries, D. Liessi, S. Maset, F. Scarabel, S. Ruan, R. Vermiglio);
3. O 18-23/06/23, **Data-driven methods for the computational sciences**, Dobbiaco Summer School (Dobbiaco) with R. Vermiglio and G. Rozza (N. Kutz, K. Urban);
4. LIO 04-06/23, **Control of time delay systems**, SUPE and PhD in Mathematical and Physical Sciences (Udine) with F. Blanchini (G. Giordano, T. Vyhldal);
5. O 11/22, **Numerical solution of stochastic differential equations**, SUPE and PhD in Mathematical and Physical Sciences (Udine) (R. D’Ambrosio);
6. LI 07-10/06/22, **Dynamical systems with delay: theoretical and numerical aspects**, Structural Dynamical Systems: Computational Aspects – SDS2022 (Rosa Marina);
7. LIO 04-06/22, **memory, past, delay: mathematics and more**, SUPE and PhD in Mathematical and Physical Sciences (Udine) (B. Buonomo, M. Mackey, G. Stepán, R. Vermiglio, P. Vidoni);
8. LIO 05/21, **Dynamical systems**, SUPE and PhD in Computer Science, Mathematics and Physics (Udine) with F. Zanolin (A. Andò, D. Liessi);
9. LI 05/21, **A primer on dynamics for systems biology**, PhD in Agriculture Science and Biotechnology (Udine);
10. LO 25-29/11/19, **Numerical stability analysis of delay equations**, CISM advanced school on Controlling Delayed Dynamics: Advances in Theory, Methods and Applications (Udine); (B. Krauskopf, T. Insperger, W. Michiels, S.I. Niculescu, S. Verduyn Lunel);
11. LO 07/19, **Periodic orbits of dynamical systems**, SUPE and PhD in Computer Science, Mathematics and Physics (Udine) (B. Krauskopf, H. Osinga);
12. LI 27-29/08/18, **Numerical Stability Analysis for Delay Differential and Renewal Equations**, IRC Distinguished Lecture Series (Toronto) (A. Andò);
13. LI 09-11/09/16, **Stability analysis with Matlab**, Szeged School on Computational Tools for Delay Differential Equations (Szeged) (J. Sieber);
14. LO 11-12/15, **Lyapunov exponents for ordinary differential equations: theory and computation**, PhD in Computer Science, Mathematics and Physics (Udine);
15. L 1/10/03, **Introduzione ai sistemi con ritardo e determinazione numerica della stabilità**, PhD in Computational Mathematics (Udine).

TEACHING

university courses indicated by “academic year, **title**, degree course or school (venue, hours)” (note: D. Breda has been part of the examination commission of all the courses/modules listed below)

– 2023/24:

- **Mathematics for machine learning**, SUPE and PhD in Computer Science, Mathematics and Physics (Udine, 10)
- **Sistemi Dinamici Applicati**, LM-MAT (Udine, 48);
- **Laboratorio di Matematica Computazionale**, LM-MAT (Udine, 48);
- **Matematica e Statistica - Modulo I**, LT-BIO (Udine, 52);

– 2022/23:

- **Control of time delay systems**, SUPE and PhD in Computer Science, Mathematics and Physics (Udine, 12)
- **Sistemi Dinamici Applicati**, LM-MAT (Udine, 48);
- **Laboratorio di Matematica Computazionale**, LM-MAT (Udine, 24);
- **Matematica e Statistica - Modulo I**, LT-BIO (Udine, 50);

- 2021/22:
 - **memory, past, delay: mathematics and more**, SUPE and PhD in Computer Science, Mathematics and Physics (Udine, 4)
 - **Sistemi Dinamici Applicati**, LM-MAT (Udine, 48);
 - **Laboratorio di Matematica Computazionale**, LM-MAT (Udine, 24);
 - **Matematica e Statistica - Modulo I**, LT-BIO (Udine, 50);
- 2020/21:
 - **Dynamical systems**, SUPE and PhD in Computer Science, Mathematics and Physics (Udine, 10)
 - **Sistemi Dinamici Applicati**, LM-MAT (Udine, 48);
 - **Laboratorio di Matematica Computazionale**, LM-MAT (Udine, 24);
 - **Matematica e Statistica - Modulo I**, LT-BIO (Udine, 50);
- 2019/20:
 - **Sistemi Dinamici Applicati**, LM-MAT (Udine, 48);
 - **Laboratorio di Matematica Computazionale**, LM-MAT (Udine, 48);
 - **Matematica e Statistica - Modulo I**, LT-BIO (Udine, 50);
- 2018/19:
 - **Periodic orbits of dynamical systems**, SUPE and PhD in Computer Science, Mathematics and Physics (Udine, 20);
 - **Sistemi Dinamici Applicati**, LM-MAT (Udine, 48);
 - **Laboratorio di Matematica Computazionale**, LM-MAT (Udine, 48);
 - **Matematica e Statistica - Modulo I**, LT-BIO (Udine, 50);
- 2017/18:
 - **Sistemi Dinamici Applicati**, LM-MAT (Udine, 48);
 - **Laboratorio di Matematica Computazionale**, LM-MAT (Udine, 48);
 - **Matematica e Statistica - Modulo I**, LT-BIO (Udine, 50);
- 2016/17:
 - **Analisi Numerica 4**, LM-MAT (Udine, 16);
 - **Laboratorio di Matematica Computazionale**, LM-MAT (Udine, 48);
 - **Matematica e Statistica - Modulo I**, LT-BIO (Udine, 50);
- 2015/16:
 - **Laboratorio di Matematica Computazionale**, LM-MAT (Udine, 48);
 - **Lyapunov exponents for ordinary differential equations: theory and computation**, PhD in Computer Science, Mathematics and Physics (Udine, 24);
- 2014/15:
 - **Analisi Numerica 4**, LM-MAT (Udine, 16);
 - **Esercitazioni di Calcolo Scientifico**, LT-INF (Udine, 8);
 - **Esercitazioni di Matematica e Statistica**, LT-SAN and LT-VIT (Udine, 30);
- 2013/14:
 - **Laboratorio di Matematica Computazionale**, LM-MAT (Udine, 48);
 - **Esercitazioni di Analisi Numerica 2**, LM-MAT (Udine, 8);
 - **Esercitazioni di Analisi Numerica 3**, LM-MAT (Udine, 4);
 - **Esercitazioni di Matematica e Statistica**, LT-SAN e LT-VIT (Udine, 15);
- 2012/13:
 - **Analisi Numerica 2**, LM-MAT (Udine, 48);
 - **Analisi Numerica 4**, LM-MAT (Udine, 48);
- 2011/12:
 - **Laboratorio di Matematica Computazionale**, LM-MAT (Udine, 48);
 - **Esercitazioni di Analisi Numerica 2**, LM-MAT (Udine, 8);
 - **Esercitazioni di Analisi Numerica 3**, LM-MAT (Udine, 4);
- 2010/11:
 - **Algoritmi Numerici e Applicazioni**, LM-INF (Udine, 24);
 - **Laboratorio di Matematica Computazionale**, LT/LM-MAT (Udine, 24);
 - **Analisi Numerica 2**, LM-MAT (Udine, 24);
- 2009/10:
 - **High Performance Computing**, LM-INF (Udine, 24);
 - **Analisi Numerica 2**, LT/LM-MAT (Udine, 24);

- 2008/09:
 - **Laboratorio di Calcolo Numerico**, SSIS (Udine, 20);
 - **Analisi Numerica 4**, LM-MAT (Udine, 24);
 - **Calcolo Scientifico**, LT-INF (Udine, 6);
 - **Laboratorio di Calcolo Scientifico**, LT-INF (Udine, 20);
 - **Analisi Numerica 2**, LT/LM-MAT (Udine, 24);
- 2007/08:
 - **Analisi Numerica 4**, LM-MAT (Udine, 24);
 - **Analisi Numerica 3**, LM-MAT (Udine, 8);
 - **Analisi Numerica 2**, LT/LM-MAT (Udine, 8);
 - **Calcolo Scientifico**, LT-INF (Udine, 8);
 - **Laboratorio di Calcolo Scientifico**, LT-INF (Udine, 12);
- 2006/07:
 - **Laboratorio di Informatica 1**, LT-MAT (Udine, 10);
 - **Laboratorio di Calcolo Numerico 1 e 2**, SSIS-143 (Udine, 20);
 - **Laboratorio di Calcolo Scientifico**, LT-INF (Udine, 25);
- 2005/06:
 - **Laboratorio di Informatica 1**, LT-MAT (Udine, 10);
 - **Esercitazioni di Analisi Numerica 2**, LT/LM-MAT (Udine, 6);
 - **Laboratorio di Calcolo Scientifico**, LT-INF (Udine, 25);
- 2004/05:
 - **Laboratorio di Informatica 1**, LT-MAT (Udine, 10);
 - **Laboratorio di Calcolo Numerico 1 e 2**, SSIS (Udine, 20);
 - **Tirocinio di Informatica Applicata alla Statistica e all'Epidemiologia**, LT interateneo Udine/Trieste di Tecniche della Prevenzione nell'Ambiente e nei Luoghi di Lavoro (Udine, 26);
- 2003/04:
 - **Informatica per l'Epidemiologia 1**, Scuola di Specializzazione in Igiene e Medicina Preventiva (Udine, 12);
 - **Tirocinio di Informatica Applicata alla Statistica e all'Epidemiologia**, LT interateneo Udine/Trieste di Tecniche della Prevenzione nell'Ambiente e nei Luoghi di Lavoro (Trieste, 24);
 - **Esercitazioni di Analisi Numerica 2**, LT/LM-MAT (Udine, 2);
 - **Laboratorio di Calcolo Scientifico**, LT-INF (Udine, 20);
- 2002/03:
 - **Esercitazioni di Analisi Numerica 2**, LT/LM-MAT (Udine, 6);
 - **Laboratorio di Calcolo Scientifico**, LT-INF (Udine, 20);

students' evaluation outcome of MSc (LM) and BSc (LT) courses in charge indicated by "course a.y., score/maximum score (n. questionnaires)": the score expresses the level of global satisfaction

- Sistemi Dinamici Applicati 2022/23, 4.0/4 (5)
- Laboratorio di Matematica Computazionale 2022/23, 4.0/4 (5)
- Matematica e Statistica modulo I 2022/23, 3.6/4 (44)
- Sistemi Dinamici Applicati 2021/22, -/4 (≤ 3)
- Laboratorio di Matematica Computazionale 2021/22, 3.7/4 (7)
- Matematica e Statistica modulo I 2021/22, 3.6/4 (42)
- Sistemi Dinamici Applicati 2020/21, -/4 (≤ 3)
- Laboratorio di Matematica Computazionale 2020/21, 4.0/4 (8)
- Matematica e Statistica modulo I 2020/21, 3.5/4 (41)
- Sistemi Dinamici Applicati 2019/20, -/4 (≤ 3)
- Laboratorio di Matematica Computazionale 2019/20, 4.0/4 (3)
- Matematica e Statistica modulo I 2019/20, 3.6/4 (41)
- Sistemi Dinamici Applicati 2018/19, -/4 (≤ 3)
- Laboratorio di Matematica Computazionale 2018/19, 3.6/4 (5)
- Matematica e Statistica modulo I 2018/19, 3.8/4 (13)
- Sistemi Dinamici Applicati 2017/18, -/4 (≤ 3)
- Laboratorio di Matematica Computazionale 2017/18, 4.0/4 (4)
- Matematica e Statistica modulo I 2017/18, 3.7/4 (44)

- Analisi Numerica IV 2016/17, 3.8/4 (5)
- Laboratorio di Matematica Computazionale 2016/17, 4.0/4 (6)
- Matematica e Statistica modulo I 2016/17, 3.5/4 (45)
- Laboratorio di Matematica Computazionale 2013/14, 3.8/4 (5)
- Analisi Numerica 2 2012/13, 3.7/4 (5)
- Laboratorio di Matematica Computazionale 2011/12, 8.8/10 (5)
- Analisi Numerica II 2010/11, 8.3/10 (6)
- Laboratorio di Matematica Computazionale 2010/11, 8.4/10 (10)
- Analisi Numerica II 2009/10, 9.0/10 (5)
- High Performance Computing 2009/10, 8.8/10 (12)
- Laboratorio di Calcolo Numerico 2008/09, 9.1/10 (7)
- Analisi Numerica IV 2008/09, 7.7/10 (3)
- Analisi Numerica II 2008/09, 8.5/10 (4)
- Laboratorio di Calcolo Numerico 2006/07, 9.2/10 (32)
- Laboratorio di Calcolo Numerico 2004/05, 6.8/10 (11)

supervision **MSc (LM) and BSc (LT) theses** indicated by “a.y. candidate **title**, degree course, role”

- | | | | |
|-----|---------|------------------|--|
| 1. | 2023/24 | M. Palermo | to be defined ,
LM-MAT, advisor; |
| 2. | 2021/22 | A. Pecile | Data-driven methods for delay differential equations ,
LM-MAT, advisor; |
| 3. | 2019/20 | S. De Reggi | Bivariate collocation methods for computing the basic reproduction number of population dynamics with double structure , LM-MAT, advisor; |
| 4. | 2017/18 | M. Gambone | Applicazioni della differenziazione automatica al calcolo di equilibri di sistemi dinamici , LT-MAT, advisor; |
| 5. | 2017/18 | A. Lanza | Alternating direction implicit methods for option pricing ,
LM-MAT, advisor; |
| 6. | 2017/18 | F. Florian | Numerical computation of the basic reproduction number in population dynamics , LM-MAT, advisor; |
| 7. | 2016/17 | G. Gava | Behavioral epidemiology: how past information affects vaccinating behaviours , LM-MAT, advisor; |
| 8. | 2016/17 | M. Meinero | Modeling of industrial processes for control and optimization , LM-MAT, advisor; |
| 9. | 2016/17 | T. Erjavec | Riemannian manifolds and tangent spaces: application to human activity recognition , LM-MAT, co-advisor; |
| 10. | 2015/16 | S. Busato | Automatic differentiation and applications to financial problems , LM-MAT, advisor; |
| 11. | 2015/16 | M. Nonino | On a special characteristic equation and its application to structured populations , LM-MAT, advisor; |
| 12. | 2014/15 | G. Menegon | On characteristic roots of delay differential equations ,
LM-MAT, advisor; |
| 13. | 2013/14 | S. Della Schiava | Computation of Lyapunov coefficients for differential equations , LM-MAT, advisor; |
| 14. | 2012/13 | D. Liessi | A model for the dynamics of the impact between hammer and string in the grand piano , LM-MAT, co-advisor; |
| 15. | 2012/13 | V. Busoni | Pseudospectral approaches for approximating retarded functional differential equations , LM-MAT, advisor; |
| 16. | 2012/13 | C. Narduzzi | Efficient determination of the stability of equilibria for delay differential equations , LM-MAT, advisor; |
| 17. | 2010/11 | R. Mauro | Chebfun: radici di polinomi e autovalori , LT-MAT, advisor; |
| 18. | 2009/10 | P. Osgnach | Raffinamento adattativo per la compressione di immagini , LM-INF, advisor; |
| 19. | 2009/10 | A.M. D’ambrosio | Teoremi di Perron e Frobenius e algoritmi di ranking ,
LT-MAT, co-advisor; |
| 20. | 2009/10 | C. Narduzzi | Wavelets e analisi multirisoluzione , LT-MAT, advisor; |
| 21. | 2007/08 | A. Paussa | Metodi pseudo-spettrali per la simulazione numerica di dispositivi nanoelettronici , LM-ING, co-advisor. |
| 22. | 2004/05 | D. Sechi | Sviluppo di interfaccia grafica per lo studio della stabilità di sistemi differenziali con ritardo , LT-INF, co-advisor. |

laboratory, internship, SUPE	indicated by “a.y. candidate title, degree course (possible affiliation for incoming/outgoing internships, external tutor for outgoing)”
1. 2023/24 A. Bellocchio	Applied Dynamical Systems (incoming internship from Univ. Trieste);
2. 2022/23 E. Sartor	Risultati di stabilità per sistemi con ritardo , LM-SUPE;
3. 2022/23 S. Milesi	Teoria dei semigruppato per i sistemi con ritardo , LM-SUPE;
4. 2022/23 N. Arghittu	Sparsità e strategie data-driven nei sistemi dinamici , LM-MAT;
5. 2021/22 I. Bruno	Introduzione alla biologia comportamentale nello studio delle epidemie , SUPE;
6. 2021/22 R. Gradara	Buona posizione di problemi di Cauchy astratti in spazi di funzioni continue , SUPE;
7. 2021/22 A. Pecile	A Data-Driven approach to Dynamical Systems: the Dynamic Mode Decomposition , SUPE;
8. 2021/22 A. Pecile	Tecniche Data-Driven per sistemi dinamici , LM-MAT (outgoing internship to SISSA mathLab, G. Rozza);
9. 2020/21 A. Pecile	Stability of Linear Systems with Stochastically Switching Delays , SUPE;
10. 2018/19 M. Gambone	Differenziazione automatica per la continuazione numerica di sistemi dinamici , SUPE;
11. 2016/17 S. Busato	Differenziazione automatica , LM-MAT;
12. 2015/16 M. Nonino	Approccio numerico ai sistemi accoppiati , LM-MAT;
13. 2014/15 P. Dolce	Alcuni algoritmi per la ricerca delle comunit'a su grafi , LM-MAT;
14. 2013/14 F. Munini	L'algoritmo di Routh e il teorema di Routh-Hurwitz , LM-MAT;
15. 2010/11 L. Iob	Implementazioni di una passeggiata aleatoria per apprezzare opzioni arcobaleno: un confronto critico , LM-MAT.

THIRD MISSION

with schools indicated by “period, title (type, institute, venue, possible collaborators)”

for teachers Progetto Lauree Scientifiche

1. 02/05/23, **Matematica per il machine learning** (lecture for “Rete Nazionale dei Licei per la Scienza dei dati e l'Intelligenza Artificiale”, online, with E. Bozzo);
2. 30/03/23, **Dai modelli ai dati e ritorno sulla ali di una farfalla (o era un gabbiano?)** (seminar, Univ. Udine, with P. Giangrandi, C. Milan);
3. 10-11/22, **Le funzionalità dell'ambiente MATLAB** (course, ITIS Malignani, Udine).

PLS Progetto Lauree Scientifiche

1. 04/05/23, **“scusi prof...ma a cosa servono le equazioni?!”** (conference, ITIS Marinoni, Udine);
2. 21/03/23, **“scusi prof...ma a cosa servono le equazioni?!”** (conference, ITIS Malignani, Udine);
3. 10/03/23, **“scusi prof...ma a cosa servono le equazioni?!”** (conference, Scuola Secondaria Don Bosco, Pordenone);
4. 14,28/02-07/03/23, **Equazioni lineari e matrici: la matematica in rete** (laboratory, ITIS Magrini-Marchetti, Gemona del Friuli);
5. 10/02/23, **“scusi prof...ma a cosa servono le equazioni?!”** (conference, ITIS Magrini-Marchetti, Gemona del Friuli);
6. 09,14,23/02/23, **Dalla bisezione ai frattali di Newton** (laboratory, ITIS Malignani, Udine);
7. 25/01/23, **...ma quanto vale $\sqrt{5}$?** (conference, ITIS Malignani, Udine);
8. 13,20,27/01/20, **Dalla bisezione ai frattali di Newton** (laboratory, ITIS Magrini-Marchetti, Gemona del Friuli);
9. 12-19/12/19, **Dalla bisezione ai frattali di Newton** (laboratory, ITIS Malignani, Udine);
10. 06/12/19, **...ma quanto vale $\sqrt{5}$?** (conference, ITIS Malignani, Udine);

11. 05/12/19, **...ma quanto vale $\sqrt{5}$?** (conference, ITIS Magrini-Marchetti, Gemona del Friuli);
12. 08/02-15/02/19, **Dalla bisezione ai frattali di Newton** (laboratory, ITIS Malignani, Udine);
13. 21/12/18, **...ma quanto vale $\sqrt{5}$?** (conference, ITIS Malignani, Udine);
14. 06-09/03/18, **Dalla bisezione ai frattali di Newton** (laboratory, LSS da Vinci, Univ. Udine);
15. 26/01-02/02/18, **Dalla bisezione ai frattali di Newton** (laboratory, ITIS Malignani, Udine);
16. 23/01/18, **...ma quanto vale $\sqrt{5}$?** (conference, LSS da Vinci, Treviso);
17. 15/02/17, **...ma quanto vale $\sqrt{5}$?** (conference, ITIS Malignani, Udine);
18. 24,27,31/01/12, **Equazioni lineari e matrici: la matematica in rete** (laboratory, ITC Zanon, Udine);
19. 09/01/12, **“scusi prof...ma a cosa servono le equazioni?!”** (conference, ITC Zanon, Udine);
20. 04,12/05/11, **Dalla bisezione ai frattali di Newton** (laboratory, ITI Malignani, Udine);
21. 05/04/11, **...ma quanto vale $\sqrt{5}$?** (conference, ITI Malignani, Udine);
22. 08,15/02/11, **Dalla bisezione ai frattali di Newton** (laboratory, ITI Malignani - LS Le Filandiere, Udine);
23. 26/01,03/02/11, **Equazioni lineari e matrici: la matematica in rete** (laboratory, ITC Zanon - LS Le Filandiere, Udine);
24. 11/01/11, **Dal mattone a Google: equazioni ovunque** (conference, ITC Zanon, Udine);
25. 21/12/10, **...ma quanto vale $\sqrt{5}$?** (conference, ITI Malignani, Udine);
26. 06/12/10, **Dal mattone a Google: equazioni ovunque** (conference, LS Le Filandiere, San Vito al Tagliamento);
27. 06/12/10, **...ma quanto vale $\sqrt{5}$?** (conference, LS Le Filandiere, San Vito al Tagliamento);
28. 29-31/03,01/04/10, **“Mi sento fortunato”: matrici e sistemi dietro il WWW** (laboratory, ITC Zanon, Udine);
29. 16,22/03/10, **scusi prof...ma a cosa servono le equazioni?!** (conference, ITC Zanon, Udine);
30. 20/05/09, **Bisezione e metodo di Newton** (laboratory, ITI Malignani, Udine);
31. 04/05/09, **“Pronto, chi parla?” ovvero dalla Formula di Eulero al telefono a toni** (conference, ITI Malignani, Udine);
32. 16/04/09, **...ma quanto vale $\sqrt{5}$?** (conference, ITI Malignani, Udine);
33. 23-27/03/09, **Matrici e applicazioni** (laboratory, ITC Zanon, Udine);
34. 26/02/09, **La matematica in rete: cosa c'è dietro Google** (conference, ITC Zanon, Udine);
35. 10/05/07, **La matematica in rete: cosa c'è dietro Google** (conference, ISIS Solari, Tolmezzo).

All PLS activities supported by the following projects, indicated by “title period, local coordinator (institution)”

1. **Piano Nazionale Lauree Scientifiche 2022-2024**, S. Urbinati (Univ. Udine);
2. **Piano Nazionale Lauree Scientifiche 2019-2021**, F. Zucconi (Univ. Udine);
3. **Piano Nazionale Lauree Scientifiche 2016-2018**, G. Gorni (Univ. Udine);
4. **Piano Nazionale Lauree Scientifiche 2010-2012**, R. Vermiglio (Univ. Udine);
5. **Progetto Lauree Scientifiche 2005-2009**, E. Toppino (Univ. Udine).

Talks-UNIUD

1. 03/02/21, **scusi prof...ma a cosa servono le equazioni?!** (Liceo Leopardi – Majorana, Pordenone);
2. 26/01/21, **scusi prof...ma a cosa servono le equazioni?!** (Liceo Stellini, Udine);
3. 18/01/20, **scusi prof...ma a cosa servono le equazioni?!** (ITIS Pujati, Sacile);
4. 19/12/19, **scusi prof...ma a cosa servono le equazioni?!** (ITIS Copernico, Udine);
5. 12/12/19, **scusi prof...ma a cosa servono le equazioni?!** (ITIS Bearzi, Udine);
6. 14/02/19, **scusi prof...ma a cosa servono le equazioni?!** (ITIS Bearzi, Udine).

- others
1. Department commission for web site development and maintenance, representative for Mathematics/Physics 2018-2021, representative for research 2022-2023;
 2. 31/10/19 interview “A tutto bit 3.0” Radio RAI FVG on **systems with delays**, (podcast on-line).

INTERNATIONALIZATION

- Erasmus** coordinator of the exchanges indicated by “foreign university (country), period, area: degrees”
1. Universidad de Valladolid (E), since 2020/21, mathematics: BSc, MSc, PhD;
 2. Bolyai Institute Szeged University (H), since 2020/21, mathematics: BSc, MSc, PhD.
- others**
1. MOU with York University (CAN):
 - agreement on research in collaboration with Jianhong Wu, LIAM;
 - agreement on students exchange (2 incoming 2019/20).
 2. proposer Erasmus+ area Canada:
 - 2021/22 Key Action 171: admitted to reserved evaluation;
 - 2019/20 Key Action 107: positively evaluated (82.5/100), not admitted for restricted funds;
 - 2018/19 Key Action 107: positively evaluated (90/100), not admitted for restricted funds.
 3. 2023: co-tutelle PhD agreement with Universidad de Valladolid (E).

COMMITTEES – MEMBERSHIPS

- scientific committees**
1. general chair **18th IFAC Workshop on Time Delay Systems** (Udine, 25-27/09/24);
 2. International Program Committee **18th IFAC Workshop on Time Delay Systems** (Udine, 25-27/09/24);
 3. scientific committee **Towards rigorous results in state-dependent delay equations** (Leiden, 04-08/03/24);
 4. coordinator (with J. Wu) **CISM advanced school on Delays and Structures in Dynamical Systems: Modeling, Analysis and Numerical Methods** (Udine, 20-24/11/23);
 5. scientific committee **Workshop Modellistica Socio-Epidemiologica** (Napoli, 18-19/05/23);
 6. scientific committee **Dobbiaco Summer School 2023 on Data-Driven Methods for the Computational Sciences** (Dobbiaco, 18-23/06/23);
 7. International Program Committee **17th IFAC Workshop on Time Delay Systems** (Toronto, 27-30/09/22);
 8. International Program Committee **16th IFAC Workshop on Time Delay Systems** (Guangzhou, 29/09-01/10/21);
 9. scientific committee **Dobbiaco Summer School 2020 on Numerical Methods for Kinetic Equations** postponed to 2022, (Dobbiaco);
 10. IFAC Technical Committee 2.2 “Linear Control Systems” – Working Group “Time Delay Systems”, 2020-;
 11. coordinator **CISM advanced school on Controlling Delayed Dynamics: Advances in Theory, Methods and Applications** (Udine, 25-29/11/19);
 12. International Program Committee **15th IFAC Workshop on Time Delay Systems** (Sinaia, 09-11/09/19);
 13. International Program Committee **14th IFAC Workshop on Time Delay Systems** (Budapest, 28-30/06/18);
 14. International Program Committee **13th IFAC Workshop on Time Delay Systems** (Istanbul, 22-24/06/16);
 15. International Program Committee **12th IFAC Workshop on Time Delay Systems** (Ann Harbor, 28-30/06/15);
 16. International Program Committee **10th IFAC Workshop on Time Delay Systems** (Boston, 22-24/06/12);
 17. International Program Committee **9th IFAC Workshop on Time Delay Systems** (Praga, 07-09/06/10);
 18. co-organization of **wANPE08: workshop on Analysis and Numerics of Population dynamics and Epidemics models** (Udine, 15-17/12/08).
- evaluation committees**
1. researcher type b position, sector 01/A5, Univ. Padova, 2023;
 2. post-doc position, sector 01/A5, Univ. Udine, 2023;
 3. final year evaluation, SUPE, 2022/23;
 4. post-doc position in PRIN project, sector 01/A5, Univ. Udine, 2023;
 5. defense Arenberg Doctoral School in Engineering Science: Computer Science, KU Leuven, 2023;
 6. admission PNRR grant 351, PhD in Mathematical and Physical Sciences, Univ. Udine, 2022;
 7. final year evaluation, SUPE, 2021/22;
 8. defense École Doctorale Sciences et Technologies de la information et de la communication, Univ. Paris-Saclay 2021;

9. final year evaluation, SUPE, 2020/21;
10. defense PhD in Computer Science, Mathematics and Physics, Univ. Udine, 2020;
11. admission PhD in Computer Science, Mathematics and Physics, Univ. Udine, 2020;
12. post-doc position, sector 01/A5, Univ. Udine, 2020;
13. mid-term evaluation École Doctorale Sciences et Technologies de la information et de la communication, Univ. Paris-Saclay 2020;
14. admission PhD in Mathematical Analysis, Modelling and Applications, SISSA, March 2019;
15. final year evaluation, SUPE, 2018/19;
16. defense PhD in Mathematical Analysis, Modelling and Applications, SISSA, September 2018;
17. admission PhD in Mathematical Analysis, Modelling and Applications, SISSA, September 2018;
18. post-doc position, sector 01/A5, Univ. Udine, 2018;
19. admission PhD in Computer Science, Mathematics and Physics, Univ. Udine, 2017;
20. admission PhD in Mathematics and Physics, Univ. Udine, 2012;
21. admission PhD in Mathematics and Physics, Univ. Udine, 2010;
22. SSIS final examination, Univ. Udine, 2007/08 and 2008/09.

- institutional committes**
1. PhD in Mathematical and Physical Sciences, Univ. Udine, 2021-;
 2. PhD in Computer Science and Mathematics and Physics, Univ. Udine, 2015-2020
– vice-coordinator, 2015-2019;
 3. PhD in Mathematics and Physics, Univ. Udine, 2010-2015;
 4. commissione VQR 15-19 area MAT, Department of Mathematics, Computer Science and Physics, Univ. Udine, 2021;
 5. U.M.I. research group “Modellistica socio-epidemiologica” since 2020
– elected member of the board 2020-2023;
 6. commissione ricerca, Department of Mathematics, Computer Science and Physics, Univ. Udine, 2020-;
 7. commissione pianificazione Lauree Matematica, Department of Mathematics, Computer Science and Physics, Univ. Udine, 2020-;
 8. GEV candidate, area 01, 2020: selected, not extracted;
 9. commissione assicurazione qualità - ricerca, terza missione e impatto sociale, Department of Mathematics, Computer Science and Physics, Univ. Udine, 2018-
– rapporto riesame ciclico dipartimentale 2023;
 10. commissione sito web, Department of Mathematics, Computer Science and Physics, Univ. Udine, representative for Mathematics/Physics 2018-2021, representative for research 2022-2023;
 11. Giunta Dipartimento di Matematica e Informatica, Univ. Udine, 2009-2012, 2012-2015.

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- projects evaluations** referee of several proposals from

1. ERC
2. EU countries
3. non-EU countries

- memberships**
1. U.M.I. research group “Modellistica socio-epidemiologica”, co-founder 2020-;
 2. IFAC TC 2.2 "Linear Control Systems" and Working Group "Time Delay Systems" 2020-;
 3. Società Italiana Caos e Complessità (SICC), 2009-2013 and 2019-;
 4. Computational Dynamics Laboratory (CDLab), founder 2017-;
 5. Unione Matematica Italiana (U.M.I.), 2015-;
 6. Biological Modelling and Scientific Computing Trento (BioMaSCoT), 2006-07;
 7. E-Delay Control Letters, 2006-;
 8. Numerical Analysis Group, 2001-;
 9. INdAM/GNCS, 2001-.

PUBLICATIONS AND SOFTWARE

All publications are peer-reviewed (internal reports not listed)

- summary
- 1 monograph;
 - 2 edited volumes;
 - 53 papers on international journals;
 - 8 book chapters;
 - 10 proceedings;
 - 7 software tools.

SIGNATURE

Autorizzo il trattamento dei miei dati personali, ai sensi del D. lgs. 196 del 30 giugno 2003.

Tricesimo, December 14, 2023

Dimitri Breda

Il sottoscritto Dimitri Breda, consapevole che le dichiarazioni false comportano l'applicazione delle sanzioni penali previste dall'art. 76 del D. P. R. 445/2000, dichiara che le informazioni riportate nel presente curriculum vitae, redatto in formato Europass, corrispondono a verità.

Tricesimo, December 14, 2023

Dimitri Breda