

PERSONAL INFORMATION **Maurizio Tavelli**

WORK EXPERIENCE

Mar.2025 – Tenure track researcher (RTT)

University of Verona

Strada le Grazie 15, 37134, Verona, Italy

Teaching:

- A.Y. 2024-2025, Course: Matematica e Statistica, modulo di statistica (72 hours)

Apr. 2022 – Feb.2025 Fixed term researcher (RTDa)

Free University of Bolzano

Piazza università 1, I-39100 Bolzano, Italy

Teaching:

- A.Y. 2024-2025, Course: Parallel Computing (60 hours)
- A.Y. 2023-2024, Course: Parallel Computing (60 hours)
- A.Y. 2023-2024, Course: Percorso di Matematica (40 hours)
- A.Y. 2022-2023, Course: Parallel Computing (60 hours)

Jan. 2022 – Apr. 2022 Research Collaborator

University of Trento

via Sommarive 14, I-38123 Povo (TN), Italy

Sep. 2019 – Nov. 2021 Postdoctoral researcher

Free University of Bolzano

Piazza università 1, I-39100 Bolzano, Italy

Nov. 2015 – Sep. 2019 Postdoctoral researcher

University of Trento

via Sommarive 14, I-38123 Povo (TN), Italy

Sep-Dec 2013-2018 Teaching support

University of Trento

via Sommarive 14, I-38123 Povo (TN), Italy

- Course: "Calcolo Numerico" (30 hours)

Jun-Jul 2015-2018 Teaching support

University of Trento

via Sommarive 14, I-38123 Povo (TN), Italy

- Course: "Scientific computing" (15 hours)

2011-2012 Teaching support

Associazione EUREKA

loc. Vallette 3/A, I-38050 Sant'Orsola Terme (TN), Italy

- I have carried out afternoon support activities in mathematics and physics for high school students.

Mar. 2008 – Jul. 2008 IT manager

Opera Universitaria

Via Tommaso Gar, 18, I-38122 Trento (TN), Italy

– I was IT manager at the student house S.Bartolomeo as part of the 150 hours project.

EDUCATION AND TRAINING

2012–2015 **PhD in Mathematics** ISCED 6

University of Trento

2010–2012 **Master's degree in Mathematics** ISCED 5A

University of Trento

2006–2010 **Degree in Mathematics** ISCED 5A

University of Trento

2001–2006 **High School** ISCED 3B

Industrial, technical institute Marie Curie, Pergine Valsugana, Trento, Italy

Jul. 2005 – Aug. 2005 **Project "Webvalley"** ISCED 4

Fondazione Bruno Kesler, Trento, Italy

PERSONAL SKILLS

Mother tongue Italian

Other languages	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	B2	B2	B2	B2

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user
[Common European Framework of Reference for Languages](https://europa.eu/europass/levels)

Organisational/ managerial skills – I was the manager of the secretariat for the Red Cross camp of Paganica for 27 days during the earthquake hit Abruzzo (Italy) in the 2009.

Computer skills – Very good knowledge of the following programming languages: FORTRAN, MATLAB, parallel programming using MPI and OpenMP;
 – Good knowledge of C, DELPHI, VISUAL BASIC, HTML, PHP
 – Good knowledge and ability to manage computer networks, basic electronics, Office programs, Latex, MySQL.

ADDITIONAL INFORMATION

Publications Journal papers:

1. M. Tavelli, W. Boscheri, *A new class of efficient high order semi-Lagrangian IMEX discontinuous Galerkin methods on staggered unstructured meshes*, Journal of Computational Physics (CiteScore2022: **11.6**), 2024, 128902, DOI:10.1016/j.jcp.2024.1132892. (Citations: **0**)
2. E. Corradi, M. Tavelli, M-L. Baudet, W. Boscheri, *A high order accurate space-time trajectory reconstruction technique for quantitative particle trafficking analysis*, Applied Mathematics and Computation (CiteScore2022: **7.9**), 2024, 113289, DOI:10.1016/j.amc.2024.128902. (Citations: **0**)
3. B. Carpentieri, M. Tavelli, D.L. Sun, T.Z. Huang, Y.F. Jing, *Fast Iterative Solution of Multiple Right-Hand Sides MoM Linear Systems on CPUs and GPUs Computers*, IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES (CiteScore2022: **8.5**), 2023, pp 1–14, DOI:10.1109/TMTT.2023.3345478 , In press. (Citations: **0**)
4. W. Boscheri, M. Tavelli, C.E. Castro, *An all Froude high order IMEX scheme for the shallow water equations on unstructured Voronoi meshes*, Applied Numerical Mathematics (CiteScore2022: **4.7**), 2023, 185, 311–336, DOI:10.1016/j.apnum.2022.11.022. (Citations: **5**, FWCI: **1.87**)
5. W. Boscheri, M. Tavelli, *High order semi-implicit schemes for viscous compressible flows in 3D*, Applied Mathematics and Computation (CiteScore2022: **7.9**), 2022, 434, 127457, DOI:10.1016/j.amc.2022.127457. (Citations: **14**, FWCI: **2.51**)
6. M. Tavelli, W. Boscheri, G. Stradiotti, G.R. Pisaturo, M. Righetti, *A mass-conservative semi-implicit volume of fluid method for the Navier–Stokes equations with high order semi-Lagrangian advection scheme*, Computers and Fluids (CiteScore2022: **6.0**) , 2022, 240, 105443, DOI:10.1016/j.compfluid.2022.105443. (Citations: **1**, FWCI: **0.16**)
7. W. Boscheri, M. Tavelli, L. Pareschi, *On the Construction of Conservative Semi-Lagrangian IMEX Advection Schemes for Multiscale Time Dependent PDEs*, Journal of Scientific Computing (CiteScore2022: **4.1**) , 2022, 90(3), 97, DOI:10.1007/s10915-022-01768-0. (Citations: **3**, FWCI: **0.34**)
8. W. Boscheri, M. Tavelli, N. Paoluzzi, *High order Finite Difference/Discontinuous Galerkin schemes for the incompressible Navier-Stokes equations with implicit viscosity*, Communications in Applied and Industrial Mathematics 2022, 13(1), pp. 21–38, DOI:10.2478/caim-2022-0003. (Citations: **5**, FWCI: **0.63**)
9. W. Boscheri, G. Dimarco, M. Tavelli, *An efficient second order all Mach finite volume solver for compressible Navier-Stokes equations*, Computer Methods in Applied Mechanics and Engineering (CiteScore2022: **11.6**), 2021, 374, 113602, DOI:j.cma.2020.113602. (Citations: **25**, FWCI: **2.22**)
10. A.A. Gabriel, D. Li, S. Chiocchetti, M. Tavelli, I. Peshkov, E. Romenski, M. Dumbser, *A unified first order hyperbolic model for nonlinear dynamic rupture processes in diffuse fracture zones*, Philosophical Transactions A (CiteScore2022: **8.1**), 379;20200130, 2021, DOI:10.1098/rsta.2020.0130 (Citations: **22**, FWCI: **3.21**)
11. M. Tavelli, S. Chiocchetti, E. Romenski, A.A. Gabriel, M. Dumbser, *Space-time adaptive ADER discontinuous Galerkin schemes for nonlinear hyperelasticity with material failure*, Journal of Computational Physics (CiteScore2022: **11.6**), 422, 2020, DOI:10.1016/j.jcp.2020.109758 (Citations: **19**, FWCI: **1.63**)
12. F. L. Romeo, M. Dumbser and M. Tavelli, *A novel staggered semi-implicit space-time discontinuous Galerkin method for the incompressible Navier-Stokes equations*, Communications on Applied Mathematics and Computations (CiteScore2022: **2.0** , 2020, DOI:10.1007/s42967-020-00077-3 (Citations: **2**, FWCI: **0.12**)
13. Boscheri, W., Dimarco, G., Loubère, R., Tavelli, M., Vignal, M.-H., *A second order all Mach number IMEX finite volume solver for the three dimensional Euler equations*, Journal of Computational Physics (CiteScore2022: **11.6**) , 415, 2020, DOI:10.1016/j.jcp.2020.109486 (Citations: **33**, FWCI: **2.21**)

14. M. Tavelli, S. Piccolroaz, G. Stradiotti, G. R. Pisaturo, M. Righetti, *A New Mass-Conservative, Two-Dimensional, Semi-Implicit Numerical Scheme for the Solution of the Navier-Stokes Equations in Gravel Bed Rivers with Erodible Fine Sediments*, Water (CiteScore2022: **5.5**), 12(3), 690, 2020, DOI:10.3390/w12030690 (Citations: **4**, FWCI: **0.26**)
15. S. Busto, M. Tavelli, W. Boscheri, M. Dumbser, *Efficient high order accurate staggered semi-implicit discontinuous Galerkin methods for natural convection problems*, Computers and Fluids (CiteScore2022: **6.0**), 2020, DOI:10.1016/j.compfluid.2019.104399 (Citations: **49**, FWCI: **4.25**)
16. A. Reinarz, D. E. Charrier, M. Bader, L. Bovard, M. Dumbser, K. Duru, F. Fambri, A.A. Gabirel, J.M. Gallard, S. Köppel, L. Krenz, L. Rannabauer, L. Rezzolla, P. Samfass, M. Tavelli, T. Weinzierl, *ExaHyPE: An engine for parallel dynamically adaptive simulations of wave problems*, Computer Physics Communications (CiteScore2022: **9.4**), 2020, DOI: 10.1016/j.cpc.2020.107251 (Citations: **42**, FWCI: **2.39**)
17. M. Tavelli, W. Boscheri, *A high-order parallel Eulerian-Lagrangian algorithm for advection-diffusion problems on unstructured meshes*, International Journal for Numerical Methods in Fluids (CiteScore2022: **3.8**), 1-16, 2019, DOI: 10.1002/fld.4756 (Citations: **12**, FWCI: **0.70**)
18. M. Tavelli, M. Dumbser, D.E. Charrier, L. Rannabauer, T. Weinzierl, M. Bader, *A simple diffuse interface approach on adaptive Cartesian grids for the linear elastic wave equations with complex topography*, Journal of Computational Physics (CiteScore2022: **11.6**), 386, 2019, pp 158-189, DOI: 10.1016/j.jcp.2019.02.004 (Citations: **21**, FWCI: **1.79**)
19. M. Dumbser, F. Fambri, M. Tavelli, M. Bader and T. Weinzierl, *Efficient implementation of ADER discontinuous Galerkin schemes for a scalable hyperbolic PDE engine*, Advanced Numerical Methods in Applied Sciences, 7, 63, 2018, DOI:10.3390/axioms7030063. (Citations: **39**, FWCI: **5.48**)
20. M. Dumbser, D.S. Balsara, M. Tavelli, F. Fambri, *A divergence-free semi-implicit finite volume scheme for ideal, viscous, and resistive magnetohydrodynamics*, International Journal for Numerical Methods in Fluids (CiteScore2022: **3.8**), 2019, DOI: 10.1002/fld.4681. (Citations: **44**, FWCI: **1.90**)
21. M. Tavelli and M. Dumbser, *Arbitrary high order accurate space-time discontinuous Galerkin finite element schemes on staggered unstructured meshes for linear elasticity*, Journal of Computational Physics (CiteScore2022: **11.6**), 366, 2018, pp 386-414, DOI: 10.1016/j.jcp.2018.03.038. (Citations: **20**, FWCI: **1.27**)
22. M. Dumbser, F. Fambri, I. Furci, M. Mazza S. Serra-Capizzano, M. Tavelli, *Staggered discontinuous Galerkin methods for the incompressible Navier–Stokes equations: Spectral analysis and computational results*, Numerical Linear Algebra with Applications (CiteScore2022: **3.4**), 25, 2018, DOI: 10.1002/nla.2151. (Citations: **23**, FWCI: **2.75**)
23. M. Tavelli and M. Dumbser, *A pressure-based semi-implicit space–time discontinuous Galerkin method on staggered unstructured meshes for the solution of the compressible Navier–Stokes equations at all Mach numbers*, Journal of Computational Physics (CiteScore2022: **11.6**), 341, 2017, pp 341-376, DOI: 10.1016/j.jcp.2017.03.030. (Citations: **88**, FWCI: **3.51**)
24. M. Tavelli and M. Dumbser, *A staggered space-time discontinuous Galerkin method for the three-dimensional incompressible Navier-Stokes equations on unstructured tetrahedral meshes*, Journal of Computational Physics (CiteScore2022: **11.6**), 319, 2016, pp 294-323, DOI: 10.1016/j.jcp.2016.05.009. (Citations: **78**, FWCI: **3.01**)
25. M. Tavelli and M. Dumbser, *A staggered space-time discontinuous Galerkin method for the incompressible Navier-Stokes equations on two-dimensional triangular meshes*, Computers and Fluids (CiteScore2022: **6.0**), 119, 2015, pp 235-249, DOI: 10.1016/j.compfluid.2015.07.003 (Citations: **42**, FWCI: **3.39**)
26. M. Tavelli and M. Dumbser, *A staggered semi-implicit discontinuous Galerkin method for the two dimensional incompressible Navier–Stokes equations*, Applied Mathematics and Computation (CiteScore2022: **7.9**), 248, 2014, pp 70-92, DOI: 10.1016/j.amc.2014.09.089. (Citations: **52**, FWCI: **2.88**)

27. M. Tavelli and M. Dumbser, *A high order semi-implicit discontinuous Galerkin method for the two dimensional shallow water equations on staggered unstructured meshes*, Applied Mathematics and Computation (CiteScore2022: **7.9**), 234,2014,pp 623-644, DOI: 10.1016/j.amc.2014.02.032 (Citations: **57**, FWCI: **3.96**)
28. M. Tavelli, M. Dumbser and V. Casulli, *High resolution methods for scalar transport problems in compliant systems of arteries*, Applied Numerical Mathematics (CiteScore2022: **4.7**), 74, 2013, pp 62-82, DOI: 10.1016/j.apnum.2013.06.009 . (Citations: **11**, FWCI: **1.10**)

Conferences Speaker in the following conferences:

- 10th International UnTRIM Users Workshop, Trento 27-29 May 2013
Title: *A high order semi-implicit discontinuous Galerkin method for the two dimensional Shallow Water Equations on unstructured staggered non-orthogonal grids*
- Modelling of Physiological Flows, Sardegna 11-14 June 2013
Title: *High resolution methods for advection-diffusion problems in compliant arterial systems*
- 11th International UnTRIM Users Workshop, Trento 19-21 May 2014
Title: *A staggered semi-implicit discontinuous Galerkin method for the two dimensional shallow water and incompressible Navier-Stokes equations*
- XX International Conference on Computational Methods in Water Resources, Stoccarda 10-13 June 2014
Title: *A high order semi-implicit discontinuous Galerkin method for the two dimensional shallow water equations on staggered unstructured meshes*
- International Conference on Spectral and High Order Methods, Salt Lake City (Utah) 23-27 June 2014
Title: *A staggered semi-implicit discontinuous Galerkin method for the two dimensional incompressible Navier-Stokes equations*
- European Workshop on High Order Nonlinear Numerical Methods for Evolutionary PDEs: Theory and Applications, Trento 16-20 March 2015
Title: *A staggered semi-implicit arbitrary high order discontinuous Galerkin method for the two dimensional incompressible Navier-Stokes equations*
- High order reconstruction and well balancing techniques for hyperbolic conservation and balance laws, Torino 15-16 April 2015
Title: *A staggered semi-implicit arbitrary high order discontinuous Galerkin method for the incompressible Navier-Stokes equations*
- 12th International UnTRIM Users Workshop, Trento 18-20 May 2015
Title: *A staggered arbitrary high order discontinuous Galerkin method for the two and three-dimensional incompressible Navier-Stokes equations*
- Numerical approximations of hyperbolic systems with source terms and applications, Cortona 14-20 June 2015
Title: *A staggered semi-implicit arbitrary high order discontinuous Galerkin method for the incompressible Navier-Stokes equations*
- 13th International UnTRIM Users Workshop, Trento 30 May- 1 June 2016
Title: *A staggered space-time discontinuous Galerkin method for the three-dimensional incompressible Navier-Stokes equations on unstructured tetrahedral meshes*

- ECCOMAS Congress 2016, Creta 5-10 June 2016
Title: A staggered arbitrary High Order semi-implicit discontinuous Galerkin method for the incompressible Navier-Stokes equations
- 19th European Conference on Mathematics for Industry, Santiago de Compostela 13-17 June 2016
Title: A staggered space-time discontinuous Galerkin method for the three-dimensional incompressible Navier-Stokes equations on unstructured tetrahedral meshes
- Honom 2017, Stoccarda, 27-31 March 2017
Title: A multi-dimensional, all Mach-number, arbitrary high order space-time discontinuous Galerkin method for the compressible Navier-Stokes equations on staggered unstructured meshes
- 19th International Conference on Finite Elements in Flow Problems, Roma, 5-7 April 2017
Title: A multi-dimensional, all Mach-number, arbitrary high order space-time discontinuous Galerkin method for the compressible Navier-Stokes equations on staggered unstructured meshes
- 14th International UnTRIM Users Workshop, Trento 15-17 May 2017
Title: A pressure-based semi-implicit space-time discontinuous Galerkin method for the compressible Navier-Stokes equations
- Equadiff 2017, Bratislava, 24-28 July 2017
- 4th Congreso de jóvenes investigadores, Valencia, 4-8 September 2017
Title: An arbitrary high order space-time DG method for the compressible Navier-Stokes equations on unstructured meshes
- 4th Congreso de jóvenes investigadores, Valencia, 4-8 September 2017
Title: A semi-implicit discontinuous Galerkin method on staggered unstructured meshes for the solution of the compressible Navier–Stokes equations at all Mach numbers
- Shark-FV 2018 conference, Minho, Portugal, 21-25 May 2018
Title: High order numerical schemes for linear elasticity
- 15th International UnTRIM Users Workshop, Trento 28-30 May 2018
Title: Arbitrary high order DG Galerkin finite element schemes on staggered unstructured meshes for linear elasticity
- SIMAI 2018, Roma, 2-6 July 2018
Title: High order numerical schemes for linear elasticity
- HONOM 2019, Madrid, 1-5 April 2019
Title: High order numerical schemes for linear and non-linear elasticity
- Shark-FV 2019 conference, Minho, Portugal, 20-24 May 2019 (only attended)
- CIAM 2019, Valencia, 15-19 July 2019
Title Talk 1: A high order parallel Eulerian-Lagrangian algorithm for advection-diffusion problems on unstructured meshes

Title Talk 2: High order numerical schemes for linear elasticity and dynamic rupture propagation
- 18th International UnTRIM Users Workshop, Trento 11-13 May 2021
Title: On the construction of conservative semi-Lagrangian IMEX schemes for hyperbolic balance laws
- 19th International UnTRIM Users Workshop, Trento 13-15 June 2022
Title: High order semi-implicit schemes for viscous compressible flows in 3D
- GIMC SIMAI YOUNG 2022. Pavia 29-30 September 2022
Title: A high order parallel semi-implicit DG scheme for linear elasticity on staggered unstructured meshes

- SIAM CSE23. Amsterdam (Nederland), February 26 - March 3 2023
Title: Asymptotic Preserving IMEX Schemes for the Shallow Water Equations on Unstructured Meshes
- 20th International UnTRIM Users Workshop, Trento 12-14 June 2023
Title: On the construction of ph-adaptive staggered DG algorithms and implementation on GPUs
- Convegno biennale GNCS, Rimini 14-16 February 2024
Title: Metodi avanzati per la risoluzione di PDEs su griglie strutturate, e non
- 3rd ProHyp2024, Trento, 22-26 April 2024
Title: A new class of efficient high order semi-Lagrangian IMEX-DG methods on staggered unstructured meshes
- Shark-FV conference, Minho, Portugal, 26-31 May 2024
Title: A new class of efficient high order semi-Lagrangian IMEX-DG methods on staggered unstructured meshes
- 21th UnTRIM workshop, Trento 10-12 June 2024
Title: Semi-implicit methods for anomaly detection in systems of compliant elastic pipes
- I organized the online-workshop titled "2nd Workshop on the use of Numerical Analysis in Engineering", Bolzano, 15 Mar 2023, see <https://www.unibz.it/it/events/141972-2nd-workshop-on-the-use-of-numerical-analysis-in-engineering>
Title: On the construction of ph-adaptive staggered DG algorithms and implementation on GPUs

Visiting

- University of Verona, 5 June 2024
Presentation: On the construction of compact high-order semi-implicit DG schemes and applications

Projects and resources Member of the following projects for which we have gained access to the SuperMUC super-computer in Munich, the HazelHen system in Stuttgart and the Marconi supercomputer in Italy:

- 2012-2013, STiMulUS project, 6th call nr. 2012071312, SuperMUC, Granted 3 million core-h
- 2013-2014, STiMulUS project, 8th call nr. 2013091889, SuperMUC, Granted 8 million core-h
- 2014-2015, STiMulUS project, 10th call nr.2014112638, SuperMUC, Granted 8 million core-h
- 2016-2017, HOSTELDG project, call for Tier1 HPC Access at HLRS, Granted 9 million core-h
- 2017-2018, HOMCoG project, ISCRA class C project, Granted 0.4 million core-h
- 2018-2019, ExaHyPE project, 19th call for GCS large-scale projects, SuperMUC, Granted 18 million core-h

Other projects

- P.I. In the 2023 GNCS research project "Metodi avanzati per la risoluzione di PDEs su griglie strutturate, e non", 5150€
- Co P.I., PRIN project TANDEM (Oct 2024- Mar 2025)
- Member, ERC project ALcHyMiA (Apr 2025-)

Abilitations I got the *Abilitazione scientifico Nazionale (ASN)* in the following sectors:

- 01/A5 Analisi Numerica - Seconda fascia (GSD24 01/MATH-05) , valid from 09/11/2020 to 09/11/2031
- 09/A1 Ingegneria Aeronautica, Aerospaziale e Navale - Seconda fascia , valid from 10/11/2020 to 10/11/2031

Prizes and awards

- Award for the best PhD thesis in Mathematics, academic year 2016-2017, University of Trento.
- Finalist of the ECMI Anile prize 2018 competition for the best PhD thesis.
- Winner of the INDAM contribution "Finanziamento Giovani Ricercatori 2019-2020", total contribution amount 1200€

Other projects

- Rank B at the first stage in 2021, starting grant ERC project "OPTIMUM"
- Rank B at the first stage in 2025, consolidator grant ERC project "INTERMESH"