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## Annex 1)

# **Notice of competitive selection procedures for Ph.D. Research Course of research with the allocation of additional scholarships for innovative doctoral studies using ESF resources REACT-EU, in implementation of Ministerial Decree n. 1061/2021 - 37th cycle**

ACADEMIC YEAR 2021/2022

(approved by Rector's Decree no. \_\_\_\_\_, on \_\_\_\_\_ October 2021)

**This translation cannot be used for legal purposes and is only meant to provide information in English on the call for applications (see Article 23)**

## **Background**

In implementation of the Ministerial Decree n. 1061 of 10 August 2021, which allocated to Italian universities ESF REACT-EU resources for Doctoral Programmes (PhD courses) that are active and accredited within the cycle, the University of Salento announces n. 53 **additional positions with scholarships** for the attendance of one of the PhD courses listed on page 2, included, for the purposes of this announcement, in two distinct areas on the basis of their affinity.

The resources of the PON R&I 2014-2020 endowment allocated by the Ministry aim to ensure support for two distinct Actions included in Axis IV "Education and research for recovery" and are aimed at supporting PhD courses consistent with the following themes:

- **Action IV.4 - Doctorates on Innovation themes** with the aim of promoting research activities on innovation, digital and enabling technologies and to support the enhancement of human capital as a key factor for the development of research and innovation in Italy (**n. 27 additional positions with scholarships**);
- **Action IV.5 - Doctorates on Green themes** with the aim of funding additional doctoral scholarships on topics oriented to ecosystem conservation, biodiversity as well as the reduction of climate change impacts and the promotion of sustainable development (**n. 26 additional positions with scholarships**).



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With the activation of doctoral programmes and the selection of research projects on issues for the development of Innovation and Green themes, the Ministry intends to encourage the spread of an approach of greater interchange between the world of research and the productive world.

The additional positions with scholarship will be covered, for each Action, up to the **economic resources allocated by the Ministry to the University of Salento (Unisalento) and the co-financing provided by the University for each of the two Actions.**

The doctoral courses activated and accredited by Unisalento for the XXXVII cycle that have presented research lines that have been evaluated by the competent bodies consistent with the themes indicated in the Ministerial Decree n. 1061/2021, and have been divided into the following areas of reference:

#### **LEGAL AND HUMANISTIC-SOCIAL AREA**

- “Filosofia: Forme e Storia dei Saperi Filosofici” / “Philosophy: Forms and History of Philosophical Knowledge” / “*Philosophie: Formes et histoire des savoirs philosophiques / Philosophie: Formen und Geschichte des philosophischen Wissens*” (international doctorate in agreement with the Université Paris Sorbonne and the Universität zu Köln);
- “Lingue, Letterature, Culture e loro applicazioni” / “Languages, Literatures and Cultures and their applications”;
- “Human and Social Sciences” / “*Human and Social Sciences*”;
- “Diritti e Sostenibilità (Law and Sustainability)”;
- “Scienze del Patrimonio Culturale” / “*Sciences for Cultural Heritage*”.

#### **SCIENTIFIC-TECHNOLOGICAL AREA**

- “Fisica e Nanoscienze” / “*Physics and Nanosciences*”;
- “Ingegneria dei Materiali e delle Strutture e Nanotecnologie” / “*Material, Structure and Nanotechnology engineering*”;
- “Ingegneria dei Sistemi complessi” / “*Engineering of complex systems*”;
- “Matematica e Informatica” / “*Mathematics and IT*”. (in agreement with the University of Basilicata);
- “Nanotecnologie” / “*Nanotechnology*”;
- “Scienze e Tecnologie Biologiche ed Ambientale” / “*Biological and environmental sciences and technologies*”.

For each PhD course, the Departments and the relevant Academic Boards have identified research lines, which are indicated in Annexes A (research lines on Innovation themes) and B (research lines in the Green field), on which **applicants must submit a research project that will be evaluated by the Selection Committee** and which must then be carried out by the applicant in the event that he or she wins a scholarship.

Selections will be made within each of the two separate Actions for the two Areas of Reference.



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Each research project provides for the involvement of companies (which will be identified for each line of research by the Departments concerned in agreement with the Coordinators of the PhD courses involved) where the doctoral student must carry out a period of study and research between a minimum of 6 months and a maximum of 12 months.

The company may also be based outside Italy. In this case, an increase in the scholarship will be paid for the corresponding period in accordance with the regulations in force.

If foreseen by the line of research chosen by the applicant, the research period outside Italy must also be carried out.

The PhD scholarships awarded as a result of this selection will be funded from the resources allocated by the MUR with the Ministerial Decree n. 1061/2021 for the two distinct Measures (ESF resources REACT-EU) and the co-financing of the third year guaranteed by this University from its own funds.

The resources for the allocation of PhD scholarships shall be allocated, for each of the two Actions, to the Areas of reference, at the amount established by the *Senato Accademico* (University Senate) and the *Consiglio di Amministrazione* (University Administrative Council), respectively, at their meetings of 5 and 7 October 2021:

**Action IV.4 - Doctorates on Innovation themes (n. 27 additional positions with scholarships)**

- ministerial resources: **€ 1.542.065.39**

- University co-financing (third year): **€ 18,844.56 for each scholarship**

➤ Legal and Humanistic-Social Area: (n. 8 additional positions with scholarships)

➤ Scientific-Technological Area: (n. 19 additional positions with scholarships)

**Action IV.5 - Doctorates on Green themes (n. 26 additional positions with scholarships)**

- ministerial resources: **€ 1.468.633.73**

- University co-financing (third year): **€ 18,844.56 for each scholarship**

➤ Legal and Humanistic-Social Area: (n. 8 additional positions with scholarships)

➤ Scientific-Technological Area: (n. 18 additional positions with scholarships)

The total cost of a doctoral scholarship (including the INPS - National Social Insurance Agency -fee) without a period outside Italy, including 40% of the eligible costs (which also includes the 10% share of the amount of the scholarship received by the doctoral student and intended for him/her), **is € 71,609.52.**



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The total cost of a doctoral scholarship (including the INPS fee) with an increase of 6 months of the foreign period, including 40% of eligible costs (which also includes the 10% share of the amount of the scholarship received by the doctoral student and intended for him/her) **is € 78,205.14.**

The PhD positions with scholarships will be awarded, for each of the two Actions (**Action IV.4 - Doctorates on Innovation themes** and **Action IV.5 - Doctorates on Green themes**) and for each of the two areas of reference that include the 11 doctoral courses (Legal and Humanities-Social Area and Scientific-Technological Area), to applicants placed in an adequate position in the eligibility list approved by the Rector, in the order of the same, based on the duration of the foreign period provided by the line of research chosen by the candidates who are selected for a scholarship.

No PhD positions will be awarded without a scholarship.

If, at the end of the selection procedures, scholarship remain unallocated in one or both Actions due to a lack of suitable candidates, the remaining funds will be allocated, exclusively within the relevant Action, to the other Area, should the latter present further suitable projects not financed in the ranking drawn up by the Selection Committee.

No compensation between the different Actions is possible as the resources are explicitly earmarked for each one of them.

The effective activation of each of the places with additional scholarship is subject to the judgement of admissibility to the funding through the National Operational Program "Research and Innovation" 2014-2020 issued by the Ministry of University and Research and by ANVUR.

The scholarships offered in this call for applications are "additional", therefore they will not be assigned in the event that all the FUR ("Unique Fund for Research") scholarships paid for by the University budget, indicated in the accreditation form and announced by D.R. n. 330/2021, whose selection procedures are still in progress, are not assigned.

### **Art. 1 - Establishment**

For the academic year 2021/2022, a public selection is called, based on **qualifications, evaluation of the research project** and **interview**, for the awarding of additional scholarships for the attendance on one of the PhD courses activated by the University for the 37th cycle and accredited by MUR in accordance with the opinion of ANVUR (National Agency for the Evaluation of the University and Research Systems).

The selection of applicants and the allocation of additional doctoral scholarships will take place, within each of the two areas of reference (Legal and Humanities-Social and Scientific-Technological), exclusively within the scope of the topics specified in art. 2, paragraph 1, letter. a) and letters b) of Ministerial Decree n. 1061/2021 for the two actions of reference:

**- (Action IV.4 - Doctorates on Innovation themes);**

**- (Action IV.5 - Doctorates on Green themes).**



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The applicant may participate in each of the reference Actions (**Innovation** and **Green**) by submitting two separate and independent applications.

The applicant must, however, choose, within each Action, only one of the two thematic areas indicated in the announcement (**Legal and Humanistic-Social Area** and **Scientific-Technological Area**).

The applicant must submit a CV and the additional qualifications indicated in this call and a research project on one of the research lines indicated by the chosen Area in the Annexes to this call (annex A research lines on Innovation and annex B research lines on Green).

Each Area groups the PhD courses of reference that have prepared, for each of the two actions, lines of research consistent with the themes of Innovation and Green.

The applicant must also choose one of the research themes indicated in the chosen Area and indicate it in his/her application.

If the applicant believes that the research project is coherent with more than one line of research, he/she is **required to identify and indicate only the one considered prevalent**.

On the basis of the overall assessment of the research project presented by the applicant, the Commission will proceed, at its sole discretion, after the interview, for each of the applicants who have obtained a final judgment of suitability, to indicate the PhD course (within the area of reference) whose educational content is more consistent with the objectives indicated by the applicant in his research project.

Once the rector's decree approving the acts of the competition has been signed, the winners will be assigned the position with a scholarship with the indication of the doctoral programme of reference.

The doctoral student must, therefore, enrol in the doctoral programme indicated in the rector's decree of approval of the acts and carry out the activities planned within the doctoral programme, committing to carry out the period outside Italy (where applicable) and the mandatory period in the company to the extent indicated in the line of research for which he/she has applied.

## **Art. 2 - Requirements for admission to the Courses**

May apply for admission to the competition for admission to one of the PhD courses indicated in Art. Those who are eligible to apply for admission to one of the PhD courses indicated in the previous art. 1, included in the Areas for the purposes of the present call, with no limits of age or citizenship, who enjoy of civil and political rights in the States of belonging or provenance and who, by the date of expiry of the present call, are in possession of a degree diploma obtained in accordance with the regulations provided by law 341/90 or a Specialist/ Magister degree obtained in accordance with D.M. 509/99 or a master's degree diploma suitable for access to Ph.D. courses in the country of origin by the deadline of the present call.



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The forms attached to this call for proposals (Annexes A and B) contain indications, for each Action and Area of reference, of the **research lines on which applicants may present their research project**, which must be coherent with the themes envisaged by the chosen Action, as listed below:

- **Action IV.4 - Doctorates on Innovation** themes with the aim of promoting research activity on the themes of innovation, digital and enabling technologies and, at the same time, to support the enhancement of human capital as a determining factor for the development of research and innovation in Italy;
- **Action IV.5 - Doctorates on Green** themes with the aim of funding additional doctoral scholarships on topics oriented to ecosystem conservation, biodiversity as well as the reduction of climate change impacts and the promotion of sustainable development.

The research projects must also be consistent with the Areas and Trajectories of the SNSI (National Strategy for Intelligent Specialization) and with the PNR (National Research Programme).

To this end, some useful links are attached for the benefit of applicants:

**PUBLIC NOTICE INNOVATIVE MUR (Ministry of University and Research):**

<http://www.ponricerca.gov.it/notizie/2021/dottorati-su-tematiche-dell-innovazione-e-green-nuove-risorse-dal-pon-ricerca-e-innovazione/>

**SNSI:**

<https://www.researchitaly.it/uploads/14175/Strategia%20Nazionale%20di%20Specializzazioni%20Intelligente%20Italia.pdf?v=26a4e6c>

**REACT-EU:** [https://ec.europa.eu/regional\\_policy/it/newsroom/coronavirus-response/react-eu](https://ec.europa.eu/regional_policy/it/newsroom/coronavirus-response/react-eu)

**NRP:** <https://www.mur.gov.it/sites/default/files/2021-05/PNR2021-2027.pdf>

Those who plan to achieve the qualification necessary for access to the PhD **within the date of 31 October 2021** established by the Ministerial Decree n. 45/2013 may also submit an application to participate in the selection, according to the procedures and within the deadline indicated in the following art. 3, paragraph 1, of this announcement.

After having obtained the qualification, the applicants must promptly send some form of self-certification, form drawn up in the form of a declaration in lieu of the DPR. (Presidential Decree) n. 445/00 (or the certification, in case of academic qualification obtained in non-EU countries), containing the name of the University that issued the qualification, the date of achievement, the type of degree (old system, Specialist/Magister) and the relative mark, accompanied by a copy of a valid identification document, by email to [amministrazione.centrale@cert-unile.it](mailto:amministrazione.centrale@cert-unile.it) and, in copy, to [master.dottorati@unisalento.it](mailto:master.dottorati@unisalento.it). Applicants who expect to obtain their qualifications by that date will therefore be able to take part in the selection procedure subject to conditions.

The same applicants, even if they eventually win the competitive selection, **will lose** the opportunity to enrol on the course if they fail to obtain the qualification required for access **before 31/10/2021**.



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### **Art. 3 – Ways of submitting the application form**

The application to participate in the competition **must be filled in and transmitted, exclusively online, no later than 13:00 (Italian time) on 29 October 2021** using the specific procedure available at <https://studenti.unisalento.it>.

There is no fee for submitting an application for the competition.

To access the procedure you must:

- a) connect to the aforementioned website <https://studenti.unisalento.it> and select, in the top right-hand corner, in the menu item MENU', the chosen language (Italian or English);
- b) Applicants who are not already registered in the system must do so by clicking on the REGISTRATION section of the RESERVED AREA;

Applicants who are already registered on Esse3 can directly access the Portal (by entering "Authentication procedure - LOGIN") and log in with the credentials they already have.

**Foreign applicants, on the other hand, will be able to access the Portal through the entry "Registration for foreign applicants" without having to obtain a SPID code.**

All other applicants must obtain for themselves **a level 2 SPID code.**

- c) The information needed to activate SPID can be found at <https://www.spid.gov.it/richiedi-spid>;
- d) after accessing the Portal click on the following items:  
REGISTAR'S OFFICE – ADMISSION TESTS/COMPETITIONS – ISCRIZIONE CONCORSI – DOTTORATO DI RICERCA/PHD.

The applicant must then choose, from the list, the selection procedure for which he/she intends to participate (PhD INNOVATION or PhD GREEN) and after having carefully read this call for selection and the attached forms, enter all the information required by the system for the online completion of the application.

The procedure described in this point is a **prerequisite** for admission to the competition. It will not be possible to submit an application for admission to the selection using a procedure other than the one described above.

- e) complete the online application form in its entirety, attach the files requested by the system and follow the instructions in the following point.

Please note that once he or she has selected the competition for which you intend to participate ("PhD on Innovation Themes" or "PhD on GREEN Themes"), the applicant must choose the Area of reference for which he/she wishes to participate.



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This choice must be made through the drop-down menu in the item “CATEGORIA AMMINISTRATIVA” / “Administrative Category”, opting for one of the two reference Areas (Legal and Humanistic-Social Area or Scientific-Technological Area).

Applicants wishing to participate in the allocation of doctoral scholarships for the Innovation Action and doctoral scholarships for the Green Action must submit two separate and independent applications.

Doctoral candidates proposing to apply for a specific thematic area within one of the two Actions must submit a research project consistent with one of the research lines envisaged within one of the doctoral programmes belonging to that area.

### **CODICE FISCALE (“TAX CODE”) FOR FOREIGN APPLICANTS**

N.B. For those accessing for the first time the system will require the indication of the tax code.

Foreign students who do not have a tax code can enter an "indicative" tax code, which can be obtained by going to the following page: [www.codicefiscale.com](http://www.codicefiscale.com) and entering the foreign country of birth as the place of birth (e.g. those born in Paris should simply enter "France" in this entry).

### **HOW TO FILL IN THE APPLICATION**

When filling in the application form for the competitive selection procedure, you must follow the instructions below in detail and comply strictly with them:

➤ **the files requested by the online procedure must be attached in pdf format. These files must be inserted in the relevant section of the online procedure and must be named as follows:**

- ID card: CI applicant's surname (e.g. CI\_JACKSON);
- CV: CV applicant's surname (e.g. CV\_JACKSON);
- self-certification of Magister degree exams: Magister degree\_applicant's surname (e.g. Magister degree\_JACKSON);
- other qualifications: TITOLO\_1\_applicant's surname; TITOLO\_2\_applicant's surname; TITOLO\_3\_applicant's surname; etc. (publications, cover letters, if any, assignments held, etc., may be included under this heading);
- research project: name the file Progetto\_applicant's surname (e.g. progetto\_JACKSON);
- research line chosen: linea ricerca\_applicant's surname;
- account for interview: ACCOUNT\_INTERVIEW\_ Applicant's surname (e.g. ACCOUNT\_INTERVIEW\_JACKSON);

In the section concerning the insertion of qualifications, the system asks, in the section "TIPOLOGIA" (“TYPE”), to choose, from a drop-down menu, among various items (e.g. C.V., Carte di identità/Identity card, Progetto di ricerca /research project, Autocertificazione laurea ed esami / Self-certification of degree and exams, line of research, Other qualifications, etc.).

For each **TYPE OF TITLE** entered, the system will require the applicant to fill in the **TITLE** field.

The applicant must include the following information under the heading **TITLE**:



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- for the TITLE TYPE related to the IDENTITY CARD it will be necessary to insert "**CI applicant's surname**";
- for the TITLE TYPE related to the "CURRICULUM VITAE" it will be necessary to insert "**C.V. applicant's surname**";
- for the TYPE TITLE related to the "Research Project" it will be necessary to insert "**Progetto di Ricerca applicant's surname**";
- for the TITLE TYPE related to "Autocert. Esami/Self Certification Exams" insert "**Esami applicant's surname**";
- for the TITLE TYPE related to "Other qualifications" you must enter for each qualification entered by the applicant "**title 1 applicant's surname**"; "**title 2 applicant's surname**", etc.
- for the TITLE TYPE related to the "**linea ricerca**" / "line of research" insert "**research line applicant's surname**"
- for ACCOUNT INTERVIEW it will be necessary to insert ACCOUNT\_INTERVIEW\_ Applicant's surname

Compliance with these instructions will enable the Commission to consult the documents quickly and will prevent the risk of computer documents containing special characters or an excessive number of characters being lost when the information is transferred from the electronic platform.

The University of Salento declines any responsibility in those cases in which the applicant proceeds to the transmission of the documents without following the instructions above in the naming of the attached files.

### **COMPLETING THE ONLINE REGISTRATION PROCEDURE**

The online registration procedure terminates with the printing out from the student portal of the receipt of the application for admission to the competitive selection procedure.

Once the applicant has printed out the "admission test application", upon completion of the online procedure, he or she can consider that his or her application to participate in the competitive selection procedure has been correctly completed.

With the online submission of the application the applicant:

- assumes personal responsibility, pursuant to article 46 and 47 of DPR (presidential decree) 445/2000, regarding the declarations he or she has made and the files attached to the online application, in full awareness of the criminal penalties deriving from false statements and / or false declarations;
- examines the methods of processing of his or her personal data.

**N.B. Applicants are invited to submit their application to participate in the competitive selection procedure well in advance of the date (and time) of the deadline for submission of the application to avoid problems of various kinds that could jeopardize the successful outcome of the application transmission procedure.**

Indeed, near the expiry time, because of overload due to the high number of users who are completing the online procedure, the system may be subject to slowing down.

**It is possible to apply for more than one Ph.D. research course; in which case, the applicant will have to complete more than one online application for each competitive selection procedure for which he / she intends to participate.**



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**indicating the line of research chosen from those indicated for the various Areas in the Annexes to the call for applications (Annexes A and B).**

Each applicant may submit only one research project for each PhD course for which he / she is applying.

If the applicant foresees that they will obtain a qualification by October 31st 2021, he / she must expressly indicate this fact in the application by filling in the section regarding qualifications for admission with the insertion of the “titolo in ipotesi” (“hypothetical qualification”). In such a case, the applicant will be admitted to the competitive selection procedure “con riserva” (conditionally).

In order to be constantly updated on news regarding this call for applications, the applicant can subscribe to the RSS feed associated with the web page of the competitive selection procedure, by clicking on the icon labelled “Sottoscrivi Rss” (“Subscribe to RSS feed”) on the page of the call for applications on the University of Salento website and adding it to his or her own RSS reader.

#### **Art. 4 - Required Documents**

Together with the application for participation in the competitive selection procedure, completed online, the applicant should attach the files containing:

- a) a valid identity document.
- b) a curriculum vitae containing, among other things, reference to **a telephone number and an email address** that may be used for all subsequent official communications related to the competitive selection procedure (e.g. notifications in the event of applicants dropping out and those below them in the rankings being moved up. or the awarding of extra scholarships for innovative Ph.D. research projects) and subsequently, in the event of a successful application for admission to the Ph.D. research course, the official notification on the part of the relevant office and the Coordinator;
- c) Substitute statement of certification made in accordance with Presidential Decree no. 445/00 regarding the possession of the **qualification necessary for access to the selection** (Specialist/Magister degree or single-cycle degree or degree obtained under the old system for students graduating in Italy and Master Degree other degree equivalent to a second level degree for foreign students);
- d) declaration in lieu of certification made in accordance with Presidential Decree n. 445/00 regarding the exams taken and the marks obtained for the Specialist/Magister degree or the degree of old system (or the Master of Science for foreign students), with an indication of the **average** and the number of academic years within which the qualification was obtained: e.g. within the legal duration of the course, first year out of course, second year out of course, etc.). Students who have not yet obtained their degree may be evaluated on the basis of the average of the exams taken up to the time of submission of the application for participation in the competitive selection procedure if this information has been provided by the applicant;
- e) **Research project** consistent with the topics referred to in art. 2, lett. a) and b) of Ministerial Decree n. 1061/2021 (Action IV.4 on Innovation and Action IV.5 on Green), written in Italian or English, **developing one of the research lines** provided in one of the two annexes to this notice (Annex A and B).  
Each applicant may submit only one research project for each Action in which he/she participates (Innovation or Green), opting for a single area of reference.
- f) Form with account for the interview via MICROSOFT TEAMS.



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### **Optional Documentation:**

The applicant may also attach the following additional documentation, which is not required under penalty of exclusion but may be evaluated by the Commission among the qualifications:

- g) **copy of the thesis or abstract of the thesis** related to the Magister degree, Specialist Degree, or Master of Science (for foreign students) or, alternatively, **summary of the thesis topic with indication of the supervisor**;
- h) any **publications**;
- i) any other qualifications/experiences/activities carried out, which the applicant may possess and which may be assessed by the Selection Committee, on the basis of what is indicated in this notice;
- j) **letters of recommendation** from professors who have followed the applicant's university studies;
- k) any linguistic **certification that** verifies knowledge of the English language with a level of at least B2; applicants with non-Italian citizenship may attach in this section the linguistic certification of knowledge of the Italian language.

**The online application is to be considered, for all legal purposes, as an act of self-certification of personal data, of the declared qualifications and the statements made as well as of the attached research project (where one is required)** and therefore, with the presentation of the online application, the applicant assumes personal responsibility, pursuant to articles 46 and 47 of DPR (presidential decree) 445/2000, regarding the declarations he or she has made. It is not required to signing the documents attached to the application will therefore not be required.

### **Art. 5 - Supplementation / correction of the application**

The application form may be corrected /supplemented exclusively by electronic means within the deadline for submitting the electronic application indicated in the previous art. 3.

In order to modify/supplement the application, the applicant must access again the website [studenti.unisalento.it](http://studenti.unisalento.it) and click on "MENU" by selecting "ADMISSION TEST/CONCORSI". So he/she may select the competitive selection procedure for which he/she wants to modify the application from "LISTA CONCORSI A CUI SI E' ISCRITTI". Then it must click on "PROCEED WITH ADMISSION" and finally on "COMPLETA IL PROCESSO SELEZIONATO" at the bottom of the page.

**Thus the applicant may access again the submitted application and proceed to replace, delete or add further documents. At the end of the modifications, the applicant will have to transmit the new application form that will automatically replace the previous one already sent.**

The new application generated by the system will permanently cancel the previous one, so it is recommended to check the correctness and completeness of the documents attached to the last application submitted.



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## **Article 6 - Applicants with a qualification awarded by a university outside Italy**

Applicants who are in possession of a degree awarded by a university outside Italy which has not yet been declared as equivalent to an Italian degree on the basis of international agreements, must accompany the application form with the following documents:

- Certification of the foreign qualification, together with a translation into Italian or English to be included in the "altri titoli" (other qualifications) of the online application; it must include explicit indication of the university exams taken and grades obtained.

The Admissions Board appointed for admission to the Ph.D. research course will, on the basis of the documentation attached by the applicant, ascertain the eligibility of the foreign qualification for admission to the Course, "*in accordance with current legislation in Italy and in the country where it was awarded and with international treaties or agreements concerning the recognition of qualifications for further education.*"

In case of admission to the Ph.D., successful applicants in possession of such qualifications awarded outside Italy must submit, within sixty (60) days from the date of registration, the following documentation:

- certificates and diplomas translated and legalized by the competent Italian diplomatic or consular representation in the country where they were awarded;
- declaration of value of the foreign qualification issued by the competent Italian diplomatic or consular representatives in the country where they were awarded.

## **Art. 7 - Responsibility**

The University of Salento does not accept any liability in the event of loss of communications due to: incorrect information about the residence or the address of the applicant; an applicant's failure or delay in notifying it of a change of address; or technical problems attributable to the email address indicated by the applicant.

## **Art. 8 – Exclusions**

The following applications will be automatically excluded:

- a) applications that are **incomplete** and/or lacking in the **obligatory annexes** or which are **irregular**;
- b) applications that are **not** submitted in accordance with the procedures indicated or with a timetable that differs from that **set out in Articles 3, 4 and 5 of this notice**;
- c) applications from applicants who **do not possess the minimum qualification required for admission to a doctoral programme (Master of Science degree or Specialist / Magister degree in the old system or Master of Science degree for graduates from countries other than Italy)** or, in the case of applications for conditional admission, if they do not obtain said qualification by the deadline of 31 October 2021;
- d) **applications submitted by applicants who have indicated several different areas within the same Action**;
- e) applications lacking a **research project**, which must be attached when submitting the application form within the deadline specified in article 3 of this call for applications.



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- f) **applications lacking an attached C.V.**  
g) **applications that lack a copy of a valid identity document**, which must be uploaded when submitting the online application form.

Any additions or corrections to the application submitted in a manner that differs from that laid down in Article 5 of the competition notice or in accordance with timeframes that differ from those strictly indicated will not be considered valid.

The person in charge of the procedure may request the necessary clarifications from candidates if this does not compromise the principle of equal treatment of candidates.

Failure to indicate the examinations taken (and the relative average) for which it is possible to use the format in Annex 2) or the other qualifications indicated and assessable by the Commission will not result in the exclusion of the candidate from the competition but will not allow the Commission to award any points for the corresponding item in the assessment of "TITLES".

In the case of applicants who, on the date of submitting their application for admission to the competition, do not yet possess the degree required for admission, **the Commission may evaluate, as an alternative to the degree mark, the average of the examinations taken in the second level course, based on a correspondence criterion that it must establish in advance.**

Similarly, the Commission shall establish in advance a correspondence criterion for the evaluation of the degree mark obtained abroad by candidates.

Candidates excluded from the competition for the reasons set out in the previous paragraph will be notified by the Administration, compatibly with the timetable for the competition tests, by e-mail, to the address indicated in the curriculum vitae attached to the application form.

Candidates who do not receive notification of their exclusion from the competition shall be deemed to have been automatically admitted to the selection.

All candidates are admitted to the competition subject to verification that they meet the eligibility requirements.

The Administration may at any time, until the classification list is approved, exclude candidates from the competition on the grounds that they do not meet the requirements.

Should the reasons for exclusion pursuant to the present article be ascertained after the competitive selection procedure has taken place, the Rector will issue a decree which will disqualify the applicant from participating in the competitive selection procedure.

The University of Salento reserves the right to carry out checks, including sample checks, in accordance with the provisions of art. 71 and following of Presidential Decree. n. 445 of 28 December 2000.

### **Art. 9 - Procedure for Competitive Selection of Applicants**

Applicants will be selected through the evaluation of the research project and qualifications for a total of max 100 points divided as follows for each of the two tests:

- **evaluation of the research project presented by the** applicant, which must focus on one of the research lines indicated in the annexes to this call (Annexes A and B) **(max 50 points)**;
- **assessment of qualifications (maximum 20 points)**;
- **interview (maximum 30 points)**.



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## **Research project**

The research project may be written in Italian or English and must be consistent with the themes set out in Article 2, letters a) and b) of Ministerial Decree n. 1061/2021 (Action IV.4 on Innovation and Action IV.5 on Green).

It must be an original work of the applicant written **developing one (and only one) of the research lines** provided in the annex to the present call (annexes A and B).

The project should include the following parts:

- ***Title of the research***, clearly indicating the topic of the proposed research, the area of reference and the line of research chosen;
- Brief ***Abstract***, showing the consistency of the topic of the research project with the research lines specified in the Call for Proposals, with the topics indicated in the Ministerial Decree n. 1061/2021, with the SNSI (National Strategy for Intelligent Specialization) and with the PNR (National Research Programme) and summarizing the fundamental objectives of the research project;
- ***State of the art***, i.e. a brief examination of the assumptions and starting data relevant to the chosen topic, identifying open problems and unresolved issues;
- A ***description of the project***, illustrating the chosen topic; outlining the methodologies that the applicant intends to adopt for the research; highlighting the proposal's originality in relation to the state of the art and the innovations that are intended to be introduced with reference to the open problems identified, for the advancement of knowledge in relation to the chosen topic; clearly outlining the prospects, in terms of scientific results, that the project proposes to achieve;
- ***Hypothesis of organization and scansion of the research work in the three-year period***, indicating the temporal phases in which the research activity will be articulated as well as the objectives and intermediate results expected at the end of each phase;
- ***Essential bibliography***, related to the sources that the applicant intends to use as an initial reference, to be written avoiding generic bibliographic references or those scarcely relevant to the proposed research project.

As a guideline, we recommend that you do not exceed 3500 words (approximately 6-7 pages; line spacing 1.5; body of text 11).

**Each applicant may submit only one research project for each Action in which he/she participates (Innovation or Green), opting for a single area of reference.**

In view of the specific allocation of resources by the PON R&I 2014-2020 budget allocated by the Ministry for Actions IV.4 - PhDs on Innovation and IV.5 - Doctorates on Green themes aimed at supporting PhD programmes consistent with the topics indicated in the introduction and, in order to avoid the possibility of revocation of the scholarship, **the Commission will not evaluate research projects that are not consistent with the line of research chosen by the applicant among those indicated in the Annex to this call and with the topics identified in Ministerial Decree n. 1061/2021.**

Applicants who obtain a score lower than **35/50** in the evaluation of the research project will not be admitted to the evaluation of qualifications.



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## **Interview**

Candidates are required to verify admission to the interview on the date established for the presentation of the results of the research project and in the case of admission to the interview, they are required to connect on the day and at the time indicated to do the interview via the MICROSOFT TEAMS platform.

During the interview, the candidate must guarantee the use of a webcam to allow his / her selection to be identified by the Admissions board and must connect in the manner prescribed by the Commission for the oral examination.

For identification purposes, and under penalty of exclusion from the selective procedure, each candidate is required, before the interview begins, to allow the Commission to identify him, showing the same Identity document already sent, in copy, as an attachment to the application. Failure to connect, the unavailability of the candidate on the day and time established, or the failure to show a valid identity document are all grounds for exclusion from the selective procedure.

## **Art. 10 - Selection Committees and their duties**

The evaluation of the applicants to be awarded positions with a scholarship will be carried out, for each Action and within each of the two areas of reference, by a separate selection committee appointed by the Rector, on the proposal of the Doctorate Academic Board, from among those who have expertise in research topics related to the topics listed in Art. 2, letter a) and b) of D. M. n. 1061/2021.

The selection committee for Scientific Technological Area will be composed of 7 members effective and 2 members as substitutes for the effective members in the event of one or more of them being incapacitated or absent, in addition to a member of administrative staff with the role of Secretary.

The selection committee for Legal and Humanistic Social Area will be composed of 5 members effective and 2 members as substitutes for the effective members in the event of one or more of them being incapacitated or absent, in addition to a member of administrative staff with the role of Secretary.

Each member of the Selection Committee can participate only for one Action.

The responsible of the research lines will not be able to be part of the selection committee.

After taking office, each Commission shall appoint a President from among its members.

The Selection Committee may carry out its work in online mode, guaranteeing in any case the security and traceability of the information in accordance with the regulations in force.

In consideration of the specific nature of the selection procedure in question, professors who have been part of other admission commissions in previous years may also be members of the Commission, as an exception to the provisions of the regulations in force regarding research doctorates.



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In evaluating the research project, the Commission will assess, within the scope of the aims and objectives of the reference Action of the PON R&I 2014-2020 with reference to the parameters indicated in art. 3, paragraph 2 of Ministerial Decree no. 1061/2021, the applicant's vocation for research and ability to propose an original, innovative, coherent and autonomous research programme, in line with the research lines proposed by the Department of reference.

**The Commission has a maximum score of 100 points** (max 50 points for the evaluation of the research project, max 20 for the titles and max 30 for the interview).

The Commission, in assigning a reasoned score to the **research project (max 50 points)**, will use the following evaluation criteria:

- 1) **degree of coherence and correlation of the research project presented by the applicant with the lines of research indicated in the Call for Proposals**, with the themes indicated in Ministerial Decree n. 1061/2021, with the SNSI (National Strategy for Intelligent Specialization) and with the PNR (National Research Programme) (max 15 points);
- 2) **scientific originality of the research project** and its impact on the state of the art in terms of advancement of knowledge and novelty of the contributions proposed with reference to the problems identified (max 15 points);
- 3) clarity in the exposition of the themes and objectives, accuracy in the reconstruction of the state of the art and methodological rigor (max 10 points);
- 4) logicity, internal coherence and sustainability of the hypothesis of organization and scansion of the research work in the three years proposed by the applicant (max 10 points).

The **evaluation of qualifications (max 20 points)** will focus on the applicant's university education (**max 7,5 points**), possession of language certifications (**max 2,5 points**) and professional and research experience (**max 10 points**).

The evaluation of qualifications will take place only and exclusively for those applicants who have achieved the minimum score within the sufficient band in the evaluation of the research project (35/50).

At the first meeting and in any case before viewing the applications received, the Selection Committee will specify in detail, for each of the three macro-items, the sub-criteria with which scores will be assigned, including the score to be assigned to the degree.

The following are examples of some of the qualifications/activities that the Commission may assess under the three reference criteria:

- a) **university course of study** (e.g. grade obtained by the applicant when obtaining the qualification required for admission, average of the exams of the second level course, duration of the university course, dissertation, etc.). (**max 7,5 points**);
- b) **Language certificates** verifying the applicant's knowledge of English with a level of at least B2 (**max 2,5 points**);
- c) Professional **and research experience** (e.g. publications, professional experience carried out by the applicant, qualification and any other qualifications obtained by the applicant (e.g. Master's degree or other doctorate) by teachers who have followed the applicant's training project (**max 10 points**).

The Commission shall give reasons for the marks awarded to each applicant for each item within the three criteria.



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The list of those who are admitted to the interview will be published *by **the 10<sup>th</sup> of November 2021*** on the Albo on line and on website of the University, in the section bandi e concorsi/dottorati di ricerca.

***The oral exam (interview) will be held on 12/11/2021.***

This communication is an official notification to the candidates.

At the end of the evaluation each Commission will prepare, for each Action and within the two Actions for each Area of reference, a merit list that will take into account the sum of the points obtained by the applicants on the basis of the evaluation of the qualifications and the research project.

The pass mark for each applicant to qualify for this selection and to be eligible for a position with a scholarship is 60/100.

On the basis of the overall assessment of the research project presented by the applicant, the Commission will proceed, at its sole discretion, for each of the applicants who have obtained a final judgment of suitability, to indicate the PhD course (within the area of reference) whose educational content is more consistent with the objectives indicated by the applicant in his research project.

#### **Art. 11 - Ranking of Eligibility list and admission to Courses**

The rankings of eligibility approved by the Rector will be published at [www.unisalento.it](http://www.unisalento.it) in the section dedicated to Research Doctorates in the link “Bandi e Concorsi” (“Calls and Competitive Selections”), as well as in the section related to the on line roll (“Albo”), as a means of notifying all concerned.

The successful applicants for each Action and for each Area will be admitted to the corresponding PhD courses up to the amount of resources available for each Action (and for each Area) as specified in more detail in the Introduction to this call which is an integral part of it.

In the hypothesis of two applicants been awarded the same marks, the criterion of precedence foreseen by art. 7, paragraph 4, of Ministerial Decree. n. 224/99 is applied, that is evaluation of the economic situation. In this case, the scholarship will be awarded to the winner who has the lowest valid ISEE.

This shall constitute notification of the interested parties for all legal purposes.

**The research project to be carried out during the PhD course will coincide with that presented by each successful applicant.**

This Administration will not send personal communications to the interested parties, considering that the fulfilment of the obligation of publicity and notification of the acts is fulfilled with the publication of the rankings in the form and manner described above.



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## **Art. 12 - Enrolment on Doctoral Programmes**

Applicants admitted to the PhD courses must register online through the ESSE3 platform, with the same login credentials used to participate in the competitive selection procedure.

All applicants admitted to the Ph.D. research course are required, under penalty of forfeiture, to proceed with online registration to the same, within 15 days of the date of publication of the rankings on the University website [www.unisalento.it](http://www.unisalento.it) in the section dedicated to “Dottorati di Ricerca” (Ph.D.) via the link “Bandi e Concorsi” (“Calls and Competitive Selections”), and in the online Albo (Official register), following the procedures that will be indicated in a special document that will be published together with the decree approving the workings of the Admissions Board.

### **No individual notification will be made to competitive selection procedure winners.**

In order to proceed with enrolment in the Course, all winners (including scholarship winners) must pay the regional tax for the Right to Education in a single payment, at the time of enrolment, therefore applicants are advised to make every effort to obtain the ISEE in time.

In the event that the applicant is **already a winner of other doctoral competitive selection procedures or is usefully placed in two separate rankings for the two actions, the applicant must exercise the option for only one action without any delay.** To this end, the applicant must send a communication to the PEC [amministrazione.centrale@cert-unile.it](mailto:amministrazione.centrale@cert-unile.it) explicitly indicating the desire to accept one or the other of the positions for which he was successful and attaching a valid identity document.

**The winners who do not proceed with the enrolment to the PhD programme within the peremptory terms indicated above or who do not exercise the option will be considered tacitly renounced** and will therefore automatically forfeit the right to enrolment.

The administration at any time during the procedure and even after the start of the PhD course, may carry out checks and spot checks, pursuant to art. 71 of Presidential Decree n. 445 of 28 December 2000, on the information and statements produced by applicants, on the validity of the documents attached by applicants to the online application and it may also request the original of these documents.

The University of Salento may at any time, by reasoned decision, exclude applicants from the selection process due to the lack of the requisites required by the call for applications or if, as a result of sample checks on the qualifications of applicants, false or untrue statements are found, and may consequently report the same to the judicial authorities.

## **Art. 13 – Renunciations and Scrolling of the Ranking**

In case of renunciation and/or forfeiture of eligible applicants, the next below in the ranking may be allowed to **take their place**, exclusively in the order of the approved eligibility list, until the last date allowed by the Ministry.



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**In the case of scrolling, the winners will have **3 days from the individual notification of the scrolling of the ranking** to proceed with the acceptance of the position.**

#### **Art. 14 - Obligations and Rights of Doctoral Students**

The PhD course has a duration of three years.

Doctoral students are obliged to attend full-time and exclusive PhD courses, carry out teaching, study and research activities provided by the Academic Board and submit, at the end of each year of the course, to the Board a report on the research activities carried out and the results achieved, in accordance with the terms and procedures established by the Board itself and on the basis of the indications contained in the operational guidelines issued by the Rector with protocol note. n. 42975, on 27/03/2020.

Winners and Coordinators are also required to comply in detail with all the prescriptions and indications contained in the Ministerial Notice, in the attached Specifications and in this announcement.

**Pursuant** to Ministerial Decree no. 1061 of 10.08.2021, the acceptance of the scholarships compulsorily implies **the performance of periods of study and research in the company from a minimum of six (6) months to a maximum of twelve (12) months.**

For some positions, periods of study and research outside Italy for a minimum of six (6) months and a maximum of twelve (12) months are also required.

The period of study/research outside Italy, if provided for by the line of research for which the applicant was awarded, must be carried out.

The applicant, since the submission of the application form, is aware that failure to comply with the minimum period of time in the company and outside Italy (where applicable) will result in the revocation of the scholarship and the need to return the instalments used on the basis of the provisions of the specification from the MUR (Ministry of Universities and Research).

Scholarships are awarded for one year and are renewed on condition that the doctoral candidate has completed the programme of activities planned for the previous year, without prejudice to the obligation to pay the scholarship after passing the assessment to be carried out by the Academic Board for each year of the course.

The confirmation of the scholarship for the years following the first is made by formal resolution of the Academic Board to be carried out at least once a year, usually within 30 days from the end of the relevant year of the course.

The negative judgment of the Academic Board during the annual review will result in the forfeiture of the doctorate, which will be proposed by the Academic Board and established by rector's decree.

The winners of the scholarships must declare at the time of enrolment on the Course and on acceptance of the scholarship:

- to formally undertake to carry out the planned research periods (minimum 6 months, maximum 12 months) in the company and outside Italy (where foreseen by the chosen line



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- of research), stating at the same time that he/she is aware that failure to comply with the minimum period of time will result in the withdrawal of the scholarship;
- to be aware that the modification of the project objectives and expected results (if not previously authorized by the MUR) will result in the revocation of the scholarship and the total refund of any amounts already paid;
  - to certify that they are aware that any negative judgment of the Academic Board and the consequent non-admission to the next year of the doctoral programme will result in the revocation of the amounts already paid for the current year, and that the failure to obtain the title will result in the revocation of the amounts already paid for the last year of the course;
  - to declare that they are not currently the beneficiary of any other scholarships of any kind awarded and to undertake, for the entire duration of the additional scholarship, not to use other scholarships of any kind awarded, with the exception of those eligible under current regulations;
  - to submit the additional declarations required by the Ministerial Notice and by art. 3, third paragraph of the Specifications;

The submission of the thesis for the final examination must take place within the deadline provided for in art. 19 of the PhD Regulations currently in force.

The Academic Board will submit the thesis to the evaluators only in the hypothesis that the applicant's project is accepted and that he or she has accumulated the necessary CFU (university credits) in the three years of the course.

For any matters not specified in this article regarding the rights and duties of doctoral students as well as the institution of the interruption, suspension, forfeiture and renunciation of the course, please refer to the provisions of art. 22 of the current Regulation of Doctoral Programmes issued by the Rector's decree n. 509/2019.

### **Art. 15 - Revocation of the Scholarship**

The coherence of the research project presented by the applicant with the themes indicated in the D.M. n. 1061/2021 to which the resources allocated by the Ministry are expressly aimed will be evaluated in the final instance by the MUR and ANVUR (National Agency for the Evaluation of the University and Research Systems) in accordance with art. 4, paragraph 1, letter f) of the Regulations attached to the D.M. n. 1061/2021.

The scholarship will, therefore, be revoked by this University in the event that the judgment of consistency/congruity is negative. In this case, this University will proceed to request from the winner the instalments that may have already been paid and will arrange, where necessary, for the forced recovery of the sums inappropriately paid.

Since these are additional scholarships, the scholarships will also be subject to revocation in the event of **non-allocation of all the ordinary scholarships from the University budget (announced by D.R. n. 330 of 2021 for the Doctoral Programmes of the 37th cycle)**.

Scholarships cannot be awarded if the deadlines set by the Ministry for the start of the courses are not respected.



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The Regulations attached to the Ministerial Decree no. 1061/2021 provide for the following additional revocations of the scholarship:

- implementation of the doctoral programme in a manner different from the project accepted for funding, where it was not previously requested and subsequently granted the necessary authorization by the MUR;
- Failure to complete the minimum period of study and research in the company and the minimum period outside Italy, if applicable, upon completion of the doctoral programme (three-year duration);
- any negative judgment of the Academic Board and the consequent non-admission to the next year of the doctoral programme;
- renunciation of the course of the doctoral programme.

In all the aforementioned cases, the University of Salento will be able to claim back the amounts received from the beneficiary.

Doctoral students are reminded that they are required to comply:

- with the obligations and constraints established by the Regulation of the PhD courses of the University of Salento, issued by rector's decree n. 509/2019;
- with the Code of Ethics and Conduct of the University of Salento;
- with all the rules and regulations of the University of Salento.

### **Art. 16 - Amount of the Scholarship**

Scholarships are awarded for one year and are renewed on condition that the doctoral student has completed the programme of activities planned for the previous year, verified according to the procedures established by the Regulations, without prejudice to the obligation to award the scholarship following the successful completion of the verification.

The amount of the scholarship, to be disbursed in monthly instalments, is determined in accordance with the provisions of Article 2, paragraph five, of the Specifications in accordance with the provisions of Ministerial Decree no. 40 of 25.01.2018, i.e. equal to € 15,343.28 per annum gross of social security charges payable by the recipient.

This amount is increased by a maximum of 50% in the event that the line of research chosen by the applicant includes the period to be carried out outside Italy.

Starting from the second year, each doctoral student is guaranteed, within the existing financial resources of the budget, a fund for research activities in Italy and outside Italy appropriate to the type of course and in any case not less than 10% of the amount of the scholarship.

Doctoral scholarships cannot be combined with other scholarships of any kind, (including research scholarships) except those granted by national or foreign institutions with the aim of integrating the research activities of the doctoral student with stays outside Italy (with the exception of scholarships for advanced training outside Italy ex Law no. 398/89).

The scholarship is paid in monthly payments in arrears.



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### **Art. 17 - Fees and contributions**

All students enrolled in the PhD courses are exempt from paying the fees for access and attendance of the courses, in accordance with the provisions of art. 11, paragraph 11, of the current University Regulations on PhDs.

All students enrolled in the Course of study will have to annually pay the virtual tax stamp and the amount of the regional tax for the Right to Education in accordance with the amounts set annually by the Puglia region Right to Education agency (ADISU) pursuant to art. 11 of Italian Regional Law (Puglia) 45/2012.

The amounts to be paid vary, according to the student's ability to pay, in relation to the ISEE (level of income) values identified annually by the regional authority and in possession of the student at the time of registration/enrolment:

Regional right-to-study tax	ISEE (level of income) values
€ 120,00	Students with ISEE equal or inferior to € 23.000,00
€ 140,00	Students with ISEE between € 23.001,00 and € 46.000,00
€ 160,00	Students with ISEE equal or superior to € 46.00,00

In case of failure to indicate their ISEE value, the student will be liable to the highest level of regional tax (€ 160,00).

The amount of the regional tax for the Right to Education and the values relating to the ISEE brackets may be subject to increase or decrease on the basis of regional provisions.

### **Art. 18 - Exemption for Ph.D. students with disabilities**

Specific forms of total or partial exemption from the payment of taxes and / or contributions for disabled students are envisaged, both with a degree of disability, following the Italian scale of disability, equal to or greater than 66%, and with disability between 31% and 65%.

Students with a recognized disability equal to or greater than 66% are exempt from paying taxes and contributions.

Students with disabilities between 31% and 65% benefit from a partial exemption from the registration fee with linear application until it is zeroed for percentages greater than or equal to 65%.

### **Art. 19 - Intellectual property of research results and publications**

Without prejudice to the Italian copyright law (Legislative Decree 633/1941 and subsequent modifications), The intellectual and industrial property rights regarding the results achieved by the PhD student, including, by way of example and not limited to, software, industrial inventions, whether patentable or not, know-how, models, data and data collections, are regulated in accordance with the current legislation and the University regulations and,



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possibly, on the basis of what is established in the individual agreements with the universities, companies or entities involved.

### **Art. 20 - Procedure for attaining a “Dottorato di ricerca” (Doctor of Philosophy – Ph.D.)**

The procedures relating to the presentation of the Ph.D. thesis and the appointment of the Evaluators and Final Examination Board are contained in the guidelines for the conferment of the title of “Dottorato di ricerca” (Doctor of Philosophy – Ph.D.) attached to the D.R. (Rector’s decree) n. 105, on 02/21/2017.

The timing of the presentation of the doctoral thesis is instead fixed by article 19, third paragraph of the current Ph.D. research course regulations issued by Rector’s decree n. 509/2019.

The procedures relating to the composition of the board for the final exam, its composition and the methods of carrying out the final exam are contained in articles 19 and 20 of the aforementioned university Ph.D. research course regulations.

### **Art. 21 Final Thesis**

Ph.D. theses must be in digital format in order to allow them to be filed, as required by law at the National Libraries of Rome and Florence and at the University of Salento open-access institutional archive if it is already active and available.

The conferment of the certificate of attainment of the title of “Dottorato di Ricerca” (Doctor of Philosophy – Ph.D.) is dependent on the depositing, by the interested party, of the final thesis in the University of Salento open-access institutional archive which will guarantee its preservation and availability for public consultation and which will deposit the said thesis, as required by law, at the National Libraries of Rome and Florence.

### **Art. 22 - Accessibility of Ph.D. theses**

Accessibility to the Ph.D. thesis in the University of Salento open-access institutional archive may be subject to restrictions, for the following reasons:

- a) parts of the thesis have already been submitted to a publisher or are awaiting publication;
- b) the thesis contains sensitive content data (article 4 of decree n. 196, June 30, 2003)
- c) the thesis is financed by external entities that have rights over it and over its publication;
- d) parts of the thesis have been discussed at a date that is earlier than the discussion and thus subject to patent protection.

In the cases referred to in letter b), the thesis will only be made available if it is possible to make the data anonymous.

As for the other cases, there could be a 12-month suspension of free access, but only after the Academic Board has expressed its approval and following a reasoned request on the part of the student countersigned by his/her tutor.

The suspension of free access can be extended, with a similar procedure, for a further 6 months. Any request for a longer suspension period, in any case not exceeding three years, in exceptional and duly justified cases will be evaluated by the Rector.

At the end of the suspension period, the thesis will however be made freely available for consultation.



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### **Art. 23 - Referral rules**

For civil servants enrolled in PhD courses, the provisions of art. 2, paragraph 1, of Law n. 476/84 as recently amended by Law n. 240/2010 apply.

An English translation of this notice has been made which cannot be used for legal purposes and is intended solely as an aid to foreign applicants.

### **Art. 24 - Processing of personal data**

Article 13 of Italian Law no. 196 (30 June 2003) establishes that the personal data provided by the applicants to the University of Salento at the time of application shall be used exclusively for institutional purposes and for the completion of any inherent procedures conducted by the persons carrying out the competitive selection procedure, also by the Admissions Board (at the University of Salento, Ufficio Master e Dottorati), even with the use of computerized procedures, in the manner and within the limits required for the above purposes, even in the event of any communication to third parties pursuant to current national and EU legislation. The data controller is the University of Salento, Piazzetta Tancredi, 7 - 73100 Lecce, represented by the Magnificent Rector, Prof. Fabio Pollice.

The person responsible for the protection of the University of Salento is Dr Giuseppina Campanile. Her contact details are: - Tel. 0832/292333 - E-mail: dpo@unisalento.it.

Applicants have the right to access their personal data, to ask for their rectification, updating and cancellation, if it is incomplete, incorrect or has been collected in violation of the law, as well as to oppose the processing of the same for legitimate reasons.

The data will be kept for the period necessary for the stipulation and execution of this agreement and until all legal obligations have been fulfilled. In any case, they will be kept for the time established for the filing obligations provided for by the regulations in force.

This is without prejudice to the right to lodge a complaint with the Data Protection Authority pursuant to Article 77 of the GDPR.

The complete information regarding the processing of personal data can be viewed at the following address:

<https://www.unisalento.it/documents/20143/970815/Informativa+trattamento+dati+degli+studenti.pdf/b6722c1f-170f-a094-5ba8-98abf4a5ba2e>

### **Art. 25 - Responsible parties for the application and competitive selection procedure**

The *Master and Dottorati* Office at the *Università del Salento* is responsible for any procedural aspect related to this call for applications.

The person in charge of the administrative procedure, for each and every competitive selection procedure, is the Director of Ripartizione Didattica e Servizi agli Studenti.



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One can also contact the *Ufficio Master e Dottorati* at the following telephone numbers ++39 (0)832/299210-299228-299041-9232 e-mail addresses: [master.dottorati@unisalento.it](mailto:master.dottorati@unisalento.it);

**Foreign applicants may request information on how to apply for admission to the competitive selection procedure and, subsequently, in case of admission, for enrolment in the Course, from the University WELCOME OFFICE at [welcome.office@unisalento.it](mailto:welcome.office@unisalento.it) (tel. 0832/299259).**

For any purely technical and non-administrative problems, applicants can request assistance according to the procedure described in the following link <https://www.unisalento.it/-/servizio-assistenza-helpdesk>

#### **Art. 26 - Final rules**

This present call for applications, together with the English version, will be made public electronically on the site [www.unisalento.it](http://www.unisalento.it) in the sliding window "Latest News", as well as in the section dedicated to PhDs in the link "Bandi e Concorsi" ("Calls and Competitive Selections").

This call is also advertised on the European website *Euraxess* and on the MIUR website.

F.to THE RECTOR  
(Prof. Fabio POLLICE)



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**RIPARTIZIONE DIDATTICA E  
SERVIZI AGLI STUDENTI**

**AREA POST LAUREAM**

**UFFICIO MASTER E DOTTORATI**

[master.dottorati@unisalento.it](mailto:master.dottorati@unisalento.it)

**Centro Congressi  
Campus Ecotekne**

**S.P. 6, Lecce-  
Monteroni**

Tel. +39 832 9041-9210-  
9238 - 9232

Annex 2

**SUBJECT:** competitive selection procedures for Ph.D. Research Course of research with the allocation of additional scholarships for innovative doctoral studies using ESF resources REACT-EU, in implementation of Ministerial Decree n. 1061/2021 - 37th cycle. Account for an interview via MICROSOFT TEAMS.

**To the person responsible for the  
admissions procedure**

The undersigned, born at \_\_\_\_\_, resident in \_\_\_\_\_, tel. \_\_\_\_\_, mail \_\_\_\_\_, having applied to participate in the competitive selection procedures for Ph.D. Research Course of research with the allocation of additional scholarships for innovative doctoral studies using ESF resources REACT-EU, in implementation of Ministerial Decree n. 1061/2021 - 37th cycle, approved by D.R (rector's decree)

**INDICATES**

the following mail account for the interview via a video call using the "Microsoft TEAMS" system (write clearly and legibly):

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N.B. This form must be attached by the candidate in the telematic platform in the section named "Account Microsoft Teams".

## Attachment A)

### Innovation

Thematic Area	Research Lines	PhD Course
<p><b>LEGAL AND HUMANISTIC-SOCIAL AREA</b></p>	<p><b>1. Analysis of legal issues related to the role of Big Data, digitalization, artificial intelligence and enabling technologies in the processes of creation of economic and social value, with the aim of developing models of regulation that reconcile the needs of innovative enterprise with the respect of the human rights and the principles of non-discrimination, security, transparency and effective democratic participation</b></p> <p><b><u>Period in a company:</u> 6 months</b></p> <p><b><u>Period abroad:</u> 6 months</b></p>	<p><b><u>DOTTORATO in “Diritti e Sostenibilità” /</u></b></p> <p><b><u>PhD in “Law and Sustainability”</u></b></p>
	<p><b>2. Biotechnology and the human condition: opportunities/risks and communication</b></p> <p>The accelerated growth of knowledge in the biotechnological field over the last 30 years has produced an unprecedented 'power to act', a capacity to intervene in the lives of human beings and other species, which has altered the conditions of many vital processes and raised great bioethical interest but also interventions which are not always adequately thought through. In-depth reflection seems particularly necessary in the light of the fact that human activities make full use of the opportunities offered by technology. The project intends to take its place in the contemporary bioethical debate by cultivating the ethical, anthropological, scientific and normative terrain and increasing</p>	<p><b><u>DOTTORATO in “Filosofia: Forme e Storia dei Saperi Filosofici”</u></b></p> <p><b><u>(dottorato internazionale in convenzione con l'Université Paris Sorbonne e con l'Universität zu Köln)</u></b></p>
<p><b>AREA GIURIDICA ED UMANISTICO-SOCIALE</b></p>		



	<p>critical awareness. The aim is to give the research a double path: - on the one hand, to deepen and refine ethical reflection on the innovative impact of technologies on life (from the complex stages of artificial insemination to the conditions of vital assistance to the very premature, to the limits of the application of surrogate therapies, to genomic editing, to the choice of changing sex definitively); - on the other hand, to seek the most appropriate ways of communicating science/dissemination by digital means, which are effective in developing informed choices and critical faculties, as well as preventing the ideological polarization of the debate. Also through a careful and balanced use of social media.</p> <p><b>Period in a company:</b> 6 months</p> <p><b>Period abroad:</b> 6 months Università di Leiden, Olanda. The scientific referee is Prof. Simcha Jong who deals with <a href="#">Healthcare management and innovation Precision medicine</a> <a href="#">Science-based entrepreneurship</a> <a href="#">Pharmaceutical R&amp;D</a> <a href="#">Global health</a>.</p> <p><b>Responsible of the research:</b> Prof. Laura Tundo</p>	<p><b>Phd in</b> <b><u>“Philosophy: Forms and History of Philosophical Knowledge” / “Philosophie: Formes et histoire des savoirs philosophiques / Philosophie: Formen und Geschichte des philosophischen Wissens”</u></b></p>
	<p><b>3. The new frontiers of lexicography call not only for the digitalization of traditional printed products – an area which has seen lively and passionate action in the last few decades – but also, and more importantly, for the development of products which have been specifically conceptualized or redesigned for the digital world. Examples of the latter type are the Tesoro della Lingua Italiana delle Origini (Florence) and the</b></p>	



**Dictionnaire onomasiologique de l'Ancien Gascon (Zurich).**

We welcome project proposals concerning the creation of a specialised dictionary, glossary or other lexicographic product conceived for the digital world and created exclusively through the use of digital humanities tools. Preference will be given to projects that conceive a product from scratch or that enhance through digital transformation an existing product whose full potential has not yet been deployed.

**Duration of internship:** 6 months with the publishing house Casa Editrice Milella di E. Augieri (Lecce)

**Duration of stay abroad:** 6 months

**Responsible of the research:** Prof. Marcello Aprile

**4. Digital transition in the form of live subtitling applied to medical settings, to support doctor-patient interaction in situations where a written-aural mixed form of communication is likely to achieve the best outcomes. These would include, for example, dialogue with patients whose physical conditions make oral communication frustrating if not impossible (deaf or hearing-impaired patients) or with infectious patients in isolation units (in this case intralanguage live subtitling could be an alternative to remote interpreting).**

We welcome project proposals concerning the theoretical and practical aspects of medical interpreting in those hospital settings where a written-aural mixed form of communication is likely to achieve the best outcomes: the doctor communicates orally, but the

**DOTTORATO in**  
**“Lingue,**  
**Letterature,**  
**Culture e loro**  
**applicazioni”**

**Phd in**  
**“Languages,**  
**Literatures and**  
**Cultures and**  
**their**  
**applications”**



interpreter's translation is presented in written form to the patient who replies orally. This form of communication requires the use of specific hardware/software for live subtitling.

The project will have to include:

1. analysis of hospital settings where live subtitling could find suitable application (e.g. with non-signing deaf – with whom sign language interpreting is not a viable option – or patients with hearing loss due to aging or accident);

2. analysis of the specific communication issues affecting doctor/nurse-patient interaction in the contexts identified in 1, considering both interlingual and intralingual communication;

3. identification of the most suitable hardware/software products to be used in a hospital context and field testing of such technology (existing technology might require some form of adjustment before it can be used in a hospital ward).

This PhD position is offered in the disciplinary area of English linguistics (L-LIN/12 – Lingua e traduzione inglese)

**Duration of internship:** 6 months

**Duration of stay abroad:** 6 months

**Responsible of the research:** Prof. Francesca Bianchi

### **5. Globally Networked Italian Language Teaching (GNILT) Project**

The GNILT project addresses the instruction of L2 Italian teachers in the use of telecollaboration as teaching/learning method. Telecollaboration, also known as virtual exchange (see the EVALUATE project;

[https://www.unicollaboration.org/wp-content/uploads/2020/08/Training-Manual\\_Final\\_EVALUATE.pdf](https://www.unicollaboration.org/wp-content/uploads/2020/08/Training-Manual_Final_EVALUATE.pdf)),

	<p>involves teachers and students in pedagogical activities and tasks aimed at promoting active participation, interaction, and information exchange among all the participants in the teaching/learning process. Telecollaboration takes advantage of national and international school and university networks and supports the development and/or improvement of transversal skills, including digital literacy and intercultural communicative abilities.</p> <p>The candidate will:</p> <ul style="list-style-type: none"> <li>- collaborate with the L2 Italian teacher in designing a new telecollaboration project (e.g. by identifying the learning design, conceiving the tasks);</li> <li>- collect empirical data within the GNILT project (which has been going on for two academic years: 2019-2020; 2020-2021): a) data on the impact of the GNILT activities on the teachers' training; b) data on video-conference interactions (these data require the signed consent of the participants);</li> <li>- assess the impact of the teaching/learning path;</li> <li>- outline the features needed in a telecollaboration environment that serves student learning purposes and also L2 Italian teacher training purposes</li> </ul> <p><b><u>Duration of internship:</u></b> 6 months</p> <p><b><u>Duration of stay abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Paola Leone</p>	
	<p><b>6. Active &amp; healthy ageing for inclusion. Enabling and assisting technologies for the wellness promotion and for the active ageing in a biopsychosocial perspective.</b></p> <p><b><u>Period in a company:</u></b> 12 months (Consorzio INNOVAAL)</p>	<p><b><u>DOTTORATO/</u></b> <b><u>Phd in “Human</u></b> <b><u>and Social</u></b> <b><u>Sciences”</u></b></p>



	<p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Stefania Pinnelli</p>	
	<p><b>7. Definition and launch of participatory and learning procedures for the creation of community cooperatives and the development of land heritage. Research of models starting from the case study of the Association of producers of sugar potatoes in Frigole in order to launch a new supply chain on a I 4.0 basis.</b></p> <p><b><u>Period in a company:</u></b> 12 months (Associazione dei produttori della patata zuccherina; Consorzio Sale della Terra Salento)</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Piergiuseppe Ellerani</p>	
	<p><b>8. Digitalisation of health care: assessment and neurocognitive rehabilitation in telemedicine.</b></p> <p><b><u>Period in a company:</u></b> 9 months (EXPRIVIA -Molfetta/Bari)</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Paola Angelelli</p>	
	<p><b>9. Telemedicine and ambient assisted living: the professionals and users perspective.</b></p> <p><b><u>Period in a company:</u></b> 6 months (INFORMATION SHARING COMPANY S.R.L.)</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Mariano Longo</p>	



## 10. Virtual restoration

Virtual restoration, born in the nineties of the last century, is increasingly a tool that supports diagnostics, design and teaching related to restoration operations.

In this proposal, we intend to use virtual restoration not only to elaborate hypotheses of integration, completion, reconstruction of works of art and architecture in both 2D and 3D, but to support companies in the cultural heritage sector, in planning and presenting their projects.

The goal of the research project is to provide analysis tools and digital graphic representation useful for illustrating the entire restoration process from the documentation of the initial state of the work to the visualization of the proposed interventions, up to the final rendering of the intervention.

The research lines that will be followed will therefore deepen the following themes:

- Graphic and photographic survey systems and techniques, 2d and 3d scanning of the works to be restored
- Elaboration of virtual rendering models of the analyzed works
- Use of "augmented reality" for the preventive visualization of the planned interventions
- Rendering of the results expected from the restoration project.

Specifically, the creation of a methodology that makes a conscious, optimized and ethical use of technologies in order to monitor, preserve, preserve and enhance the historical and artistic heritage is particularly relevant. The combination of tools such as Digital Twin, Internet of Things (IoT), H-BIM (Building Information Modeling for Heritage), sensors, sensitive spaces, and eXtended Reality (XR) can open the doors to experimentation with new processes especially useful to the world. of companies operating in the

**DOTTORATO IN**  
**“Scienze del**  
**Patrimonio**  
**Culturale”**

**Phd in “Sciences**  
**for Cultural**  
**Heritage”**



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field of both restoration and heritage enhancement.

For example, thanks to H-BIM it is possible to create digital models that contain all the information useful for restoration, maintenance and structural tests, creating a layering of contents that take into account different fields of application and different types of operators. , as has been the case for some time now in the world of contemporary architecture.

Furthermore, the creation of a Digital Twin in the context of Cultural Heritage would allow the replication of the physical asset in order to test its behavior, effects, potential and limits up to a real virtual restoration intervention.

Last but not least, the synergistic use of these technologies with those of sensors capable of recording data in real time, for example temperature and humidity parameters, would lead to constant monitoring of the asset and the possibility of monitoring the state of conservation, providing, through the development of accurate models, certain criticalities before they have their effects.

The enormous amount of information that would be created would have a simple and optimized management model, which proceeds by levels; on the one hand, the technical information that is useful to specialists and scholars, on the other, the contents for dissemination purposes which, through visualization technologies, such as Augmented Reality and Virtual Reality, can create experiential scenarios of interaction and learning.

**Period in a company: 12 months**

Companies: Pimar – Marocco, pietra leccese, S.s. 16 Lecce – Maglie, Melpignano  
Colaci Emilio, impianti e restauri, Lecce

**Period abroad: 6 months**

	<p>Université Paris-Sorbonne</p> <p><b>Responsible of the research:</b> Prof. Raffaele Casciaro</p>	
<p><b>TECHNICAL-SCIENTIFIC AREA</b></p> <p><b>AREA TECNICO SCIENTIFICA</b></p>	<p><b>11. Polaritonic systems for Quantum Information Tecnology</b></p> <p><b>Period in a company:</b> 6 months</p> <p><b>Period abroad:</b> 6</p> <p><b>Responsible of the research:</b> Prof. Giuseppe Gigli</p>	<p><b><u>DOTTORATO IN “Fisica e Nanoscienze”</u></b></p> <p><b><u>Phd in “Physics and Nanosciences”</u></b></p>
	<p><b>12. Development of automatic systems based on Machine Learning methods for construction and performance measurements of large area pixel detectors</b></p> <p><b>Period in a company:</b> 6 months</p> <p><b>Period abroad:</b> 6 months</p> <p><b>Responsible of the research:</b> Dr. Enrico Junior Schioppa/Prof.ssa Stefania Spagnolo</p>	
	<p><b>13. Development of experimental techniques and low-cost instrumentation for applications in the world of research and innovative teaching</b></p> <p><b>Period in a company:</b> 6 months</p> <p><b>Period abroad:</b> 0</p> <p><b>Responsible of the research:</b> Prof. Marco Anni</p>	
	<p><b>14. Study of the anthropic effect on air quality through the characterization of the carbon component of the atmospheric particulate and its morphological structure</b></p>	

	<p><b><u>Period in a company:</u></b> 6 mesi</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Antonio Serra</p>	
	<p><b>15. Modeling of atomistic systems for pharmacology and / or nanomedicine</b></p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Dr. Stefania D'Agostino</p>	
	<p><b>16. Theoretical and numerical modeling of topological materials for applications to spintronics and quantum computing</b></p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Claudio Corianò</p>	
	<p><b>17. Innovative concepts of mechanics and electronics applied to an ultra-light drift chamber for experiments on future lepton colliders</b></p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Andrea Ventura</p>	
	<p><b>18. Nanostructured materials to support radiotherapy treatments</b></p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 0</p>	

	<p><b><u>Responsible of the research:</u></b> Prof. Anna Paola Caricato</p>	
	<p><b>19. Design and development of an OCT module, for real-time control of the corneal photoablation rate</b></p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Maurizio Martino</p>	
	<p><b>20. Development of transparent wood substrates for perovskite-based solar cells</b></p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Giuseppe Gigli</p>	
	<p><b>21. Production of nanomaterials for the optimization of techniques aimed at the massive production of "green", eco-sustainable and economical hydrogen, and its storage and transport</b></p> <p>The Kyoto Protocol requires a reduction in CO<sub>2</sub> emissions to contain the greenhouse effect, making research into the use of low-carbon fuels urgent. In this sense, solid phase hydrogen represents a valid energy vector, however there are limits relating to production, storage and transport.</p> <p>The research is therefore aimed both at the optimization of techniques for the massive production of hydrogen, such as to be eco-sustainable and economical, and at its storage and transport by means of new materials, capable of storing it in a stable and</p>	

	<p>reversible way.</p> <p>The project to be proposed has as its objective the synthesis of nanostructured materials of metal oxides (porous, amorphous, and with different crystalline structure), such as TiO<sub>2</sub>NPs in the anatase and rutile form, amorphous SiO<sub>2</sub>NPs and mesoporous SiO<sub>2</sub>NPs of different sizes, to obtain high concentrations of hydrogen from water, using solar energy. Furthermore, we will try to maximize the yield of the photocatalysis process both by varying the size of the NPs and by functionalizing them with metal nanostructures (AgNPs, and CuNPs).</p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. ssa Rosaria Rinaldi</p>	
	<p><b>22. Theoretical artificial intelligence: towards an understanding and optimization of neural networks</b></p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Adriano Barra</p>	<p><b><u>DOTTORATO IN “Matematica e Informatica”</u></b></p> <p><b><u>Phd in “Mathematics and IT” (in convenzione con l’Università della Basilicata)</u></b></p>
	<p><b>23. Title:</b> Realization of polaritonic neural circuits for artificial intelligence</p> <p><b>Theme:</b> neural circuits for artificial intelligence</p> <p><b><u>Period in a company:</u></b> ST Microelectronics, 6 months</p> <p><b><u>Period abroad:</u></b> TUM - Università tecnica di Monaco di Baviera; University of Warsaw, Poland; Nanyang Technological University,</p>	<p><b><u>DOTTORATO IN “Nanotecnologie”</u></b></p>

	<p>Singapore; Polish Academy of Sciences, Poland, 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Giuseppe Gigli</p>	<p><b><u>Phd in “Nanotechnology”</u></b></p>
	<p><b>24. Title:</b> Development of a lab on chip platform for drug research</p> <p><b>Theme:</b> biosensors, lab on chip and drug research</p> <p><b><u>Period in a company:</u></b> ESSETI FARMACEUTICI SRL, 6 months</p> <p><b>Period abroad:</b> Ronan M.T. Fleming, National University of Ireland, 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Giuseppe Maruccio</p>	
	<p><b>25. Title:</b> Biotechnological production of hyaluronic acid by fermentative pathway: innovation and future for biomedical applications</p> <p><b>Theme:</b> new methods for the production of biomaterials</p> <p><b><u>Period in a company:</u></b> 6 months BEAUTY SYSTEM PHARMA S.R.L.; TAKIS S.r.l. la Beauty System Pharma with two co-associate abroad.</p> <p><b><u>Period abroad:</u></b> 6 months co-associates of BEAUTY SYSTEM PHARMA S.R.L.</p> <p><b><u>Responsible of the research:</u></b> Prof.ssa Loredana Capobianco</p>	
	<p><b>26. Title:</b> “Realization of highly specific and sensitive electrochemical aptasensors for applications in the health and environmental fields: optimization of the transduction process at the interface aptamer/nano-structured electrode surface”</p> <p><b>Theme:</b> optimization of sensor platforms for monitoring and diagnostics</p> <p><b><u>Period in a company:</u></b> 6 Months (Indivenire SrL; Referente: Laura Pasquardini)</p> <p><b><u>Period abroad:</u></b> 6 Months</p>	

	<p><b><u>Responsible of the research:</u></b> Prof.ssa Maria Rachele Guascito</p>	
	<p><b>27. Title:</b> “Physiological and epigenetic study on the correlation between sensory stimuli and the onset of ADHD, through the use of nano-sensor devices”</p> <p><b><u>Period in a company:</u></b> 6 months INGEL srl., Conversano (BA)</p> <p><b><u>Period abroad:</u></b> 6 months Laboratoire PRISM, Inserm U1192 Bâtiment SN3 1er étage, Campus Cite Scientifique, University of Lille</p> <p><b><u>Responsible of the research:</u></b> Prof. Michele Maffia</p>	
	<p><b>28. Title:</b> Design of ultrasensitive sensors for biomarkers detection in saliva exploiting the integration between metal nanoparticles and molecularly imprinted polymers</p> <p><b>Theme:</b> optimization of sensor platforms for monitoring and diagnostics</p> <p><b><u>Period in a company:</u></b> 6 months HiQ-nano srl (<a href="https://www.hiqnano.com/">https://www.hiqnano.com/</a>)</p> <p><b><u>Period abroad:</u></b> 6 months UTC Compiègne (Francia), world leader in molecular imprinting</p> <p><b><u>Responsible of the research:</u></b> Dott.ssa Elisabetta Mazzotta</p>	
	<p><b>29. Title:</b> Optimization of gas sensors for food monitoring and breath analysis</p> <p><b>Theme:</b> optimization of sensor platforms for monitoring and diagnostics</p> <p><b><u>Period in a company:</u></b> IBM-Italia, 6 months</p> <p><b><u>Period abroad:</u></b> IBM Research Almaden, 6 months</p>	



	<p><b><u>Responsible of the research:</u></b> Dott.ssa Silvia Rizzato</p>	
	<p><b>30. Development of experimental and theoretical techniques for the detection of early inflammatory processes related to severe diseases</b></p> <p>The project involves the design and construction of innovative biosensors of specific markers, such as, for example, TNF-alpha, IFN-gamma, etc. Such devices based on RNA / DNA rather than antibody (such as ELISA, for example) guarantee a high selectivity. Both in the design phase and in the data analysis, the candidate will use bioinformatics methods. SNSI Area: Health, food, quality of life- PNR research topics: Health, 1.4 Technologies for health.</p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Eleonora Alfinito</p>	<p><b><u>DOTTORATO IN</u></b> <b><u>“Ingegneria dei</u></b> <b><u>Materiali e delle</u></b> <b><u>Strutture e</u></b> <b><u>Nanotecnologie”</u></b></p> <p><b><u>Phd in</u></b> <b><u>“Material,</u></b> <b><u>Structure and</u></b> <b><u>Nanotechnology</u></b> <b><u>engineering”</u></b></p>
	<p><b>31. New technologies for the recycling of thermosetting matrix composites</b></p> <p>End-of-life composite materials are reaching quantities that are incompatible with the choice to further use landfills. The alarm is arising from the thousands of tons of thermosetting matrix composites resulting from the end of service of thousands of wind generators installed between the end of the 90s and the beginning of the new century. These generators had an expected life of 20 years which cannot be extended, given the availability of new generation machines characterized by larger dimensions and higher yields. There is also a similar problem in pleasure boating and aeronautics. In the latter case, the components to be discarded are mainly</p>	



reinforced with carbon fibres and some aircrafts with both secondary and primary composite structures are reaching the end of the design life objective, typically between 20 and 25 years.

The only technology currently available involves the pyrolysis of the matrix and the extraction of the fibres. This is convenient if carbon fibres are present as reinforcement of the component at the end of its life. The aim of this project is to develop new recycling technologies based on solvolysis processes capable of breaking the covalent bonds present in the matrix to recover a mixture of reusable chemicals in thermosetting matrix formulations. In addition to this, the reinforcing fibers, typically glass or carbon, must also be recovered.

The project includes:

- The development of the chemical or thermo-chemical process of solvolysis
- The characterization of the chemical composites obtained
- Process modelling
- The mechanical and morphological characterization of the reinforcement fibres extracted from the composite
- The identification of possible applications of the extracted compounds in thermosetting matrix formulations or in other industrial applications

(This research proposal is part of the SNSI's areas of specialization: green chemistry and aerospace and of Action 4.6 and 4.7 of PNR 4.6 Innovation for the manufacturing industry and Aerospace, respectively).

**Period in a company:** 12 months at CETMA consortium, Brindisi, Italy

**Period abroad:** 0

**Responsible of the research:**  
Prof. Alfonso Maffezzoli



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### **32. Development of micro and nano-structured polymeric membranes for smart sensing and drug delivery systems for applications in regenerative medicine**

This project proposal is part of the themes set out in the new Axis IV (Action IV.4) of the PON Research and Innovation 2014-2020. These actions aim to promote research activities on the themes of innovation, digital and of enabling technologies and, at the same time, support the enhancement of human capital as a factor for the development of research and innovation in Italy.

This PhD proposal aims to develop micro and nanostructured polymeric membranes for intelligent sensing and drug delivery systems for applications in regenerative medicine. Improvement of drug discovery and drug delivery process, then the development of new methods for the tissue-specific drug delivery, is a strategic issue for the development of products and services helpful in reducing the long time and high costs of conventional drugs, leading to a spending reduction in the National Health Service. Costs for National Health Service have increased in recent years due to the aging of the population and the increase in behavioural risk factors and chronic pathologies, chronic degenerative, and more recently, the Covid-19 pandemic. Therefore, the proposed activities are consistent with the "innovation" theme, as they are aligned with the "Health and well-being" research area, described as one of the 17 key objectives presented in the United Nations 2030 Agenda and then incorporated into the National Strategy of Intelligent Specialization (SNSI) and in PNR 2021-2027 (Annex Health-Chapter 1.2 Pharmaceutical and drug technologies - Article 6. The proposal is also compliant with the objectives of the

National Research Program (PNR 2021-27), which intends to promote transdisciplinarity, multidisciplinary and interdisciplinarity. The PhD student will work within the Unisalento Biomaterials Laboratory, one of the National Tissue Engineering Network nodes. It is active in various issues relating to macromolecular materials for applications in bioengineering and biotechnology. The PhD student will collaborate with the main Italian and international research centres in the field to pave the way towards a more effective research organization and governance to support and stimulate innovation. Furthermore, aligned to the indications of the PON-Research and Innovation-2014-2020- Axis II, the proposal will deal with the industrial scalability of the designed device in collaboration with companies in the sector. The PhD student's activity will also point to the production of scientific literature and intellectual property.

**Period in a company:** 6 months

**Period abroad:** 6 months

**Responsible of the research:**  
Prof. Alessandro Sannino

### **33. Acoustic sorting in two dimensional films with electroactive surfaces**

The research activity is devoted to the development of multi functionalised surfaces, thanks to the fabrication of piezoelectric and electroadhesive patterns, in order to control the kinematics of micro -- /nano particles for applications such as biosensing, microfluidics and acoustic sorting, maskless photolithography. The activity involves multidisciplinary skills in micro-/nano fabrication, electronics, contact mechanics and microfluidics.

	<p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Massimo De Vittorio</p>	
	<p><b>34. Innovative air and surface purification processes through functional treatments based on metal nanoclusters</b></p> <p>Development of innovative air treatment systems with antibacterial and antiviral action based on the combined use of metal nanoparticles and photocatalysts. The research activity includes a line dedicated to the grafting of nanostructured coatings on filter media and the other on common surfaces typically found in public places</p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Antonio Licciulli</p>	
	<p><b>35. Development of the Hybrid Propulsion for aeronautical applications for the regional transport and the urban mobility, using the machine learning, artificial intelligence and digital twin technologies for the control, security and maintenance of the propulsive system. The research topic will concern particularly the adaptation of the thermal turboengine for the hybrid powertrain, with a particular attention to the reduction of the environmental impact</b></p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 6 months</p>	



	<b><u>Responsible of the research:</u></b> Prof. Antonio Ficarella	
	<b>36. Study of Deep Learning/Computer Vision techniques through which to process the output of medical devices and technologies with the possibility to support medical staff especially in the processes of disease diagnosis, having the ability to recognize visual "patterns" associated with potential diseases.</b>	
	<b><u>Period in a company:</u></b> 12 months	
	<b><u>Period abroad:</u></b> 0	
	<b><u>Responsible of the research:</u></b> Prof. Massimo Cafaro	
	<b>37. Definition of methodologies and IT tools aimed at the acquisition, processing and sharing of health data taking into account the heterogeneity of sources, data and actors involved in the different phases of the data life cycle.</b>	
	<b><u>Period in a company:</u></b> 12 months Elif s.r.l.	
	<b><u>Period abroad:</u></b> 0	
	<b><u>Responsible of the research:</u></b> Prof. Massimo Cafaro	
	<b>38. Design of extremely accurate and fast algorithms for the analysis of ultrasound data, in order to increase the diagnostic capacity achieved by current devices, through the theoretical and experimental study of artificial intelligence techniques ranging from data mining to machine learning</b>	



	<p><b><u>Period in a company:</u></b> 12 months Echolight S.p.a.</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Massimo Cafaro</p>	
	<p><b>39. Intensive validation methods for broadband vehicular connectivity systems and on board infotainment, developed through research applied to the use of artificial intelligence for data analysis and aimed at the creation of advanced predictive models that require the use of information from: embedded electronic components, various vehicular networks and smart sensors (on board off board).</b></p> <p><b><u>Period in a company:</u></b> 12 months in Porsche Nardò Technical Center</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Angelo Corallo</p>	
	<p><b>40. Definition of rules, in support of Design for Additive Manufacturing, in additive technologies of metallic materials and optimization of the production system through the use of Machine Learning techniques</b></p> <p><b><u>Period in a company:</u></b> 12 months</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Antonio Del Prete – Prof. Antonio Grieco</p>	
	<p><b>41. Development of a Digital Twin in the case of sheet metal stamping. Specifically, the proposal will concern the</b></p>	



	<p><b>processing and analysis of the signals acquired in real time as support for the creation of the Digital Twin</b></p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Antonio Del Prete</p>	
	<p><b>42. Design and develop methodologies based on the streaming of information organized as a graph. Such a data structure is ubiquitous and ensures an efficient use of resources and allows to achieve high accuracy even in situations of continuous evolution of the reference data structure</b></p> <p><b><u>Period in a company:</u></b> 12 months Graph Aware s.r.l.</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Italo Epicoco</p>	
	<p><b>43. Research connected to the diagnosis and treatment of neuro physio rehabilitation aspects with the use of robotic beds and cognate devices. The project includes designing and constructing of a polyfunctional robotic bed with swarm/suite of electronic devices and apparatus with intelligent (artificial intelligence) digital emphasis is that work in IOT/Cloud Computing environment too.</b></p> <p><b><u>Period in a company:</u></b> 12 months Roam2000 Srl, Taranto, Italia</p> <p><b><u>Period abroad:</u></b> 8 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Lay Ekuakille Aimé</p>	

	<p><b>44. Increasing the corrosion resistance of aerospace components processed by innovative near net shape technology. The near net shape technology is also a sustainable technology favouring reduction of production cost and lightening of the structures</b></p> <p><b><u>Period in a company:</u></b> 6 months HB Technology srl</p> <p><b><u>Period abroad:</u></b> 6 months l'Università di Leon (Spagna), D.pto. de Ingeniería Mecánica, Informática y Aeroespacial</p> <p><b><u>Responsible of the research:</u></b> Prof. Paola Leo</p>	
	<p><b>45. Study of a model for the quality of open data, in order to define the level of maturity of each data set, with respect to the European requirements of open and FAIR ( Findable, Accessible, Interoperable, Reusable) data and to study approaches are able to take into account of the changes over time of FAIR and data</b></p> <p>In the European Open data panorama, Italy is in good position: in the latest "Maturity Models" developed by the European Commission, it is a "trend setter" country in 2018 and a "fast tracker" in 2019. However, Italy ranks among the "followers" countries in terms of management and use of open data for public or private applications.</p> <p><b><u>Period in a company:</u></b> 6 months HSPI</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof.ssa Antonella Longo</p>	



	<p><b>46. Model a data service platform to support decision making and to provide stakeholder with FAIR Findable, Accessible, Interoperable, Reusable data services in the circular economy domain</b></p> <p>Circular economy is one of the paradigms of sustainable development. For enacting that data driven models of the circular life cycle of resources is needed especially in the case of energy domain</p> <p><b><u>Period in a company:</u></b> 6 months HSPI</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Antonella Longo</p>	
	<p><b>47. A Digital Twin approach to aircraft Integrated Vehicle Health Management</b></p> <p>The aim of the PhD is to study both Digital Twin (DT) and Integrated Vehicle Health Management (IVHM) technologies to develop Condition-Based Maintenance (CBM) solutions improving aircrafts performance and operations. The PhD project embraces different technological domains: sensing, digitisation, IoT, big data analysis, AI/ML, etc.</p> <p><b><u>Period in a company:</u></b> 12 months</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Luca Mainetti</p>	
	<p><b>48. Development of innovative, low cost and low environmental impact physico-chemical approaches for the pre-treatment of waste biomass (fish, agricultural or forestry) to be</b></p>	<p><b><u>DOTTORATO IN</u></b> <b><u>“Scienze e</u></b> <b><u>Tecnologie</u></b> <b><u>Biologiche ed</u></b> <b><u>Ambientali”</u></b></p>

**used for the production of advanced materials and biofuels.**

Testing and assessment of new generation green solvents (deep eutectic solvents) for the disintegration of biomass and development of fast saccharification routes of chitinous and/or ligno-cellulosic matrices based on supported hydrolytic enzymes.

**Period in a company:** 6 months

**Period abroad:** 0

**Responsible of the research:** Prof. Ludovico Valli

**49. Strategies for improving air quality and thermal comfort in the urban environment.**

This project, on the basis of the morphology and micro-climate at urban scale that favor pollution and thermal discomfort, will produce development plans of green areas (such as planting trees, green roofs, green walls), which, combined with other tools (reduction of emission of pollutants, use of electric vehicles, improvement of the parking system and traffic management), will contribute to the sustainable urban development and the improvement of air quality in the framework of climate change at local scale.

**Period in a company:** 6 months

**Period abroad:** 6 months

**Responsible of the research:** Prof. Piero Lionello

**50. Creation of databases and predictive statistical models for the Geographical Characterization of Italian extra virgin olive oil**

The project intends to develop and apply the skills already present in the

**Phd in**  
**“Biological and environmental sciences and technologies”**

Unisalento General and Inorganic Chemistry group in the field of characterization of agri-food products, using metabolomic profiles based on Nuclear Magnetic Resonance spectra for the certification and promotion of the Italian product. The project aims to fill a gap in official methods in the validation protocols of the traceability of Italian extra virgin olive oil by creating a database of reference oils and predictive statistical models useful for the classification of the geographical origin.

**Period in a company:** 6 months

**Period abroad:** 6 months

**Responsible of the research:** Prof. Francesco Paolo Fanizzi

#### **51. Research, development and sustainability in aquaculture systems**

The development of sustainable, productive, “climate-neutral” and resilient farming systems is now an obligatory step to provide consumers with food at affordable, safe, traceable, healthy and sustainable prices, while minimizing the pressure on ecosystems. The improvement and innovation of aquaculture systems goes in this direction as it allows the production of high quality fish products and high value environmental services at the same time. In particular, the exploitation of underutilized resources, such as solid wastes, can provide final products from this biomass, thus guaranteeing sustainability and circularity. With this in mind, the project intends to develop new methodological, technological and biotechnological frameworks for aquaculture systems (fish farming, shellfish farming, crustacean farming, etc.) with a high index of environmental, social and economic sustainability. In this sense, the project



aims to improve farming systems (onshore, offshore, RAS, etc.), with also a perspective view towards integrated aquaculture (aquaponics).

**Period in a company:** 6 months

**Period abroad:**6 months

**Responsible of the research:** Prof. Tiziano Verri

**52. Environmental DNA metabarcoding for marine biodiversity monitoring in the Apulian Seas (eDNA-BAR)**

Monitoring marine biodiversity requires great efforts in terms of sample collection, processing and taxonomic analyses, particularly when dealing with multiple ecological compartments and sampling times over large areas. The research aims to investigate environmental DNA (eDNA) in marine waters and sediments as a cutting-edge technological tool to inform on the structure and functioning of aquatic ecosystems for the development of innovative biological indicators for the European Marine Strategy.

**Period in a company:** 6 months

**Period abroad:**6 months

**Responsible of the research:** Prof. Stefano Piraino

**53. Development of innovative soilless plant cultivation systems for the bioproduction of innovative products.**

Development of innovative soilless cultivation systems for plants, with bioreactors or controlled environment systems, aimed at the production of new innovative products. We intend to

	<p>develop innovative cultivation technologies for plants or microorganisms for the development of bioproduction chains with high environmental performance and optimized water consumption. New technologies for cultivation or the innovative use of existing technologies will have to address the production of raw materials to be used in organic farming or for the biotechnological market.</p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Gian Pietro Disansebastiano</p>	
	<p><b>54. A new approach in tissue regeneration: the role of an innovative autologous concentrate of cells and growth factors</b></p> <p>The growing understanding of the mechanisms that regulate stem cell biology in adult tissues and their role in tissue healing is essential to devise new strategies in regenerative medicine that aim to harness the potential of endogenous stem cells and autologous growth factors. The aim of the project is to develop a protocol to prepare an autologous concentrate of cells and growth factors that can also be used in combination with compatible scaffolds for tissue regeneration in different fields of application.</p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. ssa Luisa Siculella</p>	
	<p><b>55. Correlation between light stimuli and ADHD (Attention Deficit Hyperactivity Disorder) in in vivo experimental models</b></p>	



In this research project will be studied the correlation between light stimuli (such as digital devices ones) and ADHD insurgence and progression in animal models of NHE – Naples high excitability rats and wild type ones. In order to simulate digital devices light stimuli, animals will be stimulated with Organic Light Emitting Diodes (OLED) and will be implemented electronic sensors manufactured by INGEL srl that are capable to monitor and measure behaviour and physiological parameters. The PRISM lab of University of Lille will collaborate to research activities.

**Period in a company:** 6 months

**Period abroad:** 6 months

**Responsible of the research:** Prof. Dario Lofrumento

**56. New strategies for the treatment and the prevention of periprosthetic joint infections**

*Pseudomonas aeruginosa* and *Staphylococcus aureus* are opportunistic bacteria associated with periprosthetic joint infections, which have developed several strategies to respond and adapt to antibiotic stress, including antibiotic-tolerant biofilm formation.

Such antibiotic tolerance is a huge problem in the treatment of chronic infections, leading to serious implications for patient outcome; therefore, treatment and prevention strategies for periprosthetic joint infections are needed. Currently, joint arthroplasty involves the use of absorbable mineral-based materials loaded with antibiotic, which facilitates the achievement of higher local antibiotic concentrations. However, these strategies have shown modest results, due to the poor diffusibility of the materials used. Therefore, the

	<p>study of new matrices on which to load antibiotics, could introduce improvements in the resolution of periprosthetic muscular infections; more diffusible materials would be more effective in completely eradicating bacterial biofilms at the surgical site.</p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof.ssa Antonella Muscella</p>	
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## Attachment B)

### Green

Thematic Area	Research Lines	PhD Course
<p><b>LEGAL AND HUMANISTIC-SOCIAL AREA</b></p> <p><b>AREA GIURIDICA ED UMANISTICO-SOCIALE</b></p>	<p><b>1. Analysis of legal issues related to the protection of eco-systemic goods, the enhancement of natural and landscape resources, energy transition, biodiversity, as well as the reduction of climate change impacts, with the aim of developing regulatory models that enhance the development potential of enterprises in the environmental sector and stimulate innovative production processes with high efficiency and environmental sustainability.</b></p> <p><b><u>Period in a company:</u> 6 months</b></p> <p><b><u>Period abroad:</u> 6 months</b></p>	<p><b><u>DOTTORATO IN “Diritti e Sostenibilità” / “Law and Sustainability”</u></b></p>
	<p><b>2. Folkbiology of Salento <i>Osteichthyes</i> and its applications</b></p> <p>The Project constitutes the first systematic application of Folkbiology to the Mediterranean fish heritage, and in particular to the Salento area. It consists of:</p> <p>a) systematic reconstruction of the folk classification of the main <i>Osteichthyes</i> of Salento, including any alien species;</p> <p>b) constitution of the relative vernacular nomenclature;</p> <p>c) comparison of the vernacular classification with the scientific one;</p>	<p><b><u>DOTTORATO IN “Filosofia: Forme e Storia dei Saperi Filosofici” / “Philosophy: Forms and History of Philosophical Knowledge” / “Philosophie: Formes et histoire des savoirs philosophiques” / “Philosophie: Formen und Geschichte des philosophischen</u></b></p>



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d) “musealization” of the popular nomenclature.  
The project includes a training period at the Ente fauna marina mediterranea (EFMM), Scientific Cultural Association for Research and Conservation of Marine Biodiversity (non-profit association).

**Duration company period:** 6 months

**Duration foreign period:** 0 months

**Responsible of the research:**  
Prof. Igor Agostini

### **3. Medieval Arab ecological thought**

The project originates from the conviction that recovering and re-evaluating the "ecological" dimensions of pre-industrial Mediterranean culture, and the link between these dimensions and a certain way of thinking about political life, can help re-establish the link between humanistic studies and the search "from below" for real alternatives to the "unsustainable" exploitation of the territory and the environment.

The project intends to study medieval Arabic cosmologies and their circulation in European languages up to the modern age.

In particular, the project envisages:  
(1) a historical study of ecological thought, through the recovery of the medieval Arabic scientific and literary tradition;

(2) the staging of the studied works for the general public.

**Period in a company:** 6 months

**Period abroad:** 6 months

**Wissens” (dottorato internazionale in convenzione con l’Université Paris Sorbonne e con l’Universität zu Köln)**



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	<p><b>Responsible of the research:</b> Prof.ssa Samuela Pagani – Prof.ssa Fiorella Retucci</p>	
	<p><b>4. Land reconstruction instruments for the regeneration of the botanical heritage, of the landscape and for new agri-food supply chains.</b></p> <p><b>Period in a company:</b> 6 months (Casa delle Agriculture soc. coop. – Andrano (LE))</p> <p><b>Period abroad:</b> 6 months</p> <p><b>Responsible of the research:</b> Prof. Angelo Salento</p>	<p><b><u>DOTTORATO in “Human and Social Sciences”</u></b></p>
	<p><b>5. The change of contents and methods in the ecological and ecosystemical dimension of education. Definition of structural models for the co-evolution and co-construction of an interdependent network of communities of adults for the ecological transition and the development of innovative learning contexts improved by the IA for children (0-10 years) through the nature.</b></p> <p><b>Period in a company:</b> 12 months (Associazione di educazione ecologica “L’albero”)</p> <p><b>Period abroad:</b> 6 months</p> <p><b>Responsible of the research:</b> Prof. Piergiuseppe Ellerani</p>	
<p><b>6. “Invisible cities”. Remote and Proximal Sensing in Archaeology: non-invasive methods for the study of ancient cities.</b></p> <p>The aim of this project is to explore the possibilities of innovating in the field of archaeological diagnostics,</p>	<p><b><u>DOTTORATO in “Scienze del Patrimonio Culturale”</u></b></p> <p><b><u>Phd in “Sciences for Cultural Heritage”</u></b></p>	



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combining two of the technologies that are currently undergoing extraordinary developments both for the quantity and quality of information that can be acquired on complex archaeological sites that are totally or largely still buried. The goal is to develop, in collaboration with a SME specialized in proximal- and remote-sensing, a new integrated non-invasive investigation system consisting of an Unmanned Aerial Vehicle (UAV) equipped with various up-to-date sensors. To test this innovative survey system, some ancient Apulian sites will be selected: Arpi in Daunia, Rudiae and Rocavecchia in Messapia. In summary, the PhD project must be aimed at developing, both theoretically and practically, all the issues related to the use of integrated Proximal Sensing technologies in the Cultural Heritage sector, and its numerous fields of application: from discovery, to documentation, to monitoring and management.

**Period in a company: 12 months**

- Company 1: 6 months  
Servizi Informativi Geografici Srl a socio unico con sede legale in Roma
- Company 2: 6 months  
Società di Topografia s.r.l. con sede legale in Brindisi (<http://www.stf-survey.com/wordpress/>).

**Period abroad: 6 months**

Lund University (<https://www.ark.lu.se/en/>), Lund (Svezia), Institutionen för Arkeologi och antikens historia, LUX, Lunds universitet presso il "Digital Archaeology Laboratory (DARK Lab)"

**Responsible of the research:**

Prof. Giuseppe Ceraudo

## 7. ARCHAEOLOGY OF CLIMATE CHANGE: LESSONS FOR SUSTAINABLE FUTURE

**ABSTRACT:** The “fight” against climate change is today one of the main challenges that human society is called to face by making courageous social, political, economic and, last but not least, cultural choices.

Archeology has shown how societies (at different degrees of complexity) have faced, over the millennia, with abrupt climatic and environmental changes; sometimes capitulating and collapsing, other times providing adaptive and resilient abilities.

The proposed research line identifies the “Archeology of Climate Change” (Burke *et al.* 2021) as a valid opportunity to elaborate, through the knowledge of the past, actual solutions for a sustainable future: based on the study of the variegated anthropogenic responses to climate change over the last 10.000 years, the major goal is to collect useful data to offer resilience models inspired by those communities which, by adopting innovative and adaptive strategies, have successfully managed abrupt climate changes.

Using an *environmental archeology* approach, the proposed research requires the management and comparison of a strong paleoclimate and paleoenvironment dataset with the archaeological ones. Multi-disciplinary analyses and interpretation of natural and anthropic archives will be the skills required. The identification of specific key studies concerning ancient societies located in highly sensitive ecological areas (sub-arid zones), is the crucial requirement for the definition of resilient behavior models that can suggest and planning choices/behavior for a sustainable future.

	<p><b>Period in a company: 6 Months</b> Azienda: A.R.Va – Archeologia, Ricerca e Valorizzazione, Spin-off Unisalento (<a href="https://www.arvarcheologia.it/">https://www.arvarcheologia.it/</a>)</p> <p><b>Period abroad : 6 Months</b> Estero: CaSEs - Culture and Socio-Ecological Dynamics, Universitat Pompeu Fabra (UPF), Barcellona (Spagna)</p> <p><b>Responsible of the research:</b> Prof.ssa Milena Primavera</p>	
<p style="text-align: center;"><b>SCIENTIFIC- TECHNOLOGICAL AREA</b></p> <p style="text-align: center;"><b>AREA SCIENTIFICO- TECNOLOGICA</b></p>	<p><b>8. Development of transparent wood substrates for perovskite-based solar cells</b></p> <p><b>Period in a company:</b> 6 months</p> <p><b>Period abroad:</b> 6 months</p> <p><b>Responsible of the research:</b> Prof. Giuseppe Gigli</p>	<p style="text-align: center;"><b><u>DOTTORATO in "Fisica e Nanoscienze"</u></b></p> <p style="text-align: center;"><b><u>Phd in "Physics and Nanosciences"</u></b></p>
	<p><b>9. Study of the anthropic effect on air quality through the characterization of the carbon component of the atmospheric particulate and its morphological structure.</b></p> <p><b>Period in a company:</b> 6 months</p> <p><b>Period abroad:</b> 0</p> <p><b>Responsible of the research:</b> Prof. Antonio Serra</p>	
	<p><b>10. Production of nanomaterials for the optimization of techniques aimed at the massive production of "green", eco-sustainable and economical hydrogen, and its storage and transport</b></p>	



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	<p>The Kyoto Protocol requires a reduction in CO<sub>2</sub> emissions to contain the greenhouse effect, making research into the use of low-carbon fuels urgent. In this sense, solid phase hydrogen represents a valid energy vector, however there are limits relating to production, storage and transport.</p> <p>The research is therefore aimed both at the optimization of techniques for the massive production of hydrogen, such as to be eco-sustainable and economical, and at its storage and transport by means of new materials, capable of storing it in a stable and reversible way.</p> <p>The project to be proposed has as its objective the synthesis of nanostructured materials of metal oxides (porous, amorphous, and with different crystalline structure), such as TiO<sub>2</sub>NPs in the anatase and rutile form, amorphous SiO<sub>2</sub>NPs and mesoporous SiO<sub>2</sub>NPs of different sizes, to obtain high concentrations of hydrogen from water, using solar energy. Furthermore, we will try to maximize the yield of the photocatalysis process both by varying the size of the NPs and by functionalizing them with metal nanostructures (AgNPs, and CuNPs).</p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof.ssa Rosaria Rinaldi</p>	
	<p><b>11. Title: Perovskites-polymer nanocomposites for printable photovoltaic devices at high stability</b></p> <p><b>Theme:</b> Innovative solar cells for building integration</p>	<p><b><u>DOTTORATO IN “Nanotecnologie”</u></b></p>



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	<p><b>Period in a company:</b> ENI S.p.A, 6 months</p> <p><b>Period abroad:</b> VTT, Finland, 6 months</p> <p><b>Responsible of the research:</b> Prof. Giuseppe Gigli</p>	<p><b>Phd</b> _____ <b>in</b> <b>“Nanotecnology”</b></p>
	<p><b>12. Title: Study of the physiological and behavioral responses to emerging pollutants (nanomaterials and pharmaceuticals in the environment) exposure in aquatic model organisms such as Daphnia magna and development of innovative biomarkers and bioassays for biomonitoring of environmental quality</b></p> <p><b>Theme:</b> Development of innovative biomarkers and bioassays for the environmental biomonitoring of emerging pollutants in the aquatic environment</p> <p><b>Period in a company:</b> 6 months Studio Effemme Chimica Applicata Srl (Squinzano, LE)</p> <p><b>Period abroad:</b> 6 months IBM Almaden Research Center (California, US)</p> <p><b>Responsible of the research:</b> Prof.ssa Maria Giulia Lionetto</p>	
	<p><b>13. Title: "Recovery of functional biomolecules from vegetables (by)products with green biorefinery strategies and micro/nano-encapsulation of the extracts for preparation of novel foods"</b></p> <p><b>Theme:</b> green biorefinery</p> <p><b>Period in a company:</b> Farmalabor Srl di Canosa di Puglia (BAT) - 6 months</p> <p><b>Period abroad:</b> 6 months</p>	

	<p><b>Responsible of the research:</b> Prof. Marcello Lenucci</p>	
	<p><b>14. Title: Development of new technologies for biohydrogen production</b></p> <p><b>Theme:</b> Development of new technologies for biohydrogen production</p> <p><b>Period in a company:</b> IBM-Italia, 6 months</p> <p><b>Period abroad:</b> IBM Research Almaden, 6 months</p> <p><b>Responsible of the research:</b> Dott.ssa Anna Grazia Monteduro</p>	
	<p><b>15. Title: Urban heat island and sustainability strategies in climate change scenarios</b></p> <p><b>Theme:</b> Urban climate resilience</p> <p><b>Period in a company:</b> 6 months (stratup: TILEDESK S.r.l. (Italia))</p> <p><b>Period abroad:</b> 6 months CIEMAT - Center for Energy, Environmental and Technological Research (Spagna)</p> <p><b>Responsible of the research:</b> Prof. Riccardo Buccolieri</p>	
	<p><b>16. Title: “Realization of highly specific and sensitive electrochemical aptasensors for applications in the health and environmental fields: optimization of the transduction process at the interface aptamer/nano-structured electrode surface”</b></p> <p><b>Theme:</b> optimization of sensor platforms for monitoring and diagnostics</p> <p><b>Period in a company:</b> 6 Months (Indivenire Srl)</p> <p><b>Period abroad:</b> 6 Months</p>	

	<p><b>Responsible of the research:</b> Prof.ssa Maria Rachele Guascito</p>	
	<p><b>17. Title: Design of ultrasensitive sensors for biomarkers detection in saliva exploiting the integration between metal nanoparticles and molecularly imprinted polymers</b></p> <p><b>Theme:</b> optimization of sensor platforms for monitoring and diagnostics</p> <p><b>Period in a company:</b> 6 months HiQ-nano srl (<a href="https://www.hiqnano.com/">https://www.hiqnano.com/</a>)</p> <p><b>Period abroad:</b> 6 months UTC Compiègne (Francia), world leader molecular imprinting</p> <p><b>Responsible of the research:</b> Dott.ssa Elisabetta Mazzotta</p>	
	<p><b>18. Title: Optimization of gas sensors for food monitoring and breath analysis</b></p> <p><b>Theme:</b> optimization of sensor platforms for monitoring and diagnostics</p> <p><b>Period in a company:</b> IBM-Italia, 6 months</p> <p><b>Period abroad:</b> IBM Research Almaden, 6 months</p> <p><b>Responsible of the research:</b> Dott.ssa Silvia Rizzato</p>	
	<p><b>19. Smart windows with integration of photovoltaics, lighting and storage supported by artificial intelligence for the control of energy flows in buildings. As part of the national strategy of intelligent specialization, the proposed research activity will investigate two issues related to "smart buildings": the development of innovative windows for photovoltaic production and the</b></p>	<p><b><u>DOTTORATO in "Ingegneria dei Materiali e delle Strutture e Nanotecnologie"</u></b></p>

**storage of electricity, and the " lighting and the management of light and thermal energy flows through smart technologies applied to panoramic windows and shading systems.**

**Period in a company:** Chirenti SRL (6 months)

**Period abroad:** 6 months INM – Leibniz Institute for New Materials, Saarbrucken Germania

**Responsible of the research:** Prof. Antonio Licciulli

**20. Development of biocompatible and biodegradable polymeric substrates for the delivery of naturally derived biopesticides for applications in precision pest management in agriculture and livestock**

The PhD proposal aims to develop green insecticide devices to control medical or economic importance insects through targeted delivery/precision pest management actions. These devices will employ substrates based on biocompatible and biodegradable biopolymeric materials for selective delivery of bioinsecticides and/or bioactive substances (e.g. fungi, bacteria, essential oils, etc.) in the agricultural/livestock or urban (indoors and outdoors applications). The final goal is to provide alternative tools to chemical pesticides to reduce their use, favouring more selective and less polluting control methods, compliant with the principles of biodiversity protection and reduction of pollutants dangerous for the ecosystem and, directly (direct exposure) and indirectly (e.g. food or

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	<p>groundwater contamination), for humans.</p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Christian Demitri</p>	
	<p><b>21. The research activity concerns in the development, validation and use of advanced analysis techniques based on the detection of stable and radioactive isotopes as tracers in environmental studies and of techniques for the characterization of the fraction of biological origin of airborne particulate matter such as viruses, bacteria, pollen and fungi.</b></p> <p><b><u>Period in a company:</u></b> 9 months LabAnalysis Srl - Casanova Lonati (PV) Italia</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Gianluca Quarta</p>	
	<p><b>22. Short-term and long-term behaviour of innovative sustainable concrete for structural applications</b></p> <p>The cement industry traditionally being one of the most polluting in terms of emissions, both carbon dioxide and other chemical species not compatible with the natural evolution of many ecosystems. Consequently, particular attention is being paid to identifying strategies to reduce the environmental impact of the concrete that it is the main composite material for construction.</p>	



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In this perspective, following the idea of the circular economy, it is of interest the recycling of waste materials such as steel fibres or rubber from end-of-life tyres to incorporate them into concrete. The expected main effects is to improve the durability, the ductility, the damping capacity and energy dissipation capacity of the material. In addition, it is estimated that more than 4 billion tonnes of cement are produced each year, leading to the production of 8% of the global carbon dioxide (CO<sub>2</sub>) emissions. For this reason, the research of new alternative materials to be used as binder in concrete production has become widespread. In this context, both geopolymers and solfo-alluminate binder seems a promising candidate. However, knowledge of these materials is very limited and therefore result necessary to expand them, in order to provide useful guidance for design point of view.

**Period in a company:** 6 months

**Period abroad:** 6 months

**Responsible of the research:**  
Prof. Marianovella Leone

**23. Innovative strategies for the recycle and valorization of wastes materials, obtained by industrial and artisanal processes: bio-composites for the fabrication of design objects by using 3D printing techniques, according to the issues of Environmental Sustainability, Circular Economy and Sustainable Economic Development**

**Period in a company:** 6 months  
Reinova (Soliera, MO) Motor Valley, mobility industry.

	<p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Carola Esposito Corcione</p>	
	<p><b>24. Synthesis and characterization of Carbon Dots from agro-industrial waste and their use for the removal of pollutants in aqueous matrices</b></p> <p>This proposal is focused on the synthesis and characterization of Carbon Dots from agro- industrial waste and their use for the removal of pollutants in aqueous matrices. The proposal is consistent with the SNSI and with the 5.3.5 Green Chemistry sector related with the chemical industry that invests in technologies and products in favour of environmental sustainability by contributing to the reduction of pollution, recycling (of materials, water and wastes)</p> <p><b><u>Period in a company:</u></b> AquaSoil, Fasano (6 months)</p> <p><b><u>Period abroad:</u></b> Western University, Ontario, Canada (6 months)</p> <p><b><u>Responsible of the research:</u></b> Prof. Giuseppe Mele</p>	
	<p><b>25. Sustainable production of bacterial cellulose components for electrochemical energy storage. Characterization of the performance of materials and devices. Experimentation oriented to the production and transformation of bacterial cellulose, to be obtained with microbial fermentation processes of agro-food residues</b></p> <p>In this topic production and raw materials are of natural origin and in</p>	



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particular by-products of the agri-food industry. The production process is based on microbial and aerobic fermentation. The process will be developed on a laboratory scale but will be ready for technology transfer. The activities will be focused on the development of electrochemical energy storage systems starting from the cellulose hydrogel. The aim is to obtain an alternative membrane in new generation batteries. The aim will be to develop batteries capable of sustaining up to 1,000 recharge cycles comparable to those of commercial batteries

**Period in a company:** Biofaber (6 months)

**Period abroad:** Department of Agricultural and Biological Engineering and Center for Nanocellulosics, Pennsylvania State University, University Park, Pennsylvania, USA (6 months)

**Responsible of the research:**  
Prof. Antonio Licciulli

**26. Use of natural fibers for structural and seismic strengthening of heritage masonry buildings**

The research aims to develop new "green" composite materials based on natural fibers for structural and seismic strengthening of heritage masonry constructions.

The research will involve experimental and analytical/numerical activities in partnership with a leading Italian company in the national market of structural reinforcements, and a prestigious foreign university already collaborating with UniSalento



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	<p><b>Period in a company:</b> Fibrenet Spa Pavia di Udine (UD) (6 months)</p> <p><b>Period abroad:</b> Università di Lione 1 Claude Bernard – Francia) (6 months)</p> <p><b>Responsible of the research:</b> Prof. Francesco Micelli</p>	
	<p><b>27. Development of descriptive and inferential statistical models for studying and analyzing the impact of environmental pollutants and more in general of climatic factors on the COVID-19 spread in Italy</b></p> <p><b>Period in a company:</b> 12 months Fondazione CMCC (Centro Euro-Mediterraneo sui Cambiamenti Climatici), Divisione ASC (Advanced Scientific Computing) del CMCC, EMLC2 (Exascale Machine Learning for Climate Change).</p> <p><b>Period abroad:</b> 0</p> <p><b>Responsible of the research:</b> Prof. Giovanni Aloisio</p>	<p><b><u>DOTTORATO IN “Ingegneria dei Sistemi complessi”</u></b></p>
	<p><b>28. The topic of the research activity concerns a particular typology of zinc-air fuel cell (ZAFC) with a balanced fluidized bed configuration, characterized by a distributor of the electrolyte placed at the base of the fluidized bed, able to optimize the performances of the cell, through a balancing of the fluid-dynamic motions of the electrolyte itself.</b></p> <p>The cell is also characterized by the fact of being easily coupled to other cells, so as to constitute a compact and efficient module of electrical power generation.</p>	



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Fuel cells are electrochemical devices that directly convert chemical energy into electrical energy. The basic structure of a fuel cell consists of a layer of electrolyte sandwiched between an anode and a cathode

**Period in a company:** 6 months  
Società Chimica Bussi spa (SCB).

**Period abroad:** 0

**Responsible of the research:**  
Prof. Marco Milanese

### **29. Innovative Systems for the Production of Green Hydrogen**

The main topic of the research will be focused on the theoretical and experimental study of a new system-plant for the production of hydrogen, based on the combined process of photocatalysis of water and the process of electrolysis, with the use of RES. The research activities will be developed in collaboration with the company ALBORAN Hydrogen and equipment and spaces of the Laser Diagnostics and Solar Laboratories (Scientific Coordinator Prof. A. de Risi) of the Department of Innovation Engineering will be made available.

**Period in a company:** 6 months  
Alboran Hydrogen.

**Period abroad:** 0

**Responsible of the research:**  
Prof. Arturo De Risi

### **30. Innovative System for the Conversion of Co<sub>2</sub> into Methanol with the use of Renewable Energy Sources**

The topic of the research will be focused on the theoretical and experimental study of one or more



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	<p>systems for the conversion of CO<sub>2</sub> into Methanol through the exploitation of renewable energy sources.</p> <p>The activities will concern both the chemical-physical processes and, above all, all the energy and heat exchange aspects, with the aim of optimizing performance and efficiency with a multi-objective approach. The research activities will be developed in collaboration with the company HT Material Science (HTMS) and will be made available the equipment and spaces of the Laboratory of Fisica Tecnica (Scientific Coordinator Prof. G. Colangelo) of the Department of Innovation <b>Engineering</b>.</p> <p><b>Period in a company:</b> 6 months HT Material Science (HTMS).</p> <p><b>Period abroad:</b> 0</p> <p><b>Responsible of the research:</b> Prof. Gianpiero Colangelo</p>	
	<p><b>31. Lithium Batteries for automotive use. Development of a numerical – experimental methodology for the analysis of thermal propagation generated by internal/external source. Criteria definition for design to guarantee intrinsic safety for thermal runaway</b></p> <p><b>Period in a company:</b> 12 months</p> <p><b>Period abroad:</b> 0</p> <p><b>Responsible of the research:</b> Prof. Paolo Carlucci</p>	
	<p><b>32. Study of the behaviour of internal combustion engines in two modes of use (hydrogen injected directly into the combustion chamber or</b></p>	



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**biodiesel HVO) for which fuel generation is based on the production of hydrogen from renewable sources**

**Period in a company:** 6 months

**Period abroad:** Bosch - Stoccarda (Feuerbach) 6 months

**Responsible of the research:**  
Prof. Paolo Carlucci

**33. Using this waste oxygen in stationary units to achieve CO<sub>2</sub> free energy production. The idea is to characterize an internal combustion engine replacing the intake air with a mixture of O<sub>2</sub>+CO<sub>2</sub>. In this way it is possible to obtain at the exhaust a stream of virtually pure CO<sub>2</sub> convertible into green fuel through a Sabatier process**

**Period in a company:** 12 months

**Period abroad:** 0

**Responsible of the research:**  
Prof. Paolo Carlucci

**34. Study of alternative fuels based on hydrogen and ammonia. Solid forms of hydrogen storage will be analyzed, such as nanoparticles with borane ammonia or urea additives (for the production of NH<sub>3</sub>). Initially we will study the phenomena of catalysis and then we will carry out experimental tests through the injection directly into the chamber of nanoparticles adding the traditional fuel. Finally we will implement computational fluid dynamics (CFD) models with detailed kinetic mechanisms to**



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**characterize the combustion processes in the presence of hydrogen and/or ammonia in real combustors.**

**Period in a company:** 9 months  
Centro Combustione Ambiente Spa

**Period abroad:** 6 months Hydrogen Safety Engineering and Research Centre (Hysafer), Ulster University

**Responsible of the research:**  
Prof.ssa Maria Grazia De Giorgi

**35. Development of innovative technologies for the control and the energy routing of smart grids, with renewable power sources, in the main frame of smart energy communities, with particular attention to the development of technologies for the improvement of the energy efficiency and of the resilience of the system. The research activity will concern, moreover, the integration with large scale energy grids, virtual energy storage, and the implementation of technologies based on artificial intelligence and digital twin.**

**Period in a company:** 6 months

**Period abroad:** 0

**Responsible of the research:**  
Prof. Antonio Ficarella

**36. The research project is part of the development of Solarfertigation (SF), a smart fertigation system (energy self-sufficient) that integrates decision support software with hardware that translates them into actions (fertilization and irrigation). The object of the**



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**study is the evolution of the SF agri photovoltaic system which integrates the production of energy and food in the same land, the goal is to implement the Iot model with new sensors and actuators capable of optimizing the process**

**Period in a company:** 12 months

**Period abroad:** 6 months

**Responsible of the research:**  
Prof. Ivan Nicola Giannoccaro

**37. Development and characterization of sustainable and multifunctional materials for battery and electrochemical energy production and conversion systems**

**Period in a company:** 6 months

-FIAMM Energy Technology S.p.A. di Montecchio Maggiore (VI), multinational company active in the production and distribution of accumulators for starting motor vehicles and for industrial use;

-FAAM Fib S.r.l. di San Potito Sannitico (CE), manufacturer of energy storage systems for the starting, traction and stationary sectors

**Period abroad:** 0

**Responsible of the research:**  
Prof. Prof. Claudio Mele – Prof. Benedetto Bozzini

**38. Giant water harvesting efficiency of fog collectors based on piezoelectrically-driven drop roll-off**



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The research activity is devoted to the development of smart water harvesting devices from environmental fog. In particular, the goal is the fabrication of piezoelectric nets, functionalized with electrospinning of Janus fibers, to control both the nucleation dynamics of water droplets (driven by the wetting characteristics of the porous medium) as well as their detwetting dynamics. The activity involves multidisciplinary skills in contact mechanics and microfluidics, and micro-/nano-fabrication

**Period in a company:** 6 months

**Period abroad:** 6 months

**Responsible of the research:**  
Prof. Michele Scaraggi – Prof. Massimo De Vittoria

**39. Impact of the introduction of renewable energy sources on the reconfiguration and development of resilient, sustainable and competitive industrial production processes and value chains, able to proactively adapt to political, economic and technological decoupling scenarios and changes, international and supply crises**

**Period in a company:** 6 months

**Period abroad:** 6 months

**Responsible of the research:**  
Prof. Claudio Petti

**40. Study the AV systems, both at a territorial scale, with an assessment of the suitability of the different components of the landscape, and at a Company scale, through specific**



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**experimentation at the partner Company indicated. Particular attention will be paid to the integration between environmental and production issues. In the context of a semi-arid climate such as that of Puglia, the study will focus on the water and carbon cycle**

**Period in a company:** 12 months  
M2 Energia s.r.l., sede legale Via Lamarmora, 3 - San Severo (FG), con sedi operative anche a Gravina in Puglia (BAT), Potenza, Melfi e Roma.

**Period abroad:** 6 months  
Opportunity for international collaboration and willingness to host the researcher: Prof. Dimitrios K. Karpouzou, Lab. of Agricultural Engineering & Land Reclamation, Dept. of Hydraulics, Soil Science and Agricultural Engineering, Aristotele University of Thessaloniki, Greece

**Responsible of the research:**  
Prof. Antonio Leone

**41. Green Analytical Chemistry: development of sensors based on molecularly imprinted polymers for emerging pollutants**

The global market of analytical chemistry services in different fields has a great economic importance and a big increase is expected as a consequence of more tightening rules (e.g., for environmental protection) and new technologies. Then, it is mandatory to make this market environmentally sustainable. In this respect, research in analytical chemistry is developing novel approaches to replace conventional analytical methods employing great amounts of reagents and energy with greener ones. This project, devoted to

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	<p>development of biomimetic sensors for emerging pollutants based on molecularly imprinted polymers, is fully in this framework.</p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Cosimino Malitesta</p>	
	<p><b>42. Testing and assessment of processes for fuel bioproduction from waste biomass, using different types of bacteria able to adopt fermentative and/or photo-fermentative metabolism (enterobacteria, purple non-sulfur bacteria, cyanobacteria).</b></p> <p>Development of a fast and efficient system for monitoring substrate consumption and produced fuels (H<sub>2</sub>, ethanol) in order to optimize the different parameters to maximize bioconversion.</p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Ludovico Valli</p>	
	<p><b>43. Critical thresholds of changes in the hydrological cycle in the Mediterranean: time of emergence at subregional scale</b></p> <p>Climate projections show that changes of the hydrological cycle are expected in the Mediterranean basin, with widespread reduction in precipitation, increase of precipitation extreme in some areas and frequent droughts in many areas. This project uses climate simulations produced by the CMIP6 and CORDEX</p>	



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	<p>projects to determine when exceeding critical thresholds will pose significant risks on the environment and production sectors, differentiating between areas inside the basin.</p> <p><b><u>Period in a company:</u></b> 9 months</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof. Piero Lionello</p>	
	<p><b>44. Mariculture and ecology restoration: In-shore polyculture combined with artificial reefs</b></p> <p>Integrated multi trophic aquaculture is a system designed to reduce the impact of intensive farming by combining production and environmental recovery, transforming a negative impact into a positive factor in a circular economy philosophy. This project represents the next step in the application of these methods through the addition of hard substrates on the sandy bottom below the cages which would increase the effectiveness of the bioremediation activity, transforming a degraded area into a site that could also implement tourism.</p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 6 months</p> <p><b><u>Responsible of the research:</u></b> Prof.ssa Adriana Giangrande</p>	
	<p><b>45. Valorisation of by-products and wastewater from wineries; Recovery of antioxidant compounds without the use of traditional organic solvents;</b></p>	

**Use of by-products/wastewater in a circular economy, e.g. as ingredients in animal feed.**

**Period in a company:** 9 months

**Period abroad:** 0

**Responsible of the research:**  
Prof. Luigi De Bellis

**46. Development of a monitoring system for phytotherapy efficacy assessment of endotherapeutic protocols with low environmental impact**

The project intends to take advantage of the expertise acquired by the Unisalento General and Inorganic Chemistry group in the context of monitoring the performance of phytotherapeutic products, using metabolomic profiles based on Nuclear Magnetic Resonance spectra. In particular, the project refers to innovative technologies with low environmental impact, such as those of endotherapeutic administration of active ingredients and their use also for the control of *Xylella fastidiosa* in olive tree pathologies.

**Period in a company:** 6 months

**Period abroad:** 6 months

**Responsible of the research:**  
Prof. Francesco Paolo Fanizzi

**47. Comparative study of the gastrointestinal tract in model fish for the analysis of the integrated response to chemical-physical, nutritional, microbiological, toxicological and environmental stimuli**

The gastrointestinal (GI) tract is one of the major barrier organs of an animal organism. In fish, by mediating



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digestion and absorption of nutrients, by hosting the microbiome, by participating in the immune response to luminal stimuli and by activating the systemic response to food, luminal bioactive molecules and microorganisms through the gut-organ axes, the GI guarantees growth and reproductive capacity and, more generally, the welfare of the animal. From fish in use in the laboratories (e.g. zebrafish), to fish living in the various natural environments, to cultured fish species, the project aims to identify the elements of responsiveness of the GI to chemical-physical, nutritional, microbiological, infectious, toxicological, environmental (and other) stimuli and interactions, in order to translate the acquired knowledge towards: i) the discovery of new functional interrelationships between food, GI and microbiome (to be interpreted in terms of 'functional microbiology'); ii) the research and development of new nutraceutical models (by evaluating e.g. the effects of bioactives, pre/pro/post-biotics and/or fish-specific symbionts on the organism function); iii) the improvement of the quality of the meat of farmed organisms and, in a 'green' perspective, the use of derivatives and wastes (skin, skeleton, etc.) of high biotechnological value; iv) the development of new models in toxicology; v) the evaluation of the effects of environmental pollutants in laboratory and field conditions.

**Period in a company:** 6 months

**Period abroad:** 6 months

**Responsible of the research:**  
Prof. Tiziano Verri

**48. Analysis of the illegal date mussel (*Lithophaga lithophaga*) fishery along the Salento coast**



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The date mussel *Lithophaga lithophaga* is an edible endolithic bivalve mollusc, protected by the Habitat Directive, which lives inside carbonate rocks. Fishing is carried out by breaking up the rocks in which it grows, causing permanent changes in the substrate with total eradication of the associated communities, loss of biodiversity, and loss of productivity of the coastal zone. The project aims to define the ecological and economic impact resulting from this illegal activity and the possible countermeasures.

**Period in a company:** 6 months

**Period abroad:** 6 months

**Responsible of the research:**  
Prof. Stefano Piraino

**49. Bioproduction of natural products to be used in improving sustainability in agriculture.**

We intend to develop innovative cultivation methods for plants or microorganisms for the development of a bioproduction chain with high environmental performances and optimization of water consumption. The objectives pursued, in line with the PNRR's mission of developing a sustainable agri-food chain, include the development of natural products for organic farming and for the biotechnology market.

**Period in a company:** 9 months

**Period abroad:** 0

**Responsible of the research:**  
Prof. Gian Pietro Di Sansebastiano



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**50. Characterization of antioxidant properties of polyphenols extracted by coffee in vitro and in vivo models of neurodegenerative diseases**

This research project aims to the characterization of antioxidant properties of polyphenols extracted by coffee production process wastes in order to set up innovative therapeutic protocols for the treatment of neurodegenerative diseases in which oxidative stress is involved. In this project are involved both companies that roast coffee and biotec ones with expertise in extraction and purification of active principles of natural origin (Licofarma srl). Also, stages will be organized at the PRISM lab of University of Lille, where the targets of the polyphenols will be characterized at a molecular level.

**Period in a company:** 6 months

**Period abroad:** 6 months

**Responsible of the research:**  
Prof. Dario Lofrumento

**51. Development of new aerobic composting processes to reduce the environmental impact generated by waste disposal.**

Development of new methods for the removal of polluting inorganic compounds related to waste composting processes of various origins. The final objective is the reduction of the overall environmental impact of waste disposal processes through composting, in addition to the production of high quality soil improvers / fertilizers, with controlled characteristics (low concentration of toxic metals and



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	<p>other pollutants; control of chemical parameters such as humidity, pH, etc.) and suitable for agricultural, nutraceutical, ornamental and landscape applications.</p> <p><b><u>Period in a company:</u></b> 6 months</p> <p><b><u>Period abroad:</u></b> 0</p> <p><b><u>Responsible of the research:</u></b> Prof. Michele Benedetti</p>	
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