



## Directorial Decree

### SELECTION FOR AWARDING RESEARCH SCHOLARSHIPS

#### *THE DIRECTOR OF THE DEPARTMENT OF COMPUTER SCIENCE*

**Having regard** to the law 10.04.1991, n. 125 concerning "Positive actions for the achievement of equality between men and women in work";

**Given** Law 30/12/2010 no. 240, and in particular Art.s 22 and 18(1b), in the version of the text valid before the entry into force of Law no. 79-2022 of 29/06/2022;

**Given the** "Regulations for the Awarding of Research Scholarship Collaborations", issued by Rectoral Decree no. 2979-2023, Prot. no. 149094 of 31/03/2023;

**Given** Legislative Decree 30/06/2003 no. 196;

**Having regard** to the Presidential Decree 06/16/2023, n. 82, "Regulation containing amendments to the decree of the President of the Republic 9 May 1994, n. 487, concerning rules on access to jobs in public administrations and the methods of carrying out competitions, single competitions and other forms of hiring in public jobs";

**Given** the request of the Director of the Department of Computer Science, Prot. n. 470482 of 29.11.2023;

And **having evaluated** every appropriate element;

### D E C R E E S

#### **ART. 1 – SELECTION FOR AWARDING 1 (ONE) RESEARCH SCHOLARSHIP**

This document announces the selection process **AdR4498/23** to award 1 (ONE) research scholarship in the disciplinary sector MAT/02 ALGEBRA, to perform the research on the topic "**Large views of small phenomena: decompositions, localizations, and representation type (LAVIE)**".

The research scholarship is for twelve months, with the possibility of renewal in accordance with the law.

The candidate who, according to the order of the merit ranking, will obtain the highest overall score in the evaluation of qualifications and in the interview, will be the assignee of the research grant. In the event of equal merit, in compliance with the provisions of art. 47 "Equal opportunities, generational and gender, in PNRR and PNC public contracts" of D.L. May 31, 2021, n. 77, converted into law July 29, 2021, n. 108, the position announced will be assigned as a priority to a female candidate.

Admission to the selection process, and the selection procedure itself, are governed by the following Articles.

#### **ART. 2 – REQUIREMENTS**

For admission to the selection process referred to in Art. 1, potential candidates must fulfil the following requirements:

- a) PhD;
- b) Knowledge of the following foreign language: English;
- c) Other requirements: documented research and/or development experience in the disciplinary sector: MAT/02 ALGEBRA.

Both Italian and foreign nationals are admitted to the selection process, as long as the latter have the equivalent qualifications or an ideal academic and professional background for the intended research



(If a candidate has not applied for official recognition of equivalency in the Italian system for any qualifications gained abroad, the suitability of their academic and professional background will be evaluated by the Selection Committee).

Foreign citizens must have an appropriate level of knowledge of the Italian language according to the needs of the research. The level of adequacy will be defined by the Selection Committee.

Those with any relationship to, or ties with, a professor of the Department of Computer Science, the Rector, the Director-General or any member of the university Board of Directors, up to the fourth degree inclusive, may not participate.

The scholarship may not be awarded to any permanent staff of universities, public institutions or public entities for research and experimentation, the National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) or the Italian Space Agency (ASI), nor to permanent staff at any institution whose advanced academic degree has been recognised as equivalent to a PhD pursuant to Art. 74(4), Presidential Decree no. 382 of 11/07/80.

In order to be admitted to the selection process, potential candidates must meet the stated requirements at the time of the application deadline. Failure to meet these requirements may result in the applicant being excluded from the selection process with due decree by the Director of the Department of Computer Science.

### ART. 3 – APPLICATIONS AND RULES FOR SUBMISSION

Applications, written on plain paper following the outline attached to this call for applications (appendix: Form A) and addressed to the Director of the Department of Computer Science, may be submitted in the following way:

- Sending the documentation in pdf format, to the e-mail address [ufficio.protocollo@pec.univr.it](mailto:ufficio.protocollo@pec.univr.it), within the peremptory deadline indicated above. The submission may also be made by an unaudited electronic mail address.

No other forms of application submission are admitted.

**All applications, by whichever of the above means they are submitted, must be received by the strict deadline of 1.00 p.m. (Italian time), 20 days after the call for applications is concurrently published in the electronic Official University Register on the web page: <http://www.univr.it/it/albo-ufficiale>.** If the deadline falls on a public holiday, it will be postponed to the next working day.

Pursuant to Art. 76, Presidential Decree 445/2000 and aware of the criminal penalties for false statements, candidates must state in their application:

- 1) their name and surname;
- 2) their date and place of birth;
- 3) their permanent address, including street name, street number, city, province, postcode, telephone number, tax identification number and email address;
- 4) the number of the selection process in which they wish to participate;
- 5) their nationality;
- 6) that they have no prior criminal convictions, or otherwise report any criminal convictions (even if they have been granted amnesty, cancellation, pardon or legal pardon) or criminal proceedings against them;
- 7) that they have the required qualification as given in Art. 2 of this call for applications, and state the qualification and the date and place where it was awarded.



Foreign nationals must also specify if their qualification, if it was awarded abroad, has received official recognition for equivalency to an Italian qualification;

- 8) that they fulfil the other requirements specified in Art. 2 of this call for applications;
- 9) not to have any relationship to, or ties with, a professor of the Department of Computer Science, the Rector, the Director-General or any member of the university Board of Directors, up to the fourth degree inclusive;
- 10) their contact address for the purpose of the application.

Administration does not assume any responsibility if the applicant is unable to be contacted or for the loss of documents due to errors in the address provided by the applicant, or for a failure to/delay in notifying a change of the address stated in the application, nor for any postal delivery errors or otherwise which are attributable to third parties, unforeseeable circumstances or force majeure. In any case, any applications which are not signed or that, for any reason, including force majeure, are received by the University of Verona after the above mentioned deadline, will not be considered.

For the evaluation of qualifications and experience, candidates must attach to their application:

- 1) a declaration in lieu of an affidavit regarding their qualifications gained (PhD and/or Master's degree or Bachelor's degree), stating the award date, the issuing university and any grade reported.
- 2) their academic and professional CV, publications and relevant qualifications as per Art. 6 of this call for applications;
- 3) a copy of a valid identity document
- 4) a list of the documents and publications attached to their application;
- 5) a letter of motivation (no longer than one page) describing the coherence of the candidate's scientific skills and interests with the themes of the project;
- 6) letters of reference, no more than two, to be sent by the persons who will write them to Prof. Lidia Angeleri at the e-mail address [lidia.angeleri@univr.it](mailto:lidia.angeleri@univr.it).

The aforementioned documents must be submitted by the application deadline as plain paper photocopies accompanied by a statement that they are identical to the original. Alternatively, the candidate may produce a substitutive declaration reporting the important information contained in these documents. For this, candidates may use appendix Form B, also attaching a plain paper photocopy of their valid ID document.

Administration reserves the right to perform checks to verify the truthfulness of substitutive declarations. If such investigations reveal that any declarations are false, the applicant will be excluded from any benefits they may have been awarded from provisions made on the basis of the false declaration, notwithstanding the provisions of Art. 76, Presidential Decree no. 445/2000.

Pursuant to Law no. 104 of 05/02/92, candidates with a disability must make a specific request in their application regarding any aid required, as well as any additional time that may necessary to complete the test.

The signature at the bottom of the application is not subject to authentication, in accordance with Presidential Decree no. 445/2000.



#### ART. 4 – EXCLUSION FROM THE SELECTION PROCESS

Candidates are admitted to the selection process under the condition that the Director of the Department of Computer Science, may with due reason exclude those who do not fulfil the selection requirements from the selection process at any time.

#### ART. 5 – SELECTION COMMITTEE

The Selection Committee, made up of three members (lecturers or experts in the disciplinary sector related to the subject, or similar) as established by Art. 20 (1b) of the Regulations referred to in the introduction, shall be constituted after the expiry of the call and its composition will be made known promptly by means of a Directorial Decree and will be made public through electronic publication on the website, referred to at the link: <http://www.univr.it/it/albo-ufficiale>.

#### ART. 6 – SELECTION PROCEDURE

The selection procedure takes into consideration an evaluation of each candidate's qualifications and experience, as well as an interview. For the evaluation, the Selection Committee can award up to 100 points to each candidate: up to 60 points for the written documents submitted (proof of qualifications and experience) and up to 40 points for the interview.

Candidates are considered suitable if they gain at least 35 points for qualifications/experience and at least 25 points for the interview.

Candidates' qualifications and experience will be evaluated before the interview, based on the documents submitted.

**The candidate's academic qualifications and experience must be related to the following fields:  
MAT/02 ALGEBRA.**

Points for qualifications and experience will be allocated as follows:

• <i>Laurea Magistrale</i> (Ministerial Decree 270/04), <i>Laurea Specialistica</i> (Ministerial Decree 509/99), Bachelor's degree (pre Ministerial Decree 509/99) .....	Max. points	3
• PhD .....	Max. points	15
• Academic publications .....	Max. points	12
• Work experiences in the research field .....	Max. points	5
• Reference letters .....	Max. points	5
• Letter of motivation: competences and scientific interests of the candidate with the topics of the project .....	Max. points	15
• Other qualifications .....	Max. points	5
	<b>TOTAL</b> points	<b>60</b>

**The interview will focus on the following topics: representation theory of algebras, silting theory, stability theory, model theory of modules.**

**During the interview, the candidates' knowledge of English language will be checked.**

To take part in the interview, candidates must provide a current, valid ID document.

Candidates who do not show an ID document or have only an expired ID document will not be admitted to the interview.

**The interview will take place at 11.00 a.m. (Italian time) on 24<sup>th</sup> January 2024 at the Meeting Room, Department of Computer Science, 2<sup>nd</sup> floor, Ca' Vignal 2, Strada Le Grazie 15 – Verona.**



The results of the selection process will be communicated to the candidates by the Selection Committee after the interview.

The candidate who wins the scholarship must go in person within the *26<sup>th</sup> January 2024*, at the Secretary of the Department of Computer Science, Ca' Vignal 2, ground floor (room R118), Strada Le Grazie 15, Verona – tel. 00 39 (0) 458027067/7069, e-mail address: [segreteria.di@ateneo.univr.it](mailto:segreteria.di@ateneo.univr.it), to officially accept the scholarship and to present the originals of the documents listed in their substitutive declaration. If the winning candidate is abroad and unable to go in person to the Secretary of the Department of Computer Science by the aforementioned date, the candidate should contact it by email: [segreteria.di@ateneo.univr.it](mailto:segreteria.di@ateneo.univr.it) or phone 00 39 (0) 458027067/7069, by the same date, to establish the procedure and timeframe to send the necessary documents in order to activate the research scholarship.

In the event that the submission of the required substitute declarations is made after the *31<sup>st</sup> January 2024*, the first month of the research grant will be credited together with that of the first useful month, after the first month of activation of the grant.

#### **ART. 7 – RANKING LIST**

The steps of the selection procedure, including the ranking list, shall be approved by Directorial Decree. The ranking list will be concurrently published in the electronic Official University Register on the web page: <http://www.univr.it/it/albo-ufficiale>.

#### **ART. 8 – CONTRACT**

Research scholarships are awarded through the stipulation of a personal contract for research collaboration. Such contracts do not imply any form of employment and do not give the holder any priority for accessing permanent university positions.

Recipients who do not present themselves by the specified date, do not sign the contract or do not start the research at the determined time shall lose their right to the scholarship, except in cases provided for by the university's "Regulations for the Awarding of Research Scholarship Collaborations" referred to in the introduction.

The scholarship recipient's responsibilities are those established in the aforementioned University Regulations. In particular, the scholarship recipient shall collaborate on research regarding the project for which this call for applications was announced.

The total amount of the scholarship, net of administrative burden, is € 20.670,00, to be paid to the recipient in deferred monthly instalments.

Research scholarships are subject to taxation under the provisions of Art. 4, Law 476/84 and subsequent amendments and additions, as well as social security, under the provisions of Art. 2(26) and following of Law 335/95 and subsequent amendments and additions.

The University provides insurance cover of accidents related to conducting the research. The expenses are to be paid by the scholarship recipient and the premium is deducted from the scholarship amount. The University also provides cover for third party liability, the expenses being covered by the university.

Scholarships cannot be accumulated with other scholarships of any kind, except those granted by national or foreign institutions that are intended to contribute towards conducting a part of the recipient's research assignment abroad.

At the time of signing and for the total duration of the contract, scholarship recipients may not be employed, nor may they establish an employment contract, even temporary, with any private entity or public administration. Should they be already employed, a scholarship contract will not be stipulated unless the recipient is put on leave without pay by their employer by a date given by the University.



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Provided they perform their assigned tasks, scholarship recipients may carry out professional activities or other independent work if this is authorised beforehand by the Board of the Department/Research Centre, having consulted with the academic supervisor, and provided that the activity:

- is compatible with conducting research activities;
- does not represent a conflict of interest with the specific research being conducted by the scholarship recipient;
- does not lead to prejudice to the University in relation to the activities being carried out.

Scholarship recipients may not attend Bachelor's, Master's or PhD programmes with a scholarship, nor medical specialisation programmes, in Italy or abroad.

#### **ART. 9 – SAFEGUARD PROVISIONS**

For matters not provided for by this announcement, please refer to the relevant applicable provisions insofar as compatible.

The University of Verona is the owner of the processing of the personal data of the participants in the selections, pursuant to EU Regulation 2016/679; detailed information on the purposes of the processing, recipients of the data and exercise of the data subject's rights is available on the University's institutional website: <http://www.univr.it/it/privacy>.

This call for applications shall be publically published in the electronic Official University Register on the web page: <http://www.univr.it/it/albo-ufficiale>.

For more information, contact the Research Office – PhD Unit of the University of Verona, Via San Francesco 22, ph. +39(0)458028204, e-mail address [elena.cordioli@univr.it](mailto:elena.cordioli@univr.it).

THE DIRECTOR OF THE DEPARTMENT OF COMPUTER SCIENCE  
(PROF. ALESSANDRO FARINELLI)

This document is digitally signed and recorded in the report system of the University of Verona, under Legislative Decree 82/2005 and subsequent amendments.



## Large views of small phenomena: decompositions, localizations, and representation type (LAVIE)

REPRESENTATION THEORY OF ALGEBRAS is an extremely lively and visible research area with close ties to many other fields, such as algebraic geometry, modular representation theory, Lie theory, mathematical physics, or topological data analysis. An associative algebra  $A$  is studied via its representations, that is, via the category of  $A$ -modules and its derived category. Reduction techniques play an important role in this context. A strategy widely employed in algebra, geometry, and topology is the decomposition of a category into smaller parts that are still big enough to reconstruct the whole category. This leads to the notion of a torsion pair and to the fundamental tool of localization. A further reduction technique consists in decomposing modules into indecomposable summands; the indecomposable  $A$ -modules can often be classified and yield information on the whole module category. The representation type of  $A$  is a measure for the complexity of the module category and decides whether such classification is possible or not.

OUR VIEWPOINT. Problems related to the representation type of an algebra concern small, that is, finite dimensional modules. But they are controlled by large, that is, possibly infinite dimensional modules. We propose a novel approach that takes into account the interplay between small and large objects and is based on recent advances on infinite dimensional modules achieved e.g. in silting theory and localization theory.

METHODS. The project builds on a variety of different methods of inquiry and requires expertise from different areas of mathematics, including representation theory, model theory, commutative algebra, algebraic geometry, and geometric invariant theory. The researcher is expected to work on some of the following independent, but closely interrelated approaches.

1. **The lattice torsA of torsion classes** in the category of finite dimensional modules over a finite dimensional algebra  $A$  is currently receiving a lot of attention due to its connection with silting theory and mutation. Silting theory is a young and dynamic branch of representation theory with many unexpected connections to other areas. One of its highlights is the interplay with cluster algebras: clusters are interpreted as silting objects and cluster mutation as an operation that exchanges summands in silting objects. Silting mutation is reflected in a part of the lattice torsA. We propose a new approach to mutation, based on the dual concept of a cosilting object, which captures the whole lattice torsA. This requires to drop the restriction to small modules and to work with large cosilting complexes. Since the latter are pure-injective, our results also have an interpretation in terms of the Ziegler spectrum of  $A$ , a topological space originating from model theory. We will develop an abstract framework at the level of triangulated categories and address the question whether all cosilting objects are pure-injective.

2. **The ring epimorphisms with fixed domain A** form another lattice encoding valuable information on an algebra  $A$ . We will investigate the interaction of this lattice with torsA. Ring epimorphisms with nice homological properties, notably universal localizations, are closely related with (co)silting objects and with certain decompositions of derived categories. We will study these connections, building on the well-understood case of a commutative noetherian ring. We will also explore finiteness conditions on universal localizations and their impact on representation type.

3. **The concept of stability** originates in algebraic geometry and appears in many different contexts, ranging from geometric invariant theory to quantum field theory, and mirror symmetry. Bridgeland showed that stability conditions over an algebra  $A$  are encoded in a wall and chamber structure. These data can be described in terms of silting theory, interpreting mutation as wall crossing. But not all walls are captured by this approach. We will investigate these phenomena within the broader framework of large (co)silting theory. We also want to uncover the links with universal localization emerging from King's work. This involves the concept of a rank function which is currently object of renewed interest.



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4. **Case studies** over distinguished families of algebras (canonical algebras, Brauer graph algebras, triangular matrix algebras, hereditary orders) will complement our perspective. Here the focus will lie on classification results for pure-injective and/or (co)silting objects.



APPENDIX: FORM A

TO THE DIRECTOR OF COMPUTER SCIENCE  
UNIVERSITY OF VERONA

I, the undersigned, .....  
born in ..... (province .....) on .....  
residing in ..... (province .....)  
street ..... n° ..... postcode .....  
phone ..... tax identification no. ...., request  
admission to the selection process **AdR4498/23** on the merit of my qualifications/experience and an interview  
in order to create a ranking list for the awarding of 1 (ONE) research scholarship to conduct the research  
“**Large views of small phenomena: decompositions, localizations, and representation type (LAVIE)**”,  
pursuant to Art. 22, Law 240/10.

I hereby state, under my own personal responsibility:

- a) I have citizenship in the following country: .....
- b) I have no reported criminal convictions nor pending criminal proceedings; or: I have the following criminal convictions or the following pending criminal proceedings .....
- c) I have:
  - 1. a Bachelor's/Master's degree in .....  
awarded on the date .....  
by ..... with the final grade of .....  
*Only for qualifications gained abroad or for foreign candidates:* the above qualification has been  
recognised as equivalent to an Italian qualification by the relevant authority  yes  no;
  - 2. a PhD in .....  
 with scholarship /  without scholarship  
awarded on the date ..... by .....
- d) not to have any relationship to, or ties with, a professor of the Department of Computer Science, the Rector, the Director-General or any member of the university Board of Directors, up to the fourth degree inclusive;
- e) I meet the other requirements specified in Art. 2 of this call for applications.

I request to take the interview via videoconference  yes  no

I attach my qualifications as specified in Art. 3 of this call for applications, printed on plain paper.

Address for correspondence:

Street ..... City .....  
Prov. .... Postcode ..... Phone ..... Email .....

**I, the undersigned, state my knowledge that the University may use the information contained in this declaration exclusively within the context and for the institutional purposes of the Public Administration, in compliance with the current legislation on the processing of personal data**

Verona, .....

Signature .....

*APPENDIX: FORM B*

**SUBSTITUTIVE DECLARATION OF CERTIFICATION and/or SUBSTITUTIVE DECLARATION IN LIEU OF AFFIDAVIT**

(Art.s 46 and 47, Presidential Decree no. 445 of 28/12/00)

I, the undersigned,

SURNAME \_\_\_\_\_

NAME \_\_\_\_\_  
(for women: indicate maiden name)

TAX ID NUMBER \_\_\_\_\_

BORN IN \_\_\_\_\_ PROVINCE \_\_\_\_\_ ON \_\_\_\_\_

PERMANENT ADDRESS: CITY \_\_\_\_\_ PROVINCE \_\_\_\_\_

ADDRESS \_\_\_\_\_ POSTCODE \_\_\_\_\_

PHONE \_\_\_\_\_ EMAIL \_\_\_\_\_

Being aware of the criminal sanctions concerning false statements and the creation or use of false documents, as referred to in Art. 76, Presidential Decree 445/2000

**I declare:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I, the undersigned, state my knowledge that the University may use the information contained in this declaration exclusively within the context and for the institutional purposes of the Public Administration, in compliance with the current legislation on the processing of personal data.

Place and date \_\_\_\_\_ Signed \_\_\_\_\_

Pursuant to Art. 38, Presidential Decree 445/2000, this substitutive declaration of affidavit is signed by the person concerned in the presence of a suitable employee or signed and submitted together with a non-certified photocopy of an ID document of the person concerned.