Decree of the Rector n. 613 of 22/08/2023
Competition for awarding 1 research grant at the University of Udine

DISCLAIMER:
The official and legally binding call for applications is in Italian only. This document cannot be used for legal purposes and is only meant to provide information in English on the call for applications (Decree of the Rector n. 613 of 22/08/2023). Please refer to the official call published on: https://www.uniud.it/it/albo-ufficiale

Any change and integration will be made available on the above mentioned web page. Therefore, no personal written communication regarding the examination date and/or competition results shall be provided to applicants.

Annex 1

Competition announcement for the assignment of 1 research grant at the University of Udine, entitled “Tuneable Structured Fabrics” SSD: ING-INF/04 (principal investigator, Paolo Gardonio)

Research grant funded by the resources of the project PRIN 2022 - Prot. n. 20223X5S37

Art. 1
A selection procedure is hereby launched for the award of 1 research grant at the University of Udine, as identified in Attachment A which constitutes an integral part of the present announcement. The research grant is linked to the research project and is subject and conditioned upon the relative funding.
The fellowship may be renewed, in compliance with Art. 22, Law No. 240 of 30 December 2010 (as in the text in force before the implementation of the Conversion Law of the D.L. 36/2022, L. 79/2022), Law No. 11 of 27 February 2015, and the current regulations of the University of Udine for awarding research grants, issued with the Rector’s Decree No. 182 of 31 March 2021. The renewal is subject to the scientific coordinator’s positive assessment of the researcher’s activities, an adequate scientific rationale, and a corresponding financial covering.

The research fellowship does not give rise to any right with regards to accessing University posts.
Any personal communication to candidates related to this selection will be sent exclusively to the email address indicated when registering for the selection, as mentioned in Art. 5.

Art. 2
The research grant described in this competition announcement and the required qualifications to apply for the position are identified in Attachment A. The lack of the admission requirements leads to the automatic exclusion from the competition procedure.
Possession of a PhD or equivalent degree obtained abroad or, only for the interested areas, of a medical specialization accompanied by an adequate scientific production, constitutes a preferential qualification for awarding the research fellowship of this selection, if it has not been provided as a mandatory requirement.
For the only purpose of the admission to the competition, the Examining Board (Art. 7) shall assess the equivalence of the qualification obtained abroad, except for the evaluation of the medical specialization qualification to which Article 38 of the Legislative Decree 165/2001 and subsequent modifications and additions, and EU regulations on the matter, shall be applied.

The Examining Board will proceed to the evaluation of the qualification obtained abroad according to the documentation attached to the application form. The Examining Board may exclude the candidate if the submitted documentation does not provide sufficient information for the assessment. Therefore, applicants must enclose all the documentation in their possession relating to their qualification in order to provide the Examining Board with sufficient information for assessment.

Candidates holding a qualification issued by a European Research Area country, if successful, must submit, if not already attached to the application form one of the following options:
- Supplement Diploma in English issued by the competent University.
- CIMEA Certificate of comparability of the foreign qualification, issued by CIMEA (Information Centre on Academic Mobility and Equivalence) via the "diplome" service at https://cimea.diplo-me.eu/udine/#/auth/login

Candidates holding a qualification issued by a non-European Research Area country, if successful, must submit, if not already attached to the application form one of the following options:
- Declaration of the on-site value of the qualification and the certificate relating to the degree with examinations and grades. A certificate in a language other than Italian or English must be accompanied by an official translation into one of these languages (certified by the competent diplomatic-consular authority or certified by a court in Italy).
- CIMEA Certificate of comparability of the foreign qualification, issued by CIMEA (Information Centre on Academic Mobility and Equivalence) via the "diplome" service at https://cimea.diplo-me.eu/udine/#/auth/login

If the Supplement Diploma or the statement/attestation of comparability are not available when signing the contract, the applicant must demonstrate that he/she has requested the documentation and submit it as soon as possible.

Any exclusion from the selection procedure due to lack of eligibility requirements, absence of required documents, failure to sign the selection application or submission of the selection application in a manner different from what is provided for in this call for applications will be communicated to applicants exclusively at the email address indicated in the application form.

Art. 3
The research grant referred to in this call for applications cannot be awarded:

a. to employees of Universities and the entities referred to in Article 22, section 1, of Italian Law no. 240 of 30 December 2010 (in the text prior to the reform introduced by Law no. 79 of 29 June 2022);
b. to those who have already been awarded research grants pursuant to Italian Law no. 240 of 30 December 2010 (prior to the reform introduced by Law no. 79 of 29 June 2022) for the maximum period provided by law, even if not continuously, excluding the period in which the grant was used in conjunction with the doctorate, up to the legal term of the relative course;
c. to those who have already benefited from research grants and fixed-term researcher contracts provided for, respectively, in Articles 22 and 24 of Italian Law no. 240 of 30 December 2010 (in the text prior to the reform introduced by Law no. 79 of 29 June 2022), for a total of 12 years, even if not consecutive;
d. to anyone who has a degree of kinship or affinity, up to and including the fourth degree, with:
- the Rector, the Director General or a member of the Board of Directors of the University of Udine;
- the scientific supervisor or a professor/researcher belonging to the department or organisation hosting the research grant in question.

The research grant provided for in this call for applications cannot be combined:

a) with scholarships of any kind, except for those granted by Italian or foreign institutions to supplement, by means of stays abroad, the fellow's training or research activities;

b) with other research grants;

c) with an employment relationship, even if part-time, without prejudice to the relevant provisions for employees of public administrations.

The grant awarded under this call for applications is also incompatible with simultaneous attendance at university degree courses, either Bachelor's degree or Master’s degree courses, research Doctorates with scholarships and medical specializations, in Italy or abroad.

**Art. 4**

Applicants must enclose with their application, under penalty of exclusion, the following documents:

a) their professional scientific CV, highlighting the candidate's aptitude for carrying out and implementing the research project (Attachment A);

b) their identity card, their passport or any other identification document\(^1\);

c) for candidates with a foreign qualification only) certification or self-certification of both the academic qualification required for the admission to the selection, and of the exams (with evaluation) took during the period of study abroad, and of any other document that can be useful to the evaluation of the degree by the Examining Board.

Applicants can attach to the application, publications and any other certification considered useful to demonstrate the qualification based on the research program (Attachment A) and to certify any research activity accomplished at public or private institutes (indicating the starting and ending date and the duration).

The documents and qualifications mentioned above must be submitted in Italian or English. Those that are not as requested will not be evaluated. Documents originally written in a language other than Italian or English must come with a translation in Italian or English, that the candidate will do on its own responsibility. The translation can be an abstract concerning the thesis.

Italian and Community candidates wishing to submit qualifications referring to conditions and facts attested by Public Administrations must proceed exclusively with self-certification. Non-EU citizens legally residing in Italy may self-certify only data that can be verified or certified by Italian public bodies. They may also use declarations in lieu when provided for by an international convention between Italy and the declarant's country of origin. Non-EU citizens not residing in Italy cannot self-certify.

Only the qualifications possessed by the candidate on the date the application form is submitted and submitted in accordance with the procedures set out in Article 5 will be assessed.

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\(^1\) Please be aware that the residence permit is not an identification document.
Failure to submit mandatory documents provided for in this article will constitute grounds for exclusion from the selection.

**Art. 5**
The submission of the applications for the present call starts on August 31, 2023 at 2:00 pm (Italian time) and ends on September 14, 2023 at 2:00 pm (Italian time).

The application to take part in the selection must be completed, under penalty of exclusion, using the appropriate online procedure, available at the link [https://pica.cineca.it/](https://pica.cineca.it/)

The procedure involves an applicant registration step, for those who do not already have an account, and then an application completion step.

Once completed, the online application must be signed in the manner described in the online procedure (manual signature with attached identity document or digital signature), under penalty of exclusion from selection. The application does not have to be signed if you access the above-mentioned online procedure using your SPID ID.

The qualifications referred to in Article 4 must be attached to the application in .pdf format. Individual .pdf files may not exceed 30MB.

The application for participation in the selection is automatically sent to the University of Udine with the definitive closing of the online procedure.

The University Administration:
- is not responsible if it is impossible to read the submitted documentation in electronic format due to damaged files;
- shall not accept or take into consideration qualifications or documents received in paper form or by any means other than what is specified in this article.

Reference to documents or publications already submitted in connection with other competitions is not allowed.

The Administration is not responsible for any missing document or communication because of inaccurate indication of residence and/or address submitted by the candidate during the application. Also, the Administration is not responsible if the candidate has not communicated changes in this information, or has communicated them too late. The Administration is also not responsible for any postal or telegraphic problems not attributable to the Administration itself.

Applicants are advised not to wait until the last few days before the closing date to submit their application. The University accepts no responsibility for any malfunctions due to technical problems and/or overloading of the communication line and/or application systems.

**Art. 6**
The selection procedure is held in accordance with the modality indicated in Attachment A.

The test will aim to assess the general preparation, experience and aptitude for research of the candidate. It will consist in the evaluation of the professional scientific curriculum, of the publications and qualifications presented, and of the interview, where foreseen.
Art. 7
The Examinining board for the competition is identified in Attachment A of the present competition announcement, of which it is an integral part.

At its first meeting, the Examinining board shall appoint its President and Secretary, and establish the criteria and methods for evaluating the qualifications and the interview, where foreseen.

The results of the qualifications assessment must be disclosed to applicants during the interview, where foreseen.

The Examinining board can award a maximum of 100 points (one hundred out of one hundred) to the selection.

At the end of the evaluation procedure, the Examinining board shall formulate the general merit list based on the overall score of each candidate, and draw up the minutes of the whole competition procedure.

Based on the ranking list, the assignment is awarded to candidates who have obtained a minimum overall score of 70/100 (seventy out of one hundred).

The Examinining board's judgement is final.

The ranking list will be made public exclusively through publication on the University's official website.

Applicants will not be notified of the outcome of the evaluation.

Those who do not declare their acceptance of the research grant and do not present themselves at the research centre within the deadline communicated by the latter, even if not formally, shall lose the right to receive it. Exceptions to this term will only be granted in cases of documented force majeure.

Art. 8
The research activity cannot be started before signing the contract defining the terms and conditions of the collaboration.

The activity covered by the research grant must have the following characteristics:

a) it must be carried out as part of the research programme covered by the grant and not be a merely technical support to it;

b) it must have a close connection with the realization of the research program for which the winner of the grant has been awarded the contract;

c) it must be continuous and, in any case, temporally defined, not merely occasional, and in coordination with the overall activity of the University;

d) it must be carried out autonomously, solely within the limits of the programme prepared by the programme supervisor, without predetermined working hours.

The researcher is required to submit a detailed written report on the work carried out and the results achieved, accompanied by the opinion of the scientific supervisor, to the reference organisation at the intervals set out in the contract. The researcher must also submit interim reports and timesheets, if requested by the reference organisation.

Either the fellow or the reference organisation may withdraw from the contract.
The reference organisation may terminate the contract not only in the cases referred to in Article 9, sections 2 and 3, of the "Internal rules for awarding research grants pursuant to law 240 of 30 December 2010" of the University of Udine, but also in the event the research project and therefore the financial coverage on which the research grant is based cease to exist.

Art. 9

The following legal dispositions shall apply to the grant referred to in this call for applications:
- for tax matters, the provisions of Article 4 of Italian Law no. 476 of 13 August 1984, as subsequently amended and supplemented;
- for social security matters, the provisions of Article 2(26) et seq. of Italian Law no. 335 of 8 August 1995, as subsequently amended and supplemented;
- for mandatory maternity leave, the provisions of the Italian Ministerial Decree of 12 July 2007;
- with regard to sick leave, the provisions of Article 1(788) of Italian Law no. 296 of 27 December 2006 and subsequent amendments.

During the period of mandatory maternity leave, the allowance paid by INPS according to Art. 5 of the Italian Ministerial Decree of 12 July 2007 is supplemented by the University up to the full amount of the research grant.

The grant will be paid in monthly instalments.

Art. 10

The data collected as part of the procedure referred to in Art. 5 are necessary to properly manage the selection procedure, for any subsequent management of the research grant and for purposes related to managing services provided by the University. The University of Udine is the Data Controller. At any time, the data subject may request access, rectification and, depending on the University's institutional purposes, cancellation and restriction of processing or oppose the processing of their data. The data subject can always lodge a complaint with the Italian Data Protection Authority. The complete disclosure is available on the University of Udine website in the "Privacy" section, accessible from the home page www.uniud.it Direct Link: https://www.uniud.it/it/pagine-speciali/guida/privacy

Art. 11

For all matters not expressly mentioned in this call for applications, refer to the regulations in force on the subject cited in the introduction and to the "Internal rules for awarding research grants pursuant to Italian Law no. 240 of 30 December 2010" of the University of Udine, issued by Rector's Decree no. 182 of 31 March 2021.

Art. 12

The procedure supervisor is Dr Sandra Salvador, Head of the Research Services Area of the University of Udine.

The Responsible office at the University of Udine is "Area Servizi per la Ricerca - Ufficio Formazione per la Ricerca", via Mantica n. 31 - 33100 Udine, Italia.

To request information about the call for applications, please complete the following form available on the University of Udine website: https://helpdesk.uniud.it/SubmitSR.jsp?type=req&accountId=uniiversityofudine&populateSR_id=42105
Responsabile scientifico della ricerca / Principal investigator:

Nome e cognome / Name and surname: Paolo Gardonio
Qualifica / Position: Professore Ordinario / Full Professor
Dipartimento / Department: Politecnico di Ingegneria e Architettura (DPIA) / Polytechnic of Engineering and Architecture
Area MUR / Research field: 09 - Ingegneria industriale e dell’informazione
Settore concorsuale e Settore scientifico disciplinare / Scientific sector: 09/G1; ING-INF/04 - Automatica

Titolo dell’assegn di ricerca / Topic of the research fellowship “assegno di ricerca”:
I bandi sono consultabili dal sito dell’Ateneo, del MUR e di Euraxess / The calls are available on the University, MUR and Euraxess websites

Testo in italiano:

Tessuti Strutturati Sintonizzabili.

Text in English:

Tunable Structured Fabrics.

Obiettivi previsti e risultati attesi del programma di ricerca in cui si colloca l’attività dell’assegnista di ricerca / Foreseen objectives and results of the research programme performed by the research fellow “assegno di ricerca”:
I bandi sono consultabili dal sito dell’Ateneo, del MUR e di Euraxess / The calls are available on the University, MUR and Euraxess websites

Testo in italiano:

L’obiettivo generale di questo progetto è lo sviluppo di una struttura leggera con rigidità regolabile e proprietà di smorzamento, che possa essere convenientemente impiegata per ideare nuovi trattamenti e dispositivi per il controllo in linea del rumore e delle vibrazioni nei veicoli di superficie e di trasporto aereo, per macchinari industriali, per impianti, per edifici, ecc. In particolare, il progetto studierà la fattibilità di una nuova classe di Tuneable Vibration Absorbers (TVA), che può essere efficacemente adottata per controllare sia la risposta armonica di strutture e sistemi meccanici soggetti a eccitazioni tonali variabili nel tempo o la risposta risonante di sistemi meccanici variabili nel tempo soggetti a disturbi stocastici stazionari a banda larga.

Normalmente, i sistemi TVA si basano su trasduttori elettromeccanici per creare un sistema molla-massasa-smorzatore regolabile, come ad esempio lege a memoria di forma, elastomeri elettroreologici e magnetoreologici, dispositivi bobina-magnete collegati a shunt elettrici e materiali piezoelettrici patch/stack collegati a shunt elettrici. La rigidezza di questi sistemi può essere controllata elettricamente in modo tale che la frequenza di risonanza fondamentale dell’assorbitore possa essere opportunamente variata per tracciare la frequenza dell’eccitazione tonale agente sul sistema ospitante o per tracciare la frequenza di risonanza che caratterizza la risposta risonante di un sistema tempo-variante soggetto a un’eccitazione stocastica a banda larga. L’effetto di smorzamento di questi sistemi può essere variato anche elettricamente, in modo tale da massimizzare opportunamente l’assorbimento dell’energia di vibrazione sia per le eccitazioni tonali che quelle a banda larga. Normalmente, per controllare le vibrazioni tonali lo smorzamento dovrebbe essere impostato su valori piuttosto bassi, mentre per controllare le vibrazioni risonanti a banda larga dovrebbe essere regolato su un valore critico.

L’obiettivo di questo progetto è studiare un nuovo TVA, che è composto da una o più strisce di un tessuto strutturato avvolto in un sacco a vuoto la cui campata centrale è fissata al sostegno dell’assorbitore. La vibrazione flessionale della trave a due bracci è quindi caratterizzata da un modo di
vibrare fondamentale di una trave fissata al centro, la cui dinamica ricorda quella di un classico assorbitore di vibrazioni massa-molla-smorzatore. Il tessuto è costituito da una costruzione intrecciata di particelle simili a telai, che possono essere fabbricate utilizzando la tecnologia di produzione additiva. Il materiale è avvolto in un sacchetto di plastica sigillato la cui pressione interna del vuoto è controllata da una pompa miniaturizzata. La rigidità alla flessione e le proprietà di smorzamento meccanico della trave possono quindi essere corrette variando la pressione del vuoto nel sacco. Di conseguenza, la frequenza di risonanza fondamentale e il fattore di smorzamento dell’assorbidore di vibrazioni in tessuto strutturato sottovuoto possono essere sintonizzati online in modo tale da tracciare la frequenza di un’eccitazione tonale o seguire i cambiamenti nella risposta risonante del sistema ospitante.

Il progetto indagherà non solo sulla rigidità ma anche sugli effetti di smorzamento e inerzia del nuovo materiale, che giocano un ruolo chiave nei problemi di isolamento vibro-acustico. In generale fornirà un’indicazione su come valutare la gamma di frequenze di lavoro, i livelli di assorbimento del rumore e le gamme di sintonizzabilità. Fornirà inoltre linee guida generali su come sviluppare sistemi di controllo e algoritmi per la messa a punto automatica del nuovo TVA. Ciò comporterà la selezione dell’architettura di controllo (ovvero feed-forward/feedback semi-attivo/complettamente attivo), la scelta della funzione di costo (massimizzazione locale dell’assorbimento dell’energia di vibrazione rispetto alla minimizzazione del controllo globale delle vibrazioni), la progettazione del sistema sottovuoto (basato su membrane piezoelettriche) imbaldaggero in sacchetti indipendenti per generare trasduzione flessionale e disaccoppiare gli effetti di rigidità e smorzamento.

**Text in English:**

The general objective of this project is to develop a lightweight structure with tuneable stiffness and damping properties, which can be conveniently employed to devise new treatments and devices for the on-line control of noise and vibration in surface and air transportation vehicles, industrial machineries and plants, buildings, etc. In particular the project will investigate the feasibility of a new class of Tuneable Vibration Absorbers (TVA), which can be effectively adopted to control either the harmonic response of mechanical structures and systems subject to time-varying tonal excitations or the resonant response of time-varying mechanical systems subject to broadband stationary stochastic disturbances.

Normally, TVA systems rely on electro-mechanical transducers to create a tuneable spring-mass-damper system, such as for example shape memory alloys, electrorheological and magnetorheological elastomers, coil-magnet devices connected to electrical shunts and piezoelectric patch/stack materials connected to electrical shunts. The stiffness of these systems can be controlled electrically such that the fundamental resonance frequency of the absorber can be suitably varied to track either the frequency of the tonal excitation acting on the hosting system or to track the resonance frequency that characterises the resonant response of a time varying hosting system subject to a broadband stochastic excitation. The damping effect of these systems can be varied electrically too, such that the vibration energy absorption for the tonal and broadband excitations can be suitably maximised. Normally, to control tonal vibrations the damping should be set to rather low values, whereas to control broadband resonant vibrations it should be tuned to a critical value.

The objective of this project is to investigate a novel TVA, which is composed by one or multiple strips of a structured fabric wrapped in a vacuum bag whose middle span is clamped to the post of the absorber. The flexural vibration of the two-arms beam is thus characterised by a flapping fundamental mode, whose dynamics resembles that of a classical mass-spring-damper vibration absorber. The fabric is made by an interwoven construction of truss-like particles, which can be fabricated using additive manufacturing technology. The material is wrapped in a sealed plastic bag whose interior vacuum pressure is controlled by a miniature pump. The bending stiffness and mechanical loss properties of the beam can then be corrected by varying the vacuum pressure in the bag. Hence, the fundamental resonance frequency and the damping factor of the in-vacuo structured fabric vibration absorber can be tuned online in such a way as to track the frequency of a tonal excitation or to trail changes in the resonant response of the hosting system.

The project will investigate not only to the stiffness but also to the damping and the inertia effects of
the new material, which play a key role in vibro-acoustic insulation problems. In general, it will provide an indication on how to assess the working frequency range, noise absorption levels and tunability ranges. Also, it will provide general guidelines on how to develop control systems and algorithms for the automatic tuning of the new TVA. This will involve the selection of the control architecture (i.e., feed-forward/feedback semi-active/fully-active), the choice of the cost function (local maximisation of vibration energy absorption versus minimisation of global vibration control), the design of the vacuum system (based on piezoelectric membranes) the packaging into independent bags to generate flexural transduction and to decouple stiffness and damping effects.

Struttura dell'Università di Udine presso la quale verrà sviluppata l'attività di ricerca / Department or other structure of the University of Udine where research activities will be carried out:

Dipartimento Politecnico di Ingegneria e Architettura (DPIA), Polo Scientifico Rizzi / Polytechnic Department of Engineering and Architecture, Rizzi Scientific Center

Importo dell'assegno di ricerca (al lordo oneri carico assegnista) / Total grant gross for the research fellowship:

€ 19.456,00

Durata dell'assegno di ricerca / Duration of the research fellowship “assegno di ricerca”:

12 mesi / months

Finanziamento / Financed by:

La copertura finanziaria graverà sul progetto PRIN 2022 – “TSF - Tuneable Super fabrics”; Prot. n. 20223X5S37 (ammesso a finanziamento con Decreto Direttoriale n. 742 del 30/05/2023 - Settore PE8). Codice CUP G53D23001120006. Ministero dell’Università e della Ricerca (Finanziato dall’Unione Europea, NextGenerationEU).

Requisiti di ammissione / Minimum qualifications necessary:

- Possesso di un diploma di laurea vecchio ordinamento (ante decreto 3 novembre 1999 n. 509) o di laurea specialistica/maestrile (ex decreto 3 novembre 1999 n. 509 e decreto 22 ottobre 2004 n. 270) o titolo equivalente conseguito all’estero;
- possesso di un curriculum scientifico professionale idoneo allo svolgimento dell’attività di ricerca contemplata.
- University degree obtained before Decree n. 509 of 3 November 1999 or specialist/Master’s degree (post decree n. 509 of 3 November 1999 and decree n. 270 of 22 October 2004) or equivalent degree obtained abroad;
- professional scientific curriculum suitable for the research activity above mentioned.

Procedura selettiva / Competition procedure:

Valutazione per titoli e colloquio / Evaluation of titles and oral exam

I risultati della valutazione dei titoli saranno resi noti agli interessati nel corso del colloquio / The evaluation of the qualifications will be disclosed to candidates during the interview
Calendario del colloquio / Calendar of the oral exam

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<td>11:30 / 11:30 am (Italian time)</td>
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<td>Sala riunioni gialla del Dipartimento Politecnico di Ingegneria e Architettura (DPIA) - Polo Scientifico Rizzi, via delle Scienze 206, Udine / Yellow meeting room of the Polytechnic Department of Engineering and Architecture - Rizzi Scientific Center, via delle Scienze 206, Udine</td>
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Per sostenere il colloquio i candidati devono esibire un valido documento di riconoscimento. / Candidates must come to the interview with a valid identity document.

Eventuali variazioni saranno rese note esclusivamente mediante pubblicazione all’albo ufficiale on line dell’Ateneo / Any change will be made public solely through publication on the University web site [http://web.uniud.it/ateneo/normativa/albo_ufficiale](http://web.uniud.it/ateneo/normativa/albo_ufficiale)

Commissione giudicatrice / Examining Board:

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<th>Nome e Cognome</th>
<th>Qualifica</th>
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<tr>
<td><strong>Membri Effettivi / Permanent members</strong></td>
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<tr>
<td>Paolo Gardonio</td>
<td>PO</td>
<td>ING-INF/04</td>
<td>Università degli Studi di Udine</td>
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<tr>
<td>Barbara Motyl</td>
<td>PA</td>
<td>ING-IND/15</td>
<td>Università degli Studi di Udine</td>
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<td>Giovanni Cortella</td>
<td>PA</td>
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<td>Università degli Studi di Udine</td>
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<td><strong>Membri Supplenti / Temporary members</strong></td>
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<tr>
<td>Daniele Casagrande</td>
<td>RU</td>
<td>ING-INF/04</td>
<td>Università degli Studi di Udine</td>
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<tr>
<td>Roberto Rinaldo</td>
<td>PO</td>
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