

# Eric Puntel

## Address / Contact

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Scopus profile: <https://www.scopus.com/authid/detail.uri?authorId=15023049500>

## Current position

12/2022– Associate Professor of Mechanics of Materials  
 (“Scienza delle Costruzioni”) at the University of Udine

## Past appointments

09/2009–11/2022 Assistant Professor of Mechanics of Materials  
 (“Scienza delle Costruzioni”) at the University of Udine

09/2006–10/2008 Research contract at the University of Udine  
Supervisor: Prof. Cesare Davini  
Theme: Asymptotic models in elasticity.

05/2005–08/2006 Research contract at the University of Udine  
Supervisor: Prof. Marcello Riuscetti  
Project: Seismic reclassification of the Friuli Venezia Giulia region

## Research periods abroad

07/2022 Visiting appointment at the Mechanical Engineering Department of the  
Massachusetts Institute of Technology, Cambridge, MA, USA. Duration: 3  
weeks.

07/2018 Research period at the Mechanical Engineering Department of the  
Massachusetts Institute of Technology, Cambridge, MA, USA. Duration: 2  
weeks.

11/2012 Visiting Scholar at the Mechanical Engineering Department of  
McGill University, Montreal (Quebec), Canada. Duration: 1 month.

10/2011 Visiting Scholar at the Mechanical Engineering Department of the  
University of Washington, Seattle, WA, USA. Duration: 2 months.

11/2009 Visiting Scholar at the Mechanical Engineering Department of  
McGill University, Montreal (Quebec), Canada. Duration: 13 months.

## Education

03/2001–05/2004 Ph. D. in Structural Engineering at the Politecnico di Milano.

10/1998–09/2000 Master in Civil Engineering at the University of Tokyo.  
Mark: A

10/1994–10/2000 Graduation in Civil Engineering at the Politecnico di Milano.  
Mark: 100/100 cum laude

## Present and past research interests

For each of these topics at least one paper has been published or is about to be published.

2019-	Dynamical, experimental characterization of structures. In collaboration with A. Morassi (Uniud).
2018-	Coupling between mechanics and surface growth in soft matter. Study of simple systems and of their stability. In collaboration with R. Abeyaratne (MIT) and G. Tomassetti (U. Roma Tre).
2019-2023	Component method based model of base plate connections in steel racks. In collaboration with Nadia Baldassino (U. Trento).
2014-2017	Characterization of configuration changes in gels and other soft materials to be exploited for sensing and actuating purposes. In collaboration with P. Nardinocchi (Spaienza Roma).
2010-2013	Structural stability of thin films. Predictions of amplitude and wavelength of wrinkling modes usable in the design of smart devices that exploit buckling. In collaboration with Eliot Fried (Mc Gill, Canada).
2007-2009	Asymptotic models in elasticity. Consistent derivation of structural models by Gamma convergence. In collaboration with C. Davini (Udine) and R. Paroni (Sassari).
2005-2008	Constitutive modelling and experimental characterization of joints and interfaces in quasi-brittle materials. Application: discontinuity surfaces in concrete dams. Continuation of the Ph.D. thesis. In collaboration with V.E. Saouma (U. Colorado, USA) and G. Bolzon (PoliMI).

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## Publications

### Journal articles

05/2023	R. Romeo, E. Puntel, S. Pierobon, N. Baldassino, Component method applied to base plate connections of steel racks, <i>J. Constr. Steel Res.</i> .
11/2022	R. Abeyaratne, E. Puntel, G. Tomassetti, On the Stability of Surface Growth: The Effect of a Compliant Surrounding Medium, <i>J. Elasticity</i> .
10/2022	R. Abeyaratne, E. Puntel, G. Tomassetti, An Elementary Model of Focal Adhesion Detachment and Reattachment During Cell Reorientation Using Ideas from the Kinetics of Wiggly Energies, <i>J. Elasticity</i> .
10/2022	R. Abeyaratne, E. Puntel, F. Recrosi, G. Tomassetti, Surface accretion of a pre-stretched half-space: Biot's problem revisited, <i>J. Mech. Phys. Solids</i> , 167 104958.
06/2022	M. Dilena, M. Fedele Dell'Oste, A. Gubana, A. Morassi, E. Puntel, Dynamic Testing in Support of the Seismic Assessment of a Century Old Masonry Building Complex, <i>Buildings</i> , 12(6) 805.

- 05/2021 M. Dilena, M. Fedele Dell'Oste, A. Gubana, A. Morassi, F. Polentarutti, E. Puntel, Structural survey of old reinforced concrete elevated water tanks in an earthquake-prone area, *Eng. Struct.*, 234 111947
- 08/2020 R. Abeyaratne, E. Puntel, G. Tomassetti, Treadmilling stability of a one-dimensional actin growth model, *Int. J. Solids Struct.*, 198 87 – 98.
- 11/2017 P. Nardinocchi, E. Puntel, Swelling–induced wrinkling in layered gel beams, *Proc. Royal Soc. A*, 473(2207) 20170454.
- 11/2017 P. Nardinocchi, E. Puntel, Unexpected hardening effects in bilayered gel beams, *Meccanica*, 52 3471-3480.
- 10/2017 M. Curatolo, P. Nardinocchi, E. Puntel, L. Teresi, Transient instabilities in the swelling dynamics of a hydrogel sphere, *J. Appl. Phys.*, 122(14) 145109.
- 07/2016 P. Nardinocchi, E. Puntel, Finite bending solutions for layered gel beams, *Int. J. Solids Struct.*, 90 228-235.
- 03/2012 T. Kim, E. Puntel, E. Fried, Numerical study of the wrinkling of a stretched thin sheet, *Int. J. Solids Struct.*, 49(5) 771-782.
- 11/2011 E. Puntel, L. Deseri, E. Fried, Wrinkling of a stretched thin sheet, *J. Elasticity* 105(1) 137-170.
- 03/2011 D. Slejko, G. B. Carulli, M. Ruscetti, F. Cucchi, S. Grimaz, A. Rebez, F. Accaino, A. Affatato, S. Biolchi, D. Nieto, E. Puntel, T. Sanò, M. Santulin, U. Tinivella, L. Zini, Soil characterization and seismic hazard maps for the Friuli Venezia Giulia region (NE Italy), *B. Geofis. Teor. Appl.*, 52(1) 59 – 104.
- 11/2008 C. Davini, R. Paroni, E. Puntel, An asymptotic approach to the torsion problem in thin walled beams, *J. Elasticity*, 93(2) 149 – 176.
- 09/2008 E. Puntel, V.E. Saouma, Experimental Behavior of Concrete Joint Interfaces under Reversed Cyclic Loading, *J. Struct. Eng. - ASCE*, 134(9) 1558 – 1568.
- 08/2008 C. Davini, R. Paroni, E. Puntel, An asymptotic approach to the torsion problem in thin rectangular domains, *Meccanica*, 43(4) 429 – 435.
- 11/2006 E. Puntel, G. Bolzon, V.E. Saouma, A Fracture Mechanics Based Model for Joints Under Cyclic Loading, *J. Eng. Mech. - ASCE*, 132(11) 1151 – 1159.

### Editorials

- 06/2020 E. Fried, E. Puntel, Thematic issue of Mechanics of Materials: Mechanics, chemistry, and thermodynamics of gels, *Mechanics of Materials*, doi: 10.1016/j.mechmat.2020.103353 .

### Conference proceedings

- 09/2020 R. Abeyaratne, E. Puntel, G. Tomassetti, Mechanics of surface growth: Stability of 1d and 2d treadmilling systems, *24th AIMETA Congress of Theoretical and Applied Mechanics*, Rome.
- 09/2011 E. Puntel, L. Deseri, E. Fried Wrinkling of a stretched thin sheet, *20th AIMETA Congress of Theoretical and Applied Mechanics*, Bologna.

- 06/2008 E. Puntel, V.E. Saouma, Experimental Behaviour of Concrete Joints Under Reversed Cyclic Loading, *AMCM'2008 "Analytical Models and New Concepts in Concrete and Masonry Structures"*, Łódź (Poland).
- 09/2007 C. Davini, R. Paroni, E. Puntel, A  $\Gamma$ -convergence approach to the torsion problem in thin-walled beams, *18th AIMETA Congress of Theoretical and Applied Mechanics*, Brescia.
- 03/2005 E. Puntel, G. Bolzon and V.E. Saouma, An experimental and numerical investigation of concrete dam joints, *Proceedings 11th International Conference on Fracture (ICF)*, Torino.
- 06/2001 Y. Nakagawa, E. Puntel and H. Horii, A displacement rate dependent softening model applied to the unstable propagation of shear crack in soft rock, *Proceedings IUTAM Symposium on Analytical and computational fracture mechanics of non-homogeneous materials*, Cardiff University (UK).

### Co-authored technical reports

- 11/2006 "Riclassificazione Sismica del Friuli Venezia Giulia - III fase". Coordinator: Prof. Marcello Ruscetti (University of Udine). Funding: Protezione Civile del Friuli – Venezia Giulia. Contribution: 1D and 2D modelling of local seismic response.
- 04/2006 Virtual reality simulation of the Venzone Duomo collapse after the May 6th 1976 Friuli earthquake. Coordinator: Prof. Marcello Ruscetti (University of Udine). Contribution: Graphical reconstruction in three dimensions of the Venzone Duomo masonry walls and dynamic simulation of the collapse.
- 12/2005 "Modelli di interfaccia per giunti artificiali e naturali per analisi diagnostiche e sismiche". Siset Project, sub-project SIDI (Dam safety and auxiliary works). Funding: CESI Ricerca di Sistema. Scientific coordinator: Prof. Giulio Maier (Politecnico di Milano). Contribution: Co-author. Development of interface model.

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## Talks

### Conferences and meetings with abstract only

- 04/2022 E. Puntel, R. Abeyaratne, G. Tomassetti, F. Recrosi, Surface accretion of a pre-stretched half-plane: Biot's problem revisited, *EMMC18, 18th European Mechanics of Materials Conference*, Oxford (UK).
- 07/2019 R. Abeyaratne, E. Puntel, G. Tomassetti, Mechanics of surface growth: stability of a 1D actin treadmilling system, *Biomech 2019, Sino-Italian Workshop on Biomechanics*, Roma.
- 10/2018 E. Puntel, From smart actuators to polymer electrolyte membranes: diverse applications of a stress diffusion model, *SES 2018, Society of Engineering Science, 55th Annual Technical Meeting*, Madrid (Spain).

- 09/2017 M. Curatolo, P. Nardinocchi, E. Puntel, Archetypal sensing and actuation in soft gel beams, *23rd AIMETA Congress of of Theoretical and Applied Mechanics*, Salerno (Italy).
- 05/2017 P. Nardinocchi, E. Puntel, Flexure and buckling actuation in bilayer gel beams, *DeMEASS VIII, Design Modelling and Experiments of Advanced Structures and Systems*, Moscow (Russia).
- 09/2015 P. Nardinocchi, M. Pezzulla and E. Puntel, Swelling-induced elastic instabilities in geometric composites, *22nd AIMETA Congress of of Theoretical and Applied Mechanics*, Genoa (Italy).
- 06/2013 E. Puntel, E. Fried, T.-Y. Kim, Wrinkling of a stretched thin sheet, "*SIAM Conference on Mathematical Aspects in Material Science*", Philadelphia, PA (USA).
- 05/2013 E. Puntel, E. Fried, Wrinkling of a lipid vesicle in an electric field, "*Thirteenth Pan-American Congress of Applied Mechanics*", Houston, TX, (USA).
- 09/2011 E. Puntel, L. Deseri, E. Fried, Wrinkling of a stretched thin sheet, *ICMM "2nd International Conference on Material Modelling"*, Paris (France).
- 02/2011 E. Puntel, V.E. Saouma, Experimental behaviour of concrete joints interfaces under reversed cyclic loading, *GMA 2011 "5th Meeting of the AIMETA Materials' Group"*, Udine (Italy).
- 09/2009 E. Puntel, Lumped Strain Method for thin plates: a numerical appraisal *ICMM "1st International Conference on Material Modelling"*, Dortmund (Germany).
- 10/2008 P. Malisan, S. Grimaz, M. Riuscetti, F. Barazza, E. Puntel, R. Carniel, E. Del Pin, M. Di Cecca, Utilization of passive seismic methods for a rapid dynamical characterization of structures: the Salt bridge case study *Gruppo Nazionale di Geofisica della Terra Solida, 27th National Congress*, Trieste (Italy).
- 11/2007 D. Slejko, G.B. Carulli, M. Riuscetti, A. Affatato, S. Biolchi, A. Bratus, G. Burelli, F. Cucchi, E. Del Pin, S. Grimaz, D. Nieto, E. Puntel, A. Rebez, T. Sanò, M. Santulin, U. Tinivella, L. Zini, Site Effects Applied to Seismic Hazard Estimates for the Friuli-Venezia Giulia Region (N.E. Italy) *Gruppo Nazionale di Geofisica della Terra Solida, 26th National Congress*, Rome (Italy).
- 02/2007 C. Davini, R. Paroni, E. Puntel, On the torsion problem in thin rectangular domains, *1st Meeting of the AIMETA Materials' Group*, Trento (Italy).
- 02/2005 V.E. Saouma, J. Červenka, E. Puntel, T. Shimpo, Discrete Crack Models: from Theory to Dam Engineering, *EUROMECH Colloquium 460 "Numerical Modelling of Concrete Cracking"*, Università di Innsbruck (Austria).

### **Seminars, workshops and invited talks**

- 09/2021 Surface growth of a pre-stretched half-plane: Biot's problem revisited, *Active Materials: from Mechanobiology to Smart Devices*, Cortona (AR), Italy.
- 08/2017 Flexure and buckling actuation in bilayer gel beams, *INdAM Meeting of Mathematical Physics of Living Systems*, Cortona (AR), Italy.

- 11/2016 Hard facts on soft actuators, “*Recent Advances in the Mechanics of Materials*”, Dip.to di Architettura, Università di Sassari, Alghero (SS), Italy.
- 11/2016 Hard facts on soft actuators, “*Mechanics and Mathematics of (soft) Materials and Structures @ DISG*”, Dip.to di Ingegneria Strutturale e Geotecnica, Sapienza Università di Roma, Italy.
- 05/2013 E. Puntel, E. Fried, Wrinkling of a lipid vesicle in an electric field, “*Multi-Scale Modeling and Characterization of Innovative Materials and Structures*”, Cetara (SA), Italy
- 02/2013 E. Puntel, E. Fried, Wrinkling in stretched sheets and in lipid vesicles subject to electric fields, “*Mathematics and Mechanics of Biological Assemblies and Soft Tissues, second national meeting*”, Università Roma Tre, Rome, Italy.
- 12/2011 Wrinkling of a stretched thin sheet, “*ME Fall 2011 Seminars*”, Mechanical Engineering Department, University of Washington, Seattle (USA).
- 10/2011 Wrinkling of a stretched thin sheet, “*Advances in the Science of Solids and Engineering Mechanics*”, workshop of the Italian branch of the “Society for Natural Philosophy”, SISSA, Trieste (Italy).
- 11/2004 V.E. Saouma, J. Červenka, E. Puntel, V. Slowik , Modeling of Joints: tests, models, applications, *Workshop on Interface Models*, Universitat Politècnica de Catalunya, Barcelona (Spain).

### Posters

- 08/2018 E. Puntel, Swelling induced actuation of thin gel beams and sheets , *Solvay Workshop “Mechanics of slender structures in physics, biology and engineering: from failure to functionality*”, Bruxelles (Belgium).
- 04/2007 F. Barazza, R. Carniel, E. Del Pin, M. Di Cecca, S. Grimaz, P. Malisan, E. Puntel, M. Ruscetti, Site effects estimation for the seismic reclassification of Friuli Venezia Giulia (Italy), *General Assembly of the European Geosciences Union*, Vienna (Austria).
- 09/2006 F. Barazza, R. Carniel, P. Cesario, E. Del Pin, M. Di Cecca, E. Fabris, S. Grimaz, P. Malisan, L. Martin, E. Puntel, M. Ruscetti, Towards an Integrated Methodology for Site Effects Estimation, *ECEES 2006 First European Conference on Earthquake Engineering and Seismology*, Ginevra (Svizzera).

## Research

### Current research projects

- PRIN 2022 “Stability in statics and dynamics of innovative structural and material systems”, unit of the University of Udine. National coordinator: Prof. Carmelo Maiorana (U. Padova). Local Coordinator: Prof. Antonino Morassi. Duration: 09/2022-09/2024. Role: member of local unit.
- ESPeRT University “strategic plan”. Task 1.2: “Resilienza delle infrastrutture e dei sistemi territoriali in aree a rischio”. Number of task participants: 21. Task funding: 170900€. Duration: 01/2023-12/2025. Role: participant.

### Completed research projects

- JRC-FVG 2021 “Numerical simulations of human brain vulnerability to blast loading”. Collaboration between EU’s Joint Research Center and the Friuli Venezia Giulia Region. Duration: 6/2021-6/2022. Amount: 30748€. Role: PI.
- MIT-FVG 2017 “Growth matters”. Collaboration between the Massachusetts Institute of Technology and Friuli Venezia Giulia region. PIs: R. Abeyaratne (MIT) and E. Puntel. Duration: 01/2018-08/2022. Amount: 19000 \$.
- GNFM 2018 “Hydrogel Actuators”. Small project funded by the Italian National Group of Mathematical Physics (GNFM). Amount: 2500 €. Participants: E. Puntel, D. Battista (Sapienza), M. Curatolo (Roma Tre) and S. Gabriele (Roma Tre). Duration: 1 year. Role: coordinator.
- PRIN 2017 “Mathematics of active materials: From mechanobiology to smart devices”, Roma Tre University unit. National coordinator: Prof. Luigi Preziosi (Politecnico di Torino). Local Coordinator: Prof. Luciano Teresi (Roma Tre). Duration: 03/2019-03/2022. Role: member of local unit.
- PRIN 2015 “Identificazione e diagnostica di sistemi strutturali complessi”, unit of the University of Udine. National coordinator: Prof. Fabrizio Vestroni (Sapienza). Local coordinator: Prof. Antonino Morassi. Role: member of local unit.
- GNFM 2014 “Wrinkling of bilayer gel beams”. Small project funded by the Italian National Group of Mathematical Physics (GNFM). Amount: 1600 €. Participants: E. Puntel and M. Pezzulla (Sapienza). Duration: 1 year. Role: coordinator.
- GNFM 2012 “Modelling of thin structures for nano- and bio-materials”. Small project funded by the Italian National Group of Mathematical Physics (GNFM). Amount: 2000 €. Participants: E. Puntel and A. Favata (Sapienza). Role: coordinator.
- PRIN 2008 “Materiali complessi e modelli strutturali in problemi avanzati dell’ingegneria”, unit of the University of Udine. National and local coordinator: Prof. Cesare Davini (Udine). Role: member of local unit.
- PRIN 2005 “Modellazione e tecniche di approssimazione in problemi avanzati di meccanica dei materiali e delle strutture”, unit of the University of Udine. National and local coordinator: Prof. Cesare Davini (Udine). Role: member of local unit.

PRIN 2002 “Sistemi diga in calcestruzzo, fondazione e bacino: analisi di integrità strutturale in presenza di interazioni”, unit of Politecnico di Milano. National and local coordinator: Prof. Giulio Maier (PoliMI). Role: member of local unit.

### **Technical consulting**

Fabre Contract with inter-university consortium Fabre for the evaluation and inspection of Anas (state owned) bridges and viaducts. Duration: 12/2021-6/2023. Amount: 11200€. Role: contractor.

03/2014 “Analisi del collasso per instabilità di profili commerciali in acciaio formati a freddo, forati a passo regolare e soggetti a compressione semplice”. Funding: Modulblok S.p.A. Contract amount: 3000€. Role: contractor

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### **Service as editor, reviewer and organizer**

#### **Editorial activity**

2023– Member of the editorial board of the Journal of Elasticity (Springer)

07/2023–07/2024 Guest editor with Paola Nardinocchi and Giuseppe Zurlo of the Journal of Elasticity for a special issue entitled “Mechanics of growth in biology”

02/2019–02/2020 Guest editor with Eliot Fried for the journal “Mechanics of Materials” (Elsevier) for a special issue entitled “Mechanics, chemistry, and thermodynamics of gels”.

#### **Reviewing activity**

reviewing activity carried out for the following journals and research institutions:

- Journal of Engineering Mechanics (ASCE)
- Journal of Structural Engineering (ASCE)
- Journal of Testing and Evaluation (ASTM)
- Composites B (Elsevier)
- Computer-Aided Design (Elsevier)
- Engineering Structures (Elsevier)
- International Journal of Non-Linear Mechanics (Elsevier)
- International Journal of Solids and Structures (Elsevier)
- Journal of Elasticity (Springer)
- Journal of Mechanics of Materials and Structures (Mathematical Science Publishers)
- Journal of Vibration and Control (SAGE)
- Meccanica (Springer)
- Mechanical Systems and Signal Processing (Elsevier)
- Ministero dell’Istruzione, Università e Ricerca (MIUR)
- Technology Agency of the Czech Republic (TACR)
- Archive of Applied Mechanics (Springer)
- Journal of Constructional Steel Research (Elsevier)

## Organizing activity

02/2024	Member of the scientific committee of the II Convegno del Consorzio Fabre, Genova, February 12th to 15th, 2024.
12/2023	Co-organizer of the invitation-only workshop Continuum mechanics dialogues in Udine, December, 4th-5th, 2023.
02/2011	Co-organizer of the fifth meeting of the AIMETA Materials Group, Udine, February 23rd-24th 2011.

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## Teaching

### Teaching experience

09/2015–	Statics for Architecture students at the University of Udine
03/2015	Plasticity and Stability of Structures delivered in English to Civil Engineering students at the University of Udine
09/2017–09/2020	Strength of Materials for Architecture students at the University of Udine
03/2015–09/2015	Mechanics of Materials for Architecture students at the University of Udine
03/2011–03/2015	Fracture Mechanics for Civil Engineering students at the University of Udine
03-2011–03/2015	Mechanics of Materials for Civil Engineering students at the University of Udine
01/2008–07/2009	Lecturer (“Docente a contratto”) of Mechanics of Materials for Environmental Engineering students at the University of Udine.
01/2005–07/2009	Tutorials of Mechanics of Materials for Civil and Environmental Engineering Courses at the University of Udine (Prof. Cesare Davini).
09/2001–09/2003	Tutorials of Mechanics of Materials II (i.e. limit analysis and finite elements) for Civil Engineering Courses at the Politecnico di Milano (Prof. Alberto Corigliano).
11/2000–06/2004	Tutorials of Mechanics of Materials for Civil and Mechanical Engineering Courses at the Politecnico di Milano (Prof. Gabriella Bolzon, Prof. Osvaldo De Donato).

### Supervised theses

Twenty-two master and bachelor thesis supervised since the appointment as assistant professor in Udine:

- 4 master theses in Civil Engineering,
  - 13 bachelor theses in Civil Engineering and
  - 5 bachelor theses in Architectural Sciences.
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## Academic assignments

### Current

- 2022- Member of the “commissione didattica” (student curricula commission) for Civil Engineering at the University of Udine
- 2018- U. of Udine DPIA department representative for the IFTS (one year post high school specialization) construction sector courses of the Friuli Venezia Giulia region.
- 2018- U. of Udine representative for the EuMaT “European Technology Platform for Advanced Engineering Materials and Technologies”.
- 2018- In charge of the “Structural and solid mechanics lab” of the DPIA department at the Univ. of Udine, used jointly with Prof. Morassi.

### Completed

- 2019-2021 Member of the entrance test commission for the Degree in Architectural Sciences in 2019, 2020 and 2021.
- 2017-20 Tutor of the SUPE, Scuola Superiore of the University of Udine from 2018 to 2020 and member of the commission for the admission examination in 2017, 2018 e 2020.
- 2014 Former Civil Engineering Dept. (DICA) delegate for curriculum counseling and tutoring

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## Other

### Ph.D. Thesis recognitions

- 06/2005 Named by AIMETA (Italian Association of Theoretical and Applied Mechanics) as finalist in the selection process of “ECCOMAS Ph.D. Award” for the best Ph.D. thesis of 2004 in Computational Methods for Applied Sciences and Engineering.

### Foreign languages

- English Passed the “Certificate of Proficiency in English” with mark B in June 1995 and the “Test of English as a Foreign Language” (TOEFL) in March 1997 scoring 627.
- Japanese Level 3 of the “Japanese Language Proficiency Test” passed in December 1999 scoring 374/400.
- French basic skills.

Udine, June 27th 2023