



UNIONE EUROPEA
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UNIVERSITÀ DEGLI STUDI DELL'AQUILA

Amministrazione centrale
Area Ricerca e Trasferimento Tecnologico
Settore Dottorati, Assegni e Borse di Ricerca

D.R. Rep. n. 1037/2021 - Prot. n. 117706 Attachments 1

of 13/10/2021

Year 2021 Tit. III Cl. 6 Fasc. 9

PUBLIC COMPETITION FOR ADMISSION TO CYCLE XXXVII - Ph.D. COURSES IN FORCE OF D.M. AUGUST 10, 2021, N. 1061 ACADEMIC YEAR 2021/2022

THE RECTOR OF THE UNIVERSITY OF L'AQUILA

IN FORCE OF article n. 4 of law n. 210, July 3, 1998, which provides that the universities, with their own regulation establish their Ph.D. schools;

IN FORCE OF article 19 of law n. 240, December 30, 2010;

PURSUANT TO D.M. n. 45 of February 8, 2013 "*Regolamento recante modalità di accreditamento delle sedi e dei corsi di dottorato e criteri per la istituzione dei corsi di dottorato da parte degli enti accreditati*";

HAVING REGARD TO Ethical Code and "Codice di Comportamento" of University of L'Aquila issued by D.R. n. 734/2020 of July 27, 2020;

PURSUANT TO the Regulation of the Ph.D. Schools of the University of L'Aquila;

HAVING REGARD TO the D.R. n. 791/2021 of July 14, 2021, published on the University Official Register and on the University website on July 15, 2021, that called the competitions of Ph.D. XXXVII cycle - a.y. 2021/2022 courses enrollment;

HAVING REGARD TO the D.M. of August 10, 2021, n. 1061, and its related implementing regulation, which, as part of the National Operational Program (PON) "Research and Innovation" 2014/2020 for the funding of scholarships for Research Doctorates - XXXVII cycle, assigns € 614,562.51 to this University, with reference to Action IV.4 "Doctorates and research contracts on innovation topics" and € 585,297.55 with reference to Action IV.5 "Doctorates on Green topics";

WHEREAS the aforementioned fundings cover the first two years of the scholarships;

HAVING REGARD TO the Circular of the Ministry prot. n. 12025 of September 8, 2021;

HAVING REGARD TO the minutes of the Academic Senate meeting of September 28, 2021;

HAVING REGARD TO the minutes of the Board of Administration meeting of September 29, 2021, which identified the projects to be funded for all the Ph.D. courses, approved the funding of the third year of the scholarship with University funds and the announcement of the selection procedure;

HEREBY DECREES

ART. 1

Establishment and activation

1. Following the D.M. n. 1061 of August 10, 2021, public competition procedures based on qualifications and examinations have been activated in order to award the additional Ph.D. scholarships foreseen for the XXXVII cycle (a.y. 2021/2022), co-financed with PON 2014-2020 funds, in the framework of the following topics described on the art. 2, sub 1 letter a) and letter b) of the aforementioned Ministry Decree:



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a) on innovation issues (Action IV.4) focused on the issues of innovation, enabling technologies and the broader digital issue, such as enhancement of human capital in the world of research and innovation;

b) on green issues (Action IV.5) focused on issues oriented to the conservation of the ecosystem, biodiversity, as well as reducing the impacts of climate change and promoting sustainable development.

2. The identification of the PhD students recipients of the additional scholarships must take place in relation to the capability of the PhD project to contribute to the achievement of the aims and objectives of the reference Action of the PON "Research and Innovation" 2014-2020, on the basis of the following criteria and indications

ADDITIONAL Ph.D SCHOLARSHIPS ON INNOVATION ISSUES (ACTION IV.4)	ADDITIONAL Ph.D SCHOLARSHIPS ON GREEN ISSUES (ACTION IV.5)
a.a) Relevance of the doctoral program project in relation to the capability to create a high added value, in terms of scientific, social and economic repercussions on the national territory. The project has to favoring appropriate research models and the formation of professional profiles in response to the expressed innovation and competitiveness needs from the entrepreneurial system, through the promotion of research on innovation, digital and enabling technologies, supporting the enhancement of human capital, as a determining factor for the development of research and innovation in Italy.	b.a) Relevance of the doctoral program project in relation to the ability to create a high added value, through the enhancement of human capital, in terms of scientific, social and economic repercussions on the national territory. The project has to favoring appropriate research models and contamination of knowledge and skills in able to foster the development of innovative products and services with a reduced impact on the environment. The products must be focused on issues oriented towards the conservation of the ecosystem, biodiversity, as well as reducing the impacts of climate change and promoting sustainable development, as a contribution to promoting green recovery and overcoming the effects of the crisis in the context of the COVID-19 pandemic.
a.b) Conformity of the PhD project with the SNSI and the PNR, consistency with Law 240/2010 and Ministerial Decree 45/2013 regarding doctorates, with the aim of encouraging innovation and interchange between the world of research and productive world and qualification of the contribution of research projects in the innovation sectors (Law n.240 / 2010, art. 24, co. 3 and subsequent amendments).	b.b) Conformity of the PhD project with the SNSI and the PNR, consistency with Law 240/2010 and Ministerial Decree 45/2013 regarding doctorates, with the funding of PhD scholarship in the Green issues.
a.c) Measurability of the expected results and potential impact of the intervention with reference to the purposes of REACT-EU: presence within the project of the doctoral program of quantifiable and measurable targets consistent with the indicators provided for by the reference action of the PON.	b.c) Measurability of the expected results and potential impact of the intervention with reference to the purposes of REACTEU: presence within the project of the doctoral program of quantifiable and measurable targets consistent with the indicators provided for by the reference action of the PON.



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3. The actual activation of each of the places with additional scholarship referred to in the cards listed in art. 2 of this announcement is subject to ministerial approval of the research projects proposed by the University.
4. The Ph.D. courses are three years long. They start on January 1, 2022.

ART. 2 ADMISSION

The competitions referred to in art. 1 are aimed at admission to the PhD courses listed in the following sheets, each of which indicates: the number of available places and related additional scholarships co-financed on PON 2014-2020 funds, the research topics for each scholarship, the responsible Departments and courses' Coordinators, admission requirements, certifications/documents to be annexed to the applications, examination dates and assessment and selection criteria are summarised below.

Ph.D. Course in CIVIL, CONSTRUCTION-ARCHITECTURAL AND ENVIRONMENTAL ENGINEERING	
Places	3
of which	
with grant on "Innovation" issues	2
with grant on "Green" issues	1
"Innovation" issues	<p>A. Development of innovative materials in civil and building engineering</p> <p>The main topic of the research is the development of innovative materials to be used in the civil-building sector that can provide better performance if compared to standard materials in terms of load-bearing capacity, durability and sustainability. The idea is to adopt innovative construction techniques in which the concrete mix is modified or used together with other materials appropriately chosen and optimized to promote the development of "composite" materials that have better mechanical performance than standard concrete. A reduction in the use of conventional construction material is expected to lead to improvement of environmental impact.</p> <p>B. Development of new materials, models and innovative techniques for the conservation and seismic retrofitting of the historical monumental building heritage</p> <p>The research aims to develop new materials and technologies for the recovery and enhancement of the large Italian historical-architectural heritage in reference both to monumental assets, and to the many ancient villages of inestimable historical-artistic-architectural value, improving the seismic response of masonry buildings. The research to be carried out will investigate the use of special mortars to reinforce the structures able to perform their function in a more compatible, less</p>



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	<p>invasive and more effective than the conservative forms of intervention of the past. It will therefore be developed a new and innovative product, even of composite nature, aimed at simplifying the intervention techniques used today for the increase of the seismic capacity of masonry. Through this new technology it will be easier and more economical to preserve monumental assets such as city walls, castles, walls of entire historic centers and villages now compromised by the effect of environmental actions and therefore particularly vulnerable to earthquakes. Unlike in the past, this new technology of intervention on historical monuments will ensure functions of recovery, conservation, restoration and enhancement, and a significant increases in safety as well, especially seismic, with a double impact on the tourist attractiveness of the villages and their effective usability</p>
"Green" issues	<p>A. MOTEC - Techno-assisted models for the sustainable smart-fast planning of the territory</p> <p>The project is aimed at the implementation and production of a Decision Support System for public administrations (municipalities) to guide a series of actions aimed at achieving the sustainability objectives that are imposed at European level: reduction of urban sprawl at low density (de-sprinkling); de-impermeabilization of functional surfaces; urban reforestation; reduction of redundant infrastructure network; restoration/rehabilitation of sensitive areas (rare ecosystems, river stretches). These key points will have to be linked with the indicators of contrast to hydraulic risk, mitigation of climate-altering effects, improvement/increase of ecosystem services, carbon balance, to make cities and human settlements more inclusive, safe, resilient and sustainable, with a revision of the classical processes of planning towards the FAST and SMART forms. The Decision Support System will be aimed to improve performance in the field of environmental sustainability of the settlement system, consistent with the objectives of the National Strategy for Sustainable Development, the National Recovery and Resilience Plan and in particular with Goal 11 of the 2030 Agenda Sustainable cities and communities.</p>
Duration	3 years
University Department Responsible for the Ph.D.Course	Department of Civil, Construction-Architectural and Environmental Engineering
Ph.D. Course Website	http://diceaa.univaq.it/phdiceaa/
Ph.D. Course Coordinator	Prof. Marcello Di Risio marcello.dirisio@univaq.it
Admission Pre-requisites	<p>All Master-level Degrees or foreign degrees with certified equivalency or recognized as equivalent to the aforementioned qualifications.</p> <p>Candidates who are expected to obtain the above mentioned Degrees by 31/10/2021 may also apply.</p>
Admission Procedure	<p>Assessment of qualifications and research project.</p> <p>Oral exam.</p>



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Oral exam mode	<p>The oral exam can be held in person or electronically.</p> <p>Applicants may take the oral exam via web. In this case the candidate must specify the means they wish to use for their interview indicating a valid contact address. This request must be authorized by the testing commission once the identity of the candidate has been certified, to this end the candidate shall be required to show a valid identification document at the moment of the interview.</p>
Examination topics	<p>The main topics are related to Civil and Building-Construction Engineering. In particular, to the following academic disciplines:</p> <ul style="list-style-type: none"> - Structural Mechanics (for the topic "Development of innovative materials in civil and building engineering"); - Structural Engineering (for the topic "Development of new materials, models and innovative techniques for the conservation and seismic retrofitting of the historical monumental building heritage"); - Urban And Regional Planning, Techniques for environmental assessment, Indicators Engineering (for the topic "MOTEC - Techno-assisted models for the sustainable smart-fast planning of the territory")
How to apply	<p>The application must be submitted only via the online procedure available at: https://pica.cineca.it/univaq/dottorato37-pon.</p> <p>The documents must be attached in pdf format.</p> <p>The application and the attached documents are submitted automatically by closing the online procedure. So, no hard copy of the application and of the documents must be sent to the office.</p>
Documents to be annexed to the Application	<ol style="list-style-type: none"> 1. CV 2. Candidates holding a degree from an Italian university must provide: <ul style="list-style-type: none"> • Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; • Self-certification concerning their Master-level Degree course indicating final mark and list of exams taken and marks obtained. 3. Candidates enrolled in an Italian Degree Course must include: <ul style="list-style-type: none"> • Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; • Self-certification concerning the exams so far taken in their Master-level Degree course indicating marks obtained. 4. Applicants with foreign Degrees must follow the directions explained in article n. 3 of this call. 5. A summary of their Master Degree thesis. 6. A description of the research project. 7. Publications. 8. Additional qualifications deemed appropriate for admission.
Language(s)	<p>Assessment of foreign language skills</p> <p>English language skills and competence shall be assessed during the oral exam.</p> <p>Admission</p> <p>The candidate may sit the exams in ITALIAN or ENGLISH.</p>



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Exam Schedules	<p>Qualification assessment: 2nd November, 2021 - Department of Civil, Construction-Architectural and Environmental Engineering</p> <p>Oral exam: 3rd November, 2021 at 10:00 a.m. - Department of Civil, Construction-Architectural and Environmental Engineering – address: Montelucio di Roio – L'Aquila</p>
Assessment Criteria	<p>The assessment procedure consists in two phases: qualification assessment whit research project assessment and an oral exam which includes English language skills assessment. The Candidate's score will be indicated out of a total of 100 points as follows:</p> <ol style="list-style-type: none">1. Qualification assessment: Maximum 20 points2. Research project: Maximum 40 points3. Oral exam: max. 40 points, with a 25 passing mark
Title evaluation results publication	<p>Title evaluation results shall be published on the University website https://www.univaq.it/section.php?id=1036 and on Department website: http://diceaa.univaq.it/phdiceaa/.</p>



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Ph.D. Course in INFORMATION AND COMMUNICATION TECHNOLOGIES – ICT	
Places	2
of which	
with grant on "Innovation" issues	1
with grant on "Green" issues	1
"Innovation" issues	<p>A. Machine learning techniques for systems with extremely low computing resources and energy consumption, applied to multi-sensor microsystems</p> <p>Development of Machine Learning (ML) techniques for integrated Multi-sensor applications, in multiple contexts. Identification and on-chip implementation of ad hoc ML algorithms capable of guaranteeing both smart functionality in the identified application context, ensuring reduced area and minimum power dissipation in the computational phase.</p>
"Green" issues	<p>B. Machine Learning Software Engineering for Green Software</p> <p>The objective of the proposed research consists in:</p> <ul style="list-style-type: none"> – devising new approaches that, through the use of Machine Learning, allow the design and development of energy-efficient software configurations; – analyzing the energy cost associated with the use of Machine Learning; – proposing trade-off analysis solutions; – conducting empirical experiments to validate the goodness of the identified techniques.
Duration	3 years
University Department Responsible for the Ph.D. Course	Department of Information Engineering, Computer Science and Mathematics
Ph.D. Course Website	http://phdict.disim.univaq.it/
Ph.D. Course Coordinator	<i>Prof. Vittorio Cortellessa</i> vittorio.cortellessa@univaq.it
Admission Pre-requisites	<p>All Master-level Degrees or foreign degrees with certified equivalency or recognized as equivalent to the aforementioned qualifications.</p> <p>Within the deadline indicated in this call for applications, candidates who are scheduled to obtain the above indicated qualification by 31/10/2021 may also apply.</p>
Admission Procedure	Assessment of qualifications and research project. Oral exam.



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Oral exam mode	<p>The oral exam can be held in person or electronically.</p> <p>Applicants may take the oral exam via web. In this case the candidate must specify the means they wish to use for their interview indicating a valid contact address. This request must be authorized by the testing commission once the identity of the candidate has been certified, to this end the candidate shall be required to show a valid identification document at the moment of the interview.</p>
Examination topics	<p>The topics will refer to those of the typical training courses of:</p> <ul style="list-style-type: none"> - Information Engineering ("Innovation" issues) - Computer Science, Green Software Engineering ("Green" issues)
How to apply	<p>The application must be submitted only via the online procedure available at: https://pica.cineca.it/univaq/dottorato37-pon.</p> <p>The documents must be attached in pdf format.</p> <p>The application and the attached documents are submitted automatically by closing the online procedure. So, no hard copy of the application and of the documents must be sent to the office.</p>
Documents to be annexed to the Application	<ol style="list-style-type: none"> 1. CV 2. Candidates holding a degree from an Italian university must provide: <ul style="list-style-type: none"> • Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; • Self-certification concerning their Master-level Degree course indicating final mark and list of exams taken and marks obtained. 3. Candidates enrolled in an Italian Degree Course must include: <ul style="list-style-type: none"> • Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; • Self-certification concerning the exams so far taken in their Master-level Degree course indicating marks obtained. 4. Applicants with foreign Degrees must follow the directions explained in article n. 3 of this call. 5. A summary of their Master Degree thesis 6. A description of the research project 7. Publications. 8. Additional qualifications deemed appropriate for admission.
Language(s)	<p>Assessment of foreign language skills</p> <p>English language skills and competence shall be assessed during the oral exam</p> <p>Admission</p> <p>The candidate may sit the exam in ITALIAN or ENGLISH</p>



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Exam schedule	<p>Qualification assessment: 2nd November, 2021 at the Department of Information Engineering, Computer Science and Mathematics</p> <p>Oral Exam: 3rd November, 2021 at 2:30 p.m. at the Department of Information Engineering, Computer Science and Mathematics and via web</p>
Assessment Criteria	<p>The assessment procedure consists in two phases: qualification assessment whit research project assessment and an oral exam which includes English language skills assessment. Scores are indicated out of a total of 100 points, assigned as follows:</p> <p>1. Qualification assessment: Max. 30/100 points attributed through assessment of the candidate's CV, publications and other qualifications.</p> <p>2. Research project: Maximum 20 points</p> <p>The minimum score required for admission to sit the oral exam is 30/100 (Qualification assessment and Research project)</p> <p>2. Oral exam: Max. 50/100, the oral exam consists in an in depth discussion and presentation of the candidate's Degree thesis and research project he/she intends on carrying out within the Ph.D. course applied for. The aim is to evaluate the candidate's aptitude and motivation for research.</p>
Title evaluation results publication	<p>Title evaluation results shall be published on the University website https://www.univaq.it/section.php?id=1036 and on Department website: http://www.disim.univaq.it/.</p>



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Ph.D. Course in INDUSTRIAL AND INFORMATION ENGINEERING AND ECONOMICS	
Places	4
of which:	
with grant on "Innovation" issues	1
with grant on "Green" issues	3
"Innovation" issues	<p>A. Laser beam application in laser metal deposition (LMD)</p> <p>The project activities deal with the laser beam applications for the high-speed deposition of metal materials in the form of powders (Laser Melting Deposition / Laser Cladding) aimed at creating thin coatings of hard materials as an alternative to hard chrome plating, or for the manufacturing of 3D complex components in high-performance metal alloys with the additive manufacturing technology known as Directed Energy Deposition (DED).</p>
"Green" issues	<p>A. Upgrading of biogas / bio-syngas to green hydrogen with simultaneous CO₂ capture and separation via sorption-enhanced catalytic processes</p> <p>The objective of the proposed activity is the development of eco-sustainable systems for the upgrade of biogas / bio-syngas to green hydrogen and food-grade CO₂, via sorption-enhanced reforming (SER) and sorption-enhanced water gas shift (SEWGS) technologies. SER and SEWGS exploit in-situ CO₂ capture to produce high-purity hydrogen, in an intensified and more sustainable manner than the current industrial practices. Innovative solid materials, with CO₂ sorbent and catalytic functionalities, have to be used for the reforming and water gas shift reactions. The principles of Green Chemistry and Green Engineering, applied to the synthesis of these solids, can make SER and SEWGS even more sustainable; the use of biomass as a raw material for the production of biogas / bio-syngas makes hydrogen a "green" product.</p> <p>B. Multiphysics analysis and design of composite aircraft using innovative modeling methodologies</p> <p>The activity of the proposed project has as its objective the development of a rigorous and efficient methodology oriented to modeling with a high level of detail (called "high fidelity") of aircraft in composite material that can be used effectively in the project flow and that, by resorting to advanced techniques of model order reduction, parameterization and optimization, allows to reduce weight</p>



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	<p>and fuel consumption, while maintaining all the quality and safety requirements unchanged.</p> <p>C. Advanced oxidation processes for the degradation of macro and micro pollutants in wastewaters to allow water reuse</p> <p>The project is focused on the development of innovative technologies for the degradation of organic macro-pollutants and micro-pollutants present in the municipal and industrial wastewaters, carried out using advanced oxidation techniques, which lead to the complete mineralization of the pollutants; the aim is to allow the water reuse in different sectors (agricultural, industrial, urban, recreational), depending on the quality of the water obtained and in accordance with European regulations on reuse.</p>
Duration	3 years
University Department Responsible for the Ph.D.Course	Department of Industrial and Information Engineering and Economics
Ph.D. Course Website	http://diie.univaq.it/index.php?id=2613
Ph.D. Course Coordinator	Prof. Giuseppe Ferri giuseppe.ferri@univaq.it
Admission Pre-requisites	All Master-level Degrees or foreign degrees with certified equivalency or recognized as equivalent to the aforementioned qualifications. Within the deadline indicated in this call for applications, candidates who are to obtain the above indicated Degree by 31/10/2021 may also apply.
Admission Procedure	Assessment of qualifications and research project. Oral exam.
Oral exam mode	The oral exam can be held electronically. Applicants take the oral exam via web. The candidate must specify the means they wish to use for their interview indicating a valid contact address. This request must be authorized by the testing commission once the identity of the candidate has been certified, to this end the candidate shall be required to show a valid identification document at the moment of the interview
Examination topics	The topics which will be considered for the examination are those typical of the Chemical and Materials Engineering, Electrical and Electronics Engineering, Information Engineering, Mechanical, Energy and Management Engineering
How to apply	The application must be submitted only via the online procedure available at: https://pica.cineca.it/univaq/dottorato37-pon . The documents must be attached in pdf format. The application and the attached documents are submitted automatically by closing the online procedure. So, no hard copy of the application and of the documents must be sent to the office.



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Documents to be annexed to the Application	<ol style="list-style-type: none"> CV Candidates holding a degree from an Italian university must provide: <ul style="list-style-type: none"> Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; Self-certification concerning their Master-level Degree course indicating final mark and list of exams taken and marks obtained. Candidates enrolled in an Italian Degree Course must include: <ul style="list-style-type: none"> Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; Self-certification concerning the exams so far taken in their Master-level Degree course indicating marks obtained. Applicants with foreign Degrees must follow the directions explained in article n. 3 of this call. A summary of their Master Degree thesis A description of the research project Publications. Additional qualifications deemed appropriate for admission.
Language(s)	<p>Assessment of foreign language skills English language skills and competence shall be assessed during the oral exam.</p> <p>Admission The candidate may sit exams in English</p>
Exam schedule	<p>Qualification assessment: 2nd November, 2021 at the Department of Industrial and Information Engineering and Economics – Roio – L'Aquila</p> <p>Oral exam: 3rd November, 2021 at 09:00 a.m. via web</p>
Assessment Criteria	<p>The examination procedure consists in two phases: qualification assessment whit research project assessment and an oral exam which includes English language skills assessment. The candidate's score shall be expressed out of a total of 100 points attributed as follows:</p> <ol style="list-style-type: none"> Qualification assessment: Maximum 20 points Research project: Maximum 50 points, with a 30 passing mark Oral exam: max. 30 points, with a 18 passing mark
Title evaluation results publication	<p>Title evaluation results shall be published on the University website https://www.univaq.it/section.php?id=1036 and on Department website</p>



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Ph.D. Course in MATHEMATICS AND MODELING	
Places	2
Of which	
with grant on "Innovation" issues	1
with grant on "Green" issues	1
"Innovation" issues	<p>A. Nonstationary signal analysis for industrial production optimization.</p> <p>The research topic is the development of innovative algorithms for the processing of signals and measurements related to industrial production. The objective, in line with the principles of Lean Six Sigma, is to obtain from these measurements and signals the most accurate information possible regarding the periodicity in the sales of goods and services, as well as in the consumption of raw materials and spare parts in the production and maintenance processes, in order to optimize the connection between supply and demand by minimizing waste both in the production and in the sale of goods. The achievement of these objectives is now made possible thanks to the results obtained in basic research in recent years, particularly in the field of mathematics for signal processing. This research project provides an initial training phase for the student, during which the student can study and learn how to apply the most modern mathematical signal processing techniques. In a second phase, to be carried out at the headquarters of the Spindox company in Rome, the student will have the opportunity to learn the statistical models and machine learning techniques that are used by the company in question for advanced analysis, prediction, and optimization of production processes, and will be able to work on the analysis of time data relating to the production processes to be optimized. In a third phase, the student will work, also supported by the reference professor at the University of L'Aquila, to the development of an innovative approach that allows to identify periodicity and hidden characteristics in the production data and extrapolate them in order to predict the optimal future actions to be undertaken to optimize production.</p>
"Green" issues	<p>A. Variational models for the design and diagnosis of the evolution and deterioration of reinforced concrete beams.</p> <p>With the aim of obtaining increasingly reliable models for the design and diagnosis of structures, the candidate will deal with the application of variational methods, suitably generalized to the dissipative case, for elastoplastic second gradient models and with damage induced by structural aging. Going into more detail on the topic of the proposed</p>



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	research, the PhD student will: 1) deal with generalized continuum models. This will not only overcome the pathology of the dependence of the results on the mesh size in the usual finite element simulations, but will make it possible to deal with the reinforcements with the simplified, and computationally efficient, models of Euler or Timoshenko. 2) proceed to increase the space of the kinematic descriptors with a damage parameter and a concentration of the deteriorating agent, for which appropriate diffusion equations will be obtained. Furthermore, even the plastic multipliers will become kinematic descriptors of the problem. Finally, non-standard variational models will be used, suitable for the irreversibility of dissipative systems. In particular, hemi-variational models will be used. 3) use the mechanics of granular media, in which the effects of anisotropy induced by the deformations will be automatically resolved as well as the identification of the stiffness matrices in a way that is not only computationally effective, but also without the need for an excessive number of additional parameters.
Duration	3 years
University Department Responsible for the Ph.D. Course	Department of Engineering, Computer Science and Mathematics
Ph.D. Course Website	http://people.disim.univaq.it/~dottorato_mate_mode
Ph.D. Course Coordinator	<i>Prof. Davide GABRIELLI</i> davide.gabrielli@univaq.it
Admission Pre-requisites	All Master-level Degrees or foreign degrees with certified equivalency or recognized as equivalent to the aforementioned qualifications. Within the deadline indicated in this call for applications, candidates who are to obtain the above indicated Degree by 31/10/2021 may also apply.
Admission Procedure	Assessment of qualifications and research project. Oral exam.
Oral exam mode	The oral exam can be held in person or electronically. Applicants may take the oral exam via web. In this case the candidate must specify the means they wish to use for their interview indicating a valid contact address. This request must be authorized by the testing commission once the identity of the candidate has been certified, to this end the candidate shall be required to show a valid identification document at the moment of the interview
Examination topics	Presentation of the thesis and research activity The oral exam consists in the candidate's presentation of his/her Degree thesis and research activity. The congruence of the candidate's skills with the specific themes of each scholarship and the research project presented will also be assessed.



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How to apply	<p>The application must be submitted only via the online procedure available at: https://pica.cineca.it/univaq/dottorato37-pon.</p> <p>The documents must be attached in pdf format.</p> <p>The application and the attached documents are submitted automatically by closing the online procedure. So, no hard copy of the application and of the documents must be sent to the office.</p>
Documents to be annexed to the Application	<ol style="list-style-type: none"> CV Candidates holding a degree from an Italian university must provide: <ul style="list-style-type: none"> Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; Self-certification concerning their Master-level Degree course indicating final mark and list of exams taken and marks obtained. Candidates enrolled in an Italian Degree Course must include: <ul style="list-style-type: none"> Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; Self-certification concerning the exams so far taken in their Master-level Degree course indicating marks obtained. Applicants with foreign Degrees must follow the directions explained in article n. 3 of this call. A summary of their Master Degree thesis A description of the research project Publications. Additional qualifications deemed appropriate for admission.
Language(s)	<p>Assessment of foreign language skills</p> <p>English language skills and competence shall be assessed during the oral exam.</p> <p>Admission</p> <p>The candidate may sit exams in ENGLISH</p>
Exam schedule	<p>Qualification assessment: 3rd November, 2021 at 1:00 p.m. at the Department of Information Engineering, Computer Science and Mathematics.</p> <p>Oral Exam: 8th November, 2021 at 10:00 a.m. at classroom C2.10 - Coppito 2 – L'Aquila</p>



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Assessment Criteria	<p>The examination procedure consists in two phases: qualification assessment and research project assessment and an oral exam which includes English language skills assessment. The candidate's scores will be indicated out of a total of 100 points attributed as follows:</p> <ol style="list-style-type: none">1. Qualification assessment: Maximum 45 points, with a 25 passing mark2. Research project: Maximum 10 points3. Oral exam: max. 45 points, with a 25 passing mark
Title evaluation results publication	<p>Title evaluation results shall be published on the University website https://www.univaq.it/section.php?id=1036 and on Department website: http://people.disim.univaq.it/~dottorato_mate_mode</p>



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Ph.D. Course in CLINICAL MEDICINE AND PUBLIC HEALTH	
Places	2
of which	
with grant on "Innovation" issues	2
with grant on "Green" issues	-
"Innovation" issues	<p>A. Innovative health & patient engagement: enhanced personalized medicine</p> <p>Managing the health and well-being of individuals through the support of technology is becoming increasingly important. Digitization and emerging technologies as well as robotic care, or the use of the Internet of Things (IoT), especially as regards 'health monitoring', have changed the roles of caregivers and those receiving care. like the relationships between them. The Quality of Life thanks to technologies can be - but not necessarily it is - much better. In the field of personal care services, clinical management, therapeutic supports have undergone an innovative digital transformation. Smartwatches, wearables, mobile phones and applications are becoming an important part of everyday life of citizens and about 41% of Italians use a wearable device for lifestyle monitoring, 52% use a messaging app to ask the doctor to arrange or move a visit and in 47% of cases to communicate the state of health. Through tools such as Skype, live chat and devices that are always connected, the way of doing psychological counseling has also undergone a change. In fact, there are applications, generically referred to as MHapp, where MH stands for mental health, which provide psychological support often prior to meeting with your psychologist. There are also devices that allow on-demand contact with the psychologist such as the Capsuled device by the Israeli company Vaica, now also present in the Italian digital market. However, there are still some aspects to be implemented in terms of usability and application in clinical practice supported by scientific evidence for the definition of protocols and guidelines To better understand how the role of emotional support fits into an increasingly healthcare context digitized. The main objectives are: a) identification of the individual components that foster emotional and psychological resistance to adherence to digitized clinical pathways; b) identification of digital indicators, personological dimensions and behavioral characteristics of patients with chronic diseases, and c) scaling up of the clinical practice of Augmented Reality (AR) as digital therapy based on imaginative technology (people can feel "as if" in a reality that does not exist in the outside world) in clinical conditions such as stress-related disorders,</p>



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depression, eating disorders and chronic pain. The aim will be to implement new knowledge on the influence of digitalization and emerging technologies in clinical care and personal services for an effective optimization of the needs of individuals, and the empowerment of the patient who, thanks to the use of innovative and integrated technologies, improves their care experience thanks to constant proximity to the doctor and greater involvement in their path of disease management. The field of the PhD is 'Innovation'; the Specialization area 'Technologies in living environments' joined to 'Health'.

B. Evaluation of signalling pathways induced by complement system in the establishment of neuropathic pain. Effects of C5a R1 and C5a R2 antagonists in in vitro and in vivo models of neuropathic pain.

Thematic field: Health, Nutrition, Quality of Life

Development trajectories: Regenerative, predictive and personalized medicine

Biothechnology, bionformatic, pharmaceutical development

The thematic area reflects on one of the National thematic areas (Health, food, quality of life) of SNSI in the context of the development trajectories: Biotechnologies, bioinformatics and drug development and Regenerative, predictive and personalized medicine. In particular, the proposed thematic refers to the application of enabling key technologies in the pharmaceutical and biotechnology areas. The demand for health and thus the resources to assign to the health care are growing in the pharmaceutical and area and biotechnologies play a key role in the achievement of numerous ambitious

Goals on the economic, environmental and social perspectives. Specifically, the proposed thematic provides for the implementation of an experimental model which links the activities of Research, Development and Innovation to the practical potential of the beneficiary company on the Italian and foreign trade. Moreover, the research thematic allows the improvement of the national public research by promoting the development of a research network between companies and research institutes and also provides the enhancement and the strengthening of the available human capital, essential factor for an economy based on knowledge. In addition, statistical data demonstrated that the drug companies are at the top on the national manufacturer scenario for competitiveness, productivity and strength in R&D and export and thus, invest in the valorization and implementation of the sector could represent a coherent element for the SNSI.

Neuropathic pain is a high clinical need widely unfulfilled and in the recent years has been observed an important improvement on the research in the pharmaceutical area aimed at the identification of targeted therapies for the treatment of numerous disorders lacking in



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	cure. In particular, neurosensory pathologies characterized by a neuronal impairment and a progressive functional degeneration have an enormous social impact. For this reason, it is essential the exploration of underlying mechanisms of neurodegeneration propaedeutic to the development of new drugs with targeted and regenerative activity and of innovative technologies for the selective transport of the drug on the injured tissue.
"Green" issues	-
Duration	3 years
University Department Responsible for the Ph.D. Course	Department of Life, Health and Environmental Sciences
Ph.D. Course Website	https://mesva.univaq.it/?q=node/9622
Ph.D. Course Coordinator	Prof. Claudio Ferri claudio.ferri@univaq.it
Admission Pre-requisites	All Master-level Degrees or foreign degrees with certified equivalency or recognized as equivalent to the aforementioned qualifications. Within the deadline indicated in this call for applications, candidates who are to obtain the above indicated Degree by 31/10/2021 may also apply.
Admission Procedure	Assessment of qualifications and research project. Oral exam.
Oral exam mode	The oral exam can be held in person or electronically Applicants may take the oral exam via web. In this case the candidate must specify the means they wish to use for their interview indicating a valid contact address. This request must be authorized by the testing commission once the identity of the candidate has been certified, to this end the candidate shall be required to show a valid identification document at the moment of the interview
Examination topics	The topics will refer to those of the typical training courses of Regenerative Medicine and of Pharmaceutical Development
How to apply	The application must be submitted only via the online procedure available at: https://pica.cineca.it/univaq/dottorato37-pon . The documents must be attached in pdf format. The application and the attached documents are submitted automatically by closing the online procedure. So, no hard copy of the application and of the documents must be sent to the office.



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Documents to be annexed to the Application	<ol style="list-style-type: none"> 1. CV 2. Candidates holding a degree from an Italian university must provide: <ul style="list-style-type: none"> • Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; • Self-certification concerning their Master-level Degree course indicating final mark and list of exams taken and marks obtained. 3. Candidates enrolled in an Italian Degree Course must include: <ul style="list-style-type: none"> • Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; • Self-certification concerning the exams so far taken in their Master-level Degree course indicating marks obtained. 4. Applicants with foreign Degrees must follow the directions explained in article n. 3 of this call. 5. A summary of their Master Degree thesis 6. A description of the research project 7. Publications. 8. Additional qualifications deemed appropriate for admission.
Language(s)	<p>Assessment of foreign language skills English language skills and competence shall be assessed during the oral exam</p> <p>Admission The candidate may sit exams in ITALIAN or ENGLISH</p>
Exam schedule	<p>Qualification assessment: 2nd November, 2021 at 10:30 a.m. at the Department of Life, Health and Environmental Sciences</p> <p>Oral exam: 4th November, 2021 at 11:30 a.m. at the Department of Life, Health and Environmental Sciences</p>
Assessment Criteria	<p>The assessment procedure consists in two phases: qualification assessment whit research project assessment and an oral exam which includes English language skills assessment. The candidate's score shall be indicated out of 100 points attributed as follows:</p> <ol style="list-style-type: none"> 1. Qualification assessment: Maximum 20 points 2. Research project: Maximum 40 points 3. Oral exam: max. 40 points
Title evaluation results publication	<p>Title evaluation results shall be published on the University website https://www.univaq.it/section.php?id=1036 and on Department website: http://mesva.univaq.it/.</p>



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Ph.D. Course in EXPERIMENTAL MEDICINE	
Places	3
of which	
with grant on "Innovation" issues	2
with grant on "Green" issues	1
"Innovation" issues	<p>A. Characterization and development of selective allosteric inhibitors of the CXCR1 and CXCR2 receptors for interleukin 8.</p> <p>The development of selective inhibitors of the CXCR1 and CXCR2 receptors for interleukin 8 (IL8) embraces some of the pathological areas of highest therapeutic interest ranging from oncology to inflammation, to the modulation of the immune response. IL-8, also known as a chemotactic factor for neutrophils, has two main functions: a) it induces chemotaxis mainly of neutrophils (but also of other granulocytes) at the site of inflammation and b) it is a strong promoter of angiogenesis. The research to be developed within this project is to characterize compounds that regulate, through the CXCR1 and CXCR2 receptors, one of the lesser-known aspects of neutrophil activity, namely the production of Neutrophils Extracellular Traps.</p> <p>B. Study of in vitro and in vivo eye disease models in response to treatment with neurotrophins: identification of new biomarkers and therapeutic targets.</p> <p>Neurological eye diseases have an important impact on public health; however, their clinical need remains still unsatisfied. Several studies highlighted the role of neurotrophins in sensory organs development and related diseases treatment. In the last years, a topic therapy for neurotrophic keratitis based on human recombinant NGF has been FDA and EMA approved, and an increase of studies focused on identifying new therapies for orphan eye diseases has been evidenced in the pharmaceutical field. In this context, the in-depth exploration of molecular mechanisms, still unclear, at the base of neurotrophic stimulus and ocular neurodegeneration is crucial, with the aim of developing new targeted treatments as well as innovative technologies for their delivery in the damaged tissues.</p>



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"Green" issues	<p>A. SMART-REHABILIT & GREEN-WORK: employment placement for people with Autism Spectrum Disorder (ASD) diagnosis in ECO-sustainable activities.</p> <p>The research focus concerns the Application of innovative technologies for people with Autism Spectrum Disorder (ASD). The project aims to plan a rehabilitation intervention for individuals with ASD within an ECO-SOSTENIBILE employment pathway based on advanced technology. The employment rate of people with ASD is less than 10%, well below the rates of 47% for people with disabilities and 72% for people without disabilities. People with ASD have skills that could be extremely valuable in employment that are not properly supported. One of the interventions aimed at improving the employment skills of individuals with ASD is Video Modeling (VM). The mechanism behind it is very simple: an individual watches a video to learn a skill. Individuals with ASD benefit from visual stimuli rather than verbal instruction.</p>
Duration	3 years
University Department Responsible for the Ph.D. Course	Department of Biotechnological and Applied Clinical Sciences
Ph.D. Course Website	http://discab.univaq.it/
Ph.D. Course Coordinator	Prof.ssa Mariagrazia PERILLI mariagrazia.perilli@univaq.it
Admission Pre-requisites	All Master-level Degrees or foreign degrees with certified equivalency or recognized equivalency of the afore stated qualifications. Within the deadline indicated in this announcement, candidates who are to obtain the above indicated Degree by 31/10/2021 may also apply.
Admission Procedure	Assessment of qualifications and research project. Oral exam.
Oral exam mode	The oral exam can be held in person
Examination topics	Examination Topics are related to the Ph.D. Course in Experimental Medicine.
How to apply	<p>The application must be submitted only via the online procedure available at: https://pica.cineca.it/univaq/dottorato37-pon.</p> <p>The documents must be attached in pdf format.</p> <p>The application and the attached documents are submitted automatically by closing the online procedure. So, no hard copy of the application and of the documents must be sent to the office.</p>



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Documents to be annexed to the Application	<ol style="list-style-type: none"> CV Candidates holding a degree from an Italian university must provide: <ul style="list-style-type: none"> Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; Self-certification concerning their Master-level Degree course indicating final mark and list of exams taken and marks obtained. Candidates enrolled in an Italian Degree Course must include: <ul style="list-style-type: none"> Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; Self-certification concerning the exams so far taken in their Master-level Degree course indicating marks obtained. Applicants with foreign Degrees must follow the directions explained in article n. 3 of this call. A summary of their Master Degree thesis, A description of the research project Publications. Additional qualifications deemed appropriate for admission
Language(s)	<p>Assessment of foreign language skills English language skills and competence shall be assessed during the oral exam</p> <p>Admission The candidate may sit exams in ITALIAN or ENGLISH</p>
Exam schedule	<p>Qualification assessment: 2nd November, 2021 at the Department of Biotechnological and Applied Clinical Sciences</p> <p>Oral exam: 4th November 2021 at 3:00 p.m. at the Department of Biotechnological and Applied Clinical Sciences - Classroom C3.25, Edificio Angelo Camillo De Meis</p>
Assessment Criteria	<p>The assessment procedure consists in two phases: qualification assessment whit research project assessment and an oral exam which includes English language skills assessment. The candidate's score shall be expressed out of a total of 100 points, attributed as follows:</p> <ol style="list-style-type: none"> Qualification assessment: Maximum 10 points Research project: Maximum 40 points Oral exam: max. 50 points, with a 30 passing mark
Title evaluation results publication	<p>Title evaluation results shall be published on the University website https://www.univaq.it/section.php?id=1036 and on Department website: https://discab.univaq.it/index.php?id=2841/.</p>



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Ph.D. Course in HEALTH AND ENVIRONMENTAL SCIENCES	
Places	2
of which	
with grant on "Innovation" issues	1
with grant on "Green" issues	1
"Innovation" issues	<p>A. Theragnostic peptide-functionalized nanomedicine and artificial intelligence for the selective targeting of glioblastoma</p> <p>Design, synthesis, and bioinformatic analysis of lipid- and/or polymer-based nanocarriers conjugated with targeting compounds for the treatment of cancer diseases of central nervous system</p>
"Green" issues	<p>A. Advanced technological solutions to analyze biological diversity within truffles and their quality</p> <p>Characterization of microbial and invertebrate community within edible mushrooms from natural environment and assessment of effects on their quality</p>
Duration	3 years
University Department Responsible for the Ph.D. Course	Department of Life Health and Environmental Sciences
Ph.D. Course Website	http://mesva.univaq.it/?q=node/6741
Ph.D. Course Coordinator	Prof.ssa Maria Grazia CIFONE mariagrazia.cifone@univaq.it
Admission Pre-requisites	All Master-level Degrees or foreign degrees with certified equivalency or recognized as equivalent to the aforementioned qualifications. Within the deadline indicated in this call for applications, candidates who are to obtain the above indicated Degree by 31/10/2021 may also participate.
Admission Procedure	Assessment of qualifications and research project. Oral exam.
Oral exam mode	The oral exam can be held in person
Examination topics	The topics will refer to those of the typical training courses of Biotechnology, Pharmaceutical Technology, Drug Delivery and Nanomedicine (for the thematic "Innovation") and of Environmental and Biological Sciences (for the thematic "Green")



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How to apply	<p>The application must be submitted only via the online procedure available at: https://pica.cineca.it/univaq/dottorato37-pon.</p> <p>The documents must be attached in pdf format.</p> <p>The application and the attached documents are submitted automatically by closing the online procedure. So, no hard copy of the application and of the documents must be sent to the office.</p>
Documents to be annexed to the Application	<ol style="list-style-type: none"> CV Candidates holding a degree from an Italian university must provide: <ul style="list-style-type: none"> Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; Self-certification concerning their Master-level Degree course indicating final mark and list of exams taken and marks obtained. Candidates enrolled in an Italian Degree Course must include: <ul style="list-style-type: none"> Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; Self-certification concerning the exams so far taken in their Master-level Degree course indicating marks obtained. Applicants with foreign Degrees must follow the directions explained in article n. 3 of this call. A summary of their Master Degree thesis A description of the research project (maximum 10.000 characters including spaces, divided into the following sections: Summary, keywords - Maximum 5, Introduction, purpose, materials and methods, expected results, bibliography) Publications. Additional qualifications deemed appropriate for admission.
Language(s)	<p>Assessment of foreign language skills English language skills and competence shall be assessed during the oral exam.</p> <p>Admission The candidate may sit exams in ITALIAN or ENGLISH</p>
Exam Schedule	<p>Qualification assessment: 2nd November, 2021 at the Department of Life, Health and Environmental</p> <p>Oral exam: 3rd November 2021 at 9:30 a.m. at the Department of Life, Health and Environmental - Classroom D1.21, Edificio Paride Stefanini, Piazzale S. Tommasi, Coppito</p>



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Assessment Criteria	<p>The examination procedure consists in two phases: qualification assessment and research project assessment and an oral exam which includes English language skills assessment. Final score shall be indicated out of a total of 100 points attributed as follows:</p> <ol style="list-style-type: none">1. Qualification assessment: Maximum 20 points2. Research project: Maximum 40 points3. Oral exam: max. 40 points, with a 24 passing mark
Title evaluation results publication	<p>Title evaluation results shall be published on the University website https://www.univaq.it/section.php?id=1036 and on Department website: http://mesva.univaq.it/.</p>



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Ph.D. Course in PHYSICAL AND CHEMICAL SCIENCES	
Places	3
of which	
with grant on "Innovation" issues	1
with grant on "Green" issues	2
on "Innovation" issues	<p>A. Modelling of radiation-molecule interaction in nanophotonic environments for the development of optofluidic sensors for chiral drugs</p> <p>The quest for new drugs requires reliable, ultra-sensitive and fast techniques to identify, refine and test small volumes of candidates for clinical trials. The efficacy of drugs largely depends on their chiral composition, and therefore purity and high enantiomeric selectivity are important issues for the development of new drugs and for testing their bio-toxicity. This project addresses this need through the theoretical and computational modeling of new generation integrated nanophotonic devices that allow the ultra-sensitive chyro-optical spectroscopy of drug solutions with a volume of less than nano-liter, the success of which would allow to revolutionize the technological tools of detection for drug discovery and nanomedicine, as well as opening up a plethora of disruptive applications such as the characterization of small amounts of viruses and macromolecules in general. The development of the aforementioned innovative technological devices for chiral sensing requires the exploitation of integrated photonics through structured and vector light fields on a microfluidic chip. Key elements for optofluidic integration include photonic crystal hollowcore fibers, photonic nanostructures and metasurfaces. The multidisciplinary theoretical project therefore lies between theoretical chemistry and nanophotonics, focusing on the study of different spectroscopic techniques augmented in a nanophotonic environment for chiral detection.</p>



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<p>"Green" issues</p>	<p>A. Development of innovative catalytic systems based on organometallic complexes for the sustainable synthesis of bioactive molecules</p> <p>The incorporation of deuterium into active pharmaceutical ingredients (API) represents an exponentially growing research field. This nuclide in many cases improves the pharmacological properties of bioactive molecules substantially due to the kinetic isotope effect of deuterium. The topic of this PhD program in collaboration with Dompé Pharmaceuticals S.p.A., involves the design and synthesis of organometallic complexes able to catalyze the introduction of deuterium into bioactive molecules using D₂O as a source of deuterium. These complexes should be compatible with the aqueous environment, and they have to be designed to direct the introduction of deuterium in specific molecular positions subject to the metabolic attack of biological systems on the drug.</p> <p>B. Development of functional membranes based on thermoplasmonic nanomaterials for the distillation of seawater promoted by solar radiation, recovery of minerals from seawater and production of blue energy through salt concentration gradient</p> <p>The PhD student will be involved in the development of nanostructured functional membranes to be used for water desalination processes, recovery of minerals from seawater and energy production through membrane operations powered by sunlight. To increase both the productivity and the efficiency of the purification processes, the high photothermal efficiency resulting from the excitation of surface plasmon in the nanomaterials that will be confined in the polymer matrices will be exploited. Polymer nanocomposites with plasmonic nanofillers will be used in advanced membrane distillation (MD) and membrane crystallization (MCR) processes, which represent "green" technologies for their ability to produce clean water and recover mineral salts from seawater. The use of compactable MD / MCR operating units and solar energy as a renewable source will facilitate the production and marketing of autonomous desalinators that are easily transportable and can be allocated even in hostile territories, not reachable by electricity. The development of innovative plasmonic nanomaterials for the construction of desalinators, powered by sunlight, and for the production of blue energy through reverse electrodialysis is part of the environmentally responsible economic paradigm. Membrane technologies are configured as green technologies and fit perfectly into the concept of a green economy.</p>
<p>Duration</p>	<p>3 years</p>
<p>University Department Responsible for the Ph.D. Course</p>	<p>Department of Physical and Chemical Sciences</p>
<p>Ph.D. Course Website</p>	<p>https://dsfc.univaq.it/phdpc/</p>
<p>Ph.D. Course Coordinator</p>	<p>Prof. Antonio Mecozzi antonio.mecozzi@univaq.it</p>



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Admission Pre-requisites	All Master-level Degrees or foreign degrees with certified equivalency or recognized as equivalent to the aforementioned qualifications. Within the deadline indicated in this call for applications, candidates who are to obtain the above indicated Degrees by 31/10/2021 may also apply.
Admission Procedure	Assessment of qualifications and research project. Oral exam.
Oral exam mode	The oral exam can be held in person or electronically. Applicants may take the oral exam via web. In this case the candidate must specify the means they wish to use for their interview indicating a valid contact address. This request must be authorized by the testing commission once the identity of the candidate has been certified, to this end the candidate shall be required to show a valid identification document at the moment of the interview
Examination topics	Modelling of radiation-molecule interaction in nanophotonic environments for the development of optofluidic sensors for chiral drugs. Notions of Physics, Chemistry, Photonics, Physical Engineering, Mathematical Engineering, Mathematics, Applied Mathematics, Chemical Engineering, Biomedical Engineering, Electrical Engineering, Electronic Engineering, Mechanical Engineering. Modelling of radiation-molecule interaction in nanophotonic environments for the development of optofluidic sensors for chiral drugs Notions inorganic and organic chemistry Development of functional membranes based on thermoplasmonic nanomaterials for the distillation of seawater promoted by solar radiation, recovery of minerals from seawater and production of blue energy through salt concentration gradient The subjects will refer to those characteristics of the training courses typical of scientific and engineering disciplines concerning the issues of ecological transition
How to apply	The application must be submitted only via the online procedure available at: https://pica.cineca.it/univaq/dottorato37-pon . The documents must be attached in pdf format. The application and the attached documents are submitted automatically by closing the online procedure. So, no hard copy of the application and of the documents must be sent to the office.



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Documents to be annexed to the Application	<ol style="list-style-type: none"> 1. CV 2. Candidates holding a degree from an Italian university must provide: <ul style="list-style-type: none"> • Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; • Self-certification concerning their Master-level Degree course indicating final mark and list of exams taken and marks obtained. 3. Candidates enrolled in an Italian Degree Course must include: <ul style="list-style-type: none"> • Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; • Self-certification concerning the exams so far taken in their Master-level Degree course indicating marks obtained. 3. Applicants with foreign Degrees must follow the directions explained in article n. 3 of this call. 4. A summary of their Master Degree thesis 5. A description of the research project 6. Publications. 7. Additional qualifications deemed appropriate for admission.
Language(s)	<p>Assessment of foreign language skills English language skills and competence shall be assessed during the oral exam.</p> <p>Admission The candidate may sit exams in ENGLISH</p>
Exam schedule	<p>Qualification assessment: 5th November 2021 at 9:30 a.m. at the Department of Physical and Chemical Sciences</p> <p>Oral exam: 8th November, 2021 at 9:30 a.m. at the Department of Physical and Chemical Sciences</p>
Assessment Criteria	<p>The examination procedure consists in two phases: qualification assessment and research project assessment and an oral exam which includes English language skills assessment. The candidate's scores will be indicated out of a total of 100 points attributed as follows:</p> <ol style="list-style-type: none"> 1. Qualification assessment: Maximum 25 points 2. Research project: Maximum 25 points 3. Oral exam: max. 50 points, with a 30 passing mark
Title evaluation results publication	<p>Title evaluation results shall be published on the University website https://www.univaq.it/section.php?id=1036 and on Department website: https://dsfc.univaq.it</p>



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ART. 3

Requirements for Access

Candidates holding a Master-level Degree or other University Degree corresponding to criteria specified in DM – Ministerial Decree n. 509/1999, or those holding a foreign Degree with certified equivalency, within the deadline of this selection announcement, may, with no limitations as to age or citizenship, apply to participate in the Ph.D. selection process.

The academic qualification held by the candidate must refer to a course with a duration of at least 4 years and allow the access to a Ph.D. course in the country in which it was awarded.

Candidates holding a foreign Degree who have not as yet obtained certified equivalency required for the admission to the Ph.D. course, must include the following documents in their application (necessary for the Examination Commission to evaluate the Degree as conforming to requirements):

- a copy of the Degree certifications obtained (Bachelor e Master Degree), with a transcript of records of the exams taken and an Italian or English translation provided by the applicant under his/her responsibility;
- any other documentation deemed useful for the qualification assessment (Diploma Supplement, declarations etc...).

Eligibility of the qualification will be verified by the Course's Admission Committee and will only be granted for the sole purpose of admission to the chosen Ph.D. course.

The call is also addressed to:

- Candidates scheduled to obtain their Master-level degree within 31st October 2021. If admission exams are held before the Degree is conferred, the candidate's admission shall be deemed as "subject to verification".
- Candidates who have already obtained a Ph.D. in Italy although such candidates and candidates who are attending the medical specialization school cannot apply.

ART. 4

Applications

The application form may only be submitted using the dedicated online procedure, available at: <https://pica.cineca.it/univaq/dottorato37-pon>. Applications must be submitted no later than the **October 28th, 2021 at 1:00 p.m. (CEST)**.

There are 3 methodologies to sign it and the candidate must select one of them and read carefully they directions.

- By digital signature using smart card, USB token or remote signature which allow the owner to sign general documents by means of a signature software or a Remote Signature web portal made available by the Auditor. Those who have a Digital Signature smart card or USB token shall verify that they are compatible with the Digital Signature system integrated in the system server. If so, the owner may sign the application directly in the system server (e.g. ConFirma);

- Those who do not have compatible digital signature devices and the Remote Digital Signature Owners who may access a web portal for signing general documents shall save in their own PC the .pdf file generated by the system and, without modifying it, digitally sign it in CADES format .p7m file will be generated, which shall be saved and uploaded again in the system. Any editing to the file before signing with the Digital Signature shall interfere with the automatic check of correspondence between the content of such a document and the original, and this will bring to the application exclusion;



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- If none of the above-mentioned options can be used candidates shall save in their own PC the .pdf file generated by the system and, without modifying it, print and sign it with full original signature in the last page of the printed document. A scanned .pdf copy of such a document shall be produced and the file thus obtained shall be uploaded to the system.

The application must be signed, **missing the signature the application will be rejected.**

In case of the access to the platform is through the SPID system, is not necessary sign the application form with one of the aforementioned formality.

Candidates intending to apply for more than one Course must complete a separate application for each chosen Course.

All required documents to be submitted, listed in the information sheet for the chosen Ph.D. course, must be annexed to the application form, together with a copy of an identity document.

The lack of a photocopy of the identity document is cause for exclusion from the selection.

If the candidate is applying for more than one course, each application must be completed with the relative required documents. **All documentation must be attached in pdf format.**

For all legal purposes, the application is to be considered as a self-certification of the data included therein, in accordance with articles 46 and 47 of Italian Presidential Decree no. 445/2000 and subsequent amendments.

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The application is automatically sent to the University when the online procedure has finally been completed. Therefore, no paperwork needs to be delivered or sent to the University's offices.

Candidates are responsible for verifying that the procedure is completed correctly. No complaints will be accepted for any malfunctioning of the IT system due to overload experienced by candidates near the closing date.

After the deadline of the call it will no longer be possible to change the application for participation.

In force of Italian Law no. 104/92, as amended by Italian Law no. 17/99, disabled candidates may request an individual examination (with the use of aids, any additional time required, etc.) to complete the required entry examinations.

ART. 5

Examinations

The examination procedures and the dates of the exams are indicated in the Article 2 of the above reported schemes of each doctoral course. These dates are to be regarded as official legally-binding calls.

Candidates will therefore not receive any other sort of call or summons by the University as to the exams prescribed for the Ph.D. Course they have applied for.

The candidate does not have to be present during qualification assessment procedures unless otherwise specified in art. 2.

A candidate who is not present at the time and place indicated for the examination will automatically excluded from the competition.

ANY CHANGES IN DATES AND TIMES WILL BE MADE PUBLIC ON THE UNIVERSITY WEB-SITE



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To sit the prescribed exam for the course applied for, candidates must be present on the dates and times indicated in the above mentioned schemes and provide a valid identification card.

Candidates, only if indicated as an option in the chosen Ph.D. Course, sit the oral exam via web conference communication systems. In this case, the candidate is required to provide contact information in their application and guarantee the use of a web-cam to allow the Commission to verify the candidate's identity.

If, for health reasons connected to the COVID-19 emergency, the oral exam cannot be carried out in the manner indicated in the art. 2 of the notice, it will be communicated by means of a notice that can be consulted on the University website.

ART. 6

Examination Committee

Assessment Criteria and Ranking List

The Examination Committee is appointed by the Rector through a specific decree and is composed by a minimum of three to a maximum of five members among professors and assistant professors.

Having regard to Italian Law about "Equal Opportunities for Men and Women" and specifically to Art. 57 of the Leg. Decree n. 165, 30 March 2001, at least one third of the Examining Board has to be women, except impossibility to be demonstrated when the Board proposal is made.

Having regard to Art. 35 bis of the Leg. Decree n. 165, 30 March 2001, Individuals condemned for crimes – even if not yet sentenced – in Book II of the Italian Penal Code ("crimes by civil servants against public administration") cannot be nominated as members of the Examining Board.

The candidate's scores will be indicated out of a total of 100 points.

The results of the assessment of the qualifications will be published on the web site of the University https://www.univaq.it/en/section.php?id=1036&lang_s=en and on the web site of the concerned Department and on the Department information board.

At the end of the session the Examination Committee draws up the list of the interviewed applicants with the obtained scores.

This list, signed by the President and by the secretary of the Examination Committee will be published on the web site of the Department at which the test was conducted, on the same day of the oral examination.

Once the competition tests have been completed, the Commission provides two final rankings, one for the Innovation topic and one for the Green topic, based on the sum of the marks obtained by each candidate in the evaluation of qualifications and research project and in the interview. The identification of the research topic must be written next to the name of each candidate, marked with the letters A, B, C in the reference form referred to in art. 2. For each research topic, candidates will be admitted to the courses in the order established in the rankings.

The University Administration makes this list public by publishing it on the official notice board of the University <https://www.univaq.it/section.php?id=1391> and on the University web site (https://www.univaq.it/en/section.php?id=1036&lang_s=en), once the validity of the examination procedure has been checked.

If the candidate obtains equal position in more than one Ph.D. course, he/she must choose one scholarship.



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ART. 7

Enrolment in Ph.D. Courses

Successful candidates must submit their enrolment through the University of L'Aquila official website (https://www.univaq.it/en/section.php?id=1036&lang_s=en), within 7 days from online publication of selection results.

No information will be sent to the candidate's home. Candidates granted admission to the Courses are responsible for checking enrolment dates and procedures.

Failure to enroll by the deadlines set for each Course will be considered as drop out.

The enrolment forms, available on the University website, duly signed, must be delivered to the "Settore Dottorati, Assegni e Borse di Ricerca", Palazzo Camponeschi - Piazza Santa Margherita, 2 - L'Aquila within the deadline foreseen for the enrolment. The documents can be delivered in one of the following ways:

- by certified e-mail (PEC) addressed to protocollo@pec.univaq.it.
The certified e-mail account used must be the candidate's personal account. The administration shall not accept documents from candidates using certified e-mail accounts belonging to other individuals or to institutions. The University Administration declines all responsibility for any non-deliveries or misdeliveries of the documents sent via PEC or in case the documents attached to it are non-readable or damaged.
The date of submission will be indicated on the receipt sent automatically by the PEC system.
- by mail addressed to concorso.dottorati@univaq.it. **All documentation must be attached in pdf format.**

Candidates with a qualification obtained abroad, when they arrive in Italy, are required to deliver the originals of the documentation relating to the qualification to the Settore Dottorati, Assegni e Borse di Ricerca.

The documents to submit compulsory are the followings:

- a) Enrolment form;
- b) Self-Declaration in substitution of certification and Self-Declaration in substitution of attested affidavit in accordance with articles 46 and 47 of the Presidential Decree – 28th December, 2000, n.-445 (forms attached to this selection announcement), containing the following:
 - self- certified declaration of citizenship;
 - statement declaring that the candidate is not also enrolled in another University Degree Course or a "School of Specialization" or any other Master-level course, university-level vocational course or other doctoral or Ph.D. course;
 - self- certified declaration of being entitled to exercise civil and political rights;
 - statement declaring that the candidate shall adhere to and attend all activities prescribed for the Ph.D. they have been selected for in accordance with the decisions taken by the Board of Professors;
 - Statement declaring that the candidate shall ask the Board of Professors for authorization to accept, or continue to carry out, any other type of "external" employment while they are enrolled in the Ph.D. Course;
- c) self-declaration to obtain the scholarship for the Ph.D. course they have earned admission to;
- d) Scholarship accreditation form;
- e) copy of an identity document;
- f) a photocopy of the candidate's fiscal-code number;
- g) a photocopy of the candidate's "Italian-residency permit" (permesso di soggiorno) – only for non-EU citizens.



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Within 15 days from the start of the Ph.D. Course, candidates who have been conferred a scholarship must send by mail a photocopy of a receipt from the INPS (national social security service), certifying that they have been registered in “posizione contributiva alla gestione separata” (for information visit the INPS web-site at www.inps.it).

Foreign citizens must declare possessing the following requisites:

- 1) that they benefit from civil rights and right to vote in their country;
- 2) that, aside from Italian citizenship, they possess all other requisites required for citizens of the Italian Republic.

Applicants holding a university Degree awarded abroad must enclose, also, the following documents, translated and certified by competent Italian Diplomatic Authorities:

- copy of their university degree indicating their final mark;
- degree transcripts indicating the exams taken during their course and marks awarded.

If the above documentation is not available at the time of enrolment, the candidate's enrolment shall be deemed “subject to verification”. In this case all above mentioned compulsory documentation must be consigned **by and no later than the 31st December 2021, failure to do so will result in expulsion from the course.**

False declarations shall lead to the candidate's expulsion from the Ph.D. course and to prescribed sanctions for such offenses, vacant positions will be assigned to other candidates according to the ranking list.

Successful candidates who do not want to enroll in the course they have been selected for, must immediately send a signed letter of renouncement enclosing a photocopy (front-back) of their identity card.

ART. 8

Public employee

Public employees admitted to PhD courses must ask the Administration to be placed on unpaid leave.

If the public employee does not request extraordinary leave unpaid for study purposes for the whole duration of the course, or in case the Administration does not accept the request, the public employee must renounce to apply to the PhD courses.

The period of extraordinary leave is useful for the purposes of career progression and retirement and social security benefits.

ART. 9

Grants – Scholarships

The grants available indicated in the Ph.D. chart (art. 2) are assigned according to the rankings lists drawn up by the Examination Commission.

A Ph.D. gross grant consists of € 15.343,28 which includes health and social security taxes that, on 2021, amounts to 34,23% but only 11,41% is paid by the beneficiary.

The payment of the scholarship to the selected candidates is done from the approval of financing eligibility of the project by the Ministry office in charge of scholarships' funds management.



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From the second year of each Ph.D. course, in addition to the grant and according to financial resources, a research budget, not less than 10% of the total sum of the grant conferred, will also be available for research activity in Italy or abroad. If a Ph.D. student does not receive a positive evaluation or renounces the grant, the remaining sum shall remain within the institution and used accordingly for the same purpose.

Grants are yearly provided and are renewed on the condition that the Ph.D. student has completed all programmed activities for the course during the previous year.

A Ph.D. scholarship cannot be cumulated with other grants except for those provided by national or foreign institutions which are aimed at integrating the Ph.D. student's research activity with periods abroad.

The payment of the scholarship is done by monthly installment.

Candidates who have already benefited from other Ph.D. study grants in Italy (even if only for one year) are not eligible to receive another grant.

If Ph.D. student does not respect what is indicated in article 15 paragraph 7 of Ph.D. regulations, his/her scholarship will be stopped.

ART. 10

Caratteristiche di scholarship financed by PON RI 2014/2020 and rules

1. The additional scholarships, announced with this document, foresee:

- periods of study and research in the company from a minimum of six (6) months to a maximum of twelve (12) months;
- periods of study and research abroad, if any, from a minimum of six (6) months to a maximum of twelve (12) months.

Failure to comply with the minimum period to be carried out at the company causes the revocation of the scholarship.

Failure to comply with the study and research period abroad, if indicated in the PhD program, causes the revocation of the scholarship.

2. The Ph.D. student must report every two months all the activities done during his period of study. In particular the report must be done on the concerning online platform of the Ministry, using the forms there charged.

The coordinator of each Ph.D. course, is in charge to check in the student's report and approve it.

The coordinator of each Ph.D. course, has to upload on the concerning online platform once in a year (but the last academic year) the following documents:

- a) the student's annual report on the activity carried out, drawn up according to the forms prepared by the MUR;
- b) the minutes of the Academic Board containing the opinion on the annual activity carried out by the PhD student and the possible admission to the following year.

The coordinator of each Ph.D. course, has to upload on the concerning online platform, at the end of the Ph.D. course and within 30 days before the defense of the thesis, the following documents:

- a) the student's annual report on the activity carried out, drawn up according to the forms prepared by the MUR;
- b) where required, the minutes of the Academic Board containing the opinion on the activity three carried out by the doctoral student during the doctoral years and any admission to the final exam;
- c) a copy of the final thesis of the doctorate integrated with the forms prepared by the MUR;
- d) the minutes of the Commission of the final examination.



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ART. 11 **Attendance Abroad**

Based on content of the art. 10 concerning the study and research periods done abroad, Ph.D. students can carry out training periods abroad in qualified institutions.

Such training or study periods abroad cannot be longer than half the duration of Ph.D. course and can be allowed in case they are foreseen by

- a) Upon advice of the course coordinator or board;
- b) Upon request made by the Ph.D. student;
- c) Approved by MUR.

The sum of the grant/scholarship is increased to cover such training or study periods abroad up to a max of 50% and only for the duration of the period spent abroad.

This increase for study period to do abroad shall be covered by funding provided by Ministry or by the interested University Departments or through specific funds set up for Ph.D. student mobility.

Before going abroad the following documents must be sent to the above mentioned Ph.D. office by the Coordinator:

- Signed authorization by the course Coordinator for training/study periods abroad of less than 6 months or
- Board resolution allowing a period of over 6 months.

The authorization must include:

- the source of financial coverage for the additional sum of the scholarship;
- indication of the fund to which the additional sum of the scholarship is to be sent, if this sum is to be paid by the Department;

Upon returning to Italy the Ph.D. Coordinator shall present the following:

- Certification about study periods abroad.

ART. 12 **Tuition Fees**

All Ph.D. students are exempted from tuition payments. All Ph.D. students must only pay € 156,00; the Regional tax (€ 140,00) and a duty stamp “marca da bollo” (€ 16,00).

Late payment will result in a € 52.00 fine.

ART. 13 **Rights and Duties**

1. Ph.D. students are obliged to attend lessons and carry out all prescribed activities regularly in accordance with the programs and schedules set by the Board of Professors;
2. The University provides insurance coverage for the entire duration of the Ph.D. course and for activities pertaining to the course, (but in the U.S.A. and in Canada);



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3. Compatible employment activities shall be allowed for brief periods, following authorization from the Board of Professors as long as such commitments do not pose any sort of conflict with the activities required within the Ph.D. course;
4. Interruptions in attendance shall be allowed for:
 - a. Illness or injury for periods of 30 days or more;
 - b. Military or civil service;
 - c. Training courses for teacher certification.Interruption may also be agreed for substantiated serious personal reasons after having received a positive opinion of the Board of Professors. Discontinuation does not last longer than one year according to the total course length. Ph.D. students benefitting of interruption period must recover the entire time with consequent test delay for the move to following year and for the awarding of title.
5. Maternity/paternity leave and leave for adoption or foster care may also be authorized. Maternity-leave laws and regulations as indicated in Gazzetta Ufficiale n. 247 of 23rd October, 2007 shall be applied only to scholarship holders.
6. A Ph.D. student's unexcused absence or non-fulfillment of obligations shall result in his/her exclusion from the course by the Board of Professors. In this case the expelled Ph.D. student shall be liable for the sum of the scholarship conferred or for tuition fees;
7. Ph.D. students enrolled at the University of L'Aquila may carry out limited teaching or tutoring activities within the University's Bachelor and Master-level degree courses if so established and programmed by the Board of Professors in agreement with the University Department.
8. Ph.D. students must preserve the confidentiality in information, knowings and materials. They must not disclose beyond subject different by the ones that gave to them.

ART. 14

Graduation

Students can write their Ph.D. thesis in Italian or in English, an abstract in Italian or English must also be provided. Students wishing to write their thesis in a language different from Italian or English must receive authorization from the Board of Professors.

The evaluation committee for Ph.D. thesis discussion will be appointed according to the Ph.D. Regulations of the University.

A Doctoral Degree title (Dott. Ric. or Ph.D.) will be awarded following a positive assessment of the Ph.D. thesis, taking into account the achieved results.

ART. 15

Head of the Competition Procedure

According to art. 5 of law 07/08/1990, n. 241, the Head of the Settore Dottorati, Assegni e Borse di Ricerca of the University of L'Aquila (Piazza Santa Margherita, 2 – Palazzo Camponeschi - L'Aquila) shall be responsible for the competition procedure.



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ART. 16 Legal Reference

For all other matters not foreseen or included in this announcement we shall refer to Law n. 210 of 03/07/98, Law n. 240 of 30/12/2010, Ministerial Decree 45/2013 and to the “Regolamento dei corsi di Dottorato di Ricerca” (Ph.D. regulations) of this University.

This announcement is available at: https://www.univaq.it/en/section.php?id=2055&lang_s=en)

Further information may be requested by contacting the competent Ph.D. office:

Settore Dottorati, Assegni e Borse di Ricerca – tel. 0862/432055/432061/432032 e-mail: **dot@strutture.univaq.it**.

L'Aquila 13/10/2021

The Rector of the University of L'Aquila
Signed Prof. Edoardo Alesse