

CALL FOR APPLICATIONS FOR ADMISSION TO POLITECNICO DI BARI XXXIX CYCLE PhD PROGRAMMES FOR ACADEMIC YEAR 2023/2024

Rectoral Decree no. 736/2023

THE RECTOR

IN VIEW OF	Politecnico di Bari Statute, issued under Rectoral Decree 175/2019;
IN VIEW OF	Law 476 (13 Aug 1984) on regulations governing scholarships and doctorate research programmes at Italian universities;
GIVEN	Law 104 (5 Feb 1992), specifically art.20 and subsequent modifications and additions;
GIVEN	Law 210 (3 Jul 1998), as modified by Law 240 (30 Dec 2010);
GIVEN	Ministerial Decree 509 (3 Nov 1999) on didactic autonomy of universities;
GIVEN	Presidential Decree 445 (28 Dec 2000), Consolidated Law on legislative measures and regulations for administrative records;
GIVEN	Legislative Decree 82 (7 Mar 2005) and subsequent modifications and additions;
GIVEN	Prime Ministerial Decree of 9 Apr 2001 on measures for equal treatment for rights to university studies;
GIVEN	Legislative Decree 68 (29 Mar 2012), specifically art.18.8;
GIVEN	Ministerial Decree 270 (22 Oct 2004);
GIVEN	Ministerial Decree 198 (23 Oct 2003), arts. 3 and 6, Ministerial Decree 263 (9 Aug 2004) and Ministerial Decree 492 (3 Nov 2005);
GIVEN	the Politecnico di Bari Ethical and Behavioural Code, issued as part of Rector's Decree 582 (28 Sept 2018);
GIVEN	Ministerial Decree 226 (14 Dec 2021), "Regulations concerning accreditation procedures for institutes and doctorate programmes and criteria for establishment of doctorate programmes on the part of accredited institutes";
GIVEN	the Politecnico di Bari Doctorate Research Programme Regulations, issued as part of Rectoral Decree 288 (11 Mar 2022);
GIVEN	the regulations for the national doctorate research programme in Autonomous Systems;
GIVEN	agreements with Bari University regarding inter-university doctorate programmes;
GIVEN	the agreement with Acquedotto Pugliese S.p.A. for the Industrial doctorate programme in Change Management in Civil Engineering Infrastructures;
GIVEN	agreements with the University of Salento and the National Research Council's Institute for Construction Technology regarding the joint doctorate programme in Sustainability Engineering and Safety in Civil and Industrial Construction, for which Politecnico di Bari will act as administrative centre;
GIVEN	agreements with other Italian universities and the National Research Council regarding the national doctorate programme in Autonomous Systems, for which Politecnico di Bari is the administrative centre;
GIVEN	Ministerial Decree 247 (23 Feb 2022) stipulating annual amount of PhD programme grants, which will be €16,243.00 (gross total before social security contributions made by the beneficiary);
GIVEN	the administrative council deliberation of 15 May 2023, which approved a 15% increase in PhD

- programme grants, as determined by Ministerial Decree 247/2022, with effect from 1st November 2023;
- GIVEN** Politecnico di Bari's participation in "Patti Territoriali per l'Alta Formazione delle Imprese" agreements (hereinafter "Patti Territoriali"), as per Ministry of Universities and Research notice no. 1290 (8th Aug 2022), implementing art. 14 of Legislative Decree no. 152/2021;
- GIVEN** the National Plan for Resilience and Recovery – NPRR;
- GIVEN** Politecnico di Bari's role as two national centres entitled "National Centre for Sustainable Mobility – CN MOST" as part of the sustainable mobility subject area – Project Code D93C22000410001;
- GIVEN** Politecnico di Bari's participation in the "3A-ITALY Extended Partnership", as part of subject area "A Circular and Sustainable Made-in-Italy" – Project Code D93C22000920001 and "NEST Extended Partnership - Network 4 Energy Sustainable Transition" as part of subject area 2 "Future Energy Scenarios – Related Topic 2.a. Future Green Energy" – Project Code D93C22000900001;
- GIVEN** the initiative "Digital Driven Diagnostics, Prognostics and Therapeutics for Sustainable Health Care - D3 4 Health", as part of the NPRR Complementary Fund (Legislative Decree 59/2021) – Project Code B53C22006170001;
- GIVEN** Ministerial Decree no. 117 (2 March 2023) regarding the allocation of doctorate research grants from the NPRR's Mission 4, Component 2 "From Research to Enterprise" – Investment 3.3 "Implementation of innovative doctorate programmes addressing company innovation requirements and promoting company hiring of researchers", for which Politecnico di Bari has been allocated ministerial co-funding for doctorate research grants for the abovementioned field;
- GIVEN** Ministerial Decree no. 118 (2 March 2023) regarding the allocation of doctorate research grants from the NPRR's Mission 4, Component 1, "Expansion of Educational Services: from Playschools to University" – Investment 3.4 "Advanced university teaching and skills" and Investment 4.1 "Increase in number of doctorate and innovative doctorate research programmes for public administration and cultural heritage", for which Politecnico di Bari may allocate co-funding for doctorate research grants for macro-areas in "Digital and Environmental Transition", "NPRR", "Public Administration" and "Cultural Heritage";
- GIVEN** the following Project Codes (CUP) as per Ministerial Decree 117/2023 and DM 118/2023 for doctorate research programmes as below:

Doctorate Research Programme	M4 C1 - Inv. 3.4 Digital and Environmental Transition	M4 C1 – Inv. 4.1 NPRR	M4 C1 – Inv. 4.1 Public Administration	M4 C1 – Inv. Cultural Heritage	M4 C2 – Inv. 3.3
Mechanical and Energy Engineering	D93C23000510005	D93C23000520005	D93C23000530005	/	D93D23000410003
Management Engineering	/	D93C23000490005	D93C23000500005	/	D93D23000400003
Electrical and IT Engineering	D93C23000390005	D93C23000400005	D93C23000410005	/	D93D23000360003
Risk, Environmental, Territorial and Building Development	/	D93C23000420005	D93C23000430005	/	D93D23000370003
Heritage Planning: Knowledge, Tradition and Innovation	/	D93C23000440005	D93C23000460005	D93C23000480005	D93D23000390003
Engineering and Aerospace Sciences	/	D93C23000570005	D93C23000580005	/	D93D23000430003
Smart and Sustainable Industry	D93C23000540005	D93C23000550005	D93C23000560005	/	D93D23000420003

Sustainability Engineering and Safety in Civil and Industrial Buildings	D93C23000590005	D93C23000600005	D93C23000610005	/	D93D23000440003
Autonomous Systems	/	D93C23000450005	D93C23000470005	/	D93D23000380003
Change Management in Civil Engineering Infrastructures	/	D93C23000620005	D93C23000630005	/	D93D23000450003

- GIVEN** the guidelines for implementing bodies reporting Mission 4 Component 1 and Component 2 systems (NPRR);
- GIVEN** the deliberation of Politecnico di Bari Doctorate School (Scu.Do.), held on 22 May 2023;
- GIVEN** the deliberations of the Academic Senate, held on 24 May 2023 and the Administrative Council, held on 25 May, regarding the establishment and commencement of the Politecnico di Bari XXXIX cycle doctorate research programmes;
- GIVEN** the letters of intent and agreements reached between Politecnico di Bari and private institutions/companies for the establishment and funding or co-funding for XXXIX doctorate research programme grants, as per Ministerial Decree 117/2023;
- CONSIDERING** the possibility that subsequent to the issue of this decree there may be further expressions of interest in co-funding doctorate research grants as per Ministerial Decree 117 or entire funding of grants by external bodies, subject to the formalisation of related agreements by and no later than the Rectoral approving acts decree date;
- PENDING SUBJECT TO** the publication of the 2023/24 Fees and Contributions Regulations; Ministry of Universities and Research regulations, with the approval of ANVUR, regarding institute accreditation and/or establishment of PhD Programmes for which the Politecnico is the administrative centre;
- HAVING ASCERTAINED** the availability of financial resources pertaining to study grants funded by the Politecnico di Bari;

HEREBY DECREES

Art. 1: ESTABLISHMENT AND COMMENCEMENT

The XXXIX Cycle of doctorate research programmes for the academic year 2023/24 has been established with its administrative centre as the Politecnico di Bari. The programmes will be as follows:

PhD Programme	Department
1. Ph.D. IN MECHANICAL AND ENERGY ENGINEERING (hereafter abbreviated to DRIME)	Department of Mechanics, Mathematics and Management
2. Ph.D. IN MANAGEMENT ENGINEERING (hereafter abbreviated to DRIG)	Department of Mechanics, Mathematics and Management
3. Ph.D. IN ELECTRICAL AND INFORMATION TECHNOLOGY ENGINEERING (hereafter abbreviated to DRIEI)	Department of Electrical Engineering and Information Technology
4. Ph.D. IN RISK, ENVIRONMENTAL, TERRITORIAL AND BUILDING DEVELOPMENT (hereafter abbreviated to DRSATE)	Department of Civil, Environmental, Land, Building Engineering and Chemistry

5. Ph.D. IN HERITAGE PLANNING: KNOWLEDGE, TRADITION AND INNOVATION (hereafter abbreviated to CTI)	Department of Architecture, Construction and Design
6. INTER-UNIVERSITY Ph.D. (WITH UNIVERSITY OF BARI "ALDO MORO") IN ENGINEERING AND AEROSPACE SCIENCES (hereafter abbreviated to DRISA)	Department of Mechanics, Mathematics and Management
7. INTER-UNIVERSITY Ph.D. (WITH UNIVERSITY OF BARI "ALDO MORO") IN SMART AND SUSTAINABLE INDUSTRY (hereafter abbreviated to SSI)	Department of Electrical Engineering and Information Technology
8. JOINT Ph.D. WITH UNIVERSITY OF SALENTO, INSTITUTE OF CONSTRUCTION TECHNOLOGY AND NATIONAL RESEARCH COUNCIL (ITC-CNR) IN SUSTAINABILITY ENGINEERING AND SAFETY IN CIVIL & INDUSTRIAL BUILDINGS (hereafter abbreviated to DRISS)	Department of Architecture, Construction and Design
9. Ph.D. IN NATIONAL RESEARCH FOR AUTONOMOUS SYSTEMS (hereafter abbreviated to DAUSY)	Department of Electrical Engineering and Information Technology
10. INDUSTRIAL Ph.D. IN CHANGE MANAGEMENT IN CIVIL ENGINEERING INFRASTRUCTURES (hereafter abbreviated to CMCEI)	Department of Civil, Environmental, Land, Building Engineering and Chemistry

These PhD programmes form part of the Politecnico di Bari's Doctoral School (SCU.DO).

PhD programmes have a 3-year duration. Commencement date will be 1 November 2023. All teaching is carried out in English. Admission to the above XXXVIII Cycle PhD programmes will be through a public selection procedure based on qualifications and interview which is open to Italians and foreign nationals.

The number of places available with grant funding as shown in article 2 of this call may increase in line with any future funding from public or private bodies which make resources available subsequent to the publication of this call, without affecting the fixed number of places available without grant funding.

Doctorate research programmes are established on the condition that they meet the accreditation regulations stipulated under Ministerial Decree 226/2021.

The current call is deemed official notification to all intents and purposes. All communication regarding call procedures will be by the candidate's e-mail address as indicated on the application form.

Art. 2: COURSE DESCRIPTION

The following grant funding is available for each of the Doctorate research programmes.

1. Ph.D. IN MECHANICAL AND ENERGY ENGINEERING – DRIME

Co-ordinator: Prof. Antonio Emmanuele Uva

Department of Mechanics, Mathematics and Management

PLACES AVAILABLE: 24 (1 grant is reserved for graduates from non-Italian universities), of which:

- **5 places** with grant funded by NRRP, as per **DM 118/2023**, of which:
 - 1 for Digital and Environmental Transition
 - 3 for NRRP
 - 1 for Public Administration
- **2 places** with grant funding from “Patti Territoriali” agreements
- **9 places** with grant funding from the PNRR – as per Ministerial Decree **117/2023**
- **2 places** with grant funding from **bodies and private companies**
- **6 places** without grant funding

Total annual grant (gross total before social security contributions made by the beneficiary): **€ 18,679.45**

RESEARCH TOPICS AS PER MINISTERIAL DECREE 118/2023 AND “PATTI TERRITORIALI” AGREEMENTS

Total grants available: 7

1. Development of collective interaction models for underwater robots;
2. Development of numerical methods for fluid-structure interaction of active and passive structures;
3. Prediction and control of direct noise in combustion in hydrogen flames;
4. Fluid-dynamic and structural analysis of floating off-shore wind turbines;
5. Micromix technology for clean turbogas hydrogen combustion;
6. Hydrogen to decarbonize the hard-to-abate sectors;
7. Measurements and virtual measurement for industrial and civil systems;
8. Mitigation of motion sickness in self-driving vehicles;
9. Development of Materials and Interfaces with Optimized Tribological Properties for Energy and Cost Sustainability;
10. Ultralight electric vehicle for sustainable urban mobility;
11. Effect of nonlinear dynamic phenomena on the tribological behavior of real interfaces;
12. Smart Structures for Tribological Efficiency (SSTE);
13. Digital and sustainable innovation in the development of advanced materials for bioengineering;
14. Adhesion switching using microvibration and R2G (rubbery to glassy) transition technology;
15. Studying protocols for Monitoring of Neutron Damage in fusion Reactor structural materials;
16. Design, micro-fabrication and testing of bioinspired cell scaffolds for improved cell adhesion;
17. Mechanical characterization and tribological study of implant surfaces of osseointegrated dental implants;
18. Innovative methodologies for the development of bio-devices;
19. Exploiting Augmented Reality to support predictive maintenance in Industry 5.0;
20. Study and development of u-learning systems for university teaching innovation;
21. Zero-waste Laser Material Processing for a more sustainable mobility;
22. Die casting process optimization through numerical/experimental approach;
23. Artificial Intelligence (AI) to real-time evaluation of parts fabricated using 3D printing;
24. Smart training for smart operators;
25. Mathematical models for materials.

RESEARCH TOPICS AS PER MINISTERIAL DECREE DM 117/2023

Total grants available: 9

1. Study and development of innovative processes of continuous fiber composites for aerostructures - **Co-funded by Leonardo S.p.a.;**
2. Study and development of the bonding process of aircraft composites- **Co-funded by Leonardo S.p.a.;**
3. Development and application of innovative nondestructive testing - **Co-funded by Diagnostic Engineering Solutions s.r.l.;**
4. Sustainable design of automotive track & trailer accessories through the use of numerical techniques of structural analysis - **Co-funded by Daken S.p.a.;**
5. Challenges of hydrogen green production and combustion in Large Bore ICE - **Co-funded by Punch Torino S.p.a.;**
6. Development and experimental validation of a coupled CFD-topological optimizer simulation environment for the investigation of the effects on the combustion process of the hydrogen addition to fossil and/or biogas mixtures and definition of the guidelines for the development of innovative industrial burners based on additive manufacturing - **Co-funded by Seamthesis s.r.l.;**
7. Centrifugal pumps for the transfer of hydrogen in liquid state or in derived forms (ammonia, methanol, etc.) for industry and marine applications - **Co-funded by Nuovo Pignone Tecnologie S.r.l.;**
8. Numerical and experimental investigation of ammonia combustion processes in boiler systems - **Co-funded by Termotecnica Industriale S.r.l.;**
9. Development of innovative methodologies for the design and management of the alloy die-casting process - **Co-funded by Masteritaly S.r.l..**

Part of the research activity undertaken by beneficiaries must be carried out at the premises of the body/company in line with a research programme agreed upon by both parties.

RESEARCH TOPICS FOR GRANTS FUNDED BY BODIES AND PRIVATE COMPANIES

Total grants available: 2

1. Versatile and dexterous soft grippers through bioinspired design and functional materials – **Funded by Fondazione Istituto Italiano di Tecnologia;**
2. Production of hydrogen from biomass through innovative processes – qualification and quantification of hydrogen for the production of bioenergy and e-fuels – **Funded by Agenzia Nazionale per le Nuove Tecnologie.**

Part of the research activity undertaken by beneficiaries must be carried out at the premises of the body/company in line with a research programme agreed upon by both parties.

2. Ph.D. IN MANAGEMENT ENGINEERING – DRIG

Co-ordinator: Prof.ssa Ilaria Filomena Giannoccaro

Department of Mechanics, Mathematics and Management

PLACES AVAILABLE: 12 (1 grant is reserved for graduates from non-Italian universities), of which:

- **4 places** with grant funded by NRRP, as per **DM 118/2023**, of which:
 - **2 for NRRP**
 - **2 for Public Administration**
- **2 places** with grant funding from “**Patti Territoriali**” agreements
- **2 places** with grant funding from the NRRP – as per **Ministerial Decree 117/2023**
- **1 place** with grant funding from the NRRP - **Extended Partnerships**
- **3 places** without grant funding

Total annual grant (gross total before social security contributions made by the beneficiary): **€ 18,679.45**

RESEARCH TOPICS AS PER MINISTERIAL DECREE 118/2023 AND “PATTI TERRITORIALI” AGREEMENTS

Total grants available: 6

1. Development of innovative models and methods for understanding, analysing, and predicting industrial, technological, organizational transitions and their effects on socio-economic systems;
2. Data-Driven decision-making approaches, models, and tools in highly risky and uncertain industries and in the healthcare sector;
3. Advancements in Smart Sustainable Manufacturing: Digital Twins, managerial practices, and cognitive factors of operators;
4. Tools for the analysis of the opportunities and threats of Industrial Symbiosis for the development of a circular economy: technological, managerial, and organizational aspects and performance measurements;
5. Analysis and development of consumption models for eco-sustainability products: consumer perceptions on costs and benefits, intentional and effective purchasing behaviors, and barriers;
6. Theories and models for the effective management of technological evolution: processes, resources, organizational routines, risk analysis, assessment of costs and benefits;
7. Organizational and managerial approaches for sustainability management and measurement and communication of the societal impact of organizations;
8. Integrated approaches for Industrial Safety, Security and Resilience of production systems: strategy, organization, human factors, and Industry 5.0 technologies;
9. The role of Additive manufacturing for twin transition: technologies for repair/remanufacturing and new circular business models;
10. Digitainability of Business Processes: models, methods and supporting tools;
11. Manufacturing materials management for quality and efficiency of 3D printing processes.

RESEARCH TOPICS AS PER MINISTERIAL DECREE 117/2023

Total grants available: 2

1. Technological models for smart sustainable manufacturing - **Co-funded by SKF Industrie S.p.a.;**
2. Energetic modelling of manufacturing processes for sustainable manufacturing - **Co-funded by SKF Industrie S.p.a.**

Part of the research activity undertaken by beneficiaries must be carried out at the premises of the body/company in line with a research programme agreed upon by both parties.

RESEARCH TOPICS FOR NRRP FUNDING – EXTENDED PARTNERSHIPS (PE)

Total grants available: 1

1. Development of strategies and models for the design and management of circular and resilient supply chains – **Extended Partnership “Made in Italy circolare e sostenibile” – Spoke 17 (“New and consumer-driven business models for resilient and circular supply chains”)** – Scientific Resp.: Prof.ssa Ilaria Giannoccaro – Grant Resp.: Prof.ssa Ilaria Giannoccaro

3. Ph.D. IN ELECTRICAL AND INFORMATION TECHNOLOGY ENGINEERING – DRIE1

Co-ordinator: Prof. Mario Carpentieri

Department of Electrical Engineering and Information Technology

PLACES AVAILABLE: 25 (1 grant is reserved for graduates from non-Italian universities), of which:

- **7 places with grant funded by NRRP, as per DM 118/2023, of which:**
 - **1 for Digital and Environmental Transition**
 - **4 for NRRP**
 - **2 for Public Administration**
- **2 places with grant funding from “Patti Territoriali” agreements**
- **7 places with grant funding from the NRRP – as per Ministerial Decree 117/2023**
- **2 places with grant funding from the NRRP - Extended Partnerships**
- **1 place with grant funding from bodies or private companies**
- **6 places without grant funding**

Total annual grant (gross total before social security contributions made by the beneficiary): **€ 18,679.45**

RESEARCH TOPICS AS PER MINISTERIAL DECREE 118/2023 AND "PATTI TERRITORIALI" AGREEMENTS

Total grants available: 9

1. Quantum technologies in silicon;
2. Energy efficient, wearable and wireless embedded electronic systems for the non-invasive monitoring and diagnosis of chronic diseases;
3. Development of technologies for connectivity improvement;
4. Study of innovative technologies and solutions for the smart agriculture;
5. Autonomous navigation systems;
6. Intelligent and innovative solutions for sustainable mobility including connected, cooperative and automated vehicles;
7. Intelligent and innovative solutions for Smart Cities;
8. Investigation of innovative technologies and solutions for Intelligent Agents;
9. Diagnosis, Prognosis and Therapy of neurodegenerative diseases by Intelligent Systems and Digital Twins;
10. Technologies for precision medicine from multi-omics to ambient assisted living;
11. Development of energy harvesting technologies at a micro and macro scale;
12. Medium voltage direct current MVDC distribution system;
13. Development of smart systems for logistic problems optimization;
14. High performance computing and big data;
15. Nanoscale Random number generators for the security;
16. Innovative solutions for the electrification of transport on land, sea and air means;
17. Distributed monitoring of air quality using energy efficient, wireless, embedded wearable tag in smart cities;
18. Methodologies for the development of intelligent systems for active and healthy ageing;
19. Design, development and validation of an integrated system for telerehabilitation and teleassistance;
20. Technologies and innovations for photovoltaic systems;
21. Advances in Precision Medicine: Organoid Modeling and Multi-Modal Data Fusion of Bioimages, Biosignals, and Transcriptomics;
22. Innovative distributed control approaches for intelligent, cooperative and multi-agent systems;
23. Deep Learning-based 2D/3D image processing and registration to support computer/robot-assisted surgical procedures;
24. Emerging technologies for Pbit/s optical communications.

RESEARCH TOPICS AS PER MINISTERIAL DECREE 117/2023

Total grants available: 7

1. Study and design of global control systems for the optimization of Waste Heat Recovery (WHR) processes
- **Co-funded by Gruppo Sigla S.r.l.;**
2. HW development of a Cognitive Unit for Ultrasound Assistance - **Co-funded by Predict S.r.l.;**
3. Gas sensors for breath analysis - **Co-funded by Predict S.r.l.;**
4. Innovative techniques for estimating the state of "aging" of a photovoltaic inverter - **Co-funded by Enel Green Power S.p.a.;**
5. Development of methods for failures detection and prediction in marine engine applications - **Co-funded by Isotta Fraschini Motori S.p.a.;**

6. Reliable, intelligent and green propulsion control of construction and maintenance railway vehicles - **Co-funded by Tesmec Rail S.r.l.;**
7. Decision and control techniques for robots-as-a-service in the digital industry - **Co-funded by Ditro Soluzioni per l'Automazione S.r.l..**

Part of the research activity undertaken by beneficiaries must be carried out at the premises of the body/company in line with a research programme agreed upon by both parties.

RESEARCH TOPICS FOR NRRP FUNDING – EXTENDED PARTNERSHIPS (PE)

Total grants available: 2

1. Development of platform for the integrated management of multi-vector energy resources – **Extended Partnership “Network 4 Energy Sustainable Transition” (NEST) – Spoke 7 (“Smart Sector Integration”) – Scientific Resp.: Prof. Elio De Tuglie – Grant Resp.: Prof. Elio De Tuglie**
2. Analysis and synthesis of microgrids to enhance intelligent energy interactions in multi-sector and multi-vector systems – **Extended Partnership “Network 4 Energy Sustainable Transition” (NEST) – Spoke 7 (“Smart Sector Integration”) – Scientific Resp.: Prof. Elio De Tuglie – Grant Resp.: Prof. Elio De Tuglie**

RESEARCH TOPICS FOR GRANTS FUNDED BY BODIES AND PRIVATE COMPANIES

Total grants available: 1

1. Intelligent perception systems for multimodal data processing in industrial application contexts – **Funded by Istituto di Sistemi e Tecnologie Industriali Intelligenti per il Manifatturiero Avanzato (STIIMA) – CNR.**

Part of the research activity undertaken by beneficiaries must be carried out at the premises of the body/company in line with a research programme agreed upon by both parties.

4. Ph.D. IN RISK, ENVIRONMENTAL, TERRITORIAL AND BUILDING DEVELOPMENT – DRDATE

Co-ordinator: Prof. Vito Iacobellis

Department of Civil, Environmental, Land, Building Engineering and Chemistry

PLACES AVAILABLE: 18 (1 grant is reserved for graduates from non-Italian universities), of which:

- **7 places** with grant funded by NRRP, as per **DM 118/2023**, of which:
 - 3 for NRRP
 - 4 for Public Administration
- **2 places** with grant funding from **“Patti Territoriali” agreements**
- **3 places** with grant funding from the **NPRR – as per Ministerial Decree 117/2023**
- **1 place** with grant funding from the **NPRR - National Centres**
- **1 place** with grant funding from **bodies or private companies**
- **4 places** without grant funding

Total annual grant (gross total before social security contributions made by the beneficiary): **€ 18,679.45**

RESEARCH TOPICS AS PER MINISTERIAL DECREE 118/2023 AND "PATTI TERRITORIALI" AGREEMENTS

Total grants available: 9

1. Definition of digital twins simulation models for planning and design of transportation systems as a decision support tool for city managers;
2. Development of smart systems for the early detection of plant disease;
3. Resilience of buildings in metropolitan areas to local and global climate change;
4. New methodological approaches for understanding and controlling nitrate contamination in groundwater systems;
5. Advanced strategies for structural modeling and multi-hazard analysis of historic buildings in urban centers in support of cultural heritage protection;
6. Development of advanced remote sensing techniques to support the identification of anthropogenic hazards and associated risks;
7. GREen ENgineering solutions: a new LIFE for SEdiments And Shells (GREENLIFE4SEAS - GL4S)
8. Requalification and management plans for historic centres using innovative digital techniques;
9. Data-driven early-warning system enhanced by mathematical modelling for deep excavations : preventing excessive deformations in urban areas;
10. Multiscale approaches for the study of structures and composites of engineering interest;
11. Innovative models for cycle path network design based on social equity principles and the health of vulnerable road users;
12. Recovery and reconversion of metals for photocatalytic applications;
13. Eco-design for the re-use of stone waste;
14. Integrated approach of environmental monitoring, satellite remote sensing and numerical modeling for oil-spill emergency management and environmental impact risk assessment;
15. Development of a protocol based on sensor-fusion and artificial intelligence for structural monitoring and risk management of existing bridges and viaducts;
16. Sustainable processes and products in the construction supply chain: from agro-industrial waste to high-value building products;
17. Modeling and experimental validation of electroactive membranes for renewable energy harvesting;
18. Intelligent systems for spatial and mobility planning: Building innovative digitalized models to support decisions towards fragile and vulnerable communities/individuals;
19. Innovative technologies for sustainable remediation of soils and sediments;
20. Engineering characterization and modelling of the soil-vegetation-atmosphere interaction for landslide risk mitigation;
21. Design of integrated seismic and functional retrofit interventions of existing building patrimony;
22. Sustainable technologies for material recovery from plastic waste dispersed in the coastal marine environment;
23. Assessment of conventional interpretation methods of soil dynamic tests through advanced 3D numerical modelling;
24. Physical and numerical models of ecohydraulics for vegetated flows and diffusion processes;
25. Processes of mixing and dispersion of MicroPlastics at sea investigated by numerical modeling;
26. Chemo-mechanical improvement of geomaterials based on the reuse of residues of different origin;
27. Alkali-activated binders from raw and residual natural materials for soil treatment.

RESEARCH TOPICS AS PER MINISTERIAL DECREE 117/2023

Total grants available: 3

1. Combined process of dark fermentation and anaerobic digestion for the treatment of municipal and industrial organic waste - **Co-funded by Biomethane Industry;**
2. Optimization of the recovery processes of the organic fraction of municipal waste - **Co-funded by AMIU Puglia S.p.a.;**
3. Innovative approaches for the management of the building process: Augmented Reality as a decision-support tool for new construction and the refurbishment/restoration of existing buildings - **Co-funded by Evholo S.r.l..**

Part of the research activity undertaken by beneficiaries must be carried out at the premises of the body/company in line with a research programme agreed upon by both parties.

RESEARCH TOPICS FOR GRANT FUNDED BY NRPP – NATIONAL CENTRES (CN)

Total grants available: 1

1. Sustainable Processes for New Fuel Production – **National Centre “Centro Nazionale per la Mobilità Sostenibile” (MOST) – Spoke 14 (“Hydrogen and new fuels”) – Scientific Resp.: Prof. Marco Torresi – Grant Resp.: Prof.ssa Maria Michela Dell’Anna**

RESEARCH TOPICS FOR GRANT FUNDED BY BODIES AND PRIVATE COMPANIES

Total grants available: 1

1. Production of sustainable fuels and/or chemicals and chemical intermediates from substrates containing sustainable carbon sources – **Funded by Agenzia Nazionale per le Nuove Tecnologie, l’Energia e lo Sviluppo Economico Sostenibile (ENEA).**

Part of the research activity undertaken by beneficiaries must be carried out at the premises of the body/company in line with a research programme agreed upon by both parties.

5. Ph.D. IN HERITAGE PLANNING: KNOWLEDGE, TRADITION AND INNOVATION – CTI

Co-ordinator: Prof. Giuseppe Fallacara

Department of Architecture, Construction and Design

PLACES AVAILABLE: 12 (1 grant is reserved for graduates from non-Italian universities), of which:

- **6 places with grant funded by NRRP, as per DM 118/2023, of which:**
 - 2 for NRRP
 - 2 for Public Administration
 - 2 for Cultural Heritage
- **1 place with grant funding from “Patti Territoriali” agreements**
- **2 places with grant funding from the NRRP – as per Ministerial Decree 117/2023**
- **3 places without grant funding**

Total annual grant (gross total before social security contributions made by the beneficiary): **€ 18,679.45**

RESEARCH TOPICS AS PER MINISTERIAL DECREE 118/2023 AND “PATTI TERRITORIALI” AGREEMENTS

Total grants available: 7

1. The archives of 20th century architects in Puglia and the digitalization of documentation;
2. Digitization and enhancement of the artistic and architectural heritage through digital manufacturing technologies and virtual reproductions;
3. Settlement patterns in informal contexts in the rural landscape in Puglia. Social inclusion and architecture;
4. "Lithic" construction. From formal and constructive aspects to structural and energy verifications;
5. The use of artificial intelligence at the service of cultural heritage;
6. "Poor" construction. Raw earth and wood: formal and constructive composition, technical experimentation, structural verifications and sustainability;
7. The urban planning of ancient Taranto through the digitization of archival documentation;
8. The school as an agent of regeneration of urban systems in demographic dynamism;
9. The use of additive manufacturing of viscous mixtures for architecture and circular design;
10. The forms of housing for migrants in Puglia. Architectural types and building morphologies;
11. System design and cultural heritage: the enhancement of material and immaterial culture for the development of territories;
12. The unexpressed potential of the underground space in Mediterranean culture: an interdisciplinary research;
13. “Excavated” architecture. Construction, structural aspects and consolidation, hydrothermal verifications and ventilation;
14. The digitization of the public architectural cultural heritage. From survey to HBIM;
15. The reuse of existing buildings. High-performance systems for structural and energetic improvement;

RESEARCH TOPICS AS PER MINISTERIAL DECREE 117/2023

Total grants available: 2

1. Exploration of the innovative and sustainable potential of design with CNC machines in the processing of Lecce stone - **Co-funded by PIMAR S.r.l.;**
2. Stone design innovation. Analysis and development of potential innovative and sustainable design solutions with CNC machines in the processing of stone materials and the use of waste materials for the creation of eco-sustainable products with innovative design, through the use of 3D printers, for the construction sector , interior design and outdecor - **Co-funded by Manzi Marmi S.r.l. and by Gurrado Marmi S.r.l..**

Part of the research activity undertaken by beneficiaries must be carried out at the premises of the body/company in line with a research programme agreed upon by both parties.

6. INTER-UNIVERSITY Ph.D. (WITH UNIVERSITY OF BARI "ALDO MORO") IN ENGINEERING AND AEROSPACE SCIENCES – DRISA

Co-ordinator: Prof. Marco Donato de Tullio

Department of Mechanics, Mathematics and Management

PLACES AVAILABLE: 13 (1 grant is reserved for graduates from non-Italian universities), of which:

- **3 places with grant funded by NRRP, as per DM 118/2023, of which:**
 - 2 for NRRP
 - 1 for Public Administration
- **2 places with grant funding from "Patti Territoriali" agreements**
- **2 places with grant funding from the NRRP – as per Ministerial Decree 117/2023**
- **3 places with grant funding from University of Bari "Aldo Moro"**
- **3 places without grant funding**

Total annual grant (gross total before social security contributions made by the beneficiary): **€ 18,679.45**

RESEARCH TOPICS AS PER MINISTERIAL DECREE 118/2023 AND "PATTI TERRITORIALI" AGREEMENTS

Total grants available: 5

1. Analysis of innovative dynamics in the evolution of the space industry: emerging trends and dynamics;
2. Hybrid powertrains and distributed propulsion for urban mobility and delivery;
3. Advanced modeling of fluid-structure interaction problems;
4. Resource management in millimeter wave and/or optical links in transparent 3D wireless networks;
5. Development of bioengineered in-vitro models for space biomedicine;
6. Advanced tools for the design and characterization of spacecrafts under conditions of reentry into the Earth's atmosphere;
7. Development and application of innovative structural health monitoring and non-destructive testing techniques for aerospace components;

8. Clean propulsion using hydrogen;
9. Formulation and characterization of biocompatible 'smart-inks' for aerospace applications;
10. Technologies and measurement systems for characterization of components and sensors for propulsion systems in the aerospace field;
11. Applications of supercritical carbon dioxide-based multifunctional fluids in the aerospace sector;
12. Measurement and validation techniques for environmental testing;
13. Design of an on-board debris detection system;
14. Development of a biological signal monitoring system for space missions;
15. Development of new fuel systems for future clean airliners fuelled with Hydrogen;
16. Green antimicrobial formulation for human space exploration.

RESEARCH TOPICS AS PER MINISTERIAL DECREE 117/2023

Total grants available: 2

1. Immersed boundary methods for the simulation of high-enthalpy hypersonic flows - **Co-funded by Centro Italiano Ricerche Aerospaziali (C.I.R.A.);**
2. Solid/fluid heat transfer methods for ice protection systems - **Co-funded by Centro Italiano Ricerche Aerospaziali (C.I.R.A.).**

Part of the research activity undertaken by beneficiaries must be carried out at the premises of the body/company in line with a research programme agreed upon by both parties.

7. INTER-UNIVERSITY Ph.D. (WITH UNIVERSITY OF BARI "ALDO MORO") IN SMART AND SUSTAINABLE INDUSTRY – SSI

Co-ordinator: Prof.ssa Caterina Ciminelli

Department of Electrical Engineering and Information Technology

PLACES AVAILABLE: 16 (1 grant is reserved for graduates from non-Italian universities), of which:

- **4 places** with grant funded by NRRP, as per DM 118/2023, of which:
 - **1** for Digital and Environmental Transition
 - **2** for NPRR
 - **1** for Public Administration
- **1 place** with grant funding from "Patti Territoriali" agreements
- **4 places** with grant funding from the NPRR – as per Ministerial Decree 117/2023
- **3 places** with grant funding from Bari University "Aldo Moro"
- **4 places** without grant funding

Total annual grant (gross total before social security contributions made by the beneficiary): **€ 18,679.45**

RESEARCH TOPICS AS PER MINISTERIAL DECREE 118/2023 AND "PATTI TERRITORIALI" AGREEMENTS

Total grants available: 5

1. Energy management for Sustainable Urban Energy Communities;
2. Decarbonisation of energy in urban areas through the use of hydrogen;
3. Technologies and management systems for smart micro grids and energy communities;
4. Volatile organic compounds detection with an optical spectrum analyzer for human health and safety;
5. Chemical engineering of all-inorganic metal halide perovskites for solar energy conversion;
6. Analysis of technological solutions for optimizing cold sheet metal forming processes in the framework of Industry 4.0;
7. Advanced beam shaping and sensor fusion technologies applied to additive manufacturing;
8. Extended Reality for Sustainable Made in Italy values;
9. Green methodologies for synthesis of multifunctional organic materials;
10. Novel biosensors based on modified photosynthetic bacteria;
11. Innovative and multidisciplinary methodologies for the dynamic and optimal configuration of the Smart Radio Environment to support advanced services in the framework of the Smart Industry;
12. Lab-on-chip for early cancer diagnosis.

RESEARCH TOPICS AS PER MINISTERIAL DECREE 117/2023

Total grants available: 4

1. Design and realization of Acoustic Detection Modules for Quartz-Enhanced Photoacoustic Sensors operating at high flow rates - **Co-funded by De Palma Thermofluid S.r.l.;**
2. Augmented Logistics - **Co-funded by Genesys Software s.r.l.;**
3. Study of new generation sensors, solutions, application platforms, software and hardware architectures for intelligent applications and advanced digital transformation of Industries, Public Administrations, Healthcare, Buildings (e.g. SMART INDUSTRY, SMART CITY, SMART BUILDING) based on the use of artificial intelligence algorithms. Intelligent urban mobility systems and Urban Air Mobility, for logistics and people, capable of supporting the decarbonisation process, in order to reduce global pollution - **Co-funded by Axians Italia S.p.a.;**
4. Study of new generation sensors, solutions, application platforms, software and hardware architectures for intelligent applications and advanced digital transformation of Industries, Public Administrations, Healthcare, Buildings (e.g. SMART INDUSTRY, SMART CITY, SMART BUILDING) based on the use of artificial intelligence algorithms. Intelligent urban mobility systems and Urban Air Mobility, for logistics and people, capable of supporting the decarbonisation process, in order to reduce global pollution - **Co-funded by Axians Italia S.p.a..**

Part of the research activity undertaken by beneficiaries must be carried out at the premises of the body/company in line with a research programme agreed upon by both parties.

8. JOINT Ph.D. WITH UNIVERSITY OF SALENTO, INSTITUTE OF CONSTRUCTION TECHNOLOGY AND NATIONAL RESEARCH COUNCIL (ITC-CNR) IN SUSTAINABILITY ENGINEERING AND SAFETY IN CIVIL & INDUSTRIAL BUILDINGS – DRISS

Co-ordinator: Prof. Mario Daniele Piccioni

Department of Architecture, Construction and Design

PLACES AVAILABLE: 8 (1 grant is reserved for graduates from non-Italian universities), of which:

- **4 places with grant funded by NRRP, as per DM 118/2023, of which:**
 - 1 for Digital and Environmental Transition (University of Salento)
 - 1 for NPRR
 - 2 for Public Administration
- **1 place with grant funding from "Patti Territoriali" agreements**
- **1 places with grant funding from ITC-CNR from NPRR funds - National Centres**
- **2 places without grant funding**

Total annual grant (gross total before social security contributions made by the beneficiary): **€ 18,679.45**

RESEARCH TOPICS AS PER MINISTERIAL DECREE 118/2023 AND "PATTI TERRITORIALI" AGREEMENTS

Total grants available: 5

1. Smart offices for energy efficiency and environmental sustainability;
2. Innovative monitoring systems for early warning and protection from risk events of the constructions of the Archaeological Park of Pompei;
3. Zero energy factory: decarbonization and energy flexible management in industrial constructions;
4. Innovative very low thickness coatings for the energy requalification of civil buildings;
5. Valutazione e monitoraggio dell'affidabilità strutturale delle piattaforme aeree durante il servizio;
6. Characterization and mechanical modeling of materials using advanced ultrasonic techniques for the study of industrial processes with numerical approaches;
7. Innovative systems for the protection of architectural heritage using seismic metamaterials;
8. Collaborative digital environments for the conservation and management of historical built heritage;
9. Energy resilience of urban communities.

RESEARCH TOPICS FOR NRRP FUNDING – NATIONAL CENTRES (CN)

Total grants available: 1

1. Artificial Intelligence and statistical pattern recognition techniques for civil structural health monitoring and Digital Twin - ITC- CNR – National Centre "Centro Nazionale per la Mobilità Sostenibile" (MOST) – Spoke 7 ("CCAM, Connected networks and Smart Infrastructure") – Scientific Resp: : Prof. Carlo Rainieri – Grant Resp: Prof. Carlo Rainieri - CUP B43C22000440001.

9. Ph.D. IN NATIONAL RESEARCH FOR AUTONOMOUS SYSTEMS – DAUSY

Doctorate Programme in collaboration with:

Libera Università di Bolzano, Politecnico di Torino, Università degli Studi del Sannio, Università degli Studi della Campania "Luigi Vanvitelli", Università degli Studi dell'Aquila, Università degli Studi di Brescia, Università degli Studi di Cagliari, Università degli Studi di Catania, Università degli Studi di Genova, Università degli Studi di Padova, Università degli Studi di Palermo, Università degli Studi di Parma, Università degli Studi di Siena, Università degli Studi di Roma "Tor Vergata", Università degli Studi di Verona, Università degli Studi Roma Tre, Università del Salento, Università della Calabria, Università di Modena e Reggio Emilia, Università di Pisa, Università degli Studi di Roma "La Sapienza", Università degli Studi di Trento, Università Politecnica delle Marche

Co-ordinator: Prof. ssa Mariagrazia Dotoli

Department of Electrical Engineering and Information Technology

PLACES AVAILABLE: 39 (1 grant is reserved for graduates from non-Italian universities), of which:

- **23 places** with grant funded by NRRP, as per **DM 118/2023**, of which:
 - 20 for NPRR
 - 3 for Public Administration
- **1 place** with grant funding from **"Patti Territoriali" agreements**
- **14 places** with grant funding from NRRP funds, as per **DM 117/2023**
- **1 place** with grant funding from **the NRRP Complementary Plan**
- **2 places** without grant funding

Total annual grant (gross total before social security contributions made by the beneficiary): **€ 16,243.45**

RESEARCH TOPICS AS PER MINISTERIAL DECREE 118/2023 AND "PATTI TERRITORIALI" AGREEMENTS

Total grants available: 24

1. Control and monitoring of secure and distributed Cyber-Physical Systems through the Digital Twin paradigm (**Politecnico di Bari**);
2. Autonomous systems for guided endoscopic navigation and theranostics (**Politecnico di Bari**);
3. Distributed control of networked smart energy systems (**Politecnico di Bari**);
4. Robotic systems for minimally invasive and interventional surgery (**Politecnico di Bari**);
5. Platforms for optimization and control of Drone-as-a-service in logistics (**Politecnico di Bari**);
6. Autonomous navigation systems (**Politecnico di Bari**);
7. Multirobot planning and control for human-robot interaction and cooperation in the manufacturing sector (**Università di Trento**);
8. Mathematical theory for control and optimization of evolutionary phenomena (**Università di Trento**);
9. Risk-aware control of aerial cargo drones (**Libera Università di Bolzano**);
10. Stability and safety of platoons of interconnected vehicles (**Università dell'Aquila**);
11. Identification, modeling, and optimization of a sustainable urban transportation network (**Università di Parma**);
12. Advanced control strategies with applications to sustainable bioprocesses (**Università di Brescia**);
13. Security for Industrial Internet of Things (**Università di Roma Tre**);

14. Modeling of complex humans-involved systems and control of disastrous outcomes (**Politecnico di Torino**);
15. Real-time optimization with application to autonomous systems (**Università del Sannio**);
16. Reinforcement Learning Algorithms for Contact-Rich Manipulation Tasks (**Università di Padova**);
17. Integrating Swarm Sensors for Distributed Monitoring and Agent Based Modeling for Environmental Systems Control (**Università di Siena**);
18. Control methods for smart networks (**Università di Roma "La Sapienza"**);
19. New techniques for analysis, design and control of chaotic dynamics (**Università di Catania**);
20. Robotics and artificial intelligence in agriculture (**Università di Verona**);
21. Model-based and data-driven learning and control techniques for increasing reliability and safety of an autonomous system in uncertain and hazardous environments (**Università del Salento**);
22. Edge AI-enabled Internet of Things systems for smart environments (**Università della Calabria**);
23. Optimization and control techniques for energy management systems (**Università di Palermo**);
24. Modelling, control and optimisation of electrical smart grids (**Università della Campania "L. Vanvitelli"**);
25. Safety-driven mixed model- and learning-based motion planning and control of autonomous systems (**Università di Modena e Reggio Emilia**);
26. Model-based condition monitoring, fault diagnosis and control of autonomous systems (**Università Politecnica delle Marche**);
27. Autonomous Vehicles Fleet Management using Artificial Intelligence (**Università di Pisa**).

RESEARCH TOPICS AS PER MINISTERIAL DECREE 117/2023

Total grants available: 14

1. Algorithms for management and control of mobile agent fleets for logistics 4.0 (**Politecnico di Bari**) – Co-funded by **E 80 Group S.p.a.**;
2. Data fusion for indoor localization system based on UWB technologies (**Politecnico di Bari**) - Co-funded by **E 80 Group S.p.a.**;
3. Optimal design of localization infrastructure for industrial AGVs (**Politecnico di Bari**) - Co-funded by **E 80 Group S.p.a.**;
4. Decision and control techniques for autonomous smart systems applied to precision agriculture (**Politecnico di Bari**) - Co-funded by **G-Nous Tech S.r.l.**;
5. Intelligent systems for robotic path planning in industrial processes (**Politecnico di Bari**) - Co-funded by **Comau S.p.a.**;
6. Optimization and control strategies for power management of marine hybrid propulsion systems (**Politecnico di Bari**) - Co-funded by **Isotta Fraschini Motori S.p.a.**;
7. Intelligent Control for Safe and Efficient Human-Robot Collaboration in Automated Warehouses (**Politecnico di Bari**) - Co-funded by **ICAM S.r.l.**;
8. Advanced estimation methods via Kalman filters, resonator gyroscopes and machine learning (**Università di Roma Tor Vergata**) – Co-funded by **Northrop Grumman Italia (NGI)**;
9. Satellite technologies for autonomous systems and decision support (**Università di Roma "La Sapienza"**) – Co-funded by **Telespazio S.p.a.**;
10. Intelligent algorithms for the management of stationary storage systems (**Università Politecnica delle Marche**) – Co-funded by **MIDAC S.p.a.**;
11. Self diagnosis and total fault prediction solutions based on data and signals in autonomous machines for

- structural steel processing (**Università Politecnica delle Marche**) – Co-funded by Schnell S.p.a.;
12. Management and automation systems for energy management in buildings and industrial processes (**Università di Cagliari**) – Co-funded by STAM S.r.l.;
13. Multi-agent distributed coordination for workforce management with privacy by design (**Università di Cagliari**) – Co-funded by DEDEM S.p.a.;
14. Data analysis and planning for smart mobility schemes (**Università di Genova**) – Co-funded by Aitek S.p.a.

Part of the research activity undertaken by beneficiaries must be carried out at the premises of the body/company in line with a research programme agreed upon by both parties.

RESEARCH TOPICS FOR GRANT FUNDING FROM NRRP COMPLEMENTARY PLAN – D3 4

Total grants available: 1

1. Digital Driven Diagnostics, prognostics and therapeutics for sustainable Health care – PNRR Complementary Plan - D3 4 Health - Spoke 2 – Scientific Resp: Prof. Vitoantonio Bevilacqua; Grant Resp: Vitoantonio Bevilacqua

10. INDUSTRIAL Ph.D. IN CHANGE MANAGEMENT IN CIVIL ENGINEERING INFRASTRUCTURES – CMCEI
in collaboration with Acquedotto Pugliese S.p.a.

Co-ordinator: Prof. Orazio Giustolisi

Department of Civil, Environmental, Land, Building Engineering and Chemistry

PLACES AVAILABLE: 8 (1 grant is reserved for graduates from non-Italian universities), of which:

- **3 places** with grant funded by NRRP, as per **DM 118/2023**, of which:
 - 1 for NRRP
 - 2 for Public Administration
- **1 place** with grant funding from “Patti Territoriali” agreements
- **1 place** with grant funding from **Acquedotto Pugliese S.p.A.**
- **1 place reserved for an employee of Acquedotto Pugliese S.p.A.** (as per Ministerial Decree 226/2021, art.10*)
- **2 places** without grant funding

Total annual grant (gross total before social security contributions made by the beneficiary): **€ 18,679.45**

* with economic and regulatory treatment provided for by the CCNL in which **Acquedotto Pugliese S.p.A.** operates

RESEARCH TOPICS AS PER MINISTERIAL DECREE 118/2023 AND "PATTI TERRITORIALI" AGREEMENTS

Total grants available: 4

1. Sustainable strategies for the protection and development of maritime heritage
2. Digital Water Strategies for water distribution networks management and planning
3. Business model innovation for civil infrastructures management
4. Combining efficient design, fabrication, and construction methods for reinforced concrete infrastructures decarbonisation
5. Toward the roads and the vehicles of the future: innovative methods and approaches for the analysis of the risk of use of existing roads
6. Innovative and interdisciplinary approaches for the sustainable management of coastal areas
7. BIM and digital twin: Digital transformation in building design and management.

RESEARCH TOPIC FOR GRANT RESERVED FOR EMPLOYEE OF ACQUEDOTTO PUGLIESE S.p.a.

Total places available: 1

1. Study of change management of managerial and technical processes of Acquedotto Pugliese, with a new vision for internationalization - **Acquedotto Pugliese S.p.a.**

RESEARCH TOPIC FOR GRANT FUNDED BY BODIES AND PRIVATE COMPANIES

Total places available: 1

1. Climate change, asset management and resource management – **Funded by Acquedotto Pugliese S.p.a.**

Part of the research activity undertaken by beneficiaries must be carried out at the premises of the body/company in line with a research programme agreed upon by both parties.

Art. 3: ADMISSION REQUIREMENTS

Admission applications, with no age limit or nationality restrictions, may be submitted by all candidates who:

- **hold qualifications as required** on the deadline date of the current call data;
- **obtain the required qualifications for selection** before the deadline date of 31 October 2023;

It should be noted that:

- qualifications required for admission to doctorate research programmes are as follows:
 - a. 5-year degree awarded by an Italian university prior to Ministerial Decree 509 (1999);
 - b. Master's Degree (as per Ministerial Decree 509/99);
 - c. Second-level Degree (as per Ministerial Decree 270/04);
 - d. Second-level degree awarded abroad (as per the Bologna Process) which enables the holder to enrol on a PhD programme in their country of origin. These qualifications must be awarded by an officially recognized academic institute.

N.B.: specific requirements

PhD PROGRAMME	SECOND LEVEL DEGREE REQUIRED FOR ADMISSION
DRIME	All types
DRIG	All types
DRIEI	All types
DRSATE	All types
DRISA	All types
SSI	All types
CMCEI	All types
DAuSy	All types
DRISS	<ul style="list-style-type: none"> • LM-4 Architecture and Building Engineering; • LM-10 Architectural and Environmental Heritage Conservation; • LM-11 Science of Cultural Heritage Conservation; • LM-20 Aerospace and Astronautical Engineering; • LM-23 Civil Engineering; • LM-24 Building Systems Engineering; • LM-26 Safety Engineering; • LM-28 Electrical Engineering; • LM-30 Energy and Nuclear Engineering; • LM-31 Management Engineering; • LM-32 IT Engineering; • LM-33 Mechanical Engineering; • LM-34 Naval Engineering; • LM-35 Environmental and Land Engineering; • LM-44 Mathematical-Physical Modelling for Engineering; • LM-48 Urban and Environmental Territorial Planning; • Equivalent academic qualifications awarded under previous university systems; • Equivalent qualifications awarded by recognised foreign university systems.
CTI	<ul style="list-style-type: none"> • LM-2 Archaeology; • LM-3 Landscape Architecture; • LM-4 Architecture and Building Engineering; • LM-4 Single Cycle 5-year degree in Architecture and Building Engineering; • LM-10 Architectural and Environmental Heritage Conservation; • LM-12 Design; • LM-23 Civil Engineering; • LM-35 Environmental and Land Engineering; • LM-48 Urban and Environmental Territorial Planning; • Equivalent academic qualifications awarded under previous university systems; • Equivalent qualifications awarded by recognised foreign university systems.

Candidates whose degree has **already been recognised as equivalent** by an Italian university must attach self-certification indicating all relevant details of this to their application.

Where a qualification awarded by a foreign university has **not yet been declared equivalent** to an Italian university

degree, the Selection Committee will decide upon the eligibility of the foreign qualification in line with current Italian regulations and those of the country of origin, as well as any international treaties or agreements on qualification recognition for further study. In order to facilitate the recognition process, candidates must attach all documents pertinent to eligibility evaluation to their online applications. The compilation of online applications entails an implicit request for the verification of all qualifications awarded abroad.

The evaluation of qualification eligibility is only possible if the documentation provided clearly shows all required information, including **specific details** (degree type; typical length of degree course; official title of academic institute awarding the degree; date qualification obtained; mark or grade achieved in relation to the scale used in the higher education system in question).

Candidates are accepted provisionally until the validation of all admission requirements. Politecnico di Bari may ascertain the fulfilment of these requirements at any time, also after programmes have commenced, as per art. 43 of Consolidation Act 445/2000. Candidates may be excluded at any time by substantiated decision.

Art. 4: APPLICATIONS

Applications to the abovementioned Ph.D. programmes can be made **from 9:00 on 13 June 2023 until 13:00 (Italian time) on 17 July 2023 (final deadline date)** using exclusively the procedures set out on the **PICA webpage** at the following link: <https://pica.cineca.it/poliba/dottorato39/>.

The webpage can be accessed by registering or using SPID credentials, as set out under the guidelines (<https://pica.cineca.it/file/LineeGuidaCompilazioneDomandaPICA.pdf>). **In case of technical problems before or during application procedures, candidates may contact the PICA HelpDesk at the link on the application form (from Monday to Friday, 9:00-17:00).**

Application instructions for each doctorate research programme are set out under article 5.

Applications which are presented in different formats will not be considered.

Candidates are responsible for correct adherence to online procedures.

It is recommended that candidates apply to the selection procedure in advance of the final deadline date. Once completed applications are received they will be officially registered and confirmed by e-mail.

In order to send applications, **candidates must:**

- Complete their applications on PICA, attaching **all documentation (in pdf/A format)** as required under article 5;
- **pay an administration fee of € 30.** Candidates can make fee payment by clicking on “*Paga con Pago PA*” (see manual), selecting form of payment:
 - Credit/debit card;
 - Direct payment from bank account;
 - Other methods of payment and payment systems which allow for PagoPA procedures.

Only for candidates resident abroad: if it is not possible for candidates to pay using the PagoPA system, payment will also be accepted by bank transfer payable to: Politecnico di Bari - via G. Amendola, 126/B - 70126 Bari. The bank details are: IBAN: IT59X0306904067100000300001 BIC: BCITITMM - description:

"Application for PhD Programme in _____". Only candidates making payment in this way **are required, before deadline date, to attach a copy of the bank transfer payment and a declaration of failed administration fee payment** ("Dichiarazione di impossibilità al pagamento del contributo di partecipazione alla procedura concorsuale mediante PagoPA"), to be compiled using the form available on the Politecnico website (<https://www.poliba.it/it/dottorati-di-ricerca>).

Under no circumstances can refunds be issued (i.e. exclusion, withdrawal, absence, etc.).

The sole fee payment of €30 does not in itself constitute an application in the absence of an online application form, even if payment is made before the deadline.

As part of the online application, candidates with disabilities (as per Laws 104 (5 Feb 1992) and 17 (28 Jan 1999) or specific learning disabilities (SLD / ASD as per Law 170 (8 Oct 2010) must attach National Health Service certification attesting to diagnosis of said conditions and clearly state requests for any additional assistance and/or added time needed to complete the entrance examination.

Applicants who intend to apply for more than one PhD programme must provide separate applications for each, including separate payments for every application.

Applicants may modify, delete or add data and attachments, provided this is before the deadline date. After confirmation of receipt (and before deadline date), candidates may withdraw their application and make a new one.

After deadline date and/or after transmission of the application by PICA, no further additions or modifications can be made.

Verification of application validity, including correct completion of and compliance with self-certification requirements, will be carried out by the Administration Department after the deadline date.

Art. 5: DOCUMENTS TO ATTACH TO APPLICATIONS

Candidates must upload the following documentation to their online application, as per article 4. **Failure to do so will result in exclusion from the selection procedure:**

- A CV following the layout of the example provided by Politecnico di Bari at <https://www.poliba.it/it/dottorati-di-ricerca>.
- **Copy of a current identification document.** Only the following documents will be considered eligible, **failure to comply will result in exclusion from the application procedure:**
 - ID card issued by an EU member state;
 - driving licence issued by an EU member;
 - in all other cases, a current passport (also non-EU citizens).
- **Degree qualification certification for first (Bachelor's) degrees and second (specialization/Master's) degrees (or 5-year Single Cycle degrees).** Candidates with qualifications awarded in Italy must attach the Politecnico form available at <https://www.poliba.it/it/dottorati-di-ricerca>), specifying:
 - final degree mark;
 - a list of all exams taken with their relative marks in both degree courses (or the Single Cycle course);

- results of exams taken.

Candidates with a degree qualification awarded by a non-Italian university must attach the following documents to their application, as issued by the awarding body. This supersedes any form of self-declaration¹:

- degree certificate or diploma showing final mark;
- official transcript of exams taken during all university study programmes, showing all results;
- any other type of document which demonstrates the equivalence of qualifications with those required in this application call (Supplementary Diploma, “*Dichiarazione di Valore*” (statement of value) issued locally.

- **PhD research proposal** which the candidate intends to develop during the programme, stating the scientific basis of the proposal, its research objectives and the methods to be used. **The proposal should be generally based on the topics outlined in article 2** and is assessed purely for the purposes of admission; the topics are not necessarily those which the candidate will follow during the programme, which will be agreed upon between the doctorate student and Supervisor and formally assigned by the Board.

N.B: Research proposals must use the format attached to this call document (“*Allegato Format*”). For the National Doctorate Research programme in “**Autonomous Systems**”, please use the specific format under “*Allegato Format DAUSY*”.

- **Only for candidates for the Doctorate Research Programme in Heritage Planning: Knowledge, Tradition and Innovation – a motivational letter** (maximum 3,000 characters) outlining the candidate’s areas of research interest and justification for their choice of programme and, where possible, the research project proposed for the PhD programme.

It is also possible to attach the following **optional documentation** to the application for evaluation purposes:

- **An abstract of the thesis topic for Specialist/Master’s degree (or five-year Single Cycle degree)**, stating the title and name of thesis supervisor(s) (max 3,000 characters). **N.B:** this documentation, while not obligatory, allows for further evaluation of the candidate’s academic background; therefore its non-inclusion does not affect the formal process of application but may result in a lower evaluation for qualifications held.

- **Candidate thesis for Specialist/Master’s degree (or five-year Single Cycle degree)**

For **graduating students** whose thesis is not yet complete (see art.3), a draft version of the thesis which has been completed up to the time of application, including details of title and Supervisor. “Draft version” implies a version of the thesis text as completed by the graduating candidate up to the date of application, which, in terms of chapters and pages, allows the Selection Committee to evaluate its relative content and subject area. The abstract is not considered as a draft version of the thesis under any circumstances.

N.B: this documentation, while not obligatory, allows for further evaluation of the candidate’s academic background; therefore its non-inclusion does not affect the formal process of application but may result in a lower evaluation for qualifications held.

¹**N.B.** These documents must be in Italian, French or English or translated into Italian or English and verified by an official Italian diplomatic or consular representative under the responsibility of the candidate. These should follow the guidelines set out in the document “*PROCEDURES FOR ENTRY, RESIDENCY AND ENROLMENT OF INTERNATIONAL STUDENTS AND THE RESPECTIVE RECOGNITION OF QUALIFICATIONS, FOR HIGHER EDUCATION COURSES IN ITALY FOR THE ACADEMIC YEAR 2023/24*” available at the Ministry link <https://www.studiare-in-italia.it/studentistranieri/>

- **A self-certification declaration for any other qualifications held which are** deemed suitable for evaluation. This must be signed and dated (following the layout of the example provided at <https://www.poliba.it/it/dottorati-di-ricerca>), as per arts. 46 and 47 of Presidential Decree n. 445/2000.
- **Language certification** demonstrating a knowledge of English which corresponds to at least B2 level. Only those candidates who are non-Italian citizens may attach certification which demonstrates knowledge of the Italian language.
- **Publications** related to activity carried out and shown on the candidate's CV. These must be in either Italian or English or translated into Italian or English on behalf of and under the responsibility of the candidate. Publications can be uploaded via the Research section of MIUR Login system or through direct attachment (maximum size of each file: 30 MB).
- **Reference letter** After submitting their application, candidates will see an option for "**Lettere di referenza**", which can be used to request the compilation of a maximum of two reference letters. In order to complete this request, the academic e-mail details of the referee must be inserted. If the referee agrees to issue a letter and conclude the procedure, the PICA system will notify the candidate. Subsequent to this phase, applications may no longer be modified, only withdrawn (using the withdrawal option on the system) with the option of making a new application. The candidate may, at any time, access the system to verify current application status. **N.B:** referees must complete their reference letters by the deadline time and date of this call (13:00 Italian time, 17 July 2023).

In accordance with Presidential Decree 445 (28 Dec 2000) and subsequent modifications and additions, candidates may only provide a self-declaration certificate attesting to status, acts and qualifications certified by **Italian Public Administration bodies**.

Art. 6: GROUNDS FOR EXCLUSION

The following are grounds for exclusion from the PhD programme selection procedure:

- a. any application which does not comply with the format set out under article 4 of this call document;
- b. applications missing documents which are obligatory for the selection procedure as set out in art. 5 for each individual PhD programme;
- c. false or mendacious self-declaration statements relative to status / acts / qualifications;
- d. missing application fee payment by the deadline date of this call (art. 4).

Any candidates excluded from the selection procedure will be notified by the Postgraduate Department by email at the address provided to the PICA system. As such, candidates are reminded to ensure the e-mail address provided is correct and current. Other e-mail addresses will not be taken into consideration.

Art. 7: SELECTION EXAMINATION PROCEDURE

Admission to the PhD programmes is subject to a selection examination designed to ascertain candidate preparation on general programme topics and their research aptitude and is aimed toward ensuring an accurate comparative evaluation of candidates.

The Selection Board will publish a list of candidates eligible for the oral examination in line with the criteria outlined in article 8. Prior to the examination, candidates will be notified of marks received in the evaluation phase via the Politecnico website.

Upon completion of oral examinations, the Selection Board will publish a list of candidates with their relative marks which will be posted on the Politecnico website in the “*Dottorati di Ricerca*” section.

Selection evaluation and oral examinations will commence on 20 July 2023 and conclude by 1 August 2023. Interviews will be held **online**, details of which will be provided prior to the examination date via public notification on the Politecnico website in the “*Dottorati di Ricerca*” section (www.poliba.it). Candidates will be excluded from the selection procedure if they are unable to provide identification or do not attend the oral interview.

All candidates must demonstrate a good knowledge of English. This can be certified with a recognised language qualification from an accredited examination board showing B2-level knowledge of the language, in line with the Common European Framework for the Knowledge of Languages. In the absence of certification, the candidate’s English language level will be assessed during the oral examination.

Interviews may be held in Italian or in English.

Changes relating to the aforementioned dates or times **will be published on the Politecnico website** as an official notification.

No other form of notification regarding oral examinations will be sent to candidates.

Art. 8: ASSESSMENT OF QUALIFICATIONS AND INTERVIEW

The Selection Board will assess candidates’ qualifications and oral interview with a **mark of up to a maximum of 100**. Each Doctorate research programme marking system is outlined below.

Doctorate research programmes with **two** evaluation phases:

PhD Programme	1. EVALUATION OF QUALIFICATIONS	2. ORAL EXAMINATION	MINIMUM PASS MARK
MECHANICAL AND ENERGY ENGINEERING (DRIME)	Min. 20; Max. 40	Min. 30; Max. 60	50
MANAGEMENT ENGINEERING (DRIG)	Min. 20; Max. 40	Min. 30; Max. 60	50
ELECTRICAL AND INFORMATION TECHNOLOGY ENGINEERING (DRIEI)	Min. 10; Max. 40	Min. 15; Max. 60	25
RISK, ENVIRONMENTAL, TERRITORIAL AND BUILDING DEVELOPMENT (DSRATE)	Min. 10; Max. 40	Min. 15; Max. 60	25
HERITAGE PLANNING: KNOWLEDGE, TRADITION AND INNOVATION (CTI)	Min. 10; Max. 40	Min. 15; Max. 60	25

SMART AND SUSTAINABLE INDUSTRY (SSI)	Min. 10; Max. 40	Min. 15; Max. 60	25
CHANGE MANAGEMENT IN CIVIL ENGINEERING INFRASTRUCTURES (CMCEI)	Min. 10; Max. 40	Min. 15; Max. 60	25

Doctorate research programmes with **three** evaluation phases:

PhD Programme	1. EVALUATION OF QUALIFICATIONS	2. EVALUATION OF RESEARCH PROPOSAL	3. ORAL EXAMINATION	MINIMUM PASS MARK
ENGINEERING AND AEROSPACE SCIENCES (DRISA)	Min. 10; Max. 20	Min. 10; Max. 20	Min. 30; Max. 60	50
SUSTAINABILITY ENGINEERING AND SAFETY IN CIVIL & INDUSTRIAL BUILDINGS (DRISS)	Min. 10; Max. 20	Min. 10; Max. 20	Min. 30; Max. 60	50
AUTONOMOUS SYSTEMS (DAuSy)	Min. 10; Max. 20	Min. 20; Max. 40	Min. 20; Max. 40	50

Admission to the subsequent phase of the selection procedure is subject to the attainment of the minimum pass mark shown for each of the PhD programmes.

Upon completion of the examination procedures, the Board will carry out an overall assessment and draw up an admission rankings list on the basis of the marks obtained by candidates in each part of the examination. **The assessment criteria for qualifications will be established by each Selection Board.**

Art 9. SELECTION BOARD AND GRANT ALLOCATION

The Rector will appoint a Selection Board with a Rector's decree in line with art. 15 of Politecnico di Bari's Doctorate Research Programme (available on the Politecnico website).

The members of the Board will provide self-certification in line with art. 46 of Presidential Decree 445/2000, stating that:

- they will report any potential conflict of interest and/or reason for abstention and/or incompatibility with relation to their role;
- they have at no time had a criminal record for offences which bar them from public office duties, offences which affect professional morality or offences as set out in Legislative Decree no. 231/2001;
- they are unaware of any current legal proceedings against them;
- they will act with impartiality and carry out their duties with confidentiality, due care and attention and respect for current legislation as well as the founding principles of the Ethical and Behavioural Code of

Politecnico di Bari.

The Selection Board will draft an examination report which will then be submitted to the Postgraduate Department to provide admission rankings lists for each of the PhD programmes.

The allocation of different grants will be overseen by the Board of Professors for each PhD programme.

Art. 10: ADMISSION RANKINGS AND COURSE ELIGIBILITY

The Rector will issue a decree confirming his approval of the acts (*"Decreto di Approvazione Atti"*) and publish the names of successful candidates by confirming the ranking lists and allocation of grant funding (*"Assegnazione Borse"*).

Successful candidates are admitted to courses in the order of admission rankings until all available positions with grant funding have been assigned for each programme.

In cases where candidates have an identical result, gender balance will be considered, with preference given to the minority gender with higher ranked positions in the same list. If candidates are still at the same level, the younger of the candidates will be selected.

The general admission rankings list for successful candidates will be published online as an official notification on the *Albo Ufficiale* page of the Politecnico di Bari website www.poliba.it, as well as in the Doctorate Research Programme section.

Art. 11: ENROLMENT

Candidates admitted to PhD programmes must enrol online following the procedures and conditions outlined in a public notification which will be published online as an official notification on the *Albo Ufficiale* page of the Politecnico di Bari website www.poliba.it, as well as in the Doctorate Research Programme section. This notification will be an attachment of the Rector's *"Approvazione Atti"* Decree.

Candidates who fail to enrol as set out in the abovementioned notification will be considered as having waived their status as a successful candidate. This waiver will affect any subsequent entries on the admission ranking list and rulings which may arise as a result.

The notification attachment to the Rector's Decree will outline the terms and procedures for subsequent entries and rulings.

Please note that candidates will be given a deadline to implement these procedures, after which failure to reply or comply with the terms will be considered as withdrawal from the rankings list.

If a successful candidate waives their position or loses their right to admission prior to the commencement of the PhD programme, a replacement participant will be admitted according to their position on the admission rankings list. If a candidate is deemed eligible for more than one programme, they must opt for only one of these.

Withdrawal from a PhD programme after enrolment procedures have been completed will entail a compulsory stamp

duty payment of €16.

Art. 12: OBLIGATIONS AND RIGHTS OF DOCTORATE RESEARCH STUDENTS

Participation in the PhD programme is a full-time commitment subject to a specific discipline, in accordance with art. 10 of the Doctorate Research Programme Regulations issued as part of Politecnico di Bari Rector's Decree no. 288 (11 Mar 2022).

Doctorate Research students are hereby notified of their obligation to respect:

- the rules and conditions set out in the Doctorate Research Programme Regulations, issued as part of Rector's Decree no. 288 (11 Mar 2022);
- the Politecnico di Bari's Ethical and Behavioural Code, issued as part of Rector's Decree no. 582 (28 Sept 2018);
- all applicable rules and Politecnico di Bari regulations, including those pertaining to student fees as stipulated by the Politecnico di Bari.

In accordance with Ministerial Decrees nos. 117 and 118 (2023), beneficiaries of NRRP grant funding, both for Extended Partnerships and National Centres, must adhere to specific reporting requirements as set out in guidelines which will be made available to successful candidates.

Art. 13: GRANTS

Grants are paid in monthly instalments which are gross and subject to social security contributions paid by the beneficiary. The full amount is outlined under article 2 in the tables for each PhD programme.

Grants are annual and are renewable on the provision that the student has completed the programme of activities for the previous study year and has been admitted to the following year by Academic Board deliberation.

As part of the financial resources of the Politecnico budget, **all** participating doctorate research students are guaranteed:

- a **research budget**, which is a fund for research activity in Italy or abroad of 10% of a total grant amount, with a 20% threshold for participants on the PhD programme for National Research for Autonomous Systems; the use of research budget resources is to follow the reference guidelines available at the following link:
<http://www.poliba.it/it/dottorati-di-ricerca>
- **an increase for period spent abroad** of 50% of the monthly grant amount, allocated monthly if authorisation has been given by the programme Coordinator to carry out research activity abroad. This increase may be extended to a maximum of 12 months or 18 months for those PhD students in joint co-ordination with external bodies or those established according to the Politecnico di Bari Regulations for Doctorate Research Programmes.

Participants should note that the **annual personal income limit** established by Politecnico di Bari as **compatible with grant allocation** is equal to **the gross amount of grant** as set out in article 2 for each PhD programme. This includes property income as well as any other source of recurring income, with the exception of income for occasional work. Should this limit be surpassed, the candidate will be obliged to refund any instalments already paid for the fiscal year

in which the amount was exceeded.

Art. 14: FEES AND CONTRIBUTIONS

Upon enrolment on the programme, PhD students are subject to the current Student Fees and Contributions Regulations. These are available for consultation on the Politecnico website.

All PhD students are exempt from the all-inclusive contribution and are required to pay only the electronic revenue stamp fee and the ADISU Right to Higher Education fee, as well as adhering to the conditions set out in the Politecnico di Bari Fee Regulations.

The enrolment fee is €136, based on a stamp duty fee of €16 and the first instalment of Regional Tax (€120).

ADISU fees are divided into three bands according to income, which are respectively €120, €140 and €160. Accordingly, based on the aforementioned ISEE figure, contributions will be invoiced in the private area of each PhD student.

All payments must be made using the PagoPA electronic payment system. Payments made this way will be automatically recognised by the Esse3 system.

In order to determine the total amount of Regional ADISU fees payable, Politecnico di Bari automatically acquires Equivalent Financial Situation Index certification (ISEE) from the National Social Insurance Agency (INPS) regarding subsidised benefits for higher education study. All declarations should be completed in full on the INPS website by 31 December of the calendar year of enrolment (e.g. for Academic Year 2023/24 the deadline date is 31 Dec 2023). Failure to provide declarations by the deadline date will result in the application of the full fee rate.

Up-to-date Doctorate Research student financial contributions are a compulsory condition required in order to access Politecnico services and maintain PhD student status.

Art. 15: TREATMENT OF PERSONAL DATA

As per Law 675/96, the private nature of information provided by candidates will be guaranteed. All data provided will be used only for purposes connected with selection procedures. For successful candidates, this data will also be used for purposes related to the PhD programme. For students completing the programme, data supplied will be used for purposes of employment opportunities. All data treatment is in compliance with current regulations as per European General Data Protection Regulations EU2016/679.

Under arts.15-18 of the abovementioned Regulations, candidates have the right to access their personal data as well as request modifications, additions and cancellations. Candidates may also request limits for their data treatment by contacting the Politecnico di Bari at rpd@poliba.it.

In all cases, by participating in the selection process applicants give their implied consent for the publication of their data, including examination results, on the Politecnico di Bari website, as per the abovementioned Law.

In accordance with Law 241 (7 Aug 1990) and Presidential Decree 184 (12 Apr 2006) and subsequent modifications and additions, any party with a related legal interest may have access to the selection procedure documentation, in line with guidelines set out under current legal rules. Accordingly, any documentation provided by applicants may be

made available for consultation by other candidates.

Art. 16: PROCEDURAL SUPERVISOR

The Procedural Supervisor for selection proceedings is Simona Del Vecchio, Politecnico di Bari Research, International Relationships and Postgraduate Office, whose contact details are as follows; post-lauream@poliba.it, telephone (+39) 080 596 2229 / 2201 / 2525 / 2068.

Art. 17: REGULATIONS

For all conditions not specified in this Call document, please refer to current regulations as well as those outlined in the Politecnico di Bari's Regulations for Doctorate Research programmes, issued as part of Rector's Decree no. 288 (11 Mar 2022).

This application call is published on the website of the Italian Ministry of Universities and Research and that of Euraxess, as well as the *Albo Ufficiale* page of the Politecnico di Bari's website (www.poliba.it) and the *Dottorati di ricerca* section.

Bari, 13 June 2023

Signed by Prof. Francesco CUPERTINO

(Rector, Politecnico di Bari)