

FRANCO ZIVCOVICH

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Date of birth 19 September 1991
Nationality Italian
Languages Italian, English, Spanish, French

Positions

- Jan '22 - today **Research and Development Engineer**
at Neurodec, Nice, France
Project *"HPC optimization and modeling of biomechanical processes for decoding muscular signals and developing a Myoelectric Digital Twin"*
- May '21 - Dec '21 **Post Doctoral**
at Sorbonne Université, Paris, France
Supervisor prof. Katharina Schratz
Project *ERC grant LAHACODE on "Low-regularity and high oscillations: numerical analysis and computation of dispersive evolution equations"*
- May '20 - Apr '21 **Fellowship Grant**
at University of Verona, Verona, Italy
Supervisor prof. Giacomo Albi
Project *"Efficient numerical methods for multiscale and control problems with applications"*

Education

- Oct '16 - Jan '20 **Ph.D. in Mathematics** (cum Laude)
at University of Trento, Trento, Italy
Advisor prof. Marco Caliari
Thesis *"Backward error accurate methods for computing the matrix exponential and its action"*
- Sep '11 - Jul '16 **B.Sc. & M.Sc. in Mathematics** (cum Laude)
at University of Verona, Verona, Italy
Advisor prof. Marco Caliari
Thesis *"Hermite interpolation for the matrix exponential"*

Visiting Academic

- Sep '21 **Universidad de Sevilla**, Sevilla, Spain
Responsible prof. Eleonora Viezzer
Activities together with the Plasma Physics Group of Sevilla I equip the MEGA code of advanced numerical schemes for solving large systems of ODEs.
- Sep '18 - Jul '19 **Universitat Politècnica de València**, Valencia, Spain
Responsible prof. Jorge Sastre
Activities together with the High Performance Scientific Computing Group (HiPerSC) I developed a new algorithm for computing the matrix exponential in arbitrary precision arithmetic.
- Apr '18 - Jun '18 **Université Pierre et Marie Curie**, Paris, France
Responsible prof. Frédéric Hecht
Activities together with the FreeFem++'s developers team I worked on the C++ implementation of simple exponential integrators techniques for solving systems of ODEs.
- Sep '17 - Jan '18 **University of Manchester**, Manchester, United Kingdom
Responsible prof. Nicholas J. Higham
Activities together with the Numerical Linear Algebra group (NLA) I studied Krylov subspaces methods for computing the action of matrix exponential on vectors needed for the exponential integrators technique.
- Sep '15 - Jun '16 **University st. Kliment Ohridski**, Sofia, Bulgaria
Responsibles prof. Nadezhda K. Ribarska, prof. Mikhail I. Krastanov
Activities thanks to the Erasmus+ program I spent the last year of my M.Sc. degree at the University of Sofia st. Kliment Ohridski. The main topics were: Calculus of Variations and Control Theory.

Publications

M. Caliari, F. Cassini, and F. Zivcovich, "A μ -mode approach for computing matrix φ -functions appearing in exponential integration", in preparation.

Y.A. Bronsard, A. Ostermann, K. Schratz, and F. Zivcovich, "About Exponential Integrators and Finite Elements Method", in preparation.

G. Albi, D. Kalise, C. Segala, and F. Zivcovich, "Fast and efficient implementation of sparse control problem for the Cucker-Smale model.", in preparation.

B. Li, K. Schratz, and F. Zivcovich, "A second-order low-regularity correction of Lie Splitting for the semilinear Klein–Gordon equation.", submitted.

M. Caliari, F. Cassini, and F. Zivcovich, "BAMPHI: matrix and transpose-free algorithm for computing the action of combinations of φ -functions", submitted.

M. Caliari, F. Cassini, and F. Zivcovich, "A μ -mode BLAS approach for multidimensional tensor-structured problems", submitted.

F. Zivcovich, J. Sastre, J. Ibañez, and E. Defez, “Krylov on-the-fly backward error estimate for matrix exponential approximation by Taylor algorithm”, submitted.

L. Einkemmer, M. Caliari, F. Cassini, A. Ostermann, and F. Zivcovich, “A μ -mode integrator for solving evolution equations in Kronecker form”, J. Comp. Physics Vol. 455, 2022.

M. Caliari, F. Cassini, and F. Zivcovich, “Approximation of the matrix exponential for matrices with a skinny field of values”, Bit Numer Math, 2020.

F. Zivcovich, “Fast and accurate computation of divided differences for analytic functions, with an application to the exponential function”, Dolomites Res Notes Approx, 2019.

M. Caliari, and F. Zivcovich, “On-the-fly backward error estimate for the matrix exponential approximation by Taylor algorithm”, J Comput Appl Math, 2018.

M. Caliari, P. Kandolf and F. Zivcovich, “Backward error analysis of polynomial approximations for computing the action of the matrix exponential”, BIT Numer Math, 2018.

Conferences

“NUMASP 2021”, Verona, Italy. I presented “Numerical aspects of solving sine-Gordon equation using Exponential Integrators.”, December 2021.

“NUMDIFF 2021”, Halle (Saale), Germany. I presented “BAMPHI: matrix and transpose-free algorithm for computing the action of combinations of φ -functions in exponential integrators”, September 2021.

“SMAI 2021”, Montpellier, France. I presented “BAMPHI: matrix and transpose-free algorithm for computing the action of combinations of φ -functions in exponential integrators”, June 2021.

“MATA 2020”, Perugia, Italy. I presented the poster “Fast and accurate computation of divided differences for analytic functions, with an application to the exponential function”, January 2020.

“ICIAM 2019”, Valencia, Spain. I presented “Backward error analysis of Krylov approximations for computing the action of the matrix exponential”, July 2019.

“BIRS 18w5152 Integrating the Integrators for Nonlinear Evolution Equations: from Analysis to Numerical Methods, High-Performance-Computing and Applications”, Banff, Canada. I presented “Backward error analysis for Krylov approximations to matrix exponential”, December 2018.

“LSSC 2017”, Sozopol, Bulgaria. I presented “Newton interpolation at Hermite-Leja points”, June 2017.

Teaching Experiences

UNIVERSITY-LEVEL TEACHING ACTIVITIES					
PERIOD	POSITION	AT	SUBJECT	COURSE	HOURS
Aug'22	professor	University of Verona, Verona, Italy	preparation to the test of admission	School of Medicine and Surgery	24
Jul'22	professor	University of Verona, Verona, Italy	pre-university course on general mathematics	all scientific degrees	40
Apr'22	professor	University of Verona, Verona, Italy	preparation to the test of admission	all scientific degrees	16
Jul'21	professor	University of Verona, Verona, Italy	pre-university course on general mathematics	all scientific degrees	60
Oct'20 to Jan'21	professor	University of Verona, Verona, Italy	Calculus I	B.Sc. Biotechnologies	48
Jul'20	professor	University of Verona, Verona, Italy	pre-university course on general mathematics	all scientific degrees	60
Mar'20 to Jun'20	assistant prof.	University of Verona, Verona, Italy	Partial Differential Equations	M.Sc. Mathematics	16
Mar'20	professor	University of Verona, Verona, Italy	preparation to the test of admission	all scientific degrees	15
Oct'19 to Jan'20	assistant prof.	University of Verona, Verona, Italy	Calculus I - exercises and practice	B.Sc. Bioinformatics	24

HIGHSCHOOL-LEVEL TEACHING ACTIVITIES					
PERIOD	POSITION	AT	SUBJECT		HOURS
Jan'20 to Feb'20	teacher	Liceo Carlo Montanari, Verona, Italy	Mathematics & Physics	–	40
Mar'20 to Jun'20	teacher	Liceo Carlo Montanari, Verona, Italy	Mathematics & Physics	(special education)	27

TOTAL TEACHING HOURS: 370