



PUBLIC SELECTION ESTABLISHED WITH DIRECTOR'S DECREE NO. 15761 OF 29/10/2024 PURSUANT TO THE NOTICE PUBLISHED IN THE OFFICIAL GAZETTE NO. 15/11/2024, n.91 FOR 1 POSITION AS FULL PROFESSOR FOR THE GROUP OF ACADEMIC DISCIPLINES 09/IIND-07 - THERMAL SCIENCES, ENERGY TECHNOLOGY, BUILDING PHYSICS AND NUCLEAR ENGINEERING - ACADEMIC DISCIPLINE IIND-07/C - NUCLEAR REACTOR PHYSICS, PURSUANT TO ART. 18 - LAW 240/2010, AT THE POLITECNICO DI MILANO - DEPARTMENT OF ENERGY (PROCEDURE CODE 2024_PRO_DENG_2).

FINAL REPORT

The Selection Board, appointed with RD Index No. 19651 ref. No. 313141 of 17 December 2024, composed by the following Professors:

Prof. POLA Andrea - Politecnico di Milano;
Prof. GALLEGO DÍAZ Eduardo Florentino - Universidad Politécnica de Madrid;
Prof. RUBIOLO Pablo - Grenoble INP, Université Grenoble Alps,

met on March 10th, 2025, at 10:00AM, for the first teleconference meeting.
Each board member was connected from his/her workstation.

At the start of the session the members of the Selection Board named the Chairman and the Secretary of the Selection Board:

EDUARDO FLORENTINO GALLEGO DÍAZ, FULL PROFESSOR at the Universidad Politécnica de Madrid, Chairman;
ANDREA POLA, FULL PROFESSOR at the Politecnico di Milano, Secretary.

Each member of the board declared not to have conjugal nor family relationship or other degree of kinship or affinity up to the fourth degree, not to be in same-sex civil union (as per art. 1 of Law No. 76 of 20.05.2016) and not to form a cohabiting couple (as per art. 1, paragraphs 37 et seq. of Law No. 76 of 20.05.2016) with the other members of this board and that there were no reasons for abstention pursuant to arts. 51 and 52 of the Civil Procedure Code.

The members of the Selection Board and the Secretary declared, pursuant to art. 35-bis of Legislative Decree 165/2001, not to have criminal convictions, even with non-definitive sentences, for offences provided for in Chapter I, Title II of the second book of the Criminal Code.

The Selection Board established the criteria and the parameters according to which the assessment was carried out, and set the minimum score below which the candidate shall not be included in the ranking of candidates.

On April 7th 2025 at 9:00AM, the Selection Board met in remote to inspect the list of applicants, who were:

- 1) CAMMI, Antonio
- 2) LUZZI, Lelio
- 3) PATELLI, Edoardo
- 4) PEDRONI, Nicola

Each member of the board declared not to have conjugal nor family relationship or other degree of kinship or affinity up to the fourth degree, not to be in same-sex civil union (as per art. 1 of Law No. 76 of 20.05.2016) and not to form a cohabiting couple (as per art. 1, paragraphs 37 et seq. of Law No. 76 of 20.05.2016) with the candidates and stated that there were no reasons for abstention pursuant to arts. 51 and 52 of the Civil Procedure Code.

Each member of the Selection Board also declared to not be co-author, with one or more candidates, in a percentage exceeding 50%, of the publications attached by them for evaluation purposes.

Pursuant to the examination and after adequate evaluation, the Selection Board assigned a score to each of the established criteria and a judgment to each publication submitted by the candidate; furthermore, the board evaluated the knowledge of the English language.

Therefore the board, considering the sum of the scores given, expressed a collective judgment in relation to the quantity and the quality of publications, evaluating the overall productivity of the applicant, also with regard to his/her period of activity.

The above-mentioned judgments are attached to this report and they are an integral part of it (Attachment No. 1 to this final report).


The Selection Board drew up, according to the majority of its members, a ranking of candidates selected to carry out the scientific/teaching functions for which the selection was called, in a number equal to a maximum of five times the number of positions available in the competition (Attachment No. 2 to this final report).

THE SELECTION BOARD

Prof. GALLEGO DÍAZ Eduardo Florentino (Chairman)

Prof. RUBIOLO Pablo (Member)

Prof. Andrea Pola (Secretary)





PUBLIC SELECTION ESTABLISHED WITH DIRECTOR'S DECREE NO. 15761 OF 29/10/2024 PURSUANT TO THE NOTICE PUBLISHED IN THE OFFICIAL GAZETTE NO. 15/11/2024, n.91 FOR 1 POSITION AS FULL PROFESSOR FOR THE GROUP OF ACADEMIC DISCIPLINES 09/IIND-07 - THERMAL SCIENCES, ENERGY TECHNOLOGY, BUILDING PHYSICS AND NUCLEAR ENGINEERING - ACADEMIC DISCIPLINE IIND-07/C - NUCLEAR REACTOR PHYSICS, PURSUANT TO ART. 18 - LAW 240/2010, AT THE POLITECNICO DI MILANO - DEPARTMENT OF ENERGY (PROCEDURE CODE 2024_PRO_DENG_2).

ATTACHMENT No. 1 to the FINAL REPORT

CRITERIA	Quality of scientific and/or project production, assessed on the basis of criteria and parameters recognized by the international scientific community of reference	Teaching activity at the university level in Italy or abroad	Scientific responsibility for funded research projects	Results obtained in technology transfer in terms of participation in the creation of new enterprises (spin off), development, use and marketing of patents	Total
CAMMI Antonio	36.1	30	8	0	74.1
LUZZI Lelio	32.2	17.6	9.4	3	62.2
PATELLI Edoardo	21.5	13.1	6.2	0	40.8
PEDRONI Nicola	17.6	17	8.4	0	43

CANDIDATE: CAMMI Antonio

CURRICULUM:

Antonio Cammi graduated in Nuclear Engineering in 2000 from the Politecnico di Milano. In 2004, he got a PhD in Radiation Science and Technology, also from the Politecnico di Milano. He is currently an Associate Professor in the academic discipline Nuclear Plants at the Department of Energy of the Politecnico di Milano. In 2015, he obtained the National Scientific Qualification for Full Professor in the academic recruitment field 09/C2 (now Group of Academic Disciplines 09/IIND-07 - THERMAL SCIENCES, ENERGY TECHNOLOGY, BUILDING PHYSICS AND NUCLEAR ENGINEERING). Overall, the candidate's curriculum demonstrates a high-level scientific profile in the field of dynamics and control of nuclear plants and of nuclear reactor physics, in particular neutron kinetics. The curriculum is appropriately consistent with the statement of the academic discipline IIND-07/C – NUCLEAR REACTOR PHYSICS, which is the subject of the call.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Stability analysis of the Generation-IV nuclear reactors by means of the root locus criterion	excellent impact; excellent individual contribution; excellent editorial placement; good pertinence
2	An improved zero-dimensional model for simulation of TRIGA Mark II dynamic response	very good impact; excellent individual contribution; excellent editorial placement; full pertinence
3	Stability analysis of a zero-dimensional model of PWR core using non-modal stability theory	good impact; excellent individual contribution; excellent editorial placement; full pertinence
4	An object-oriented approach to simulation of IRIS dynamic response	very good impact; excellent individual contribution; excellent editorial placement; good pertinence
5	Modeling and simulation of nuclear hybrid energy systems architectures	excellent impact; discrete individual contribution; excellent editorial placement; discrete pertinence
6	Development and implementation of a multi-physics high fidelity model of the TRIGA mark II reactor	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence
7	Development of an Open FOAM model for the Molten Salt Fast Reactor transient analysis	excellent impact; low individual contribution; excellent editorial placement; full pertinence
8	Multiphysics modelling of gaseous fission products in the Molten Salt Fast Reactor	excellent impact; excellent individual contribution; low editorial placement; full pertinence
9	Reactor dynamics analysis using Model Order Reduction: The TRIGA Mark II reactor case study	good impact; excellent individual contribution; low editorial placement; full pertinence

10	Multi-physics model bias correction with data-driven reduced order techniques: Application to nuclear case studies	good impact; excellent individual contribution; excellent editorial placement; full pertinence
11	A new model with Serpent for the first criticality benchmarks of the TRIGA Mark II reactor	very good impact; low individual contribution; excellent editorial placement; full pertinence
12	Comparative analysis of thorium and uranium fuel for transuranic recycle in a sodium cooled Fast Reactor	excellent impact; low individual contribution; excellent editorial placement; full pertinence
13	Multiphysics analysis of the MSFR helium bubbling system: A comparison between neutron diffusion, SP3 neutron transport and Monte Carlo approaches	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence
14	A neutronics optimization approach for preliminary design and safety of nuclear reactors for nuclear thermal propulsion	good impact; excellent individual contribution; excellent editorial placement; full pertinence
15	OFELIA: An OpenMC-FEniCSx coupling for neutronic calculation with temperature feedback	excellent impact; excellent individual contribution; low editorial placement; full pertinence
16	Experimental and theoretical studies on density wave instabilities in helically coiled tubes	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
17	Characterization of the TRIGA Mark II reactor full-power steady state	excellent impact; excellent individual contribution; low editorial placement; full pertinence
18	TRIGA reactor absolute neutron flux measurement using activated isotopes	excellent impact; good individual contribution; excellent editorial placement; full pertinence
19	Stability analysis by means of information entropy: Assessment of a novel method against natural circulation experimental data	excellent impact; discrete individual contribution; excellent editorial placement; low pertinence
20	Preliminary validation of the 1D modeling of the DYNASTY natural circulation loop against results from water experimental campaign	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
21	Data-driven model order reduction for sensor positioning and indirect reconstruction with noisy data: Application to a Circulating Fuel Reactor	excellent impact; excellent individual contribution; low editorial placement; full pertinence
22	Hybrid data assimilation methods, Part I: Numerical comparison between GEIM and PBDW	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
23	Hybrid Data Assimilation methods, Part II: Application to the DYNASTY experimental facility	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
24	A finite element implementation of the incompressible Schrödinger flow method	good impact; excellent individual contribution; excellent editorial placement; low pertinence
25	Analysis of reactor burnup simulation uncertainties for antineutrino spectrum prediction	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence

Overall collective judgement

QUALITY OF SCIENTIFIC AND/OR PROJECT PRODUCTION, ASSESSED ON THE BASIS OF CRITERIA AND PARAMETERS RECOGNIZED BY THE INTERNATIONAL SCIENTIFIC COMMUNITY OF REFERENCE:

The candidate submits 25 papers published in peer-reviewed journals in the period 2011-2024. The publications focus primarily on modelling, simulation and stability analysis of advanced nuclear reactors, including TRIGA, PWR, MSFR and hybrid reactors, with multiphysics approaches, model order reduction and neutron optimisation methods. In addition, they explore safety, fuel behavior, instability analysis and prediction of the antineutrino spectrum. The papers presented are published in international journals, 80% of which are placed in the first quartile. In 76% of the publications submitted, the candidate appears as the first, last author and/or corresponding author. The scientific impact, also in consideration of the number of citations, is judged to be good. The consistency with the academic discipline subject of the call is judged on average to be very good. The overall scientific production is excellent and has been continuous overtime since 2002. The CV lists more than 215 journal articles, 2 books, and 11 book chapters. The overall citation metrics are excellent (h-index 32, citations over 4400, 268 works; source: Scopus). The international profile of the candidate on topics related to the academic discipline subject of the call is very good, also in consideration of the numerous participations in research projects on competitive calls (EURATOM) and the numerous awards received. The overall evaluation of scientific production in the academic discipline subject of the call is very good: 36.1/45.

DIDACTIC ACTIVITIES CARRIED OUT IN ITALIAN OR FOREIGN UNIVERSITIES OR BODIES:

The candidate has been teaching on nuclear engineering topics continuously since 2003 for a total of more than 1700 hours of classroom. In particular, he has been teaching in the academic discipline of the call since 2013, for a total of over 700 hours of classroom. He has experience in teaching at the PhD level. He has significant teaching experience in international initiatives. He has supervised more than 100 thesis projects, and over 30 PhD students in nuclear engineering. The overall evaluation of the didactic activity in the academic discipline subject of the call is excellent: 30/30.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS: The candidate documents experience in international projects, especially in the European (EURATOM), and national contexts. Many of these projects concern specific issues of the academic discipline subject of the call. Overall, scientific responsibility for funded research projects is considered sufficient: 8/20.

RESULTS OBTAINED IN TECHNOLOGY TRANSFER IN TERMS OF PARTICIPATION IN THE CREATION OF NEW ENTERPRISES (SPIN OFF), DEVELOPMENT, USE AND MARKETING OF PATENTS:

The candidate does not present technology transfer activities. The overall rating is complete deficiency: 0/5.

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

The analysis of the CV, the publications presented, the participation in the international scientific field and the teaching activity demonstrate an excellent knowledge of the English language by the candidate.

CANDIDATE: LUZZI Lelio

CURRICULUM:

Lelio Luzzi graduated in Nuclear Engineering in 1994 at Politecnico di Milano. He got a PhD in Radiation Science and Technology from the Politecnico di Milano (X cycle). Since 2015, he has been an Associate Professor in the scientific-disciplinary sector ING-IND/19 Nuclear Plants (now IIND-07D) at the Department of Energy of the Politecnico di Milano. In 2014, he obtained the National Scientific Qualification for Full Professor in the academic field 09/C2 (now Group of Academic Disciplines 09/IIND-07 – TECHNICAL PHYSICS AND NUCLEAR ENGINEERING).

Overall, the candidate's curriculum demonstrates a high-level scientific profile in the areas of modeling, development, and characterization of nuclear fuels and innovative structural components for nuclear systems, including next-generation ones, with reference to thermo-fluid-mechanical aspects. The curriculum is sufficiently consistent with the description of the academic discipline IIND-07/C – NUCLEAR REACTOR PHYSICS, which is the subject of the call.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Modelling and control strategy of the Italian LBE-XADS	excellent impact; discrete individual contribution; excellent editorial placement; discrete pertinence
2	Thoria and inert matrix fuels for a sustainable nuclear power	excellent impact; low individual contribution; excellent editorial placement; good pertinence
3	An approach for the modelling and the analysis of the MSR thermo-hydrodynamic behaviour	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
4	A generalized approach to heat transfer in pipe flow with internal heat generation	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
5	A multi-physics modelling approach to the dynamics of Molten Salt Reactors	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence
6	An extended version of the SERPENT-2 code to investigate fuel burn-up and core material evolution of the Molten Salt Fast Reactor	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence
7	Investigation of the MSFR core physics and fuel cycle characteristics	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence
8	An approach to the MSR dynamics and stability analysis	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence
9	The molten salt reactor (MSR) in generation IV: Overview and perspectives	excellent impact; excellent individual contribution; excellent editorial placement; discrete pertinence
10	Development of an Open FOAM model for the Molten Salt Fast Reactor transient analysis	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence
11	Object-oriented modelling and simulation for the ALFRED dynamics	excellent impact; excellent individual contribution; excellent editorial placement; good pertinence
12	Calculating the effective delayed neutron fraction in the Molten Salt Fast Reactor: Analytical, deterministic and Monte Carlo approaches	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence
13	Comparison of a Modal Method and a Proper Orthogonal Decomposition approach for multi-group time-dependent reactor spatial kinetics	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence
14	Control approach to the load frequency regulation of a Generation IV Lead-cooled Fast Reactor	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
15	Dynamic stability of natural circulation loops for single phase fluids with internal heat generation	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
16	Development of the ALFRED reactor full power mode control system	excellent impact; excellent individual contribution; excellent editorial placement; good pertinence
17	A Geometric Multiscale modelling approach to the analysis of MSR plant dynamics	excellent impact; excellent individual contribution; excellent editorial placement; good pertinence
18	POD-Galerkin method for finite volume approximation of Navier-Stokes and RANS equations	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
19	Analytical and numerical investigation of the heat exchange effect on the dynamic behaviour of natural circulation with internally heated fluids	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
20	The influence of the wall thermal inertia over a single-phase natural convection loop with internally heated fluids	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
21	Assessment of analytical and numerical models on experimental data for the study of single-phase natural circulation dynamics in a vertical loop	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
22	A reduced order model for investigating the dynamics of the Gen-IV LFR coolant pool	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
23	Stability analysis by means of information entropy: Assessment of a novel method against natural circulation experimental data	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
24	Development of a multiphysics model for the study of fuel compressibility effects in the Molten Salt Fast Reactor	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence
25	Development of an SP3 neutron transport solver for the analysis of the Molten Salt Fast Reactor	excellent impact; excellent individual contribution; low editorial placement; full pertinence

Overall collective judgement

QUALITY OF SCIENTIFIC AND/OR PROJECT PRODUCTION, ASSESSED ON THE BASIS OF CRITERIA AND PARAMETERS RECOGNIZED BY THE INTERNATIONAL SCIENTIFIC COMMUNITY OF REFERENCE:

The candidate presents 25 papers published in peer-reviewed journals in the period 2006-2019. The publications concern research activities primarily in the field of modeling, simulation and control of advanced reactors (MSR, MSFR and LFR). They also explore stability, neutron dynamics, thermohydraulic behavior, fuel analysis and order-reduction methodologies for optimising safety and performance. The works presented are published in international journals, 96% of which are placed in the first quartile. In 88% of the publications submitted, the candidate appears as the first, last author and/or corresponding author. The scientific impact, also in consideration of the number of citations, is judged to be excellent. The consistency with the academic discipline subject of the call is judged to be fair. The overall scientific production is excellent and has been continuous overtime since 1999. The CV lists 128 journal articles, 2 books and 12 book chapters. The overall citation metrics are excellent (h-index 29, citations over 3900, 141 works; source: Scopus). The scientific quality of the candidate is overall excellent, also in consideration of the numerous participations in research projects on competitive calls (EURATOM) and the numerous awards received. However, the activities are only partially related to the academic discipline subject of the call. The overall evaluation of the scientific production in the academic discipline subject of the call is very good: 32.2/45.

DIDACTIC ACTIVITIES CARRIED OUT IN ITALIAN OR FOREIGN UNIVERSITIES OR BODIES:

The candidate has been teaching nuclear engineering topics continuously since 2002 for a total of more than 2000 hours of classroom. Demonstrates teaching activity at PhD level. He also has significant experience in the field of international educational proposals. He has supervised more than 100 thesis projects, and over 30 PhD students in nuclear engineering. However, the teaching activity is on the whole fairly relevant to specific topics of the academic discipline subject of the call. The overall evaluation of the didactic activity in the academic discipline subject of the call is good: 17.6/30.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS: The candidate documents responsibilities and experience in international projects, especially in the European (EURATOM), and national contexts. Some of these projects concern specific issues of the academic discipline subject of the call. Overall, scientific responsibility for funded research projects is considered fair: 9.4/20.

RESULTS OBTAINED IN TECHNOLOGY TRANSFER IN TERMS OF PARTICIPATION IN THE CREATION OF NEW ENTERPRISES (SPIN OFF), DEVELOPMENT, USE AND MARKETING OF PATENTS:

The candidate is the holder of an international patent. The overall rating is good: 3/5.

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

The analysis of the CV, the publications presented, the participation in the international scientific field and the teaching activity demonstrate an excellent knowledge of the English language by the candidate.

CANDIDATE: PATELLI Edoardo

CURRICULUM:

Edoardo Patelli graduated in Nuclear Engineering in 1999 at the Politecnico di Milano. In 2006, he got a PhD in Radiation Science and Technology from the Politecnico di Milano. Since 2019, he has been a Professor of Risk and Uncertainty Quantification at the University of Strathclyde (Glasgow, UK). Overall, the candidate's curriculum demonstrates a high-level scientific profile in the field of digital technologies supporting risk assessment and uncertainty management, with applications across various sectors, from the nuclear sector to aerospace, civil, and mechanical engineering. The curriculum is marginally consistent with the description of the academic discipline IIND-07/C – NUCLEAR REACTOR PHYSICS, which is the subject of the call.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Modeling the effects of the engineered barriers of a radioactive waste repository by Monte Carlo simulation	very good impact; discrete individual contribution; excellent editorial placement; discrete pertinence
2	Monte Carlo simulation of radionuclide transport through fractured media	very good impact; good individual contribution; excellent editorial placement; full pertinence
3	Uncertainty Management in Multidisciplinary Design of Critical Safety Systems	excellent impact; excellent individual contribution; low editorial placement; low pertinence
4	Risk-informed analysis of the large break loss of coolant accident and PCT margin evaluation with the RISMC methodology	very good impact; excellent individual contribution; low editorial placement; low pertinence
5	Robust artificial neural network for reliability and sensitivity analyses of complex non-linear systems	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
6	Same as 5	---
7	Simulation methods for system reliability using the survival signature	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
8	Spectral correction factors for conventional neutron dose meters used in high-energy neutron environments-improved and extended results based on a complete survey of all neutron spectra in iaea-TRS-403	discrete impact; good individual contribution; very good editorial placement; low pertinence
9	Structural reliability of pre-stressed concrete containments	excellent impact; excellent individual contribution; low editorial placement; low pertinence
10	Robust vulnerability analysis of nuclear facilities subject to external hazards	excellent impact; low individual contribution; excellent editorial placement; low pertinence
11	A probabilistic metric for the validation of computational models	excellent impact; low individual contribution; excellent editorial placement; low pertinence

12	Probabilistic Risk Assessment of Station Blackouts in Nuclear Power Plants	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
13	Implications of uncertainties on European DEMO design	very good impact; excellent individual contribution; excellent editorial placement; good pertinence
14	Analytic Probabilistic Safety Analysis under Severe Uncertainty	very good impact; excellent individual contribution; excellent editorial placement; low pertinence
15	Robust on-line diagnosis tool for the early accident detection in nuclear power plants	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
16	Machine Learning Approaches for Performance Assessment of Nuclear Fuel Assemblies Subject to Seismic-Induced Impacts	good impact; excellent individual contribution; excellent editorial placement; low pertinence
17	A post-contingency power flow emulator for generalized probabilistic risks assessment of power grids	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
18	Uncertainty Propagation in SINBAD Fusion Benchmarks with Total Monte Carlo and Imprecise Probabilities	discrete impact; excellent individual contribution; very good editorial placement; full pertinence
19	Distribution-free risk analysis	very good impact; excellent individual contribution; excellent editorial placement; low pertinence
20	Robust optimization of a dynamic Black-box system under severe uncertainty: A distribution-free framework	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
21	Toward DEMO Power Plant Concept Selection Under Epistemic Uncertainty	good impact; excellent individual contribution; low editorial placement; good pertinence
22	Robust data-driven human reliability analysis using credal networks	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
23	Identification of human errors and influencing factors: A machine learning approach	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
24	Robust online updating of a digital twin with imprecise probability	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
25	Non-Dimensional Probabilistic Analysis of Seismic Pounding Between Flexible Structures and Rigid Boundaries	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence

Overall collective judgement

QUALITY OF SCIENTIFIC AND/OR PROJECT PRODUCTION, ASSESSED ON THE BASIS OF CRITERIA AND PARAMETERS RECOGNIZED BY THE INTERNATIONAL SCIENTIFIC COMMUNITY OF REFERENCE:

The candidate presents 24 papers published in peer-reviewed journals in the period 2003-2024. The publications concern research activities primarily in the field of safety, reliability and uncertainty management analysis in nuclear systems and critical infrastructures, with a focus on probabilistic methods, machine learning and robust optimization models. They also cover seismic risk, structural reliability and early detection of accidents in nuclear reactors. The works presented are published in international journals, 72% of which are placed in the first quartile. In 72% of the publications submitted, the candidate appears as the first, last author and/or corresponding author. The average scientific impact, also in consideration of the number of citations, is judged to be good. Consistency with the academic discipline subject of the call is judged on average to be marginal. The overall scientific production is excellent and has been continuous overtime since 2001. The CV lists 124 journal articles, 2 books and 3 book chapters. The overall citation metrics are excellent (h-index 32, citations over 3500, 187 works; source: Scopus). The scientific quality of the candidate is overall excellent, also in consideration of the numerous participations in research projects on competitive calls, the numerous awards received and the assignments attributed. However, the activities are marginally related to the academic discipline subject of the call. The overall evaluation of the scientific production in the academic discipline subject of the call is fair: 21.5/45.

DIDACTIC ACTIVITIES CARRIED OUT IN ITALIAN OR FOREIGN UNIVERSITIES OR BODIES:

The candidate demonstrates that he has carried out teaching activities continuously since 2014. He has teaching experience at PhD level. He also has significant teaching experience in international initiatives. He has supervised over 30 PhD students. The teaching activity is on the whole marginally relevant to the specific topics of the academic discipline subject of the call. The overall evaluation of the didactic activity in the academic discipline subject of the call is fair: 13.1/30.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS: The candidate documents important responsibility and experience in international projects, many deriving from industrial funding. Only some of these projects concern specific topics of the academic discipline subject of the call. Overall, the scientific responsibility for funded research projects in the academic discipline subject of the call is considered sufficient: 6.2/20.

RESULTS OBTAINED IN TECHNOLOGY TRANSFER IN TERMS OF PARTICIPATION IN THE CREATION OF NEW ENTERPRISES (SPIN OFF), DEVELOPMENT, USE AND MARKETING OF PATENTS:

The candidate does not present technology transfer activities. The overall rating is complete deficiency: 0/5.

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

The analysis of the CV, the publications presented, the participation in the international scientific field and the teaching activity demonstrate an excellent knowledge of the English language by the candidate.

CANDIDATE: PEDRONI Nicola

CURRICULUM:

Nicola Pedroni graduated in Nuclear Engineering in 2005 from the Politecnico di Milano. In 2010, he earned a PhD in Radiation Science and Technology from the Politecnico di Milano. Since 2017, he has been an Associate Professor in the scientific-disciplinary sector ING-IND/19 - Nuclear Plants (now IIND-07D) at the Department of Energy of the Politecnico di Torino. In 2018, he obtained the National Scientific Qualification for Full Professor in the academic field 09/C2 (now Group of Academic Disciplines 09/IIND-07 – TECHNICAL PHYSICS AND NUCLEAR ENGINEERING).

Overall, the candidate's curriculum demonstrates a good-level scientific profile in the areas of studying and developing advanced mathematical/statistical tools and computational models and methods for analyzing the reliability, safety, risk, vulnerability, and resilience of

components, systems, and engineering infrastructures for production and distribution, with particular emphasis on industrial installations such as nuclear power plants. The curriculum is marginally consistent with the description of the academic discipline IIND-07/C – NUCLEAR REACTOR PHYSICS, which is the subject of the call.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Nuclear Data Uncertainty Propagation for the Molten Salt Fast Reactor Design	discrete impact; excellent individual contribution; very good editorial placement; full pertinence
2	A non-intrusive reduced order model for the characterisation of the spatial power distribution in large thermal reactors	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence
3	Passive safety systems analysis: A novel approach for inverse uncertainty quantification based on Stacked Sparse Autoencoders and Kriging metamodeling	excellent impact; good individual contribution; excellent editorial placement; low pertinence
4	A Framework based on Finite Mixture Models and Adaptive Kriging for Characterizing Non-Smooth and Multimodal Failure Regions in a Nuclear Passive Safety System	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
5	Failure identification in a nuclear passive safety system by Monte Carlo simulation with adaptive Kriging	excellent impact; excellent individual contribution; low editorial placement; low pertinence
6	A Bayesian framework of inverse uncertainty quantification with principal component analysis and Kriging for the reliability analysis of passive safety systems	excellent impact; excellent individual contribution; low editorial placement; low pertinence
7	Seismic fragility analysis with artificial neural networks: Application to nuclear power plant equipment	excellent impact; low individual contribution; excellent editorial placement; low pertinence
8	Adaptive simulation for failure identification in the Advanced Lead Fast Reactor European Demonstrator	excellent impact; excellent individual contribution; excellent editorial placement; discrete pertinence
9	An Adaptive Metamodel-Based Subset Importance Sampling approach for the assessment of the functional failure probability of a thermal-hydraulic passive system	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
10	Treating uncertainties in a nuclear seismic probabilistic risk assessment by means of the Dempster-Shafer theory of evidence	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
11	Monte Carlo simulation-based sensitivity analysis of the model of a thermal-hydraulic passive system	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
12	Estimation of the functional failure probability of a thermal-hydraulic passive system by Subset Simulation	discrete impact; excellent individual contribution; low editorial placement; low pertinence
13	Nuclear reactor dynamics on-line estimation by Locally Recurrent Neural Networks	excellent impact; excellent individual contribution; excellent editorial placement; discrete pertinence
14	Selecting Features for Nuclear Transients Classification by Means of Genetic Algorithms	excellent impact; excellent individual contribution; low editorial placement; low pertinence
15	How to effectively compute the reliability of a thermal-hydraulic nuclear passive system	excellent impact; excellent individual contribution; low editorial placement; low pertinence
16	Quantitative functional failure analysis of a thermal-hydraulic passive system by means of bootstrapped Artificial Neural Networks	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
17	Comparison of boot strapped artificial neural networks and quadratic response surfaces for the estimation of the functional failure probability of a thermal-hydraulic passive system	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
18	An optimized Line Sampling method for the estimation of the failure probability of nuclear passive systems	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
19	Identification of LOFA precursors in ITER superconducting magnet cryogenic cooling circuit	very good impact; excellent individual contribution; excellent editorial placement; low pertinence
20	Integrated deterministic and probabilistic safety assessment of a superconducting magnet cryogenic cooling circuit for nuclear fusion applications	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
21	Metamodeling and On-Line Clustering for Loss-of-Flow Accident Precursors Identification in a Superconducting Magnet Cryogenic Cooling Circuit	good impact; excellent individual contribution; excellent editorial placement; low pertinence
22	Bootstrapped Artificial Neural Networks for the seismic analysis of structural system	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence

23	Simulating the dynamics of the neutron flux in a nuclear reactor by locally recurrent neural networks	excellent impact; excellent individual contribution; excellent editorial placement; full pertinence
24	Identification of Protective Actions to Reduce the Vulnerability of Safety-Critical Systems to Malevolent Intentional Acts: An Optimization-Based Decision-Making Approach	excellent impact; excellent individual contribution; excellent editorial placement; low pertinence
25	An empirical classification-based framework for the safety criticality assessment of energy production systems, in presence of inconsistent data	very good impact; low individual contribution; excellent editorial placement; low pertinence

Overall collective judgement

QUALITY OF SCIENTIFIC AND/OR PROJECT PRODUCTION, ASSESSED ON THE BASIS OF CRITERIA AND PARAMETERS RECOGNIZED BY THE INTERNATIONAL SCIENTIFIC COMMUNITY OF REFERENCE:

The candidate presents 25 papers published in peer-reviewed journals in the period 2003-2023. The publications concern research activities primarily in the field of reliability and safety analysis and modeling in nuclear and critical systems, with a focus on advanced simulation techniques, statistical and artificial intelligence methods for risk assessment, failure prediction and resilience optimization. In addition, specific attention is given to passive safety systems, reactor dynamics and mitigation of seismic or intentional events. The papers presented are published in international journals, 76% of which are placed in the first quartile. In 72% of the publications submitted, the candidate appears as the first, last author and/or corresponding author. The average scientific impact, also in consideration of the number of citations, is judged to be very good. Consistency with the academic discipline subject of the call is judged on average to be marginal. The overall scientific production is very good and has been continuous overtime since 2006. The CV lists 60 journal articles, 1 editorial and 5 book chapters. Overall citation metrics are very good (h-index 23, citations over 1700, 94 papers; source: Scopus). The scientific quality of the candidate is overall very good, also in consideration of the numerous participations in research projects on competitive calls, the numerous awards received and the assignments attributed. However, the activities are marginally related to the academic discipline subject of the call. The overall evaluation of the scientific production in the academic discipline subject of the call is sufficient: 17.6/45.

DIDACTIC ACTIVITIES CARRIED OUT IN ITALIAN OR FOREIGN UNIVERSITIES OR BODIES:

The candidate demonstrates that he has carried out teaching activities continuously since 2011. He has teaching experience at PhD level. He also has significant teaching experience in international initiatives. He has supervised over 7 PhD students. The teaching activity is on the whole marginally relevant to the specific topics of the academic discipline subject of the call. The overall evaluation of the didactic activity in the academic discipline subject of the call is fair: 17/30.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS: The candidate documents responsibility and experience in international projects. Some of these projects concern specific topics of the academic discipline subject of the call. Overall, the scientific responsibility for funded research projects is considered sufficient: 8.4/20.

RESULTS OBTAINED IN TECHNOLOGY TRANSFER IN TERMS OF PARTICIPATION IN THE CREATION OF NEW ENTERPRISES (SPIN OFF), DEVELOPMENT, USE AND MARKETING OF PATENTS:

The candidate does not present technology transfer activities. The overall rating is complete deficiency: 0/5.

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

The analysis of the CV, the publications presented, the participation in the international scientific field and the teaching activity demonstrate an excellent knowledge of the English language by the candidate.

THE SELECTION BOARD

Prof. GALLEGO DÍAZ Eduardo Florentino (Chairman)

Prof. RUBIOLLO Pablo (Member)

Prof. Andrea Pola (Secretary)



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PUBLIC SELECTION ESTABLISHED WITH DIRECTOR'S DECREE NO. 15761 OF 29/10/2024 PURSUANT TO THE NOTICE PUBLISHED IN THE OFFICIAL GAZETTE NO. 15/11/2024, n.91 FOR 1 POSITION AS FULL PROFESSOR FOR THE GROUP OF ACADEMIC DISCIPLINES 09/IIND-07 - THERMAL SCIENCES, ENERGY TECHNOLOGY, BUILDING PHYSICS AND NUCLEAR ENGINEERING - ACADEMIC DISCIPLINE IIND-07/C - NUCLEAR REACTOR PHYSICS, PURSUANT TO ART. 18 - LAW 240/2010, AT THE POLITECNICO DI MILANO - DEPARTMENT OF ENERGY (PROCEDURE CODE 2024_PRO_DENG_2).

ATTACHMENT No. 2 to the FINAL REPORT

MERIT RANKING

SURNAME AND NAME	Overall score
CAMMI Antonio	74.1

Milan, April 7th, 2025

THE SELECTION BOARD

Prof. GALLEGO DÍAZ Eduardo Florentino (Chairman)

Prof. RUBIOLO Pablo (Member)

Prof. Andrea Pola (Secretary)

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